Transforming the Discussion
Breaking our Landscape Architecture Chrysalis

Part I: Conference Abstracts

CELA 2018
March 21–24, 2018
Landscape Architecture Program
School of Architecture + Design
College of Architecture and Urban Studies
Virginia Tech

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Christine Calorusso
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Majora Carter, of the South Bronx, knows how to make low-status communities more livable, greener, and healthier. She is an award winning urban revitalization strategist who addresses systemic inequity through economic development incentives and innovative talent-retention projects. Working with government, businesses, and neighborhood organizations, she creates new opportunities for transportation, fitness and recreation, nutrition, and wealth creation. Today, Majora Carter is profoundly transforming the quality of life for people nationwide.

Majora Carter holds a B.S. from Western University and an M.P.A. from New York Universit. Carter has received eight honorary PhD’s, a Innovation Genius Award, a Kennedy Award, has been named one of the 100 most Influential Entrepreneurs, a natural lover of her tech work, and best in the world for work.

MARCH 22ND / 6:30 - 8:00PM
AT THE MOSS ARTS CENTER
RODDY MOORE: 
DO WE REALLY KNOW WHAT WE'RE LOOKING AT WHEN WE'RE LOOKING AT THE CULTURAL LANDSCAPE?

Roddy Moore was born in Roanoke, VA and raised in southern WV. He graduated from VPI, with majors in both Colonial American History and Rural Sociology. While in Blacksburg, he was one of the founders of "Books, Strings and Things"—a coffee house, book and record store. Before graduate school, he worked at Colonial Williamsburg, first as an apprentice gunsmith, and later running the conservation lab in the archaeology department. Moore did graduate work at Cooperstown program in Folklore and Folklife at the State University of New York College at Oneonta in Cooperstown, NY. Worked at Mountain Empire Community College in Wise County and for the past 40+ years, has been the Director of the Blue Ridge Institute and Museum (The State Center for Blue Ridge Folklore and Folklife) at Ferrum College in Ferrum, VA. Served as an advisor and on numerous boards over the years.

Most significant work has been with Institute Projects and exhibits.

Carl Eldridge, Artwork and Writing, in southwest VA, co-authored with DDS, poster about of 1715-1765. Mountain Blue Ridge Culture, VI. Blacks, the History of African-american in the Commonwealth; The Virginia Commonwealth Recording Series and their experience into the bellamy bell series in the professor's Institute. Most of the time in these recordings in the series were accompanied for this exhibition.

MARCH 23RD / 7:15 - 8:15PM
AT THE INN AT VIRGINIA TECH

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FOREWARD

Transforming the Discussion | Breaking Our Landscape Architecture Chrysalis

As researchers and designers, we engage complex landscape and societal issues in our practices. Transformative practitioners engage in the layered dialogues that call to account their positions and reflect upon their actions. Transformative educators challenge conventions, habits of mind, and those deeply held meanings that guide our thinking about social, political, and environmental issues. Conference presenters and participants were invited to enter into discussions and debates intended to challenge contemporary norms, transform our discussions, and break our landscape architecture chrysalis.

In addition to traditional paper and poster presentations organized by conference tracks, including one for the conference theme, the conference features two unique discussion sessions for all attendees.

The first transforms our conference praxis by engaging in critical roundtable discussions to identify and parse out the layered dialogues in each track’s presentations and posters as well as attendees’ contemporary thinking. The second closes the conference. A plenary panel of discussants presents discussion of the dialogues’ commonalities, differences, and absences as revealed in the roundtable sessions and in the conference abstracts and papers. The conference Host Committee intended to foster a variety of discussion and critique on the intersections between the conference presentations and posters, roundtable discussions, and visions of transformative praxis.

The Virginia Tech Host Committee believes that this multi-staged discussion will help move conference presentations from small-room spectators and limited discussions to a more public and critical exchange between individuals and constituent groups.

We welcome all to join in these discussions, to challenge our actions, to question our positions, roles and directions, and to break from our landscape architecture chrysalises.
Communication and Visualization
Comparing Drafting Systems against Their Impact on Efficiency and Effectiveness in the Creative Design Process

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Keywords: BIM for landscape, CAD, creative design, drafting systems, design workflows, technology

Computer aided design (CAD) systems were introduced in the 1970s and popularized in the 1980s. Since then, they have gained acceptance as the new standard to overtake hand drafting. More recently, CAD systems have evolved into building information modeling (BIM) systems. However, drafting with BIM software is only a partial solution for landscape architects. Compared with drafting in a landscape architecture specific BIM software, or BIM(L), the design process for landscape architects who just use BIM software is not as efficient nor as effective, and can hinder BIM ideals. Tools specific to landscape architectural design are required to make a CAD-based workflow compatible with a creative landscape design process. This paper argues that BIM alone is not much better than CAD alone when compared on scales of efficiency, training time, team coordination, and quality of output and creative design, but that BIM(L) is best for all these factors.

The design process is defined as analysis, consultant coordination, concept, public outreach, construction drawings, and construction management, and is used as the basis to compare three basic drafting systems: CAD, BIM, and BIM(L). Past research is used, along with a survey of how today’s landscape architecture community drafts to compare the value of each drafting system. This value is tied to the direct impact of each system on each aspect of the design process. These values are tallied to compare the collective positive or negative impact of each system on the design process as a whole.

The conclusions explore what this information should mean for landscape architectural professionals looking to audit their firms’ current workflows for how to best allow for creativity in the design workflow while remaining efficient, accurate, and competitive in the marketplace. They also explore how to apply this information to training a CAD-based workflow in post-secondary education. BIM(L) software allows professionals to communicate their design intent in ways not possible with BIM or CAD alone. These landscape-specific tools dramatically reduce the time required for tasks not directly associated with creativity, such as cost estimates, bid sheets, labeling and notes, schedules, and dimensioning. This increased productivity allows more time for creative tasks. It also promotes efficiency in tasks with a
Communicating creative intent, such as symbol creation and placement, site layout, editing designs for improvement, and communication in a 3D environment.
Ghost Ecologies: Storytelling and Futures in the Athabasca Oil Sands

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Keywords: design communication, storytelling, Athabasca oil sands, future, Alberta, oil, mapping, photography, photomontage, wicked problem

Landscape architects are increasingly being called upon to lead discussions about complex social and ecological issues (i.e., wicked problems). The Athabasca oil sands in Alberta, Canada exemplify the challenges of addressing wicked problems. Roughly the size of New York State, the dilemmas created by the region’s mining industry not only directly impact the local people and landscape, but the greater world as well. Hampered with environmental, social, political, and economic issues, the future of this region is largely unknown, as there are few formal plans and regulations to ensure reclamation and guide urban development. This project connects the degradation of significant landscapes with the power of landscape architecture, making imponderable environmental and social impacts tangible and the landscape architecture profession visible in how/why/where we are needed most.

Ghost Ecologies presents a compendium of original photographs, mappings, and photomontages that aims to catalyze action, debate, and discussion to get people in the region, country, and world talking about places like the oil sands and how planners, designers, and the public can take action. A nonlinear, iterative methodology used inquiry and maps, diagrams, photomontage, and photographs to identify dilemmas, pose questions, and address issues. The nonlinear and iterative process allowed the author to better address the complexity of wicked problems by allowing the researcher to break down the complexity of the problem; think across scales; think across infrastructural and cultural systems; and think spatially and nonspatially. The project concludes with a series of highly speculative, more productive, and programmatically integrated futures for the oil sands and its people to spark dialogue and debate by imagining a series of new futures for the region. These futures are evocative, imaginative, and challenge pre-conceived notions of what landscape reclamation can and should entail, born directly out of the design process.

Ghost Ecologies serves as a resource to landscape architects as a source of inspiration for how and why we can innovatively and creatively analyze, research, and communicate the wicked problems we are charged with addressing in our wicked world. For those not within landscape architecture, it reveals the impacts the industry has had on the landscape and presents a call for action for better planning, design, and management.
Dispersed and Discontinuous: Digital Platforms for Traversing and Triangulating the Survey Text

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Keywords: visualization, digital platforms, history survey, digital humanities, prototype development

The essential task of landscape history is to interrogate both the construction of landscapes and “cultural narratives [used] to make sense of this activity.” As historian David Nye notes, tracing the inflected agency of depictions, devices, and designs requires working from “extremely dispersed and discontinuous documents” (Nye, 6-8). A project might triangulate tours, treatises, and WPA photos or aggregate Landsat images or tweets for ecological and post-occupancy assessment. History, in this sense, is not unlike design; they share tools for articulating contexts, connections, and concerns. Yet, in most professional curricula, history is taught as a rushed survey; it often blurs into a “grand tour” of seemingly inevitable, under-examined sites.

Our presentation explores how the history survey can be redesigned in the age of digital archives and databases. As part of the larger Landscape Studies Initiative, we are asking: How can a digital “text” embrace trans-media triangulations, project-based learning, and build cross-disciplinary alliances between design and the environmental humanities? Along with engaging history, the goal is to strengthen students’ digital literacy and proficiency, enabling the communication of environmental intensities and issues to wider constituencies. This talk will proceed in three steps. First, we introduce the Landscape Studies Initiative, its goals and context—beginning from Elizabeth Barlow Rogers’s Landscape Design, A Cultural and Architectural History. Second, we will evaluate several precedent platforms for their alignment and potential adaptation to landscape materials. Cases include both recent landscape and digital humanities platforms, such as UCLA’s RomeLab, Utah’s Digital Library of Landscape Architecture History, Stanford’s Palladio project, and U. Richmond’s American Panorama. For each platform precedent, metrics of assessment include the conceptual aims of the original study, the relationships visualized and spatialized, the type of platform (documentary database, virtual model, etc.), the breadth of media engaged, and the degree of course integration. We also detail the production of each project, from design and development to funding and maintenance, as the institutional framework for digital collaborations differs significantly from independent research.

Finally, we will “demo” the evolving prototypes of the Landscape Studies Initiative. Iterative interface designs and metadata visualizations will ground our discussion of alternate access
and traversal of Landscape Design. Beta tools will be previewed in light of pedagogical usage, while also examining the challenges and next steps in digital project development. We look forward to a lively discussion of digital history platforms and invite engagement with Landscape Studies Initiative’s development process.
Data Visualization in Photography: Stacking

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Keywords: photography, post-production, stacking, cinematograph

Photographs represent a fixed attitude, an immobility that cannot be animated to portray a living picture. However, in the 1890s, a new apparatus was able to reconstitute the individuality of each particular movement by stringing successive attitudes: the cinematograph. Since the creation of motion pictures at the end of the 19th century, film has been used to create the perception of motion and visualize change. In landscape architecture film has solved a problem in visualization by mediating a sense of actual experience to the spectator: the dynamic experience of the landscape can be transferred to film and video, communicating not only a visualization but rather “narrating the lived experience.”

While film focuses in recreating the experience, a recent post-production technique in photography integrates multiple instants into a single information-rich aggregate image: “stacking” aligns and layers multiple exposures of the same scene, revealing selective changes over time. Stacking does not aim to recreate motion, but to highlight change, or sameness, depending on the revealed sections. The outcome is a photograph with data embedded into it: a composite documentary tool that combines in one moment and single point of view, multiple temporalities.

This technique creates images that are both real and fictional at the same time, an imaginary scenario from true images of the real world. If stacking and film both challenge the depiction of a singular moment in time, stacking does so in a single image instead of a rapid succession of them. Stacking as a technique was used in a second-year undergraduate class in landscape architecture to document similarities of temporal events in the landscape. A simple sequence of post-production steps in Photoshop was taught to students, many of whom have not used the software previously, and with basic concepts of masking, aligning, layering, and selection, students were able to create images that explore the commonalities that are missed when we only see the world moment by moment.
Sequential Narratives: The Comic Vocabulary and the Future of Landscape Representation

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Keywords: landscape representation, narrative landscapes, visual storytelling, sequential narratives

"Comics are the next new literary form.” – Charles McGrath, New York Times Magazine

This presentation explores the potential of the sequential narrative as a graphic tool for transmitting the dynamic and phenomenological qualities of the landscape. The comic is a unique form of visual storytelling that can frame a series of individual events in a variety of ways: scenes can be read independently and isolated in time, reassembled into a complete tableau, or put together in a combination of ways. The sequential narrative allows for relentless stylistic experimentation. The graphical language of comics offers an infinite range of possibilities that may incorporate writing, drawing, painting, typography, music, theater, landscape, and architecture. Serial drawings are effective tools for illustrating complex relationships between time, space, and the environment. Building on the arguments put forth by Kate Orff in her recent book, Toward an Urban Ecology, typologies of drawing are critical means of combining the diagramming and narrative tools of the designer to affect “systems storytelling.”

This study draws on the decade of experience of the educator, who has employed this methodology in studio teaching. Findings indicate that the integration of word and image is a powerful tool to communicate the transformative powers of observation and to develop environmental consciousness. This presentation will detail how the sequential narrative can create shifts in perspective, scale, and time that are essential in communicating and representing progressive spatial situations, useful in the teaching and practice of landscape architecture.

“Sequential art does what prose inherently cannot do: it supplies a visual and immediate image of cause—followed by effect.” – Joseph Witek
Intangible Landscapes: An Argument for the Realignment of Theory and Practice through Data Visualization

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Keywords: visualization, network, theory

The graphics we make have the power to influence the ways we create and conceive of landscape. The static graphic conventions currently preferred within landscape architecture often fall short of capturing the intangible characteristics inherent in dynamic landscape systems. This graphic shortcoming perpetuates the viewer’s perception of landscape as an immutable object while simultaneously depriving researchers and designers of potentially revelatory graphic experiences. This paper builds the case that landscape architecture does not yet prioritize the graphic representation of intangible and non-spatial landscape qualities which, when reflected in our built works, may function to the detriment of intangible landscape qualities such as community connection, ecological function, and human perception. Graphic strategies from outside of the field may represent one fruitful opportunity for designers and researchers to better align our understanding of landscapes with our graphic representations.

Networks represent one specific non-tangible aspect of landscape, that of connection. Connections within the landscape, while frequently invisible, are crucial components of ecological and social processes. If we consider landscapes as more than physical objects, but bundles of such processes, the understanding of connections provides a conception of the interstitial aspects of landscapes, leading to a fuller appreciation of landscape as a whole. Graphic depictions of networks are widespread outside the field of landscape architecture and common graphic trends emerge across disparate subjects and fields of study. This paper uses the practice of network visualization as a lens for evaluating graphic depictions of non-tangible landscape elements within the field of landscape architecture. Grounded in contemporary representational theory, this paper examines the current prevalence and potential future role of data visualization as a technique for examining and representing connections within landscape systems. It offers an exploration of contemporary network visualization strategies broadly and across disciplines and evaluates the prevalence of such strategies within landscape architecture through an examination of award-winning landscape projects from the past decade. In looking to the future, this paper also contributes a speculative application of network visualization strategies from outside the field to landscape-related themes. Through calling attention to a representational shortcoming within the field, the paper aims to advocate for a greater breadth of representational strategies, less dependent upon traditional perspectival and orthographic conventions, and offers data visualization techniques as a potentially relevant set of strategies worthy of further consideration.
Emerging Trends in Geospatial Technologies for Study of Urban Landscape

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**Keywords:** geographic information system, urban form, 3D GIS, remote sensing, virtual reality

Geographic Information System (GIS) has been used to study urban landscapes over the past decades. It is particularly useful to measure quantitative variables of urban form, such as density, clustering, proximity, accessibility. Overall, GIS has been an effective tool for researchers in the field. However, GIS as its own field has continued to evolve in a rapid pace. Recent development in the area of geospatial technologies offers new possibilities with new toolsets for spatial analysis and data visualization. This paper traces recent major trends in GIS and discusses their implications to the field of urban landscape study. These trends include (1) Increase in dimensions with 3D GIS: conventional 2D maps are being replaced by interactive 3D models generated by procedural rules stored in GIS. Along with locations and associated attributes, vertical elevation and architectural details are also represented. (2) Integration with remote sensing, which not only enables 3D visualization with imagery processing but also provides other spatial information to create meaningful analysis results. For instance, LiDAR point-cloud data allow extraction of built forms and identification of physical features and land covers. (3) Cloud-based GIS: web-based GIS services allow centralized access to location-based information. Yet through distributed mobile platforms, real-time data collection, sharing, and collaboration are done seamlessly in the cloud. (4) Integration with virtual reality: virtual reality creates immersive experiences with a perception of being physically present in a nonphysical world. GIS can greatly enhance the accuracy and realism of virtual scenes with up-to-date terrain models, street networks, and 3D features. This paper identifies best practices from two recent projects in North America. Beaverton, Oregon used a web-based GIS platform to create a series of 3D web scenes to study various urban planning issues, including land use, zoning, and flood risk. Central Boulder in Colorado used 3D scenes generated from LiDAR and other GIS basemaps to conduct a growth factors analysis, including existing natural physical factors about open spaces and water features, as well as man-made systems, such as bike lanes, trails, parks. This paper concludes with a discussion of a class project and demonstrates the potentials of these new, emerging GIS tools for study of urban landscape. Many GIS applications were incorporated in this urban design project, including 2D mapping, remote sensing, scenario planning, 3D procedural modeling, virtual reality, and cloud-based tools. Technical specifications and project workflows will be detailed in the paper.
Scenic Resource Management in the Digital Age: A Case Study of the Richmond Riverfront Viewshed Project

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Keywords: scenic resource, GIS, virtual reality

Managing our scenic resources and promoting public awareness of visual quality of landscapes are the important responsibilities of landscape architects. Public agencies, including the Bureau of Land Management (BLM), U.S. Forest Service (USFS), and National Park Service (NPS), have developed detailed and mature systems to evaluate, maintain, and enhance scenic resources. However, many challenges still arise from practices that deal with controversial development projects in this digital age. Civic groups are empowered to produce computer renderings of landscape changes on their own. The popularity of social media and online image sharing is giving rise of crowdsourced informal landscape assessment. And decision makers and developers are often unaware of many grassroots-level scenic resources appreciated by local residents. Therefore, valid representation and effective communication of the visual implications of complex spatio-temporal dynamics are central to scenic resource management today.

This paper takes the Richmond Riverfront Viewshed Project as a case study to illustrate how the advances in digital technology are helping achieve a balance between the conservation of scenic river views and appropriate development along the James River in Richmond. To begin with, the combination of offline community engagement and online crowdsourcing creates a spatial inventory of favorite river views with locations and view angles. Spatial and 3D analyses reveal the most favorite views as well as the important landscape elements in those views. A web-based design evaluation tool is developed to give developers and designers instant feedback on visual impacts of new projects. Finally, the immersive visualization of virtual reality gives the general public a more realistic and personal perception of the landscape change. This case study demonstrates that technological developments in big data, spatial modeling, web mapping, and VR will continue to help landscape architects meet those challenges in scenic resource management.
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**Urban Landscape Metrics: Reimagining the Class Field Trip in New York City's Great Parks**

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**Keywords:** urban park design, urban park metrics, field trip, site visualization

This paper explores new methods for researching existing sites as case studies in landscape architecture. While traditional precedent readings of sites offer insight into history and general site layout, a development in landscape representation techniques and overall urban landscape analysis strategies reveal connections between scale, typology, materiality, and proportion. Sixteen urban parks in New York City are examined using metrics developed specifically for this level of evaluation. Over 520 acres of urban parks are investigated through 250 digital drawings and diagrams, a selection of which are exhibited in this paper. A variety of often omitted precedent research factors such as perimeter edge conditions, material scale, programmatic proportions, planted form, and path accessibility through topography range are embedded within a new approach to this new visualization and communication process. By reimagining how great parks are studied, a new level of performance-based quantitative data, proportional relationships, and per-acre landscape density are made visible to provide students, educators, and practitioners alternative tools and layers of inquiry for designing with urban metrics in mind. In addition, unmistakable parallels and divides between sites are revealed. Overall, this paper provides students with a framework for contextualizing sites and underscoring their particular character defining of high and low-performativity that can be used as a model for future studies. Once abstract delineations of a site on a list become animated in both the history and the flows that shape a visitor's daily experience of place shifting paradigms of landscape communication.
Beyond the Visual: Evaluating Videography in Design Pedagogy

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Keywords: videography, video, film, technology, communication, teaching, pedagogy

In the 1960s, at the advent of digital media, designers began to consider video as a means of design interpretation, analysis, and modeling. Recognizing its ability to communicate complex relationships through time and space, this inquiry was touched on; however largely fell by the wayside. As our design imperatives shift in order to respond to dynamic conditions, and reinforced by our current technological capabilities, it is critical that we develop means of expression and experimentation that are also dynamic.

There are various approaches for incorporating the dynamic into design pedagogy. This presentation examines videography in order to encourage more experimentation. The presentation will consider different methods for including videography in the design process, examine discoveries made through implementation in classes, and speculate on potential implications for future exploration.

Increasingly, competitions and presentations are including video components for the presentation of design ideas, typically to document existing conditions or to demonstrate the experience of a final proposition. This method of incorporating video as a component of a design project can also be (and has been) employed in the classroom. However, if we consider deploying the camera as an instrument of exploration and experimentation and/or develop prompts that hinge on video throughout the design process, we can establish a broad range of possibilities for integration of videography as a tool of critical thinking about the dynamic environment. Part of thinking about these methods is also rethinking the way we present, relay, and display information during the process of design as well as at the final presentation.

Incorporating examples of student work in the presentation, I will discuss lessons learned through incorporation of these methods into teaching. These will include discussion of making audio and video part of the design routine, giving license to students to be creative and to experiment, incorporating multiple short assignments instead of singular components, providing and seeking precedent, and committing time/space for revision and critique. Implications suggest how the process of using video becomes a way of expressing connections between the subject/object/action/communication and experiences. Timing, framing, atmosphere, and consideration of senses become integral to the design process. The students make choices about how to refine and/or introduce additional data/information into this human-landscape intermediary establishing the ability to alter understanding and evaluation of the dynamic environment.
Modeling Landscape Performance

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Keywords: parametric modeling, landscape performance, dynamic visualizations, arid environments, responsive workflow

The purpose of this research is to determine if parametric modeling can effectively integrate landscape performance metrics into a responsive platform between the analytical and design process of a project. By working within a responsive platform, design outcomes can adapt and be evaluated for specific environmental, social, and economic measurables in relation to a site’s goals and objectives. Due to this responsive platform being housed within a digital 3-dimensional environment, parametric modeling can be explored to communicate analytical metrics into relative and visual measurements, reducing the abstraction of landscape performative benefits. Methods of representation must transform to address landscape performance complexities by using dynamic visualization techniques that can include analytical datascapes, immersive experiences, interactive media, and animated scenarios, in response to spatial and temporal conditions. Parametric modeling creates a responsive workflow by taking a site's measurable conditions such as hydrology, soil, vegetation, slope, and climate, then outputting a framework of constraints and opportunities on site. Because the calculations are performed from a digital site model, the analytical output will respond to changing conditions. By having the quantitative aspects combined with the digital model into a collective aggregation, dynamic representations can be extracted from the digital source model, such as datascapes and immersive experiences.

The site for this investigation will be digitally modeled to measure and calculate stormwater runoff volume and create data representations of runoff conditions within a specific watershed. The results from these methods will provide opportunities and constraints to develop a responsive design solution as it relates to stormwater management, outdoor comfort, and others. Design strategies can be tested for their performance to validate the findings or propose alternative strategies. Utilizing parametric modeling in the design process is becoming common practice; however, integrating it into a responsive design outcome from landscape performance metrics has been limited within calculators and spreadsheets. Integrating those calculators and formulas used for performance metrics into a 3D design environment communicates the outcomes more effectively through dynamic visualizations of data.
The value of using parametric modeling to quantify environmental, social, and economic is the ability to generate responsive outcomes that adhere to the necessities of a site’s conditions, commonly known as evidence-based design. The advantage of modeling environmental performance benefits with parametric modeling is in the communication of analytics within specific site conditions that relate to location, materials, and vegetation by removing the abstraction and relativity of numeric data and replacing it with comprehensive outputs.
Re-illuminate Mapping: Recalling Mapping as Representation Medium in Contemporary Landscape Architecture

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Keywords: mapping, visualization media, typology of mapping

More than half of the world lives in a city (United Nations, 2014) and a proportion that is expected to reach to sixty six percent by 2050. Managing urban areas has become the issue of current landscape architecture, and urban problems are getting complex. According to the post-industrial shift, cities lost population (Hollander, Pallagst, Schwarz, & Popper, 2009) and cities are on different development stages at an unprecedented speed. Landscape architecture has a strong relationship with cities and has been responded to ecological and social problems of rapid urbanization (Waldheim, 2013). The study aims to reclaim and revive mapping as a visualization medium in contemporary landscape architecture to represent, investigate, and create an urban space. This study has two research questions: What is mapping and how landscape architects have used it? How do categories of types of mapping be used? The first part is conducted to compromise theories and practical cases as well as historical overview of mapping studies to define mapping and its features. Based on the part 1, typology of mapping is categorized into three mappings in part 2. The study aims to reclaim mapping to accentuate its importance especially for practitioner and arouse the necessity of its theoretical values.

Mapping in contemporary landscape architecture is located in a unique position compared to other visualization media used in the field. It can be defined as a process and an activity (Cosgrove, 1999; Corner, 1999) which links and represent a visible world and its relations (Abrams & Hall, 2006; Desimini & Waldheim, 2016). Based on the theoretical and empirical reviews, mapping is divided into three types: descriptive, analytic, and creative mapping. Descriptive mapping is aimed to plot physical features of the world and visualize it on a map. Corner calls this kind of mapping “drift” (Corner, 1999). Analytic mapping is a mapping which reveals hidden features and relationships of the site. Historically, hand-drawn mapping (Manning, 1913), overlay method (McHarg & Mumford, 1969), and layering and game-board (Corner, 1999) are included in the analytic mapping. Creative mapping means the possibility of mapping for design tool. Bernard Tschumi used mapping to design Parc de la Villette and Rem Koolhass used mapping to explain Downsview Park’s evolutionary plan. Each type of mapping is depicted with practical cases in landscape architecture.

Comparison with other representation media highlights the unique characteristics of mapping—specifically its ability to convey deep information and represent complexity (Corner, 1999) even from short descriptions. The various types of visualization media that have been used to deliver diverse information. In this part, visualization media are determined types, such
as maps, diagrams, infographics, and mappings and reviewed the history, characteristics, and strengthen and weakness. Maps are similar to mappings in their ability to represent a field (Cosgrove, 1999); however, mappings show existing as well as invisible features. Diagrams share characteristics of mappings and often contain rich information represented simply. Infographics is a newly emerged medium that visualizes invisible features. However, diagrams and infographics are limited; they cannot generate new aspects. Similar to mappings, photo collages generate methodologies for design; however, they cannot deliver deep information. The special advantages of mapping distinguish it from other visualization media.

In landscape architecture, mapping can be divided into three function-based categories: representative, analytic, and performable. Representative mapping means an abstract representation of complex urban contexts. Analytic mapping finds valuable implications by visualizing invisible characteristics. Performable mapping determines landscape design. This section describes each mapping category with specific cases in landscape architecture, for example, representative NYC street tree mapping effectively displays real conditions; Alen Berger’s Drosscape uses analytic mapping to show understanding of urban contexts; and Parc de la Villette and Downsview Park competitions are canonical attempts to use mapping as a performable tool. The study as a whole concludes that recall mapping is able to effectively display multifaceted urban problems while representing complexity, analyzing contexts, and generating landscape designs.
Emergent Visualization in Community Design

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Keywords: visualization, emergent, community design

This paper will demonstrate the use of visualization and social media to produce a new model for community outreach and embark on a new approach to community-engaged design. Utilizing digital film narrative, data visualization, and immersive 360 virtual reality, students explored how visualization and design could impact economic development in a rural community in southern New Mexico.

Silver City, New Mexico is a rural community that for the last century has been dependent on mining as the primary economic engine in the region. This community recently has begun a slow process in developing a new identity and has continued to search for new economic development opportunities. Recently, creative commerce in the areas of fine arts, culinary arts, and music has begun to proliferate the fabric of the region. In searching for opportunities to further develop the creative commerce, a partnership entitled the Plata Studio was created between several community organizations and the School of Architecture and Planning at the University of New Mexico, Woodbury School of Architecture/San Diego and Western New Mexico University to research and develop proposals for the future of the region. This paper will further elaborate on how emergent visualization techniques were key factors in the storytelling and soliciting funding to promote the programs developed in the Plata Studio.

The learning outcomes for the students were that they understood the potential of how visual narratives and new platforms in VR could express a quality of environmental design that traditional forms of delineation could not communicate effectively. The students benefitted in their public discussions by having the data visible on the web for the community to access. This allowed for a more focused presentation on the studio’s mission and the overall goal of impacting the economic development in the region.
A Digital Tool for Helping Students Read the Landscape through Soil Mapping and Visualization

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Keywords: soil survey, GPS, iPad app, instructional aid

Are you looking for a different way to help your students learn about soils that are integral to reading the landscape? The goal of this interactive session is to highlight the power of the Integrating Spatial Educational Experiences (Isee) project. The objective of Isee is to teach students how and why soils vary at different scales and why it matters. This project utilizes data from the USDA SSURGO soil survey dataset, digital elevation models from the National Elevation Dataset, roads and streets from OpenStreetMap, and data from other sources to prepare informative digital maps designed specifically for teaching and learning. The approach takes advantage of digital data and technologies so that essential soil factors can be seen at the scale of a site or across an entire state by using a simple hand gesture or mouse movement. Dominant Soil Parent Materials, Natural Soil Drainage Classes, and Soil Orders maps are available for Indiana, Illinois, Kentucky, Ohio, Texas, West Virginia, and Wisconsin. Some states, such as Indiana, have additional maps of Surface Soil Colors, Acid Subsoils, Limiting Layers, and even a historic map from 1852. All maps are available via a free iPad app or the SoilExplorer.net website. Landscapes can be explored by zooming to a scale of 1:18,000, while pop-ups can provide additional information about each map unit. The hillshade and roads base maps are being expanded to cover the entire U.S. so more states can be easily added in the future.

To date much of the instructional use of this project has occurred in soil science courses. Students explore soil landscapes by zooming and panning different maps, while pop-ups provide additional information about each map unit. For example, in an introductory Soil Science course, the website is used to introduce key concepts related to soil spatial variability. In an upper level Soils and Landscapes course, students use iPads throughout the semester to learn how concepts discussed in the classroom correspond to the features students see on the maps. Then, during field labs, students experience how the features on the maps correspond to the real features they see in the field. This teaching-with-maps approach allows students to develop a deeper understanding and reading of the landscape in a much easier and meaningful way. We are looking for people to work with to expand the evaluation of this technology for landscape architecture education.
(IN)SITE: Digital Experiences of Physical Landscapes

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Keywords: immersive experience, affect, access, montage, storyboarding

As the global digital landscape develops, our access to both creating and viewing short films grows day by day. Cameras, video editing tools, and video host websites like Vimeo are available to the public in unprecedented ways. How can the discipline of landscape architecture incorporate film into its repertoire? How can using video enhance the expressions and experiences of an environment?

Landscape architects can use film to promote affect (emotional response) in response to a site. This could be especially helpful in communicating cases involving analysis, creative process, education, issues of access, and conservation. Sergei Eisenstein, Russian film director and theorist, regarded cinema "as a factor for exercising emotional influence over the masses" (Smith). Film can elicit empathetic responses in ways that differ from text, image, or data: visual and auditory stimuli establish a narrative sensory experience.

Of the many film methods that align closely to traditions in landscape design and theory, we will primarily be discussing montage, considered by Eisenstein to be a central component of cinema (Smith), and storyboarding, a method already incorporated in landscape architecture classrooms (Davids, Sullivan). Serial vision, as discussed by Gordon Cullen, considers the human experience of path: the body’s traversal through a place as an experience involving movement and time. Both montage and storyboarding are tools that are akin to serial vision—each involves storytelling through a visual lens.

The authors created case studies to illustrate how cinematography techniques such as montage, storyboarding, and documentary can be used to aid in experiencing and understanding the landscape in nontraditional ways. Landscape architects can frame cinematic narratives of (a) place, creating not just an informational display for an audience but an immersive experience. In this way, landscape film can stand as not only series of audiovisual data, but as crafted and choreographed performance. Unlike Cullen, whose focus is on human traversal of urban spaces, we hope to also invite the less-seen experiences of flora and fauna within environments of interest.
Visualizing Soundscapes: Invisible Agents of Well-Being in the Everyday Urban Landscape

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Keywords: sonic visualization, soundscape, experiential landscape, sound performance, well-being

Decibel levels have an impact on human well-being in the urban environment. Equally significant is how they are visualized. Despite a growing body of work on representation, landscape architecture, urban design, and planning largely neglect documenting sonic realities of existing public spaces. This paper looks at inventory and analysis of found sounds through technologies that render layered audio-recorded information graphically. Findings reveal an underrepresented performative quality of the outdoors. This paper argues that in-depth field recording investigations are critical to conducting thorough inventory, analysis, and synthesis of the performative qualities of public sites. The work builds off of existing technologies and examines sounds to provide a new level of visual clarity for how sound can be understood. New multimedia graphics reconstruct geospatial audio-recordings to acknowledge frequencies and types of sounds perceivable to humans otherwise only experienced and understood by physically being in that space in real-time. Factors such as spatial location, duration, pitch, loudness, timbre, and sonic texture explore relationships between sounds and how they are perceived. Ultimately, the tangibility of which provides for a more informed approach to making design decisions that impact mental, physical, and social well-being for people in cities.
Applications of Photomontage in Contemporary Landscape Architecture

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Keywords: photomontage, representation, visual communication, contemporary landscape architecture

Landscape architects have employed montage as a representation tool since the 18th century. More recently, a specific type of montage, the photomontage, or a composite drawing created by combining photographic elements with other representation types such as pen or watercolor, have become prevalent in contemporary landscape architecture representation. Digital tools such as Photoshop have contributed to the proliferation of photomontage as a representation technique. Paralleling the use of digital tools to assemble photomontages is a shift from highly abstract, creative, conceptual photomontage compositions to more literal representations (Composite Landscapes Exhibit, 2014).

Despite the trend of literal representation in contemporary photomontages, there are representation examples that still employ the photomontage in a number of creative ways in their design process and presentation (Belanger and Urton, 2014). From an analysis of contemporary works by several landscape architects and firms, including James Corner Field Operations, Christophe Girot, and GROSS MAX landscape architects, four categories of photomontage representation emerge: (1) photomontage as an exploratory sketch, (2) photomontage as a way to communicate a conceptual idea, (3) photomontage as a way to combine scientific data and emotional quality, and (4) photomontage as a way to literally represent a place. Using these four categories, this poster explores the compositional techniques of photomontages in each category, connecting their application to the intention and philosophy of their contemporary designer.

Initial findings reveal how unique compositional features characterize each category. Photomontages as sketches exhibit high transparency, varying scales and saturations, and are highly conceptual in nature. Eidetic representations, which a focus on emphasizing an idea, hold similarly abstract qualities, juxtaposing disparate images at different scales and abandoning the traditional rectangular frame. Composites constructed with three-dimensional modeling tools include more detail in data and photographs, and are even incorporated as analytical tools in the design process. Understanding the various types of photomontage compositions and intentions behind the creation of the drawing shows how the representational tool can be used broadly, or beyond the literal representation of place that characterizes many contemporary landscape architecture photomontages.
Design Education and Pedagogy
Roleplaying Crises to Create More Resilient Cities

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Keywords: roleplaying; scenario methods; urban systems; resilience; crisis planning

Cities are complex, emergent systems that combine social, biophysical, and cyber elements. During extreme events, functional dynamics among elements may change, and understanding possible actions by key stakeholders to adapt can contribute to crisis planning. This paper presents an exercise that asked graduate students to explore such dynamics through a roleplaying game and then propose options to improve resilience.

The exercise was an extension to the Archaria 2035 Scenario and GIS model, which was developed by the NATO Urbanization Project. Archaria depicts a future city with 5.5 million people and fragile governance which is used for seminar-styled wargames conducted to advance concepts that support military operations, including disaster response, civil support, and counter-terrorism. Assessment of one such wargame highlighted the need for a greater ability to examine possible relationships among civilian stakeholders who may have different priorities and different responses to a crisis.

Prior to roleplaying assignment, students worked in teams to identify and map critical relationships related to health, safety, and welfare. Each student was then given a 1-page stakeholder profile that specified motives, kinds and degrees of influence, and connections to other stakeholders. For example, the city manager reported to the mayor, shared views with and was an acquaintance of the mayoral challenger, and had contact with the crime family member. Each student created a map that showed how his or her character understood the city. Crisis event details were revealed the day before the exercise. At the exercise, NATO staff participated by presenting courses of action to restore security and order. Students gave opinions about how their characters might act during the event and react to the proposed military operations. Conversations created temporary collaborations among some stakeholders, but also conflicts among others that could create additional security problems. NATO personnel and observers from the United States Military Academy provided comments throughout the exercise. A post-exercise assignment asked students to write memos on specific policies and plans that would have reduced vulnerability to the crisis.

As a matter of pedagogy, results of the exercise demonstrate the value of roleplaying to consider multiple perspectives and second- and third-order effects of the crisis. Specifically, connecting gameplay conversations and results back initial ideas about health, safety, and
welfare contributed to reconsiderations of assumptions about contingent relationships. It was also demonstrated that students need significant time to adopt their game personas.
Desiring Waste: A Pedagogy of Lifecycle Approaches to Waste and Brownfield Transformation

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Keywords: waste reuse, brownfield, lifecycles, waste, design studio, pedagogy, design education, economies

Waste is a human construct associated with undesirability. The word is embedded with negative connotations retained by a long lineage of cultural attitudes towards undesired material excess. This perception has resulted in inefficient handling, storing, and regulating of potentially valuable waste products. These wastes must be embraced as desirable, cheap, available materials with latent value for new economies, ecologies, and cultural landscapes. Techniques of waste reclamation are beginning to recast waste as the fuel of the 21st century. Landscape architecture is uniquely positioned to reimagine the potentials of wastes for redeveloping and adding value to contaminated sites: the most prevalent and complex landscape condition faced by this profession. Currently, the U.S. contains 450,000 to one million brownfields, encompassing about the same land area as 60 of its largest cities. It is the domain of landscape architecture to reimagine the ecological and anthropogenic potentials of brownfield sites, revitalizing them through the repurposing of other wastes.

The design pedagogy of my studios centers on the theme of waste reuse: restructuring local and regional waste streams to guide the redevelopment of wasted sites. Students are challenged to both reimagine strategies for remediating brownfields, and to develop techniques for reusing internally and externally sourced waste to regenerate those landscapes. They are pushed to develop landscapes that not only encourage recreation and ecological richness, but also have an economic driver supporting the landscape and local economies, driven by the continuous input of waste products. Using relationships between ecology, economy, and culture as the organizing spatial and programmatic principles in their designs, students develop hybridized landscapes that close material lifecycle loops. These landscapes are designed with the idea that they are never complete: they generate waste-to-life cycles, continually reworking the landscape by the addition of new materials and becoming increasingly robust and complex as they mature. The studio’s principle result is a design framework of material lifecycle approaches towards waste reuse and brownfield reclamation. Students explore their unique interests within a highly structured studio, ultimately resulting in a diversity of distinct ideas and responses that engage with a site’s broader context. The design studio is a laboratory for students to dream, test, and experiment with different concepts, build new skills to develop their ideas, and enrich their visual and verbal communication techniques. But students must also be driven to think critically to confront complex, contaminated landscapes and waste legacies which they, as landscape architects, will inevitably inherit.
Flipping the Regional Design Studio: Teaching GIS through an Applied Studio Project

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Keywords: design education and pedagogy, GIS, flipped studio

This paper presents a case study of an innovative pedagogical strategy to learning and applying geographic information systems (GIS) within the design process. Geospatial knowledge is a requirement of landscape architecture program accreditation and is expanding through geodesign efforts; however, little has been written about GIS pedagogy within landscape architecture (Gobster, Nassauer, & Nadenicek, 2006; Montagu, 2001; Powers & Walker, 2003). An initial review of accredited landscape architecture programs suggests that landscape architecture GIS education typically relies on other departments, especially geography-led introductory courses relying on abstract GIS textbooks geared towards non-design professionals. These courses provide GIS theory and basic GIS skills. This is insufficient in facilitating applied understanding integrated with knowledge of complex systems, which is needed for landscape architects to model and evaluate design impacts on the built environment. Additionally, research shows that teaching theory before application does not foster retention of concepts or critical thinking (Henderson, Beach, & Finkelstein, 2011). Landscape architecture students need to be prepared quickly to apply GIS and do not require the theoretical expertise provided in typical geography-based GIS curricula.

Flipped classrooms offer several advantages to overcoming these barriers. They allow students to have 24/7 access to new material outside of class, such as GIS tutorial videos. This opens up classtime to do the work of assimilating GIS knowledge into the design process through experiential design projects while instructors are readily available. In terms of Bloom’s revised taxonomy (Anderson, Krathwohl, & Bloom, 2001), this means that students are doing the lower levels of cognitive work (i.e., gaining knowledge and comprehension) outside of class and focusing on the higher forms of cognitive work (application, analysis, synthesis, evaluation) in class, where they have the support from peers and instructors (Bishop & Verleger, 2013; Newman, Kim, Jung, Brown, & Huston, 2016).

The author draws on his flipped studio experiences, exit interviews by the departmental chair, informal student interviews, course evaluation results, and in-class reflections to present (1) lessons learned, (2) next steps in flipped landscape architecture studios, and (3) the differences in undergraduate and graduate experiences. The author has taught two different versions of flipped studios engaging with GIS: a graduate Introduction to GIS and an undergraduate Regional Design. The flipped classroom approach can provide landscape architecture students with meaningful introductory GIS skills while requiring students to critically apply design impact analysis and modelling to real-world projects.
Assessing Learning Landscape Performance

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Keywords: landscape performance, student survey, assessment tools, curriculum, landscape architecture pedagogy

Utilizing landscape performance, defined by the Landscape Architecture Foundation (LAF) as measure of the effectiveness with which landscape solutions fulfill their intended purpose and contribute to sustainability, continues to be a stronghold in the field (LPS 2017). Teaching landscape performance principles is now a requirement for degree programs accredited by the Landscape Architectural Accreditation Board (LAAB 2016). Just as we value the ecological, cultural, and economic performance of design work in practice, evaluating student learning of landscape performance principles is important to develop effective curriculum and teaching methods for equipping students as they enter practice (Brown et al. 1994). Methods for assessing landscape performance of planned or designed projects already exist, available as part of programs such as Sustainable SITES or LAF’s Landscape Performance Series. However, there is a gap in literature and methodologies for evaluating student learning of landscape performance. Exploration of the pedagogical benefits and challenges is needed to critically analyze this emerging area of landscape architecture curricula.

The purpose of this presentation is to report on the development of a pre- and post-class student survey to investigate interest, competency, and applicability of landscape performance in the curriculum. The survey was distributed to 35 students at three landscape architecture programs, in one graduate and two undergraduate courses focused on varied analysis and evaluation topics in landscape architecture. The survey was distributed at the beginning of the course, prior to instruction in landscape performance, and conclusion of the course. Quantitative and qualitative response analysis was conducted following course completion and explored results between pre- and post-data. Students considerably improved knowledge of landscape performance dimensions between the pre- and post-evaluation. Challenges with data quality, time limitations, and complexity of topics persisted in student reporting. The presentation provides an overview of the survey tool, obstacles and advantages to student learning at varying cognitive processes (Anderson et al. 2001), and implications for the implementation of teaching landscape performance in the curriculum. The findings discuss the development of a survey tool for entrance and graduation stages to evaluate longitudinal learning. Furthermore, this initial exploration of landscape performance pedagogy provides critical insights for effectively meeting LAAB requirements as well as informing further research needs. In sum, this study contributes empirical evidence for the importance of ongoing assessment of student learning in parallel with landscape assessment curriculum.
Gray Hair Matters: A Custom MLA Curriculum for Training Seasoned Practitioners to Become Transformative Educators

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Keywords: design pedagogy, critical pedagogy, reflective practice

Design professionals with substantial practice experience have usually amassed a wealth of experiential knowledge and lessons learned over their career. And they have the gray hair to show for it. There could be a benefit to having these professionals impart both their tacit and explicit knowledge to the next generation as instructors in university landscape architecture programs. For practitioners with a bachelor’s degree interested in this pursuit, how does one prepare to make the transition from practice to teaching? Most positions for teaching landscape architecture begin with a minimum requirement of an MLA. However, what about this degree prepares one to be an effective instructor? Could a custom MLA curriculum be designed to prepare practitioners to become successful practitioner/educators?

To answer this question, a triangulated research design was created through which critical pedagogical components of design-based education were identified and analyzed, including an extensive literature review on design pedagogy, use of reflective practice to document the lessons learned from the author's personal MLA experience, and accumulation of data from a questionnaire sent to over 200 current instructors of landscape architecture. Each course in the practitioner/educator program addresses some aspect of the critical pedagogical elements identified in the research. Students would be evaluated on their performance in the classroom while acting as instructor as well as the writings they produce, which would document and support reflections on their experiences in the program. These writings would form the basis for a thesis focused on their personal pedagogical findings, intended to further supplement the research basis of the practitioner/educator program as a line of scholarly inquiry.

The practitioner/educator program would provide graduates with knowledge and experience in higher education instruction, as well as pedagogical preparation for teaching in a university-based design program. It offers on the job training in studio and lecture settings, emphasizing both theoretical and technological skills. Lastly, it provides an understanding of academic research and scholarship expectations. A combination of instructors with differing backgrounds and pedagogical specialties contribute toward providing a rewarding academic experience for students in landscape architecture. Upon completion of this MLA program, the practitioner/educator will be prepared to help train future landscape architects and otherwise contribute to an academic program and the landscape design profession in a unique and transformative way.
E+D: Ecology and Design—Improving the Ecological Function of the Designed World

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Keywords: design, ecology, ecological design, pedagogy

The School of Architecture & Landscape Architecture at Penn State University has a new initiative whose mission is research-activated design intervention that seeks to significantly improve the ecological health of the designed world, or simply E+D. E+D will be the fusion of knowledge from the natural sciences, social sciences, and design perspectives into collaborative research, design, outreach, and education efforts. E+D will create that space where ecology and design are closely merged and strategically capitalize on Penn State’s strength in ecological sciences, design, and interdisciplinary collaboration.

We introduced E+D to Penn State through a 1-day symposium on November 1, 2017, where internationally known ecological designers presented their ideas through a framework that addressed:

- What are key ecological principles that should be considered in physical design, and how are they (or how should they be) manifested in built work?
- What are some useful collaborative strategies that can bring together ecological science and physical design?
- How could (or how does) research help us test the theories and design strategies through performance assessment of built projects?

David Orr opened with a strong call for improving the state of democracy and urged all to recognize that design is inherently political. Bill Braham illustrated the interaction of ecology and design in the organization of city landscapes. Kristina Hill noted the past is no longer a prelude to the future and illustrated the importance of novel ecosystems as a consequence of design. Keith Bowers focused on place-based design and emphasized that design and ecology must be equal partners on any team. Chris Barnes stressed that ecology must not be merely ornamental and used the living breakwater as an example of such a design principle. Tom Price showed the importance of talking about ecological design with people in terms they understand, getting everyone involved up front. Steven Apfelbaum displayed the wide range of ecological design that could be accomplished and stressed the importance of training people with skill in both ecology and design. Bill Mitsch presented the importance of ecological design in potentially solving massive pollution issues facing Lake Erie. Hong Wu closed out the symposium with a wide-ranging display of the importance of ecological design in landscape architecture. The symposium effectively brought together colleagues representing the...
physical sciences, social sciences, and the arts from across the University. We expect that dialogues initiated during the symposium will engender research that advances E+D's mission.
Teaching Studio: Conversations with Landscape Architecture Professors

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Keywords: design education, studio, interviews

The creator of Teaching Studio has built a research program around the study of the philosophy and history of western design education, which for centuries has been carried out in a studio setting. The results of the research so far have yielded a sense of the sequence and mix of underlying epistemological paradigms that have dominated the practice. Teaching Studio is an initial attempt to discern how, and to what extent, these undercurrents affect contemporary practice. In a typical semester, over three hundred studio courses are offered in landscape architecture in the United States at sixty-eight institutions in ninety-three programs (ASLA, 2017). The number of PhD programs in landscape architecture is increasing; these programs are presumably intended at least in part to produce new faculty. At the 2017 CELA conference, sixty-two presentations were accepted in the Design Education and Pedagogy track (CELA, 2017). Yet there is little explicitly shared understanding of the philosophy, the history, or the purpose of studio instruction or of design education more generally.

In the summer of 2016, video-recorded interviews were conducted with thirteen highly-respected landscape architecture instructors. There is about an hour of raw footage per interview. The least experienced of the interviewed instructors were recently promoted associate professors. Several interviewees had considerably more experience; one had recently retired after teaching for roughly forty years. The interviews took place at institutions in Pennsylvania, Virginia, North Carolina, Kentucky, Illinois, Kansas, Utah, and California.

The interviews were open-ended conversations that usually included these questions:

- Do you have a project (or strategy) that you feel is particularly successful?
- Have you done a studio project that was a complete disaster?
- Did you have notable role models?
- What is effective/ineffective about the studio model of teaching?
- How has studio teaching changed during your career?
- Has digital technology impacted the effectiveness of the studio?
- Do students sometimes take projects in completely unexpected but interesting directions?
- Can creativity be taught?
- How does a person learn to teach studio?
- What's the hardest lesson you've learned in your studio teaching career?
- What is the goal of the studio method of instruction?
Teaching Studio is intended to be a full-length documentary; its goal is to start a conversation about why we teach as we do and how to do it better. The movie presentation proposed here will include excerpts from the full work.

Movie trailer:
https://vimeo.com/233116257
The State of Planting Design in the Field of Landscape Architecture

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Keywords: planting design, scope, horticulture

When the eleven charter members established the American Society of Landscape Architects in 1899, the term landscape gardening was one of the first things to go. Gardening was seen as a trade, and the founding members were dedicated to establishing landscape architecture as a profession (Griswold, 1994). From the moment architect replaced gardener, the profession began distancing itself from horticulture and gardening. The newly monikered landscape architect was now responsible for roadways, planning, and built form - a list of responsibilities that has only grown larger over the decades (Brzuszek et. al., 2011). With the modern emphasis on urban planning and large-scale development, the question has arisen as to whether landscape architects are adequately equipped to effectively use plants in their designs.

This paper seeks to spark conversation regarding the role and scope of planting design in landscape architecture. The initial hypothesis was that increasing project size and expanding professional responsibilities may be minimizing the importance of planting design and horticultural knowledge. However, upon analyzing the results of a survey distributed to landscape architecture professionals, students and faculty, a different trend is apparent. The profession is expanding in terms of scope and responsibility, but planting design remains an important part of landscape architecture, albeit as a specialty.

The results of this study suggest a departure from the original scope of the profession. Planting design appears to have shifted from a generalist tool towards a niche within the profession. This is coupled with a discipline-based ambiguity regarding the necessary role of planting design in the profession, resulting in significant implications for landscape architectural practice, education, and training. Among these are the need (or lack thereof) for emphasis placed on planting design in university programs, the ability of landscape architects to contribute meaningfully on multidisciplinary teams, and the importance of horticulture and nurserymen in projects traditionally ascribed to our profession. These implications need to be discussed in all sectors of the profession.
Diversifying Collaborative Learning Experiences in Design Studio

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Keywords: design studio, collaboration, design pedagogy, multi-layered framework

Design studio is a unique pedagogical format that has been widely adopted in the curricula of design fields. Although studio environments remain a powerful component of design education enabling students to have highly reflective experiences, it is challenging to fully exploit the potential of peer learning and active collaboration in contemporary studios due partly to the growing trend of individualistic studio culture and reliance on technology.

This paper organizes an experimental analysis of the studio environment to better understand the limitations and opportunities of peer-on-peer learning and collaboration. The studios were set up with an incremental, multilayered collaboration framework that emphasized student’s creativity and soft skills such as communication and decision-making. With the total of 75 students, four advanced design studios were considered to examine the viability of different frameworks intended to boost student collaboration and creativity. The increased level of complexity, collaboration maneuvers, and structuralized conditions was added to the studios in every semester. To understand the modality of collaboration activities within and beyond student groups, team dynamics, and the subsequent impacts on final outputs, productivity, and soft-skill abilities, several qualitative methods were employed including observation, non-directive interview with students and faculty, peer-evaluations at initial, intermediate, and final stages of design development, and descriptive assessments of co-production work.

It was evident that sophisticatedly designed studio structure combined with plural, diversified strategies for collaboration was essential for successful learning experiences in both explicit and tacit form. Initial results also showed that collaboration can cause progression or regression in overall learning processes depending on approach (passive/active, obligatory/autonomous), group composition (designed/organic, personal characteristics, professional standards), and ways of arriving at common decisions (e.g., compromise, agreement, group leaders/project coordinator). For example, progressive collective learning was found in groups with a mix of cultures, personalities, and defined roles. The groups with homogeneous personalities and lack of or over-dominant leadership struggled in the collaboration process, which in turn obstructed active learning. In these groups, formal collaborative settings were not as effective as in their counterpart. Culture and interdisciplinarity were the factors catalyzing quality design development but also fueling conflict among the group members. The lessons gained will help develop an effective studio teaching model that can facilitate collaboration training and reflection-in-action for a holistic design process, and thus help achieve one of the important student learning outcomes that our profession necessitates and values.
Developing a Standard for Curricular Evaluation in Landscape Architecture

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Keywords: outcomes and assessment, design education, body of knowledge, curriculum measurement

The landscape architecture body of knowledge (LABOK, 2004) has not been updated to reflect current issues, trends, and technologies in practice and is at risk of becoming obsolete in regards to the knowledge and skill base of current and future graduates. The landscape architecture program at Purdue University has used the existing LABOK as a curricular assessment tool to measure perceived success of content delivery to students. Previous research (Barbarash, 2016) found the original LABOK to be a valid assessment measure; however, both student and professional mentor respondents found certain question areas too broad and generalized to illustrate the successes (or failures) in the nuances of modern professional performance and project realities.

This paper proposes an updated and more granular LABOK matrix, generalized for use in any LA program, for evaluating the strengths and weaknesses of academic programs. This will be applicable for in-program outcome and assessment measures and for SER accreditation reporting. These updates mainly focus on areas involved with Stormwater and Related Issues, Ecology and Systems (human, animal, vegetative, energy, symbiotic, etc.), Planting Design, and Performance-Based Design.

Results of faculty and student surveys demonstrating how the updated measure can be used for curricular planning on both an individual class and holistic program scale are presented as a case study. The original LABOK was purposefully kept brief to avoid survey exhaustion and increase the response rate. While longer than the original LABOK, this adaptation is primarily intended for curricular review. The updated version is vital to understanding the specific strengths and weaknesses of design curricula in order to prepare students for post-graduation success.
Environmental Justice and Local Knowledge: Learning from Practice

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Keywords: resilience, local knowledge, ecological wisdom, environmental justice, community–university partnership

The term “community ecology” is introduced in this paper to describe the relationships of residents between themselves and the nature of the space they share. How does the physical environment of a neighborhood impact its residents? What wisdom is gained by examining community ecology? These questions are explored through the lens of community resilience, interpreted as a neighborhood’s ability to retain stability in response to the recent Great Recession. Lessons learned at the local scale prompted further questions of how residents experience quality of life and community resilience differently to better understand factors that might lead to a neighborhood “falling out” of the system.

The research was conducted through the Charlotte Action Research Project (CHARP), a community–university partnership with a distinct focus on issues connected to spatial justice and landscapes of exclusion and poverty. CHARP’s model joins academic researchers and community groups to implement projects based on “learning from action.” This project illustrates the importance of established infrastructure that connects university researchers to the communities from which they seek to learn. Although we as academics and practitioners are typically more adept at solving technological problems, better solutions and more accurate knowledge about “wicked problems” can be derived by turning to the “ecological wisdom” (or learning from practice) that exists in communities where problems play out. This research highlights ways to understand complex urban problems by engaging a mix of graduate and undergraduate students in learning by examining 66 newly constructed “starter-home” neighborhoods and their contexts. Students compared neighborhood assessments conducted remotely using computer sources (i.e., Google Earth, local municipal databases) versus on-the-ground, first-hand observations. Reflections on the conditions in neighborhoods and their surrounding contexts point to spatial inequalities through the purposeful siting of neighborhoods for low-income and minority populations near LULUs (locally unwanted land uses) including environmental hazards and other negative elements in the built environment like industrial or heavy manufacturing uses. Equally telling are positive characteristics missing in many neighborhoods such as a lack of parks and open spaces that encourage social capital, and the consequences of developers’ poor construction practices. The hands-on approach of spending time in neighborhoods, with some students also talking with residents while conducting windshield surveys, yielded a more holistic understanding about the conditions and contexts experienced by residents compared to remote analysis. This made a substantial impact on students’ perceptions of neighborhoods and helped them understand the importance of local knowledge.
Team-Teaching Strategies and Effectiveness in Design Pedagogy: A Pilot Assessment

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Keywords: team-teaching, pedagogy, mixed-methods

Accredited landscape architecture programs are bound by common curricular requirements typically accomplished in studio, skills, and other types of courses (such as seminars, professional practice, and field-based courses). The Department of Landscape Architecture at Penn State has applied a team-teaching pedagogy to its undergraduate design curriculum for over 40 years; an approach that many of Penn State’s faculty believe has significantly contributed to the success of our Bachelor of Landscape Architecture program. The literature typically defines team-teaching as a pedagogy specific to an interdisciplinary team of instructors or the method of instructing small groups or teams. Traditionally at Penn State, two to three faculty members with different types of relevant (though not necessarily interdisciplinary) experience are thoughtfully assigned to a course. In theory, each faculty member’s unique strengths contribute to the overall team effort of providing a breadth of experience, meeting accreditation standards, and introducing students to the complex spectrum of social and ecological responsibility.

We seek to advance the pedagogy of team-teaching (as implemented at Penn State in landscape architecture education) by leading a discussion of its perceived value. Our study asks what are the ways and means of team-teaching at Penn State and what are the benefits and challenges associated with a team-teaching approach across the curriculum? We employ a mixed-method analysis of key faculty member interviews, a faculty survey, and a blind assessment of Student Rating of Teaching Effectiveness (SRTE) reports. The faculty data engendered a matrix of team-teaching approaches ranging from least to most collaborative that address four pedagogical components: course preparation, content delivery, critique and feedback, and evaluation. SRTE data represented nearly 8,000 student opinions regarding 18 curricular courses over nine years. The data suggested how team-teaching influenced average course effectiveness and variability for studios, skills, and other course types.

While the results of the study are specific to Penn State’s program, they highlight the critical role teaching assignments play in assessing curricular risks, rewards, and stability.
Design Based Study Abroad: The Critical Step in Fostering Creative Designers

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Keywords: creativity, study abroad, design education

The research reported on in this paper demonstrates that design study abroad experiences may be one of the most impactful elements of a design education with regard to enhancing an individual’s creative potential. Specific aspects of creative ability were studied and measured in undergraduate design students over a period of three years. Some students, who did not participate in study abroad, pursued their design studies during a semester at a major design college in the United States. Other students in the design college, with similar backgrounds, elected to spend a semester attending a design study abroad experience. When the results of a series of validated tests given before and after the study abroad semester were analyzed, those students participating in study abroad showed significant improvement in all of the creativity measures. Those design students electing not to participate in the study abroad semester over the same period of time showed no improvement in three of the creativity measures and a decline in creativity in one.

This research builds on a number of recent studies that have indicated that exposure to other cultures can enhance some aspects of creativity. The concepts and ideas generated by a person are in some way associated with their cultural exposure; therefore, understanding this relationship is crucial because it can aid in determining the dynamic of cultural impact on an individual’s creativity levels (Chiu & Hong, 2005). Such exposure allows individuals to acquire knowledge that contrasts with their conventional ideas and actions. This exposure can help people break traditional thought patterns restrained by culture (Leung, Maddux, Galinsky & Chiu, 2008; Paletz & Peng, 2008; Cheng, & Leung, 2013). The research presented in this paper concentrates on a specific type of cross-cultural exposure, a design-based study abroad experience, and examines the experiences of 131 design student participants over a three-year period. Data collected included the results of a series of validated tests used to evaluate aspects of divergent thinking, convergent thinking, and personality related to creativity. A comparison of baseline pre-experience scores of the treatment group and the control group revealed no significant difference prior to the study abroad experience.

This paper presents details of the study methodology, measurement tests, and statistical analysis of findings. In addition, the results of a parallel study abroad student journaling exercise are discussed that begin to reveal the most impactful elements of a design study abroad experience.
Current Research in the Field of Living Architecture

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Keywords: living architecture, green roofs, green walls, curricula

Transforming passion into effective advocacy and sustainable design requires knowledge, skills, and abilities based on good information. To assist with the development of curricula and research programs in the Landscape Architecture community, this session provides an overview of the organizations, literature, and scenes of research that will inform and support the development of policy, incentive, planning, design, maintenance, and post occupancy evaluation of Living Architecture. The author’s survey of the members of the Green Roofs for Healthy Cities (GRHC) Research Committee illuminates the status of research and pedagogy in Living Architecture. The survey requested information about research categories (Benefits; Innovation and Technology; Planning, Design, and Maintenance; Policy and Incentive) and funding sources. The survey asked participants to identify urgent areas of need for research. This overview will share the survey results as well as a summary of how Living Architecture is situated in the curricula of institutions conducting research in more than 40 U.S. and international institutions.
Semester of Learning: A Qualitative Evaluation of the Development and Implementation of an Integrated Course Model

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Keywords: semester of learning, integrated course model, curriculum, 4-year BLA, assessment, workflow

Converting a Bachelor of Landscape Architecture degree from a 5-year to a 4-year program presents a unique opportunity to implement novel approaches in education. Rather than simply eliminate courses or compress content, curriculum development provides the opportunity to reimagine a program that integrates theory, professional workflows, and technology in dynamic, contemporary ways. The faculty at Texas Tech University developed an integrated course model entitled the Semester of Learning (SoL) to dynamically address curriculum redevelopment.

The faculty conducted an intensive evaluation of the prior curriculum and identified areas that needed to be restructured and modernized. A cohesive set of student learning objectives based on LAAB standards and university core competencies was developed and course content was reevaluated to determine where isolated skills could be incorporated into dynamic, iterative workflows that hybridize analog and digital applications. The SoL curriculum shares projects and content between courses, allowing student productivity and quality of work to advance more quickly and consistently. The SoL course model can be applied to existing 4 year programs as a way to efficiently meet student learning outcomes.

The faculty conducted a qualitative evaluation of the SoL with a test group of 30 freshman over one year. The method for evaluation included observation, informal feedback from the students, and final product assessment inclusive of work comparisons from isolated versus paired course formats. In order to evaluate student outcomes, the faculty developed a server-based file management system that allows students to build a digital portfolio throughout the program. This system streamlines both internal assessment and external accreditation by allowing the department to measure student growth and learning outcome attainment over time, as well as providing an efficient way to conduct a comparative evaluation of a group of students through a single semester.
The outcomes of the SoL qualitative review process exhibited the student’s ability to achieve higher levels of productivity under the SoL model. Student products revealed a more holistic and in-depth understanding of landscape architecture and an elevated collaborative approach compared to prior studio settings. Conversely, final review by faculty revealed the new model requires high levels of coordination, collaboration, and communication between members teaching paired courses. Collectively, the results of this test group illuminated the strengths and challenges of the SoL model. These findings are being used to refine the SoL curriculum to be a more efficient model to facilitate student learning outcomes.
Studio Design and the Prospect of Tool-Power

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Keywords: methodology, infrastructure, political ecology

This paper proposes a new methodology for landscape architecture that integrates power structures, intersectionality, infrastructure, and design. It is derived from the concept of tool-power defined by Meehan (2014), where objects in themselves are well springs of power around which power structures are organized. The work of landscape architects often furthers the agenda of the state, by literally concretizing state power in designs that prevent alternative uses, or by undermining that power. Meehan (2014) states, power emerges through the assembling of allies in particular temporal and spatial events. As choreographers of temporal and spatial entities that serve the citizenry, landscape architects create invisible structures that organize and support hidden power.

Implications for landscape theory include a new sensibility toward intersectionality and expanded approaches to system design and site analysis. In order to integrate political ecology perspectives like tool-power into design curriculums, more cross-disciplinary research and studio projects are encouraged. Through broadened disciplinary horizons, infrastructure can be understood as a tool that reinforces federal regimes that affect design.

Infrastructural networks, if examined as the greatest tool wielded at the largest sale, can open student’s eyes to the tangled nature of power relations. An example study of water infrastructure in the American West will demonstrate the complex relationship that people have to infrastructural networks. Developed by the Bureau of Reclamation and the Army Corps, these federal projects created a bureaucracy that was opaque to urban dwellers and farmers alike, and created a dependence on hidden systems for economic stability through subsidies, low cost loans, and infrastructural initiatives (Reisner 1986). This is apparent in California, where the Los Angeles River and State Water project control water, riparian growth, and human access in restricted ways. Understanding how and why tool power opens alternative avenues for landscape architecture can support the goals of the EPA, Paris Climate Accord, and local environmental ethics by unveiling the hidden ways designers are restricted and sites are controlled.
Digging to the Root: Distilling Accredited Landscape Architecture Program Specialties to Grow the Profession

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Keywords: topic areas, recruitment, communication, resources, ASLA, mission, community college, feeder program, diversity, curriculum

In an effort to increase recruitment efforts for accredited landscape architecture programs, the American Society of Landscape Architects created a new position focusing on career discovery and diversity. In early 2017, the Career Discovery and Diversity manager began compiling the action plan for recruitment efforts. Part of ASLA’s action plan includes an inventory of existing web resources on the profession and a proposed list of revisions. ASLA is planning to further develop resources for prospective students interested in an accredited BLA, BSLA, or MLA program.

As part of this research and web update, ASLA initially reviewed webpages of ninety-four accredited landscape architecture programs to ascertain how each institution represents its curriculum focus (or specialty). ASLA distilled the information into approximately twenty focus areas. In late 2017, a survey was distributed to program chairs to analyze how each university program ranks the focus areas gathered in this exercise. ASLA also collected information on experiential coursework (internships, career development, etc.) in landscape architecture departments, community college partnership opportunities, diversity efforts in program curriculum, and collaboration with local chapters.

Survey results are intended to start a conversation about how programs could be represented on ASLA’s Study Landscape Architecture webpage to create accurate, comprehensible, and helpful university profiles for students. Survey results will be examined towards growing the profession and assisting recruitment efforts at accredited programs.
A Call to Action: Career Discovery and Diversity

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Keywords: career discovery, diversity, recruitment, resources, awareness, communication, ASLA

Our nation is changing dramatically and by 2043 the U.S. Census Bureau projects the nation to become a major-minority nation; a demographic that is not reflected in landscape architecture. Projections also show that many current landscape architects will be retiring in the near future leaving a gap in the profession as enrollment and graduation numbers are not growing at a rate sufficient to sustain the profession over the long term. New perspective is needed to ensure that landscape architecture reflects the growing population and the communities it serves.

Each year, the American Society of Landscape Architect’s (ASLA) surveys the ASLA Executive Committee, ASLA Board of Trustees, and ASLA staff to rate the importance and effectiveness of ASLA’s strategic objectives. From 2013 to 2016, an uptick in the importance to grow the Profession was surveyed. In late 2016, ASLA developed a new role that would take aim to overcome these challenges. In early 2017, the Career Discovery and Diversity manager was hired and an action plan was created to increase visibility and recruitment to diverse student groups.

This document presents a case for action from current statistics, strategies to assist growth in the profession, and opportunities to foster diversity in design. The discussion will highlight current ASLA programs and resources including the ASLA Diversity Summit, Your Path to Landscape Architecture, and YOUR LAND along with a look at new and improved resources.
What Should Students Learn for the 21st Century?

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Keywords: cognitive skills, content knowledge, habits of success, sense of purpose

We are living in a post-industrial age, but our education (primary, secondary and higher) system still reflect the careful design of an earlier era. The last major changes to curriculum were effected in the late 1800’s as a response to the sudden growth in societal and human capital needs. As the world of the 21st century bears little resemblance to that of the 19th century, education curricula need to be deeply redesigned for the needs of 21st century and beyond as supported by interdisciplinary educational research, workforce development research, and evidence based principles.

The latest LAAB Accreditation Standards do not directly deal with nine of the nineteen attributes employers seek in new college graduate’s resumes (Job Outlook 2016 Survey). These attributes not only prepare graduates to be more competitive among their peers but also better prepare them for the future problems of the planet they have not even faced yet. How will we prepare future landscape architects (and other planners and designers) for success to develop their cognitive skills, provide applicable content (professional) knowledge, develop habits of success, and instill a sense of purpose to guide their life at and beyond their education?

This presentation will provide an overview of the outcomes necessary and/or categorized by several education research, curriculum design, and educational leadership groups and recommend an application toward, perhaps, a more desirable model of landscape architectural education. Although the presentation will be mostly theoretical based on literature survey, it will provide practical examples from the current education system in comparison to the LAAB Accreditation Standards. It is hoped that this presentation would lead to development of a group among the attendees to initiate a formal structured research dealing with questions collectively raised by the author and attendees.
GREEN STEAM: Using Principles of Design to Power the Development of Outdoor Educational Spaces

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Keywords: STEAM, STEM, school gardens, educational spaces

“As long as considerations of utility are neglected or are overridden by considerations of ornament there will not be true art.” — Frederick Law Olmsted Manuscript fragment. Olmsted Papers, LC.)

The purpose of the Green STEAM Project is to evaluate how principles of design facilitate the building of sustainable, cost-effective, aesthetically pleasing, and academically enriching green spaces in grade schools. The inclusion of science, technology, engineering, and mathematics (STEM) in school curricula transitions education from a single-discipline approach to a multidisciplinary one. In recent years, incorporating elements of art and design (adapting STEM to make STEAM) has taken hold (Sochacka, Guyotte, & Walther, 2016; Sharapan, 2012). A resurgence in the adoption of service learning and art and environmental education into educational curricula engages students, fosters community involvement, and provides a platform for both STEAM activities and educational core mastery.

The Green STEAM Project represents a multidisciplinary approach, including investigators from landscape architecture, art, and science education, and visual communications and branding. The Green STEAM Project created a research-driven network of schools within North Texas that is intended to eventually broaden out to cover more of the state. The project’s multidisciplinary approach to creating STEAM gardens at partner elementary schools supports Olmsted’s concept of bridging utility and art.

The scope of the project includes the development of up to five sustainable green spaces at pilot schools. Study data that assesses both best practices and obstacles to development at completed STEM and STEAM gardens is utilized in the creation of a Green STEAM website and an annual conference or forum that was organized to share information and to inspire future activity. The website acts as a gateway for continued collaborative learning on topics such as curriculum development and effectiveness, sustainability, and project management over time.

Although independent programs for educational gardens exist throughout the United States, little research has been completed on the impact of art and design principles on the
development of outdoor educational spaces. The Green STEAM Project is ongoing with significant research results expected by the time of the CELA conference. The website development and conference launch in the fall of 2017. Research results from several gardens will be presented after a series of questionnaires, interviews, and reflections with participating teachers and administrators are analyzed.
Reframing the Discussion: An Examination of Design Studio Teaching through the Conceptual Lens of Self-Regulated Learning

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Keywords: pedagogy, design, survey, teaching and learning

This study investigates the acquisition and application of pedagogic content knowledge (Shulman 1987) and its relationship to teaching design in studio settings. More specifically, this study uses a national survey of landscape architecture educators to investigate the pedagogic methods and beliefs that inform contemporary design studio teaching. The results of the study help "transform the discussion" of design pedagogy by reframing studio teaching and learning through the conceptual lens of self-regulated learning (SRL). Self-regulated learning may be unfamiliar to many design educators even though it significantly affects student-learning outcomes. Over forty years of research has shown that SRL is a primary determinant of learning and achievement across fields. SRL refers to one’s self-generated thoughts, feelings, and behaviors oriented toward attaining goals (Zimmerman 1989). SRL requires a student to become an active participant in his or her own learning. SRL influences a student’s motivation, effort, self-efficacy, time management, and choice of activities.

The study has three constructs related to teaching methods, project-based learning, and student-learning outcomes. Study questions include what types of teaching methods and activities do landscape architecture design educators typically use in studios? What types of projects do design educators typically use in studios? And, how do current teaching methods, studio projects, and educator beliefs shape learning outcomes, especially in terms of encouraging SRL? Study data was collected using an online survey containing 23 questions with 112 items. The survey included fixed response and open-ended questions. The survey was sent to 450 landscape architecture faculty members in the United States. There were 127 respondents representing a wide diversity of backgrounds. The data was analyzed using basic statistics, open coding, factor analysis, reliability analysis, and other techniques.

Study findings begin with a demographic description of study participants. Next, findings related to the selection and use of teaching methods are discussed. These findings highlight the relationship between pedagogic knowledge, method selection, and the encouragement or discouragement of SRL. Several concepts associated with SRL such as self-efficacy and goal orientation are also discussed. Overall, the study findings present new and experienced design educators alike with greater insight into contemporary design pedagogy. As a result, this study "transforms the discussion" about how landscape architecture design educators teach design and how these efforts relate to key learning processes like SRL.
Research Methods within the MLA: Implications for Scholarly Inquiry in Landscape Architecture

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Keywords: research methods, scholarly productivity, faculty, MLA

This study analyzes research methods courses offered within North American MLA programs and their potential implications on scholarly inquiry within landscape architecture. Landscape architecture faculty face higher research demands than ever before. Literature describes the range of research and creative scholarship within the discipline (Deming & Swaffield, 2011), projections and discussion of future scholarship (Gobster, Nassauer, & Nadenicek, 2010), levels of scholarly output and its relationship with teaching loads and other factors (Milburn & Brown, 2003; Milburn & Brown, 2016), and research productivity of recently tenured landscape architecture faculty among peer institutions (Christensen & Michael, 2014). Research productivity levels have increased among landscape architecture faculty; however, they still lag behind those of other disciplines. Despite more emerging landscape architecture faculty hold doctoral degrees than in previous generations and emergence of some landscape architecture doctoral programs, the MLA is still widely regarded as the discipline’s terminal degree. In published landscape architecture academic position announcements, which typically list doctoral degrees as not required, but preferred credentials. The MLA is assumed to be sufficient training for meeting the research/creative scholarship outputs demanded by many university tenure and promotion processes.

This study describes and evaluates how North American MLA/MSLA programs train emerging academics in the craft of research through content analysis of their research methods course syllabi and associated course documents. Within program's published MLA curricula, courses that focus on research methods are identified and corroborated by program personnel. Content of research methods course syllabi, assigned readings, assignment descriptions and deliverables reveal which research methods are most widely covered within MLA research methods courses, methods that receive less coverage, and presence of program-specific specializations within research methods training.

When evaluating faculty for promotion and tenure, universities often rely on traditional measures of research productivity, with emphasis on conventional peer-reviewed products. Because research questions must be aligned with corresponding research methods, the range of methods that emerging academics are formally taught may impact the range of scholarly inquiries they pursue, the resulting peer-reviewed products they produce, and ultimately their access to particular scholarly venues for dissemination. Broad analysis of how MLA programs educate emerging academics in the craft of research reveals which methods universities
believe are most essential for their graduates, which methods are less covered, and some implications that MLA research methods courses may have on the discipline’s ability to effectively pursue its range of possible scholarly inquiries.
Places Drawn: Two Pedagogical Approaches to Place—Understanding through Image-Making

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Keywords: place theory, placemaking, site inventory, site analysis, landing, grounding, intuitive design process

Understanding place through on-site drawing of personal perceptions and later through research-driven creative photomontage provides designers with important foundations for placemaking. To support our claim, we summarize the literature covering image-making for place-understanding, and reflect on a sampling of student work from two studio assignments applying the theory. Two landscape architecture professors working at different universities developed and implemented the assignments over the last several years. Both methods are partially inspired by Girot’s (2009) intuitive, four-phase design process: Landing, Grounding, Finding, and Founding. Here we are most concerned with Landing becoming initially familiar with a site through immersion and Grounding subsequently unpacking a place’s layered conditions through research, analysis and further immersion. Girot’s final two phases involve application of place understanding (as opposed to developing place understanding) and are outside the scope of this paper.

Our first method, assigned during Landing and early stages of Grounding, uses in-situ drawing as a means for students to explore their aesthetic experience, and subsequent understanding, of place. The media and mode abstract charcoal drawings emphasizes deep-reading and cognizance of perceptions, rather than careful representation and fidelity to landscape physiology. The student’s work was woven with analysis of place-based, nineteenth century landscape paintings and aesthetic and place theories. Our second method, deployed throughout Grounding, asks students to expand upon firsthand experiences and onsite documentation, and investigate places complex narratives, both seen an unseen. Students conduct research and create a series of eidetic photomontage using current and historic photography, maps, drawings, text, and other media. The resulting compositions juxtapose wide-ranging phenomena to help better define a place’s existing identity, and provide agency for subsequent placemaking proposals.

We have two primary findings: first, we confirm that design and representation literature and practice has, for centuries, recognized image-making as a highly valued practice for comprehending place. Second, we assert image-making practices of in-situ abstract drawing and subsequent eidetic photomontage provide students with a robust foundation in landscape understanding and design conceptualization. Specifically, these methods help students improve their ability to observe and document their perceptions, as well as provide catalytic
visuals for investigating place-based narrative complexity. We support our findings with examples of student work alongside specific arguments from the literature. In sum, these endeavors demonstrate novel ways to encourage nascent environmental designers to look beyond the concrete realities of space, and explore and understand place through image-making.
Gauging Merits and Challenges of Interdisciplinary Studio Teaching and Learning

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Keywords: interdisciplinary teaching, teaching and learning assessment, landscape architectural studio, design pedagogy

Interdisciplinary teaching has been regarded a desirable pedagogical practice, since it transfers knowledge and techniques, encourages critical thinking, recognizes gaps and bias, and acknowledges ethical concerns (Applebee, Langer, & Mullis, 1989; Baloche, Hynes, & Berger 1996; Newell, 2001; Repko, 2008). However, the limited number of cross-curriculum landscape architecture studios presented little chance to test these claims. And many dilemmas of interdisciplinary teaching, such as time consuming, generating conflicts, and creating misunderstandings, were rarely examined in design studio setting.

At the author’s university, a joint studio was established in 2012 by faculty members from architectural and landscape architectural programs, in order to foster an in-depth and complex design pedagogy. Since then, this joint studio has involved about 15 design professionals from four design disciplines on campus and outside, developed about 55 design proposals for eight project sites in three countries, offered about 260 undergraduate students on campus with challenging and fulfilling learning experiences.

Using the joint studios in 2016 and 2017 as a vehicle, this study intends to gauge the successes and failures of interdisciplinary studio teaching and learning. First, it investigates the impacts of interdisciplinarity on team work from six aspects, such as idea provoking, conflict resolving, technique learning, time management, work distribution, and work ethics improvement. Second, this study investigates instructor-student relationship in the same six aspects mentioned above. Three research methods, such as peer group review, open questionnaire, and interview are used to collect qualitative data, which will be inductively summarized and interpreted.

In addition to presenting six-year student’s work, this study outlines the major merits and challenges of interdisciplinary studio teaching on an empirical base. Instructors may find these understandings useful in planning, instructing, and documenting future interdisciplinary studios.
Crossing Boundaries: When Private Development Meets the Design Studio

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Keywords: pedagogy; design studio; private development; interdisciplinary

In many ways, the academic experience of design students and the project trajectory taken by private landowners have traditionally run in parallels. Seldom do teachers engage with the insular nature of private interests for fear that the relationship may compromise student’s educational journeys. Conversely, landowners may not necessarily see the value in considering student perspectives into their proposals. An unlikely relationship of sorts, it is precisely this pairing that guided the delivery of an interdisciplinary graduate design studio at NC State University.

Working in collaboration with the landowner and various development interests, the studio used an 842-acre tract to develop speculations that explored methods for conserving the landowner’s property while satisfying various economic and legal requirements. To do so, fundamental questions about the land and its role within the larger socio-ecological matrix had to be considered as two pillars of the course, and of the student proposals that ensued. However, key to the success of the course was that those groups with a financial stake in the sale, development, and management of the property had to be actively engaged in each phase of investigation.

This presentation will discuss the processes and outcomes of the unique design process that folded students together with design, real estate, and legal professionals to collectively explore design and planning proposals that have resulted in a marked shift from traditional development practices. In doing so, the course uniquely served as a design nexus that transformed real-time discussions related to the economic applicability of coastal land conservation while simultaneously marrying the programmatic and financial goals of stakeholders with pedagogical goals of the course. Testimonials from both stakeholders and anonymous end-of-semester course reviews yielded overwhelmingly positive feedback and are contributing to future collaborations of a similar nature at NC State, and beyond.
Student Use of Design Software: Results of an International Study on Student Software Proficiency

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Keywords: software, curriculum

Design software is a fundamental tool in the contemporary practice of landscape architecture and permeates nearly all courses in an academic curriculum. In previous decades, the limited number of applicable software programs meant that many departments would teach the same handful of software packages, namely AutoCAD, Photoshop, and ArcGIS (Cantrell and Michaels 2014). Today, with a multitude of software options, landscape architecture programs must decide what software will be taught in their curricula, and to what degree these digital tools should be discussed and practiced. The criteria for making these decisions are varied. Certainly, one factor is the current software being utilized in professional practice. Existing surveys of technology trends offer valuable insight into design software used in professional offices (Calabria 2012, 2016). Another factor that might influence software decisions in an academic curriculum is software taught at peer institutions. This too has been documented and offers a snapshot of consensus software and niche programs that are beginning to emerge (Summerlin et al. 2017). Still, another factor is from students themselves. As some programs move away from dedicated computer software courses, students are experimenting and deciding for themselves the software packages they prefer to utilize in the design process.

This presentation will examine the results of an international survey of 322 landscape architecture students at 37 accredited programs on their current software preferences and perceived proficiency in those programs. The first series of questions document the specific software packages being employed by students and captures the degree to which each software package is used by attaching a Likert scale to each software program. This added texture provides a truer representation of the depth of software usage among the students. The survey also examines student perceptions of the adequacy of software training they receive in their courses.

The results indicate that AutoCAD and Adobe Photoshop are entrenched in student workflows, which parallels surveys of both professional offices and faculty teaching objectives at accredited programs. The results differ from those of professional offices with regard to 3D modeling programs with a higher integration of more advanced modeling programs like Rhino 3D and publishing software like Adobe InDesign. Additionally, the results reveal concerns from students regarding the software training they receive from their institutions. This presentation
will present these and additional findings to better inform educators of student software usage and student concerns regarding design software instruction.
Creating a Studio Culture where Landscape Architecture Students Identify and Maneuver Outside Their Comfort Zone, Thus Creating More Agile and Expressive Designers

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**Keywords:** design inquiry, design process, project-based assignment, landscape architecture curriculum

What happens when a design student is given a new assignment? Before they begin the design process, there is a time where fear of the unknown is present. Before a viable design begins to take form, staying with the unknown (the design inquiry) can be a difficult place to be, but a place where all successful designs begin. According to Bloom’s taxonomy of learning domains, the highest level of learning is to create or produce new work. A designer must build skills to be able to design, but it goes beyond learning how to navigate the design process; there is also the student’s emotional energy that needs to be sparked in order to create during a project-based assignment.

As an educator, how do you get a student to uncover an idea and stay with it long enough to develop or finesse the design into a viable design solution. Evaluating whether a student is putting forth their best work can be a challenging. And, what if your student is not producing their best work? What methods work to encourage them to put more energy into developing their design to its full potential? How does an emerging designer determine when a project is finished, beyond running up against the deadline. This session will focus on successful approaches used to teach students how to develop a comfortable relationship with their design creativity and to encourage them to mine the gold that comes from the design inquiry.
Virtual Reality and Student Understanding of the Third Dimension in the Landscape Architecture

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Keywords: virtual reality (VR), design studio, spatial awareness, visualization techniques

The ability to accurately visualize spatial aspects of a project while it is being designed can be challenging. Common methods used to visualize design projects are hand drawings, digital two-dimensional (2D) drafting, physical modeling, and digital modeling. Although these methods are commonplace, how do they enhance a student’s understanding of a design’s spatial characteristics? Research suggests that representation mode has an impact on spatial perception and the third dimension of a space is not always perceived accurately through these visualization techniques (Holmes, Rice, & James, 2000, p. 326).

Virtual reality (VR) is an emerging tool that has the potential to enhance spatial visualization skills. This paper uses a literature review and the findings from a research project designed to examine the use and impact of VR on the development of design visualization skills. The hypothesis that drove the research was incorporating VR in the student design process would increase student designer awareness of the three-dimensional implications of their designs. The exploratory research project completed at Tehran University, Iran involved 100 graduate landscape architecture students. The research project asked landscape architecture graduate students to fill out a same questionnaire about the same studio project twice; once before experiencing the design in the VR environment and once afterward. The questionnaire was a combination of multiple choice and open-ended questions. Students were asked to compare their perception of the design as represented in three different modes of representation; 2D drafting, 3D modeling, and virtual reality. The goal was to compare their comprehension of the spatial qualities, aesthetics, and details of the design. Preliminary research outcomes indicate that participants found the VR environment the most useful in enhancing their understanding of the volumetric characteristics of the design. However, the VR environment was less useful in assisting them in understanding the relative proportions and scale of design elements. Moreover, the VR environment was more successful in helping students feel that they had a better understanding of the space compared to other modes of visualization.
Representing Landscapes 3D: Revisiting the Physical Model in Landscape Architecture Education

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Keywords: design pedagogy, 3d modeling conventions, education in experiential landscape architecture education

This paper explores methods in early landscape architecture and urbanism studio design pedagogy. While digital modeling and rendering technologies continue to evolve, the disconnect between scale and feasibility of form and function continues to emerge as a problem for internalizing designs before they are built. The paper argues for using abstracted materials and spatial geometries rendered in a tactile physical form at key moments throughout the design process to cultivate an awareness of scale and the figure ground to address this issue. As an extension of 2d design communication often covered in the early semesters of design education in particular, alternative realities in 3d are imagined and fabricated as a means to work through problems rather than digitally represent final solution proposals to problems. This work is illustrated through a variety of student work samples ranging from loose paper to precision laser-cut and mixed-media constructions. Some works are featured in the book Representing Landscapes: Hybrid (Routledge: 2016). This iterative design approach employs multi-dimensions and pairs traditional analogue and digital media together with form in a comprehensive pragmatic way. In general, the work asks students to develop and refine design interventions with an emphasis on physical form, composition, and embodiment to inform site design, rather than aesthetics or abstract ideas alone. As a result of this immersive approach to design making, students engage their work on an experiential level analogous to all living landscapes. This approach is inclusive of dynamic landscape processes, a core topic in beginning landscape architecture curricula. Students test site design problems and site details with an enhanced understanding, spatial awareness, and perception of the built environment.
Writing to Learn in Beginning Graphics Studios

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Keywords: design education, writing across the curriculum, sketching

Writing Across the Curriculum (WAC) programs have been adopted in many university settings to strengthen student learning and writing through in-depth and tailored writing assignments. This study utilized Writing to Learn and Reflective Writing to get feedback from students about drawing concepts learned in an early graphic presentation class. Writing to Learn works to improve students’ understanding through the process of writing and results in a different type of deliverable than something simply written to communicate. The intent of these exercises is for the student to make their own thoughts, ideas, and knowledge clear and organized to themselves rather than transferring knowledge to an audience. The benefit of teaching writing as a part of the design process is the “exploration of what we know and what we feel about what we know through language, using language to learn about our world, to evaluate what we learn about our world, to communicate what we learn about our world” (Murray, 1972). Students were given multiple reflective writing assignments accompanied by a space for producing a drawing for the concept at hand. According to Kolb (1985), reflective observation is one of the four axes that students should cycle through for deeper understanding of their work and to help find a style of writing that may suit them better over time. These exercises also helped students link current work in the studio to past experiences and knowledge. Longer “microthemes” were given as writing assignments to let students explore larger concepts in the studio and explain their understanding of these themes. Small group peer-review workshops were also administered when writings were turned in so that basic grammar and spelling mistakes could be eliminated before a final draft was submitted; this process also ensured that students wrote at least two drafts of the work. The overall goal of the workshops was not only to identify easily fixed grammar and spelling, but also to let students explore goals, improve ideas, and comment on organization and sentence structure (Bean, 2011). The study shows not only improved graphic abilities in the students, but also the ability to be self critical of their graphics. Student feedback was also favorable concerning the peer review workshops as a pre-review of their work.
The Resuscitated Diagram: Landscape Syntax, Operation, and Spatial Relations

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Keywords: diagram, topology, spatial operation, spatial organizations

This paper first seeks to reinvigorate the design diagram as a devise for foreshadowing the potentials of spatial experience, relation and organization. The diagram is not a mute abstraction nor a static separation of landscape systems. The diagram is a generative device firmly rooted in the design process as a means to site the landscape project and engage the physical, biological and social/cultural system of site. Second the paper puts forward a landscape diagram syntax tailored to the discipline and current disciplinary discourse. The paper is essentially a return to the diagrams origin where the structure of spatial meaning or intent trumps technique in the generation of the landscape architecture proposal. Spatial definition and the volumes of experience have fallen victim to indeterminacy and flux. The resuscitated diagram is positioned as the means to achieve both spatial resilience and spatial identity.

The author has taught core and advanced design studios in landscape architecture along with digital visualization for nineteen years. The author’s work in Rome addressed design technique that fostered spatial perception and definition in the historical project. This work coupled with recent teaching in design fundamentals has identified a need to clarify and establish again the important position of the design diagram in the post-critical and indeterminate landscape eras.

The paper puts forward definition of the diagram based on a literature review spanning the landscape and architecture disciplines. The paper then provides example of spatial weakness as a means to argue perceivable volumes achieved through diagrammatic studies. The paper then proposes a relational and operational syntax based on mathematical topology. Mathematical topology is used as means for framing the discussion of increasing spatial complexity as the diagram transitions from a two to three-dimensional investigation. Spatial operations, both formal and generative are listed and discussed in tandem with typical spatial organizations and spatial relations. The syntax is then applied to landscape architectural precedents as proof of concept.

As mentioned above the authors believes that spatial definition and volumetric experiences have been lost or weakened in the post critical era. Indeterminate ends have challenged spatial identity. Landscapes of movement have challenged both space and place definition. Design students must comprehend the fundamentals of space and volume distribution in landscape architecture before challenging spatial perception in the landscape architectural project.
Analyzing Place, Behavior, and Site Systems at the Talley Student Union

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Keywords: post-occupancy evaluation, evidence-based design, sustainable landscapes

There are many urban places on the NC State University campus in Raleigh, North Carolina. As the University grows and matures, the need for thoughtfully planned and designed places to accommodate a variety of social activities, circulation, service, and other functions will undoubtedly increase. North Carolina State University wants to learn from the successes and problems associated with new Talley Student Union landscape. How is this landscape performing? What are the design lessons learned? Are there ways to increase its performance?

Principal results: gutters drain rainwater from roof directly into gardens. Water is infiltrated and is collected into a 55,000-gallon cistern. Water from the cistern is used to irrigate the lawn and rooftop gardens. Surveys showed that 60% of people asked did not understand the benefits of raingardens and cisterns in a campus landscape.

Graduate students in the Department of Landscape Architecture at NC State generated evidence, using tools such as ArcGIS Collector, user surveys and other methods for data collection including a soil moisture meter, double ring infiltrometer, cone penetrometer and tubular soil sampler. Their findings show where and why the design is successful and not successful in terms of how people use the landscape and how the landscape supports or does not support various activities and functions throughout the year. The students used a systems approach when analyzing the site by mapping site systems such as: transportation networks, pedestrian circulation, environmental impacts and sustainable awareness. The students were given a list of questions to begin their research:

- What are the places of the Talley landscape? What defines these places?
- Where do people sit, eat, walk, seek shelter, congregate, play, study, watch movies, and walk
  - at different times of the day/week?
  - week days verses weekends, day time verses night time?
- How might changes in weather conditions (sun, rain, snow) and seasons (summer, fall, winter, spring) potentially affect usage?
- How are services brought to and removed from the building?
- Where do people enter/exit the building?
- How does sunshine affect use of the landscape?
- What are the memorable experiences people come away with from having been in the Talley landscape?
**PANEL PRESENTATIONS**

**Landscape Architecture Online: Accreditation Standards for Online Landscape Architecture Education**

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**Keywords**: education, online education, distance education, accreditation, LAAB, ASLA

Landscape Architectural Accreditation Board (LAAB) currently accredits first professional programs at the bachelors and masters level in the United States and its territories. Of these programs, all are traditional on-site programs housed within universities and colleges throughout the United States. While some courses within a few programs are offered via distance education, there are no LAAB-accredited programs that currently deliver a significant portion of their courses through online media. However, as more students enroll in a greater variety of online courses and programs during their time in higher education, the demand for an LAAB accredited online degree program may grow. About 5.8 million students were enrolled in at least one distance learning course in fall 2014, up 3.9 percent from the previous fall, according to "Online Report Card: Tracking Online Education in the United States," an annual report by the Babson Survey Research Group. Additionally, a majority of inquiries received at the ASLA Center for Landscape Architecture regarding landscape architecture (LA) education involves the availability of online courses. Many prospective students are interested in enrolling in landscape architecture programs, however, they often have a scenario that does not allow them to attend a university full-time to complete a degree. Additionally, enrollment in LA programs has dropped roughly 10% over the last 5 years. Enrollment in accredited LA programs, in the US, was 5,326 in 2017 (down from 5,923 in 2013). As the profession seeks to grow the number and diversity of landscape architecture graduates qualified for licensure online education may offer additional entry points into landscape architecture.

This panel will engage in a discussion around accrediting online program delivery, particularly landscape architecture programs. An LAAB board member will be discussing the timeline and process for developing and implementing standards to accredit online programs/coursework and identify how educators can be involved during this process. Panel members will discuss a recent LAAB visit to Academy of Art University’s online landscape architecture program in San Francisco to demonstrate how a program is currently operating via distance education.
Additionally, experts in distance education and distance education accreditation will discuss how online education is not only possible but thriving in a variety of fields and is regulated to ensure compliance with accreditation standards.
Design Implementation

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Keywords: green infrastructure, sustainable urban drainage system, best management practice, landscape performance, hydrology

Stormwater runoff is correlated with and sensitive to climatic conditions. Variations in storm size, intensity, and duration cause different hydrologic responses of a watershed, including peak flow, stormwater volume, and time to peak. Future climate change such as increasing storm intensity and air temperature would cause runoff estimate and prediction of flood less accurate, which challenges effective stormwater management. Low impact development (LID) techniques such as bioswales, green roofs and porous pavement, developed in the 1990s for managing on-site stormwater runoff, aims to mitigate runoff from frequent, less-intensive rainfall events. Previous studies have evaluated LID performance in both laboratory and field settings. However, most results were produced based on the existing climatic assumptions, and the impact of climatic factors on LID effectiveness is often neglected when an only single rainfall event was observed in research design. Therefore, some previous findings have limited external validity to apply in practice where storm characteristics and temperature vary by spatial and temporal scale. A better understanding of climate impacts on LID will be necessary to predict its performance in local conditions and achieve specific stormwater management goals for targeted climate events.

The main objectives of this study are to (1) document evidence of contributing climatic factors to determine LID effectiveness; (2) identify research trends over time by subcategories such as climatic factor, LID type, and water quantity/quality; and (3) assess methodological approaches employed in hypothetical, empirical, and experimental studies. It should be noted that this study is the second phase of an extensive and systemic literature review. In the first phase, we developed review protocols and screening processes to select the most relevant literature, and the results were presented at 2017 CELA Annual Conference.

In this study, forty-five peer-reviewed journal articles were classified into multiple categories. For our preliminary results, the number of articles for each category was counted, and research trends over time were analyzed to identify which subtopic has been more frequently examined, gained attention recently, or have lack of performance data. Methodological
Design Implementation

approaches of the selected articles were also analyzed based on study design. Statistical models developed from empirical studies were compared with those from hypothetical ones. Observed, hypothesized, or experimentally designed climate and LID conditions were further explored and compared to one another to assess the validity issue. Finally, suggestions for future research are documented to encourage the application of LID to current policy for effective stormwater management.
Building Decision Tree Classifiers to Predict Bioretention Performance

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Keywords: bioretention, decision tree, low-impact development, machine learning

A decision tree is a non-parametric algorithm that can efficiently classify large, complicated datasets without imposing a complex structure. It is a popular data mining approach which helps identify a strategy to reach a goal. The most appealing aspect of decision tree algorithm is that it is simple to understand and easy to interpret. There is still limited research applying decision tree to environmental research. In this study, we aim to use decision tree to predict bioretention pollutant removal performance based on bioretention design features.

This study continues the investigation presented at the 2017 CELA annual conference. In our 2017 presentation, we built a decision tree for Zn and TP removal prediction. We also used decision tree to analyze other pollutants but obtained unreasonable results. The purpose of this continued presentation is to apply decision tree to more pollutants and test the reliability of decision tree classifiers. Our database is extracted manually from 109 publications in the recent decade. We record bioretention surface area, contributing drainage area, filter media depth, presence of internal water storage (IWS) layer, presence of organic matter, soil composition, and vegetation type as potential design features to input to decision tree. Our predicting outcome is a binary variable which indicates “good” or “bad” performance. For example, 80% TSS removal is the dividing point between “good” and “bad” performance. We are refining the previous study by splitting the dataset into train set, cross validation set and test set. We will use cross-validation to prune the tree. The test set will be used to evaluate model performance of the pruned tree.

From the decision trees we construct for different pollutants, we will obtain design features which combine to guarantee “good” bioretention performance. We expect that bioretention without organic matter, with vegetation and deep media depth guarantees high nutrient removal; bioretention with organic matter, with vegetation and some percentage of silt guarantees high metal removal; TSS removal can be predicted by bioretention soil composition only. We expect that the accuracy and reliability of decision tree can reach above 70% for the test set. By introducing the decision tree tool to the field of landscape architecture, we anticipate generating in-depth discussions among those who are interested in analytical tools for analyzing complex datasets.

Learning Outcomes:
- Attendees will know how to design bioretention to meet different performance goals.
- Attendees will learn about how to construct as well as prune decision tree.
DESIGN IMPLEMENTATION

- Attendees will learn the opportunities as well as challenges to apply decision tree algorithm to environmental research.
Energy Gardening: Photoluminescent Applications for Landscape Architecture

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Keywords: smart materials, photoluminescence, lighting

Consideration of materials and technologies related to renewable energy production or energy harvesting and their potential for design applications in landscape architecture remain relatively unexplored. Inspired by the idea of energy harvesting, or the conversion of ambient energy into electricity, energy gardening is a concept that explores the creative use of materials associated with energy harvesting, such as smart materials, for landscape architecture applications.

Smart materials are commonly employed in energy harvesting for their ability to transform available energy found in the environment into usable forms. They are largely characterized as property-changing, physically transforming as a result of environmental change; or energy exchanging, transforming input energy into a different form of output energy, such as photovoltaics, piezoelectrics and photoluminescent materials. As such, smart materials present great practical and artistic opportunities for their use in landscape applications.

This presentation focuses on an examination of photoluminescent materials for landscape architecture projects. Photoluminescent materials, commonly known as glow-in-the-dark, are a type of energy-exchanging smart materials that harness ultraviolet radiation during the day and re-emit it as visible light at night. Like other luminescent materials, they emit light without producing heat or requiring electricity, self-charging with sunlight or artificial light sources. Through an overview of material properties, a comparison of available photoluminescent products, and a presentation of three case studies: Van Gogh Path by Studio Roosegarde, Photoluminescent Labyrinth by Carolina Aragón, and Orbs by Keira Lee, this presentation will provide a guide to best practices for the use of photoluminescent materials and ideas for their creative use through hybrid methods.

The use of photoluminescent materials to produce landscape lighting by harnessing sunlight has great potential in activating and enhancing the quality of outdoor spaces, while embodying sustainable values. The technology not only eliminates or reduces the need for electricity, reducing energy consumption, but can also contribute to minimize light pollution supporting dark-sky efforts. Furthermore, the incorporation of smart materials in landscape architecture may serve to demonstrate and humanize renewable energy technologies, expand the material vocabulary for the creation of outdoor spaces, and create poetic spaces that exude a sense of abundance through their indexical relationship with the energy found in the environment.
A Study of the Adaptation of Parametric Design among Landscape Architecture Professionals in Texas

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Keywords: parametric design, pedagogy to practice, digital technology, software, education trends, design trends

Parametric design utilizes algorithmic-based software to produce computational, generative, responsive, and immersive three-dimensional models for use in landscape architecture, planning, and architecture (Cantrell & Holzman, 2016; Jabi, 2013). Current professional practices illustrate that software development within the design fields, including landscape architecture, is trending towards augmented reality, open source software, and building information modeling systems (Bentley, et al. 2016). The purpose of this research is to understand the adaptation of the innovation of parametric design into the field of landscape architecture through a literature review, then compares those observations to the perceptions of landscape architecture professionals practicing in Texas. Research on this topic has the possibility to increase awareness of technological advancements in the practice and education of landscape architecture.

This research followed qualitative methods (Deming & Swaffield, 2011) and employed in-depth interviews with 16 professionals to discover patterns in the acceptance or likely adaptation of parametric design in landscape architecture firms in Texas. The subjects were designers or managers of landscape architecture firms in varying sizes. Rogers’s theory, Diffusion of Innovation, was used to design questions as well as to draw themes from the interviews (Rogers, 2003). Roger’s four key elements, five-step rate of innovation, and innovation adopter categories are utilized to document the overall rate of adaptation of the use of parametric design. The responses are studied to understand where each firm or landscape professional stands within its understanding of parametric design and its process of innovation (Taylor & Bogdan, 1998; Deming & Swaffield, 2011). Research shows that the respondents, 75% of them with 10 years or more experience, had a wide range of experience in professional management and practice. However, experience with emerging industry software and technology was more prevalent in the academic training of new staff then it is with upper management. Most interviewees agreed that technology changes are on the horizon, yet some parametric design software remains on the fringe of mainstream landscape architecture practice after many years of development. The most contended discussion came from respondents discussing BIM in collaboration with architects. Almost all respondents commenting on this reported having a work around solution without having to use the software directly. In conclusion, this research reveals that various levels of adaptation are happening in parametric design among landscape architecture firms in Texas.
architecture firms in Texas, but its current usage and adaptation rate is influenced by the technical, financial, and educational parameters of adapting these technologies and methods.
Smart Hills: Rethinking the Intersection of Engineering, Ecology, and Landscape in Design

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Keywords: resiliency, climate change, design implementation, ecological design, engineering, landscape infrastructure, landscape architecture, design practice

Climate change and resiliency are changing the way we look at waterfront landscapes, often with the desire to “build-up” the land in anticipation of storm surge/sea level rise. In response, contemporary landscape design projects are continuing to push the boundaries of how we manipulate the land. The term berm has become synonymous with ecological resilience. Given the lack of space in our coastal cities, the constraints of existing building footprints and infrastructural networks, how feasible is it to build-up, berm, or transform through topography? Highly engineered landscapes often lack human experience and are often unoccupiable. How can we as designers take standard engineering measures related to surficial and mass stabilization and soil settlement and re-think them to integrate the human aspect into their design? In this education session, participants will learn through a series of case studies, how dynamic partnerships between landscape architects and geotechnical engineers can result in creatively rethinking, and in some cases combining hard (revetments, armored edges, mechanically stabilized earth, etc.) and soft (managed retreat, bioengineering, afforestation, etc.) engineering practices to create a man-made, yet functional, ecologically resilient landscape. Using Governors Island in New York City as the primary case study, this session will share the collaborative design and research efforts related to the subsurface design of the park to achieve the design vision of “transformation through topography.” In order to create “Smart Hills,” geotechnical settlement monitoring devices were integrated into the topography, further reinforced by soil stabilization measures typically used in highway revetment projects combined with soil bioengineering planting strategies typically used in upland restoration. This project (and others) demonstrate the future of research-activated ecological design interventions in the contemporary design world.

Learning Outcomes:
1. Demonstrate how ecological performance and contemporary landscape design projects address climate change and resiliency in the 21st century through the merger of hard and soft engineering practices.
2. Understand successes and challenges of integrating geotechnical engineering interventions with landscape infrastructure during design and design implementation.
3. Examine strategies for utilizing bioengineering techniques as a means for upland stabilization.
4. Gain insight on soil/landform/earthwork relationships.
Fabrications: Making and Simulation in Contemporary Landscape Architecture

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Keyword: fabrication, simulation, 3D printing, thermoforming, CNC milling

Choices and assemblies but also in the way they experimented with the making of pavements, walls, stairs, and objects. This foundation of experimentation and innovation emanated, at least for some, from the influence of French Modernists such as Robert Mallet-Stevens; his abstract pre-cast concrete trees in the 1925 exposition in Paris caught the eye of Fletcher Steele who in turn wrote about it in American journals which were eventually read by Dan Kiley and Garrett Eckbo, among others. This paper reviews the current emphasis on physical and digital making and simulation in the profession and the academy in order to trace the lineage of today’s methods back to the earlier approaches to making. From the pre-cast concrete tree stumps and limbs as fence posts and rails in Butte Chaumont to Eckbo’s Alcoa Garden to the use of foam milled machettes to houses created with 3D printed concrete, it is clear that making and fabricating in landscape architecture has undergone a major transformation and will continue to evolve rapidly. Examples from both built work and student exercises will illustrate just how far the profession has come and the unlimited possibilities available through the application of new technologies.
Reviewing and Critically Assessing the Extent to which Maintenance Regimes Are Considered by Professional Landscape Architects

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Keywords: landscape, maintenance, ecology, design

Contemporary urban landscape projects are increasingly expected to provide ecological benefits in addition to aesthetic and social functions. The nature of “living” landscapes, involving plants and trees, evolves over time, and therefore the ability of these projects to establish and perform their aesthetic and ecological return on investment requires ongoing and regular maintenance. Yet, the most recently published Landscape Specification Guidelines per the Landscape Contractors Association of Maryland, DC, and Virginia does not include maintaining ecological functions as part of long-term maintenance principles. This presents a concerning scenario regarding the ability of such landscape architecture projects to perform their ecological, in addition to aesthetic, design intention. This project extends from this conjecture into a structured investigation into the landscape profession toward a comprehensive assessment of the degree of influence of long-term maintenance regimes on design strategies. Issues of plant establishment, biodiversity, resiliency, aesthetic intentions, as well as accountability as land stewards will all be considered as a part of this inquiry. As such, the underlying questions of this investigation are as follows:

• What maintenance considerations and consequences affect aesthetic design intentions?
• Can or should a maintenance regime not guide the design rather than vice versa?
• Is the landscape profession confirming its role as land stewards, and providing investment services to clients?

The project will critically analyze a rigorous maintenance-regime-centered framework of the principles and practices of select professional urban landscape projects in the mid-Atlantic. In This project is intended as a precursor to a follow-up urban landscape project using ecologically holistic maintenance strategies that may guide design decisions toward a long-term pattern of human interaction with functionally resilient living systems.

Learning Outcomes:

• What constraints dictate the long-term management goals, and what alternative strategies can be designed?
• What maintenance and ecological needs can and/or should be addressed through design intentions?
• What strategies can landscape architects use in design to influence maintenance standards and greater fulfill their role as land stewards?
Integrating BIM into LA Education

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Keywords: BIM, workflow, 3-D, model, intelligent

Building Information Modeling (BIM) has been widely used by the building and construction industries throughout the past two decades. BIM is two things: (1) a process or workflow, and (2) an intelligent 3D virtual model. It is largely about a multi-disciplinary team (architects, landscape architects, engineers, contractors, clients/owners, and other project stakeholders) collaborating, from the inception of a project, to design a detailed, intelligent 3D virtual model of that project to be used for analysis, visualization, construction documentation, and implementation.

Successful BIM use depends on sharing data in a common format/software. Some common software options (e.g., Autodesk Revit, Vectorworks Architect, Graphisoft ARCHICAD, and others) exist for creating BIM models. Unfortunately, they all cater largely to buildings and building infrastructure, and offer inadequate tools for site analysis, site design, landform design, or landscape detailing. While BIM instruction is standard in many architecture, engineering, and construction management curricula, it is relatively uncommon in landscape architecture education. Without some BIM exposure and practice in school, landscape architecture graduates will be at a distinct disadvantage when seeking employment with many of the larger planning and design firms now invested in BIM. Furthermore, the lack of attention to BIM in academia may put landscape architecture in danger of being a non-factor in, or completely left out of, significant projects or project teams. Our profession cannot afford to let this happen.

In partial response to this concern, the Department of Landscape Architecture at Ball State University recently added a fourth engineering course to its BLA curriculum. The majority of the course focused on BIM theories, workflows, and technologies. The software of choice was Revit, partly because it is currently the industry standard BIM tool, and partly because it was available at no cost. The pedagogic intent was two-fold: to immerse students in the BIM process (albeit not in the true interdisciplinary context BIM is meant to be experienced), and to look beyond the known inadequacies of Revit and explore ways of creatively and effectively using it for landscape analysis and design. Now that the course has been taught multiple times, the authors are ready to share how BIM was incorporated, what went well, what needs improvement, and how BIM may best be incorporated in LA education. They will present a compelling argument that LA educators should use the inevitability of BIM as motivation to move away from static 2-D design methods, toward intelligent 3-D workflows.
Overcoming Regulatory Barriers to Nature Play and Learning—Both Real and Perceived—in Child Care Facilities

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Keywords: outdoor learning environments, nature play, learning places, childcare licensing regulations, environmental rating scales, playground standards

Time spent playing in naturalized outdoor settings has been linked to a variety of positive health and wellness outcomes. It has been associated with improved gross motor skills, improved concentration, reduced stress levels, and higher physical activity. However, many childcare facilities continue to provide low-quality outdoor areas with static equipment and surfacing that offer few affordances for play and learning. The complex web of laws, childcare licensing regulations, accessibility regulations, and assessments tied to reimbursement rates for government-subsidized childcare may deter some childcare facilities from implementing nature play and learning settings. Designers and childcare professionals working with very small budgets—sometimes only a few thousand dollars—are unlikely to have the time or ability to go through hundreds of pages of regulations to find the few that apply to a specific setting. Even if the practitioners do manage to navigate these documents, they may have difficulty understanding how their requirements apply to nature play and learning settings, as many requirements were written with playground equipment in mind.

This presentation will introduce two practitioner guides, created by the authors in collaboration with others, that aim to make it easier for designers and childcare professionals to navigate the complicated regulatory environment related to childcare facilities in Texas and Colorado. The presentation will also build off of reports analyzing key regulatory language related to Texas, Colorado, and North Carolina childcare facilities, and offer reflections on areas where this language might be improved to remove both real and perceived barriers to naturalizing outdoor learning environments. This body of work has been informed by key informant interviews with childcare center directors, early childhood educators, regulators, government officials, designers, and design instructors; critical engagement with the language of the regulations and standards themselves; and feedback by key informants based on an initial draft.

Opportunities for removing barriers to nature play and learning that have been discussed in the guides and/or reports will be identified. Examples include clarifying when nature play features meet the definition of playground equipment, explaining opportunities for integrating trees into composite play structures, and providing new language regarding the integration of
playground equipment into topography. The work is being summarized with the hope it may influence other landscape academics to conduct similar projects in other states.
Film
Gear Up KY: Landscape Architects Influencing Radical Change in Education

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Keywords: design education, creative thinking, pedagogy

GEAR UP Kentucky is a six-year grant program that was funded by the U.S. Department of Education from 2011 to 2017. The program serves 29 middle schools and their corresponding high schools in the state of Kentucky. Students who attend a GEAR UP school and entered the seventh grade in 2011, 2012, or 2013 are GEAR UP Kentucky students. The program provides services for students beginning in seventh grade continuing until at least 2017. One of these services is the Summer Academy offered during students’ junior and senior years of high school. These immersive experiences were offered in partnership with universities across the state in order to best prepare students for college and career readiness.

The film follows 22 high school students and their instructors during the 2017 Summer Academy. Together they engage in an immersive creative problem-solving experience designed to investigate the future of programs like GEAR UP in Kentucky and generate innovative pathways moving forward. Watch as the students are introduced to a new way of thinking, the Creative Process.

This short film highlights landscape architects stepping outside of their traditional role in response to a call for action. This step outward requires landscape architects to extend beyond the landscape and environment while looking inward to share a way of seeing and experiencing the world. It is based on the realization that landscape architects are uniquely qualified to transform the model of education in the United States. They can become agents of change on a much larger and impactful scale, helping shape the minds of the next generation.

Led by landscape architecture faculty and students, this project demonstrates the power landscape architects possess when moved to respond to this call for action. It highlights the tremendous impact landscape architects can have in the effort to reimagine education at all levels and across various modes of engagement. This project and others represent a model upon which a larger effort can build to effect change in education.

https://vimeo.com/223818676
pw: gearup
In Three Acts: Sequence in Art and Nature

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Keywords: landscape, music, experience

The current landscape architecture discussion is largely dominated by performance metrics and assessments that attempt to objectify and categorize human behaviors. These measures are often useful and appropriate. Another dimension of our work is the relationship between experience in the landscape and the feelings it generates. This proposal attempts to make the pragmatic points that awareness exists in many forms, each of us has unique tools with which to approach our work, and transforming the discussion may require us to suspend conventional mindsets. Frederick Law Olmsted wrote: “landscape moves us in a manner more nearly analogous to the action of music than anything else—an effect—of a kind that goes back of thought, and cannot be fully given the form of words” (Beveridge, Rocheleau, 1995, p. 35). If words are not suited to convey feelings generated by landscape, can one, as Olmsted implies, approximate them with music? Can one come closer to understanding our emotional reaction to landscape by making music that draws form and structure from it? Can intense observation and interpretation lead to expression that resonates and inspires?

In Three Acts is a movie created by a landscape architect who has spent years making music. Its video component is a single, uncut, fourteen-minute shot of ocean waves which appear to break according to a script. Mapped over time, the amplitudes of the waves form a pattern of three sections of activity, each rising to a climactic moment followed by a period of relative calm (please see the trailer submitted separately); the third section has the highest climactic amplitude. The video sequence is a three-act play of ocean waves. The second component of the movie is music composed to sound like the ocean looks. The music takes its cues from the timing of the waves and the changes in the colors and patterns of the light.

In Three Acts is primarily a free-standing work of art. It is not intended to introduce a general method for use by landscape architects. Still, the experience of it, and thinking about its motivation, method, and design process may lead to something useful. Sometimes successful creative collaboration is the result of the introduction of an alternative perspective. We do not have the words to talk about the way landscape affects our emotions. Maybe “transforming the discussion” requires that we begin not by speaking, but by seeing and listening together.

Trailer:
https://vimeo.com/233115154
Introduction to Stream Restoration: Lessons Learned from Wildland Hydrology Short Course IV: River Restoration and Natural Channel Design

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Keywords: stream restoration, natural systems, fieldwork, ecological restoration, construction monitoring

Dave Rosgen has been called the Restoration Cowboy, and at age 75, he estimates he has had 11,000 students in his four Wildland Hydrology short courses. Rosgen’s courses are a required qualification for bidding on stream restoration projects in states like Minnesota and Wyoming. Rosgen’s watershed assessment and sediment supply modeling methods are being implemented at the federal regulatory level. The Wildland Hydrology courses attract mostly engineers but also fisheries biologists, regulators, and allied disciplines. Through six weeks of the four courses (in four states) and among 150+ students, however, I encountered only one other landscape architect and two other educators (in environmental science and geography).

This video presents lessons learned in Rosgen’s Course IV and is an introduction to stream restoration I use in my landscape architecture course, Natural Systems Design. I filmed it at Green Creek Ranch, Yampa River, Colorado in August 2017. This video details Wildland Hydrology’s direct involvement during the construction process, presenting an alternate model for the role of the designer (Brandon Rosgen) on site during construction beyond monitoring and management, and also depicts the firm’s close working relationship with contractors (Chaparral Construction). The goal of this 35-minute video is to introduce landscape architecture students to basic principles of stream restoration design and serve as the prologue to fieldwork evaluating streambank stability, stream pattern, and form.

As water becomes an increasingly precious resource, strategies to elevate groundwater and improve urban stormwater management will become increasingly important tools in the landscape architect’s arsenal. Our students enter studios often not knowing what they don’t know. Engaging short videos can capture students’ attention, facilitate interest in new subject matter, and (most importantly) quickly help them become aware of subject matter they do not yet know. The accessible nature of film also helps students to bridge between abstract concepts and representation, and real-life design and construction operations. According to Brandon Rosgen, “If this kind of work isn’t fun, you’re not doing it right.”

Link to video: https://vimeo.com/233352412
Password: yampa
Plastic World

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Keywords: film, story of a place, farming town in Turkey

A short film (2015) was made from footage shot as an aide-memoire whilst on a study trip to a rural area in southwest Turkey. The film illustrates the village of Kumluca, an agricultural settlement founded in 1950. Located in a relatively inaccessible area locked between mountain and sea, Kumluca was chosen as a study for rural change undertaken by the LE:NOTRE Landscape Forum in 2012. The film has been shown in several European, Canadian and U.S. universities (GSD Harvard; UBC, Vancouver; Westminster, University of London; TU Graz, Austria and UCD Dublin) as well a public showing in Dublin.

This paper describes the audiences’ reaction to the landscapes shown in the film, and discusses cultural stereotypes and preconceptions about rural communities, farmland, farming, the countryside and the landscape. The oral presentation includes clips of the film allowing a virtual visit of an otherwise exotic and inaccessible place. It provides a glimpse of an unusual farming community, and prospering settlement that defies easy description.

Kumluca has been transformed by connections to the “global city.” Its people are wealthy. Proud of its success, Kumluca celebrates agriculture in its urban core. Remote, connected, traditional, and modern all at the same time, Kumluca forces us to re-imagine “rurality,” a discussion too often neglected in our focus on the urban world.

https://www.youtube.com/watch?v=XP6fkBaetek
In the Field and in the Ether: Video Mapping Impressions

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Keywords: Detroit, praxis, landscape architecture, video mapping

The Detroit Praxis Studio explored history, race and urban change in three African American neighborhoods in Detroit. Studios like these that focus on unique urban environments require a substantial amount of time to immerse students in historic, ecological, and social context and the discussion and analysis of context related to politics, economics, race, and power are difficult to parse because they are so complex and intertwined.

To provide a complimentary approach to the studio discussion and analysis, students recorded short video clips of what they found interesting at any given moment during the site visit to Detroit. They later compiled video clips from Google searches that contained information they were not aware of or that somehow was at odds with what they documented from their meetings with residents, community groups, urban designers, planners, and government officials.

The Field and in the Ether contains student video clips, footage of police and the 1967 Riot, and material promoting Detroit as the Motor City. The production of the final cut, a 6-minute video with a three-frame layout, engaged students in the design analysis and synthesis process requiring the thoughtful review of clips, discussion and consolidation of ideas and finally the design of a visual narrative that expressed their experience of Detroit. The video as a studio exercise encompassed discussion, analysis and representation and provided an alternate form of parsing and reconnecting information gathered in the field. The flexibility of video media allowed students to structure and sustain an audio and visual narrative of their impressions that was ironic and contradictory and expressed the complexity and interconnection of issues in unique urban environments.

Film Preview: https://youtu.be/TDl9jYJga2I

Full Film:
https://drive.google.com/file/d/0B22Hl9uiJ6KIYzNmMkxmOEVtOF/view?usp=sharing
History, Theory, and Culture
ORAL PRESENTATIONS

The Unknown Unknowns: Lessons from the Anthracite Trail

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Keywords: energy landscapes, coal, acid mine drainage, fracking

Donald Rumsfeld famously philosophized the Iraq war in terms of risk awareness, describing “unknown knowns,” “known unknowns,” and “unknown unknowns.” Things we don't know we don't know. Despite public ridicule of the phrase “unknown unknowns,” the concept is essential in assessing proposed activities; we must evaluate known factors, predict unknown elements, and acknowledge that conditions exist or phenomena will occur that we cannot yet predict. Philosopher Slavoj Zizek warns us of the fourth, unstated term in Rumsfeld's structure: the “unknown knowns”—the disavowed beliefs, suppositions, and obscene practices we pretend not to know about, even though they form the background of our public values. Landscape architects can illuminate this fourth realm “the realm of suppressed awareness” through research and creative practice.

Using interviews, field research, and archival materials, this essay presents a history of the “unknown unknowns” that emerged in northeastern Pennsylvania’s anthracite coal mining, and through creative practice, reframes them as “unknown knowns” that frame our values regarding the current natural gas industry in the same region. This essay presents three unnatural disasters: coal mine fires that forced the evacuation of Centralia, Pennsylvania; the Knox Mine disaster, when the Susquehanna River collapsed into a coal mine; and abandoned mine drainage, which coats the Lackawanna and Susquehanna Rivers in iron particulates, suffocating aquatic life. No one could have predicted when the first commercial load of anthracite coal was shipped down the Susquehanna River in 1809 that the same river would be irrevocably ecologically altered by the fuel industry.

The development of hydraulic fracturing, or fracturing, has allowed the oil and gas industry to access deep reserves of natural gas in the shale beds of the region, resulting in a familiar boom: natural resources and new technologies leading to rapid wealth generation and equally rapid risk assessment. The enduring impacts of long-ceased coal extraction warn us of the unknown risks of site-scale intervention into landscape-scale systems. Mining the historic disasters through critical mapping and speculative drawing, the essay provides a framework for discussion of the “disavowed beliefs” inherent in the disasters, points that are uncomfortable to admit and address, but are essential in responsible decision making. These factors led to environmental disasters and the collapse of the regional coal industry, and unless publicly discussed, they may lead to landscape-scale disasters from natural gas extraction as well.
Martha Brookes Hutcheson and the Modern Roots of Ecological Agriculture

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Keywords: landscape history, agriculture, ecological agriculture, feminism, Martha Brookes Hutcheson

Using archival records and field documentation, this essay reveals the ecological underpinnings of Martha Brookes Hutcheson’s Merchiston Farm, situating both ecology and agriculture as integral inquiries in early twentieth-century landscape architecture. And the essay reveals a discipline in transition: engaged in the aesthetic debates of the previous century while deploying emerging ecological and agricultural science to create a terrain for social advances. At Merchiston Farm in New Jersey, Hutcheson synthesized nineteenth-century garden theories of the wild and the architectural garden, using the emerging science of ecology as a mediating terrain. At the farm, we see the stirrings of an environmental ethic as a central inquiry in landscape architecture, distinguishing the discipline from architecture or horticulture. It would take nearly a century for the profession to pick up this thread again and fully integrate ecological, agriculture, and aesthetic production.

The farm is an early example of ecological design, with a water system woven into the aesthetic, recreational, agricultural and conservation programs of the farm, with native plants used alongside productive and decorative plants, and with an ongoing soil and habitat conservation plan. The farm was Hutcheson’s laboratory for the professional implementation of the emerging field of ecology. In the gardens, she explored the ornamental use of “American plants for American gardens,” a position she advocated through her writing and lecturing. Plant associations were selected for their suitability to the local climate, their mutual support, and their use as wildlife habitat. The site’s hydrologic system, organized on its own “wild” structure, is the central spine of the design, linking the architectural forms of the gardens and farmyard. The water course was a complex rainwater harvesting system, used for a range of aesthetic, agricultural, and recreational activities, then released into the creek below. Both functionally and aesthetically, it situated systems thinking and ecological communities at the heart of the design. At the scale of the farm, she implemented a soil and habitat conservation plan, an early version of what we now term ecological agriculture, the careful integration of agriculture with wildlife habitat and corridors and soil preservation and improvement. Farming was also a political activity; Hutcheson was a founding member of the WWI Women’s Land Army, and at her own farm she directed a group of “farmerettes,” providing fertile ground for sustenance as well as women’s education and political activity, determining “not what women can do but what they will do.”
Interpreting Sense of Place in Daehak-ro, a Cultural District in Seoul, Korea

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**Keywords:** sense of place, landscape interpretation, in-depth interview, cultural district, Daehak-ro

This study aimed to explore and interpret the sense of place in Daehak-ro—a cultural arts street designated as the cultural district in Seoul—through the thoughts and opinions of insiders who actually experience it. The study also aimed to identify a sustainable plan for the development and preservation of Daehak-ro.

Daehak-ro was found to have the characteristic of an “unconscious sense of place” which had formed by environment planner and designer. And then, this characteristic applies to most physical, social, cultural, and experiential elements that make up Daehak-ro. It developed as a place of cultural arts, and thus Daehak-ro has continued to be a representative place of cultural arts until the present. While a uniform modern consumer culture is emerging as a result of the integrated designs and socioeconomic changes brought about by urban capitalism, these changes arguably fall within such a range that Daehak-ro’s unique, conscious sense of place is not greatly damaged. Accordingly, Daehak-ro—as a unique, attractive place where the new cultural characteristic of “modern costume” blends appropriately with “cultural arts”—can be understood as a representative place that expresses Korea’s new cultural arts place past and present life.

This study is significant because it examined Daehak-ro’s sense of place by moving away from expert perspectives and focusing on interviews with insiders. Based on the results, the study developed a sustainable plan direction for the preservation and formation of Daehak-ro’s sense of place. Though this study’s results can suggest basic directions and processes for interpreting sense of place, they are limited in terms of suggesting specific planning and design elements. Therefore, a limitation exists in terms of drawing practical implications. Follow-up studies using this study’s suggestions for preserving and improving Daehak-ro’s sense of place can formulate more concrete strategies.
Beyond Environmental Elegy: Spatializing Narratives of Loss

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Keywords: Anthropocene, commemoration, climate change, design, extinction, memorial

The physical consequences of biodiversity loss, environmental degradation, and climate change have been well documented, and more is being said about emotions connected to major environmental impacts. This paper explores the role of design theory and practice in marking environmental losses and changes to places of personal and collective significance. I draw upon the early literature on associated emotions and affect, including work from the ecological humanities, psychology, and biology, and pull this together with the work of artists and curators to explore the implications for landscape architecture design theory and practice.

Designers generally focus on creating beautiful and pleasant places where one might connect with nature in a positive way. They do not often engage with emotions such as grief, anxiety, guilt, and despair. Yet, as illustrated by the important role played by memorials in most societies, designed spaces can serve as important points for publicly addressing traumatic histories and memories in collective forums. While landscape architects have done the important work of highlighting human intervention in the landscape and making ecological processes evident in designed terrains, I explore how design practice might also respond to the emotional aspects of environmental loss and climate change. Such sites can play a role in transforming public grief into political resistance, but to do so they must move beyond pastoral forms, lament and nostalgia.

Explored in the paper are a number of recent projects that address climate change and environmental losses, which are explored as means for enfolding explorations from other disciplines into spatial design approaches. Strategies are examined that include the two-dimensionality and linearity of text, sculpture, art practices, and spatial experiences. Examples include The Moth Snowstorm, written by environmental journalist Michael McCarthy, Maya Lin’s What Is Missing? project, and the Mass Extinction Monitoring Observatory currently under construction in England. This accounting is directed towards drawing some conclusions about how design practice might develop along these lines, and then extend beyond elegy and mourning to create sites for reflection, commemoration, and experience of a variety of emotions in relation to changing environments. This does not mean that designed spaces must offer overly didactic messages. Rather, what is important is that they offer physical sites that allow for engagement over time, creating embedded encounters that include feelings as well as ideas.
Transforming the American Garden: Looking Back at 12 “New” Landscapes

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Keywords: landscape architecture, garden design, postmodernism, art, exhibitions

In the mid-1980s, an emphasis on lightness, authenticity, and artful presentation defined new movements across a broad range of subjects from gastronomy to physics. In the field of landscape architecture, a similar attention to playfulness, truth (the search for a philosophical base), and representation characterized many works of the era, and was evident in a key exhibition of “new” landscape design held at the time. Titled “Transforming the American Garden: 12 New Landscape Designs,” the 1986 exhibition received widespread attention from the design community, both within and beyond landscape architecture. Looking back at the work presented in this exhibition (and the critical debate it prompted) presents an opportunity to assess what trends influenced landscape architects then, and what, if any, paradigms evolved in the intervening decades to “transform” American garden design.
An Uncommon Collaboration: Charles Platt and Olmsted Brothers in the Country Place Era

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Keywords: country place era, Olmsted brothers, historic designed landscapes

The artist and architect Charles Platt was among the most influential designers of the country place era. Beginning as an artist, he would become a garden designer and an architect with commissions ranging from academic buildings to estates and estate gardens. His 1894 work Italian Gardens was instrumental in re-introducing the designs of renaissance and baroque Italian villas to the United States and would help make the academic classicism of the Beaux-Arts a powerful influence in the design of buildings and gardens. By 1910 Platt had focused his practice on architecture, collaborating with some of the era’s finest landscape architects, most notably with Warren H. Manning and Ellen Biddle Shipman at Gwinn, the Mather estate near Cleveland, Ohio.

Percival Gallagher and Edward Clark Whiting were among the most trusted members of the Olmsted Brothers staff. Gallagher became noted at Olmsted Brothers for estate gardens, fusing a degree of the romantic pastoralism still part of the Olmsted legacy with more formal and classical elements made fashionable by Platt and others. Among Gallagher’s notable gardens is Oldfields, the country place estate of Hugh Landon and, later, J.K. Lilly in Indianapolis. Here, Gallagher would powerfully and skillfully weave a series of garden spaces surrounding the house of architect Lewis Ketchum Davis.

Though Charles Platt and the designers at Olmsted Brothers were much sought-after, and each was open to collaboration, they would work together on only four residential designs during the era: an early commission that has been destroyed; a later commission completed only after Platt’s death; and two extant examples of mature work executed as a single design project near Youngstown, Ohio.

In 1914, steel magnates James A. Campbell and Richard Garlick, directors and officers of the Youngstown Sheet and Tube Company, each commissioned a house from Charles Platt and hired Olmsted Brothers to provide a siting and garden. The resulting complex provided each owner with extensive private gardens connected by a commons of pasture and orchard. This paper illustrates the houses and gardens resulting from this collaboration, focusing on the common threads of each designer’s work through an investigation of selected precedent projects. The paper also presents the social and economic context of this project and argues for the importance of this unique collaboration as both a typical and atypical example of country place era design.
Claremont and Stone Cliff: A Case Study of Hidden Cemeteries in West Virginia’s Coal Country

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Keywords: cemeteries, coal mining, cultural landscapes, New River Gorge National River, West Virginia

Located in southern West Virginia, the New River Gorge National River (NERI), established in 1978 by the National Park Service, includes nearly 73,000 acres of rugged wilderness. Around the turn of the 20th century, this area contained over fifty coal company towns, home to thousands of miners and their families. Today, most physical evidence of these places has been erased by time and nature. Although the coalfields of southern West Virginia were booming for several decades, robust documentation and analysis of coal camps and associated landscapes does not exist. Very little is known about NERI’s cemeteries, usually segregated by race and sometimes ethnicity, and they are particularly difficult to locate. This study focuses on two settlement locations along a 2-mile stretch of the New River, Claremont and Stone Cliff.

Fieldwork in this densely wooded area has revealed several burial areas on the narrow strip of land between the banks of the New River and the parallel railroad tracks and road. Physical documentation of the area, including GPS/GIS information, has been conducted as well as related research in genealogy, railroad history, and mine ownership records. Although very few traces of the isolated hollows of Claremont and Stone Cliff remain, this case study stitches together a patchwork of clues to reveal information about the lives and landscapes of the New River Gorge during the heyday of coal mining in the region.
History of the Minneapolis Park System: Lessons for Contemporary Urban Design

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Keywords: park systems, urbanism, Minneapolis

If, as Charles Waldheim asserts, contemporary landscape design requires “new modes of description, new forms of scholarship, new models of discourse,” then might it also need a new kind of landscape history? (Waldheim 2006, 16). Indeed, when historians declare that “the [Back Bay] Fens was complete at the time of Olmsted’s retirement in 1895,” it is apparent that LA history, based on art and architectural historiographical methods, presents landscapes as framed and finished objects, rather than the dynamic, open-ended ecosystems today’s designers hope to create. (Zaitzevsky 1982, 57). What new insights might emerge if landscape history instead engaged the systems-based “thematics of organization, dynamic interaction, ecology, and technique” currently espoused in contemporary urbanism (Corner 2006, 23)?

Analyses of late 19th-early 20th-century American park systems can yield such insights, as demonstrated by an historical exploration of the Minneapolis Park System, widely heralded as “the best-located, best-financed, best-designed, best-maintained public open space in America” (Tate 2001, 179). First envisioned by H.W.S. Cleveland in 1883, the system transformed an ancient route of the Mississippi River into a landscape framework that defines Minneapolis as the “City of Lakes.” Expanded in 1907-1935 under park superintendent Theodore Wirth, the system now encompasses 6,500 acres and 26 miles of parkways structured around an ostensibly natural, yet highly engineered hydrological system.

This paper will demonstrate how, in the 19th century, the Minneapolis Park System engendered characteristics ascribed to contemporary landscape architecture, such as “the ability to shift scales, to locate urban fabrics in their regional and biotic contexts, and to design relationships between dynamic environmental processes and urban form.” For example, the park system’s diagrammatic origins and its continuing evolution demonstrates “regenerative” or “emergent” design principles, where form is not set, but emerges from changing environmental and social conditions. Similarly, the park system’s collaborative implementation by city administrators, design consultants (e.g., Warren Manning, Edward Bennett, Garrett Eckbo) and community partners demonstrates the employment of “imperative” implementation techniques (Corner 2006, 24, 28; Koh 2013, 248; Barnett, 2013). In using a systems-based lens to analyze the history of this important, yet relatively unexamined park system, this paper hopes both to broaden approaches to LA history and to embrace precedents beyond the Olmsted canon to better reveal the role of landscape architecture in American urbanism. The writing of this “new kind of history” may, in turn, help better connect landscape architecture’s contemporary aspirations with those of the profession’s past.
From Natural Forms to Phenomenal Richness: Aesthetics and Function in Landscape Design

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Keywords: aesthetics, design theory, modernism, landscape urbanism, nature

Aesthetics remains a vague and contested term within landscape architecture. Aesthetics is what distinguishes design work from engineering, yet we struggle to define the term. Without a clear articulation of aesthetics and its value to design, it will continue to be considered a superficial add-on to instrumental problem-solving; and design will continue to be considered an add-on to engineering. In order to better understand the role of aesthetics in design, this paper explores the definition of aesthetics through three historically-influential texts: Marcus Vitruvius Pollio’s (Vitruvius) classical triad of durability, convenience, and beauty; Louis Sullivan’s modernist claim that “form ever follows function” and James Corner’s presentation of landscape urbanism in “Terra Fluxus.”

Each of these foundational texts justify aesthetic choices by referring to nature. Vitruvius uses the mathematical proportions found in nature, Sullivan turns to the efficiency of evolution, and landscape urbanists claim ecological metabolisms as a natural imperative for design decisions. However, each of these architectural periods expresses a distinct aesthetic style that is not contingent on a natural law or function; suggesting that, in design, there remain aesthetic choices that are human choices and not simply effects of natural systems or laws. These choices work within the constraints of the material world but also allow for human creativity.

A closer reading of these texts reveals that, for their authors, design includes more than mathematical principles, functional efficiency, and ecological processes. For all of them, design also involves a subjective, human experience: a pleasurable experience of beauty, according to Vitruvius and a poetic engagement with the physical world, according to Sullivan and Corner. When the aesthetic experience—defined as the human experience of our physical world—is included in the design process, design is no longer limited to practical, mechanical, or organic functions; design also includes the human desire to experience, interpret, and express our own interactions with the world. Corner suggests that design has the most potential to enrich our experiences through the small, local, tactile, and particular details of everyday life. Defining landscape aesthetics as a human experience of “the phenomenal richness of physical life” (Corner 32) reclaims landscape architecture’s value to everyday life without reducing it to functional outcomes.
Designing for Production and Pleasure: Insight from the Orchards of Monticello and Mount Vernon

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Keywords: productive landscapes, orchard, fruit garden, Monticello, Mount Vernon

Contemporary landscape architecture discourse suggests that high performance landscapes should be both functional and aesthetically pleasing. This is especially important for urban agricultural landscapes. While agriculture outside the city is frequently both functional and beautiful, it remains a challenge to create aesthetically pleasing urban agriculture. However, we are not without designed landscapes that meet this goal in small areas. Historic orchards offer insight. Even the etymology of the word orchard suggests a dual purpose. Orchard combines the Latin word hortus and the Anglo-Saxon word yard. If hortus suggests a more refined space, yard leans toward the utilitarian.

During the late 18th-century and into the early 19th in the United States, orchards took two forms: farm orchards and fruit gardens (Dolan 2009, 26). American plantsmen and landscape designers, such as Thomas Jefferson and Andrew Jackson Downing, used the term fruit garden for their enclosed orchard plantings near their homes (Downing, 1857). What were these fruit gardens like? How did they integrate production and pleasure? What insight might they provide for contemporary designers? How has labor and maintenance changed? What limitations or opportunities are now present for urban fruit gardens?

Through field investigation and archival study, this paper analyzes the reconstructed fruit gardens at Thomas Jefferson’s Monticello and George Washington’s Mount Vernon to understand how they perform. These particular orchards are quite faithful to the plans and practices of their original owners (Hatch, 2007, and Griswold, 1999). The analysis shows that both emphasized diverse species and cultivars, serving as living laboratories to test the viability of many tree types for practical use. Both displayed trees in outdoor rooms, extensions of the home, designed for contemplative strolls and entertaining guests. Furthermore, Jefferson and Washington practiced grafting and espalier pruning of trees on dwarf rootstock to shape the scale and form of their orchards, creating distinctive spaces in their fruit gardens for sheer enjoyment. Such efforts were a significant step beyond the pure production of farm orchards, and evidence of the important aesthetic role of their fruit gardens. Of course, these gardens developed in a very different context with labor by enslaved persons. Now, we embrace a free labor structure, which often means a limited volunteer workforce for urban agriculture. Nonetheless, the practices of planting and maintaining these historic orchards are viable models for how to integrate food production into garden-scale landscapes in delightful ways, particularly within the constraints of contemporary urban areas.
The Role of Plants in James C. Rose’s Gardens

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Keywords: plants, gardens, James C. Rose, design

Planting is a major component in James C. Rose’s gardens that is constantly addressed throughout his writings and garden manifestation since he advocates that understanding the intrinsic qualities of these media is a prerequisite for any landscape designer. Rose rebelled against prevalent planting approaches of the beginning of the last century, according to which, plants were simple representations of nature that were introduced into the landscape schemes in eternal aesthetic/decorative ways, overemphasizing the idea of the garden as a collection of specimen plants without any direct relation to space concepts. To the contrary, plants, for Rose, are landscape materials which defy gravity. As design material, they are kinetic, not static; they are alive, and, thus, grow, change and interact with their environment; and finally, they also hold a dynamic interaction with time, having the potential to affect our human perception of time. Their appearance is never absolutely predicted or determined. To design with plants, Rose argues, requires an acknowledgment that the end product, the garden, is never “finished” as a static creation, arguing that, “finish” is another word for “death”. Moreover, he views plants as a landscape medium that can create “interspatial vistas” through which gardens are experienced.

A trajectory evaluation of planting design schemes is attempted through a close examination of a number of James C. Rose’s gardens. Early modular gardens of James Rose designed in the early 40’s and 50’s provide us with early planting schemes in which the plants, mostly big trees, are used as primary space definers. In this early stage of Rose’s gardens, it is interesting to notice that flowers and mixed color planting proposals are part of his planting schemes. In later, and more mature years, as can be observed in a number of case studies from the 70’s-90’s, Rose thought of plants, basically big trees and massive shrub formations exclusively in green color variations, as a major landscape material that allowed him to create garden space and established the notion that plants are the best definers of habitable spaces. In his gardens, ranks of evergreens form walls and provide privacy, specimens appear to pierce space and dictate movement, trunks of tall deciduous trees create canopy and give a sense of enclosure while outdoors, and individual plants stand as fine sculptures.
The Experience as a Conceptual Image of Parks: Considering the Perspectives from Modern Recreational Park History

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Keywords: modern parks history, park experiences, recreational landscape

What image parks remind of? For parks, someone thinks a green grassed “place,“ others “activities” there like walking, and others spatial “meaning” like social exchanges. They are conceptual images of parks formed over a long time. “Park” is a conceptual word with a common ideal reminding of a certain scene without any additional explanation. Through what process has this park image been formed?

This study aims to examine factors affecting process where today’s conceptual image of “Parks” has been formed. Parks in Europe before the invention of urban parks and parks as perceived by people today are different. In 15th century England, a deer park had fences or walls around it, and its purpose was animal hunting and only certain classes of people could use it. Today, people do not imagine or expect from parks the same appearance, activities and users with those of a deer park. However, components of the 15th century park still exist. For instance, animals still remain as difference species, habitats and materials in national parks, urban parks and theme parks. This means parks have changed with the times, but such changes are also within the broad conceptual frame of parks.

Is people’s “park” image determined by appearance formed with traditional park components? Or is it affected by how parks are used? This study contemplates “experiences” in parks as a factor constituting today’s conceptual image of parks. First, park category from ancient gardens, urban parks to theme parks was classified by park experiences, mainly with the literature of Karen R. Jones and John Wills, and Galen Cranz, which covered history and types of parks in modern times. Experiences were classified into walking, riding, sports, spectating, children’s play, shopping, and environmental awareness. Next, the literature was reclassified by the content on park components supporting each of the classified experiences. Finally, this study interpreted changes in park components observed in the process where each experience took root as universal park activities of contemporary times. Interpretation result revealed park experiences have been deployed through processes of “ordinary park experiences,” “derived from park experiences,” and “mixing with park experiences.” Depending on experience type, characteristics of park components supporting it have changed. This study shows park activities taken for granted today consist of the convergence of constant social needs, competition with other places and changes in perception. Further, such convergence came to work as a conceptual image for contemporary parks.
Contemporary Research Topics of Landscape Architecture in China

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Keywords: landscape architecture, China, contemporary, localization, modernization

Based on a study of the proceedings from two key landscape conferences held in 2013 and 2017, contemporary research topics in landscape architecture in China appear to have reached a “fork in the road.” Either to maintain a focus on the balance between advanced theories and traditional values, or to intensify an orientation toward scientism and systematic research. Previous periods have established and formed the current professional and academic system in landscape architecture in China, a system of dynamic balance between localized foreign theories and modernized traditional theories as a whole both in teaching and practice.

The project uses classification and interpretation methods to analyze content and achievements of academic discourse from two conference proceedings: first, a major collection of 58 full academic papers presented at a conference entitled Landscape Architecture of Tomorrow, which in 2013 celebrated the 10th anniversary of the Graduate MLA program held at Tsinghua University, Beijing. The second is a collection of 250 abstracts focusing on Chinese topics for the 2017 CELA conference held in Beijing. Both conferences include authors representing most of the Landscape Architecture professional programs in China.

In the first phase of analysis, each paper in the proceedings is analyzed for key content and terms. The second phase uses classification and interpretation of themes to reach a new understanding about current status and values among Chinese landscape architects. In comparison to the most popular keywords in 2013, where there was a widespread discussion of tradition, culture, and space, in CELA 2017 the highest frequency word is “urban.” This suggests landscape architecture is moving into an active, influential and elemental role in the urbanization of China broadly. In addition, scholars increasingly pay attention to “non-core” topics like technologies, pedagogy, and gender.

Based on these interpretations, future directions in teaching and practice are explored. Against the background of contemporary conditions, Chinese landscape architects are searching for new sources of inspiration and values that can transcend the current situation, but are also authentic to China herself.
Transforming from Cultural Relics to Multiscale Landscape Settings: Research on the Integral Conservation and Exhibition of Cliff Inscriptions in Mount Taishan of China

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Keywords: cultural relics, landscape settings, cliff inscriptions, integral conservation

The cliff inscriptions in Chinese sacred mountains are one of the most important types of cultural relics. It is very important to protect the cultural relics with its settings. In the past, the protection work of cliff inscriptions mainly focus on the stone body in very small spatial scale, about threats of the such as weathering by water and wind, and the physical and chemical protection technology to prevent further weathering. With rapid tourism development and facilities construction, the cliff inscriptions and their settings are under the trend of commercialization. Without the environmental information, the value of the cliff inscriptions could not be protected integrally, and could not be displayed and understood by the public deeply and comprehensively. Transforming of the protection concepts and methods is urgently needed: from relics to multi-scale settings.

Mount Taishan is one of the main symbols of Chinese culture. It is a world natural and cultural heritage site. There are more than 700 cliff inscriptions in the mountain, from Qin Dynasty and Han Dynasties, till to the Ming and Qing Dynasties. This study takes the cliff inscriptions protection in Mt. Taishan Sacred Mountain in China as a case, to discuss how to transform from “protecting cultural relics ontology” to “protecting integrity of cultural relics and its settings,” especially how to implement it from theoretic concept to practical frameworks, guidelines and cases.

Firstly, the study analyzes the characteristic, content, style, etc., of the cliff inscriptions, and summarizes its historical value, cultural value and landscape value. Then, two types of relationships between the lithography body and the settings are established: “host” or “guest.” The “host” means, the historical information and artistic information of cliff inscriptions are the main body, and the whole settings could be seen as to help creating the context of stone carving. The “guest” means, the environment is so wonderful, the cliff stone help to highlight the artistic conception of the whole settings. Thirdly, the specific factors of relationship between ontology and settings are refined, including the analysis of its large spatial sequence positioning, the surrounding natural environment, cultural and historical atmosphere, regional and peripheral visual landscape requirements, etc., Finally, protection and recovery measures, from different distance and space scale, are defined based on the analysis; as well as various demonstration measures. Two specific sites of the cliff inscriptions in the mountains are chosen to explain the detailed framework.
Generic Terroir: Place Identity in 21st Century Agriculture

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Keywords: terroir, agricultural landscapes, place identity, landscape meaning, cultural landscapes

In the era of globalization and rapid urbanization, place-identity has come to play an increasingly important role in shaping consumer perceptions of food quality. The concept of terroir has consequently gained traction in agricultural and anthropological discourse. Often mistranslated as “around” or “toil,” the French term terroir describes the tangible and intangible characteristics of a region that imbue unique qualities to its products, typically wine. Terroir frames the productive region as a place, defined by its unique physiographic, cultural and historical genealogies. While much has been written about place-identity within traditional, local, and slow food practices, there remains an opportunity to explore the terroir of contemporary, industrialized food systems. If the people who tend to it, the minerals in the soil in which it is grown, and the local microclimates of the area shape terroir, how is the essence of place made manifest in an era of globalization and agricultural mechanization?

This paper attempts to define the terroir of 21st-century agriculture by looking to the world’s most productive and heavily subsidized commodity crop: corn. In the U.S., corn uses more land than any other crop, spanning over 90 million acres that produce over 14 billion bushels annually. Corn is used as dairy, beef, swine, poultry, and even catfish feed. It is converted into ethanol, high-fructose corn syrup and bio-based plastics. In addition to consuming land and water resources, modern corn hybrids require more nitrogen fertilizer than any other crop, some 5.6 million tons of nitrogen annually. The intimidatingly vast scale of corn production is countered by the universally standardized methods of agricultural production. The homogeneity of corn production makes it the ideal case study in generic terroir. To know the character of a single cornfield in Iowa, is increasingly to know that of all cornfields in the United States, if not the world.

Using Jefferson County, Iowa—the nation’s highest yielding agricultural county—as a case study, commodity production is mapped in relationship to the physiographic and cultural qualities of the Corn Belt. Analytical drawings of past and current production methods contribute to a greater understanding of one of the world’s largest industries, the scale and pervasiveness of which is profoundly affecting contemporary regional identities. Building upon the arguments of Rem Koolhas, Keller Easterling, and Pierre Belanger, the underlying objective is to understand the ways in which contemporary agricultural production constructs (and constricts) identity across the American landscape.
Sustaining Beauty and Amazing Grace: Reflections on the Lexicon of Landscape Aesthetics in the Anthropocene

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Keywords: linguistics, aesthetics, history, sustainability

This paper builds on history and contemporary aesthetic theory in landscape architecture, as well as premises from cognitive linguistics (e.g., Lakoff, Johnson) and actor-network theory (e.g., Latour 2017). It is prompted in part by Elizabeth Meyer’s manifesto, “Sustaining Beauty: The Performance of Appearance,” which was published in 2008 by the Journal of Landscape Architecture. Meyer’s provocative essay sought to reinsert considerations of aesthetics into discussions about sustainability in landscape design. In establishing a foundation for discussing aesthetics, Meyer remarked, “while some early-21st-century readers, this author included, might find accounts of grace a bit odd, I do find intriguing the idea that the sensuous perception of beauty could charm, as in influence or persuade, one’s intellectual and moral position.” Perhaps the oddness of words such as “grace” and “charm” is what prompts Meyer to largely abandon these antiquated terms in favor of “beauty.” Yet such odd words were tightly woven into the discourses of earlier generations of landscape architects. They circulated prominently within the milieu of Romanticism that flourished at the time, and they also resonated with the everyday experiences of people whose sustenance derived directly from their own labor in the land. It is perhaps worth pausing, for a moment, to recall that many of landscape architecture’s early practitioners entered the nascent profession through the portal of agriculture. Is it a coincidence that as the profession moved further from its agrarian roots—indeed, as modern society as a whole became increasingly urban and detached from the productive countryside—that words such as “grace,” and “charm,” faded from the lexicon of landscape aesthetics? If Meyer’s manifesto sought to “insert aesthetics into our discussions of sustainability,” this paper aims to broaden the discussion beyond “beauty” to briefly ponder the rehabilitation of seemingly antiquated notions such as “grace” and “charm.” While not synonymous with beauty, the semantic fields of these concepts nonetheless overlap in ways that further elucidate the power of aesthetics that most interests Meyer: the capacity of aesthetic experiences to alter one’s moral stance toward the world and toward non-human nature. Indeed, this paper argues that both “grace” and “charm” entail moral postures that are absent or muted in the concept of “beauty.” Moreover, to the extent that landscape architects and planners attempt to integrate non-human actors into landscapes—that is, to create expansive networks of actors—they will both demand and foster an expanded lexicon of aesthetics.
Waterscape as a Cultural Heritage in Rural Chinese Villages

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Keywords: indigenous water system, preservation, rural landscape, China

Rapid economic development and population growth combined with urbanization and changes of industrial and agricultural practices have considerably modified the traditional landscape in rural China in the past decades. These changes have resulted in the loss of natural resources and agricultural lands to new development. They have also dramatically modified the hydrologic cycle through massive construction for flood control, water supply, irrigation, and hydropower (Gleick 2000). Indigenous water resource management systems have evolved from an intimate association with local geographical and hydraulic conditions to an industrialized water infrastructure that do not respond to the local particular socio-cultural and natural conditions (“reinventing” 2008).

Hong Village is located in Anhui province of China. It was designated as a World Heritage Site by UNESCO in 2000. The designation has driven a significant growth of local tourism. Since 1998, the county government of Yi County has published a series of regulations to preserve the traditional dwellings in the village. They required any alterations to the building’s interior and exterior needed evaluation and approval from the county government. And since 2001, almost no new constructions have been allowed in the village. Instead, new villages near Hong Village were developed to accommodate the increasing needs for tourism and updated living conditions. Despite the emphasis of preserving the traditional dwellings in Hong Village, there has not been sufficient official attention on preserving the local landscape, especially the indigenous water system that had played a seminal role in shaping the local socio-economic and cultural structures.

This article examines the history and controversies in using and preserving the traditional water system in Hong Village. It explores how rhetoric of tradition has been negotiated and manipulated in the new socio-political context with the rapid socio-cultural and economic transformation of the local area, and what the difficulties have been encountered at the intersection of development and water conservation. As a qualitative research, this study has adopted a combination of research methods including archive research, field observation, oral history, and personal interviews. It aims to facilitate a meaningful change towards a new and innovative approach and a new way of preservation for the Chinese rural villages. The formation of strong linkages between watershed logics, farming practices, and urbanization patterns with a rapid industrialization in China transformed the traditional rural landscape into a modern urban development paradigm (“Reinventing” 2008). A natural hydrologic network was replaced by an underground drainage network. Such ignorance of the indigenous
morphology of adaptive water system has led to the loss of both cultural and natural resources. The study argues that continued investments in huge systems that provide more water for some is being challenged by a higher priority of projects that meet sustainable goals and support the village to endure and flourish into the indefinite future. The integrity of the hydrological cycle should be preserved to re-integrate water use with maintaining social and ecological health and the local identity.
Kintsugi: Reflections on Broken Landscapes, Narrative, and the Language of Repair

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Keywords: metaphor, ecolinguistics, narrative, ecological restoration, kintsugi

This paper borrows insights from cognitive linguistics (e.g., Lakoff and Johnson 2003) and recent work in ecolinguistics (e.g., Stibbe 2015) to consider how linguistic and visual metaphors may impel creative thinking about the restoration or repair of damaged landscapes. In particular, the paper explores the metaphorical entailments afforded by a traditional Japanese art of ceramic repair called kintsugi, especially in relation to current conversations about the role of history and “novel ecosystems” in contemporary ecological restoration practice (e.g., Higgs, et al. 2014). The paper offers a preliminary assessment of strengths and weaknesses of kintsugi as a conceptual metaphor for the practice of repairing damaged ecosystems. The paper begins from the premise that metaphors powerfully shape how we conceptualize, perceive, and experience ecological restoration, and how we communicate its goals and methods. Recent scholarly work in linguistics has focused on the ways in which metaphors pervade everyday life, shaping not just language and thought, but also individual and collective action “including organized efforts to restore damaged ecosystems” (Larson 2011). Indeed, the practice of ecological restoration has long lent itself to comparisons with forms of artistic practice such as gardening (e.g., Jordan 1994, 2003; Turner 1985), design (e.g., Higgs 2003), and painting restoration (e.g., Hall 2005). Perhaps none of these arts, however, so aptly “its” the suite of philosophical and practical quandaries of contemporary restoration as the Japanese art form of kintsugi. Dating from the late 15th century, kintsugi “golden joinery” is the art of mending broken pottery by fusing together its fractures with lacquer mixed with gold, silver, or platinum. The repaired object—and the art of kintsugi itself—embraces a philosophy that regards the fracture and the repair as an integral part of the object’s history, rather than something to be hidden or erased. The aim of kintsugi is to restore a cherished but damaged object to a condition of wholeness and utility, while honoring the life of the object in such a way that it becomes more beautiful for having been broken and repaired. The paper highlights some of the advantages as well as potential limitations of thinking about contemporary ecological restoration in terms of the principles of kintsugi, and offers preliminary suggestions for how restorationists and landscape planners might adapt the metaphor to help people conceptualize the difficult ethical, technical, and aesthetic dilemmas that restoration projects often embody.
Cincinnati Riverfront: Changes in Urban Form, 1820–2020

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Keywords: public landing, urban form, riverfront redevelopment

The purpose of this study is to understand the changes over time to the Cincinnati Riverfront urban form, and how those changes occurred. National and local level social and environmental changes, and shifts in major cultural paradigms, and their effects on urban form are analyzed. The riverfront of Cincinnati, Ohio has changed over the last 200 years. Three periods of urban form and land use are identified: phase 1. public landing with four story mixed use buildings (1820-1940); phase 2. warehouses with one story, single use buildings (1940-1960); phase 3. transportation, parks, sports, mixed use (1960-2016). In each of these three phases, the impact of social and environmental changes, as well as shifts in major cultural paradigms, will be analyzed.

The Ohio River has exerted significant impact on the riverfront. Flatboats and then steamboats carried goods up and down river. The Miami and Erie Canal, completed in 1845 linked the city to the Great Lakes. The amount of riverboat and canal boat traffic declined with the increase in the railroads after the Civil War. This lead to a gradual decline in the use of the public landing. Canalization of the river was completed in 1929 with the construction of many locks and dams, which lead to a gradual increase in barge traffic on the river. The catastrophic flood of 1937 moved city officials to propose a transportation corridor, Fort Washington Way, in 1946. In 1961, the Central Riverfront Study proposed a stadium, residential towers, parks and recreation, and reconfigured public landing. Between 1970 and 2016 numerous projects have been completed in the area to transform the old public landing to a busy mixed-use district. The method of study is archival work with an emphasis on historic maps, city land records, and period photographs. Fieldwork will document current conditions.

Cincinnati Riverfront is a case study for cities to evolve from a commercial public landing to a mixed uses area with transportation, parks, sports, and residential. National and local level social and environmental factors have impacted and changed the urban form of this area. Change has occurred over a long period of time with the support of city government and the public. Redevelopment has been funded with a mixture private and public investment. Shifts in major cultural paradigms over time have impacted urban form as well.
Reframing Mill Memorialization through the Lens of Landscape

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Keywords: preservation, textile mills, memorialization, commemoration, labor history, landscape

The proposed paper explores landscape’s framing role in memorialization through a discussion of southeastern United States mill villages. This paper moves the preservation discussion from the architectural realm of an isolated textile mill building to the scale of the landscape. The beginning of the 20th century witnessed the transformation of the piedmont region of South Carolina from a farmland of sharecroppers to the cotton textile center of the nation. This rapid industrialization altered rolling landscape and winding creeks into a series of mill villages and dammed waterways connecting larger cities of neighborhood mills.

The beginning of the 21st century is witnessing another transformation, the shuttering of those mills because of globalization and a trend toward adaptive reuse into luxury apartments. While this form of preservation rescues a portion of the deteriorating memory infrastructure, it threatens to distort or erase the unique relationship between mill, mill village, and the broader mill landscape by romanticizing mill life and brushing over the complex history of labor and ecology present in those spaces. This nostalgic treatment blurs the lines between commemoration (celebrating the past) and memorialization (remembering the past).

The mill and mill village complete with company-owned: stores, schools, churches, and housing, speaks to the deep paternal nature of the mills. Existing projects reveal the limits of architectural preservation. Architecturally these buildings can tell a portion of a difficult history marked by such events as the Textile Strike of 1934, the murder of a balladeer, the internment of strikers, “flying squadrons,” and dancing picket lines. But the paternal decision-making that gave rise to these human protests, didn’t end with the constraint of people. The landscape reveals that the mills channeled not only human labor, but also the work force of nature. Like the social restructuring of the mills, this restructuring of nature had impacts: disturbed ecologies, threat of extinction, toxic sedimentation, and altered waterways.

Investigation will proceed through a research and design process. Research includes creating a spatial data set of the mills in the South Carolina piedmont region from a list in the 1920’s textile “blue book.” Watershed analysis determines a specific mill site for intervention. Research includes analysis of paradigms and case studies for restored waterways. Designing will explore the pros and cons of revising or removing the mill dam, a piece of memory infrastructure, and wrestle with the balance of preservation and ecological restoration.
Designing for Resiliency in Antiquity

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Keywords: history, archaeology, design, built landscapes

Archaeological sites offer designers and scholars the opportunity to assess factors of persistence and resiliency in designed landscape over time. This paper presents the case study of the urban waterfront of Herod the Great at Caesarea Maritima (Israel). Close study reveals evidence that Herod's maritime palace, built out into the surf of the Mediterranean, may have been deliberately sited on a living vermetid reef, quite possibly knowing the reef's protective characteristics. Vermetid reefs form from occupation of Aeolic sandstone platforms rather than being entirely formed of the mollusks themselves. The paper presents an analysis of the architectural features together with an assessment of the reef's biological capacity to protect the building. The case study concludes with the potential of the palace's ruins to serve as a marker of the decline of the Mediterranean's vermetid reefs due to climate change and acidification of the Mediterranean Sea.

This example illustrates the capacity of landscape archaeology to illuminate urban responses to natural disaster and climate change both in the short term and in the long term. Based on local knowledge, the ancient designers responded to the potential for great change and variability in the site over time. The knowledge gained from the archaeological analysis points to new directions for contemporary landscape architects in charge of coastal heritage sites in the Mediterranean and elsewhere. In addition, recent coastal resiliency projects, such as SCAPE's oyster reef restoration project, may offer alternative models for protection of these valued places as they face sea level rise and storm impacts.

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Keywords: landscape architecture theory, feminist theory, architectural anthropomorphism, sociology of architecture

The objective of this project is to extend Meyer's (1997) epistemological foundation by analyzing three sites of public landscape architecture: (1) Millefleur Park, D-Cube City in Seoul, Korea; (2) Namba Parks in Osaka, Japan; (3) and La Villette Park in Paris, France. By expanding upon the Feminist scholarship which examine the relations between the body and architectural aesthetics, this paper explores the overarching question of how architectural aesthetics become (un)gendered. By illustrating cases of postmodern landscape architectural sites through the feminist theoretical framework, this paper interrogates the following main overarching questions: (1) What implications does the ontology and epistemology dialectic have for the development of landscape architecture theory and design? (2) What does the (un)gendered aesthetics in the selected sites speak in terms of Meyer's (1997) notion of design? (3) How are the symbolic elements (i.e., deriving from aesthetics) in landscape architecture designs crucial to subverting patriarchal anthropomorphism?

This project seeks to highlight the importance of aesthetical elements in landscape architectural theory which derive from embodied experiences. As Meyer (1997) emphasizes, the feminist standpoint epistemology and methodology are important tools in generating situated knowledge in landscape architectural theory. Additionally, this project suggests that (un)gendering of public architecture is to critique the patriarchal structures, which implicates both physical and nonphysical (symbolic) realms. By theoretically contextualizing the different design elements from D-Cube City Amphitheater and Living Garden, Namba Park in Osaka, and La Villette Park in Paris, this project demonstrates the importance of (un)gendering public postmodern landscape architecture. In doing so, it also reveals the ontology and epistemology dialectic that is critical, and not limited to, theory and practice of landscape architecture.

Overall, this project is concerned with demonstrating the importance of embodied knowledge which proliferates into design and symbolic gender equality in design aesthetics. In demonstrating such case, this project finds that androgyny in design aesthetics more accurately depicts lived experiences of designers as subjects of embodied knowledge. The implication of this project subverts the regime of binary identification in regards to gender symbols in architecture, thus highlighting the importance of landscape architecture. Reflexively, this project also discusses the important implications for a sociological and metaphysical understanding of landscape architecture.
Reframing Historic Civil War Monuments in the American South: The Example of Abbeville, S.C.

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Keywords: Civil War monuments, lynching, memory

Given the renewed interest in the symbolic meanings of Confederate War monuments after the deadly “Ignite the Right” protest in Charlottesville, Virginia in August 2017, this paper and presentation documents an important, recent example of how problematic statuary could be reframed in meaning. Specifically, this submission describes how the living descendants of a lynching victim, Anthony Crawford, converged in a small town in rural South Carolina and transformed the discussion of the cultural understanding of the public sphere of the town square, and the Civil War monuments there.

Working with the Equal Justice Initiative, a non-profit organization whose mandate is committed to “ending mass incarceration and excess punishment in the United States, challenging racial and economic injustice, and to protecting basic human rights for the most vulnerable in American society” (https://eji.org/about-eji, accessed Sept. 3, 2017), family members erected a marker that provided the gruesome details of the lynching of their ancestor. Such markers at the sites of lynching are part of a larger effort to recognize that "public spaces have yet to become part of the formal reparation or racial reconciliation process for Black Americans" (Ifill, 39). The placement of the memorial plaque revealed what had previously been the largely invisible and racialized violence that white mobs had inflicted on black people. This new memorial gesture re-contextualizes the pre-existing Civil War Memorials that dotted the town square.

Through the use of historical research methods, personal interviews, and direct observation, this submission documents the unveiling of the memorial plaque, explores the meaning of the event for family members, and indicates how the existing Civil War memorials are now reinterpreted. My analysis relies on Kenneth E. Foot’s work regarding the memorial strategies of sanctification, designation, rectification, and obliteration regarding sites of violence and tragedy as useful frames that allow for transformation and reframing of the dominant narrative.
Welfare Services in Parks: Their Roles and Ideological Development Processes

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Keywords: green welfare, eco welfare, social welfare, environmental welfare

In the mainstream consciousness, parks have been a performing field of welfare. This notion has been the central thesis in which this study has come to consider. Thus, the main overarching question that this study ask is the transformation of the park as an instrument for welfare. By theorizing parks as an instrument for welfare, this study inquires the distinction between the welfare characteristics of parks apart from social welfare.

This study divides the process in which parks develop as defined by Galen Cranz. The process is an attempt to view how welfare benefits offered by parks have changed in their development by looking into the roles and types of its welfare functions based on the particular historical periods. As such, this study comprehensively examines the characteristics and development ideological underpinning of the welfare services. This takes into account the progression of function and elements of the welfare services as provided by the parks.

The functions that parks have performed so far can be classified into three categories. First, they have a remedial function. Parks have given direct services to “the socially disadvantaged” such as relief, fostering, and rehabilitation. Second, parks have played a preventive function. They aim to reinforce the functions of individual, family, group, and community. Third, they have exerted a developmental function. They function to promote the change of society in a way for it to contribute to social development.

In its beginning stage, the ideology of welfare in parks remained ideal. It confined itself to idealistic characteristics. But as time went on, they created several social benefits in response to various social demands. Thus, parks have developed into a field where welfare ideology manifests and is realized in an active manner. Furthermore, it was witnessed that the parks and welfare of the present times are standing at the point of contact for participation and universal well-being.

The present study reconsiders the meaning and value of parks from the perspective of them as a provider of welfare benefits. In addition, it examines how the welfare ideology of parks is connected to practice. By doing so, this study discovered the various roles, values, and ideology that parks should bear in the future.
A Search for Non-Representational Landscape-Sign: A Case Study of Byungsan Confucian School, Korea

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Keywords: landscape aesthetics, landscape sign, non-representational art form, presentation and representation, Korean garden

This paper examines Byungsan School, a seventeenth-century Confucian school located at Andong, Korea. Understanding the modality of landscape-sign that helped to integrate the microclimate-control functionality of the campus into the Confucian way of landscape appreciation constitutes the body of the research.

For centuries, landscape architecture has been regarded as a representational art form, and use of the constructed image-sign as a signifier of idealized nature has been the norm of landscape design since the earliest days of the profession. However, as sustainability becomes a new paradigm of contemporary landscape practice and ecological performance of designed landscape becomes a significant criterion, the discipline is actively searching for a new approach to the landscape-sign, one that would communicate ecological functionality as a meaningful aesthetic experience. At issue is the practice of re-presentation, as Diana Balmori puts it, which inevitably structures a distance from the scene of natural process as it becomes “second order of reality.” In other words, the semantic and the functional of designed landscape are incompatible with each other in representational landscape-sign.

Against that background, this paper examines the Confucian School as a historical precedent that communicates ecological functionality without any representational gestures. Understanding the use of the empty courtyards and surrounding pavilions which do not contain any sign-bearing representation in and of themselves is of special importance, both as the passage of the wind and as the device of a window framing. Based on the recent discourse of visual culture, this paper tentatively identifies the modality of the landscape-sign articulated in the case study as a presentational image-field of landscape in contrast to the representational image-sign that has preoccupied the aesthetic discourse of the discipline.
Landscape Photography and Time: Benefits of Thinking of Time as Thick

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Keywords: photography, time, thick description, Anthropocene

The idea of time—short, momentary, a slice (Szarkowski), 1/60th of a second or less—commonly associated with landscape photography is simply not correct. The concepts of photography as representative of a single moment in time, or capturing of a decisive moment (Cartier-Bresson) must be reconsidered. Landscape Architecture still casually accepts these object-based theories about photography established in the Modern era. These theories are incapable of addressing the complexity of the Anthropocene (most recently, e.g., Tsing et al.; Morton). Often unexamined are the processes and decisions that occur both before and after the release of the shutter. Instead of a single precious moment or single ideal, a multitude of (at times contradictory) decisions and actions determine how a photograph is made, what it looks like, how we view it and how we use it in landscape architecture. A photograph of a landscape can be considered as a living object, constantly changed over time by its context, its viewers, and the conception of the time and place it was originally "made" (Nader).

There are three types of time occurring simultaneously in any landscape photograph:

1. The time involved in making the primary photographic image.
2. The time arranging, producing, and developing the work.
3. The time of thought, understanding, and change and that threads through and beyond the process of the first two types.

Though we are habituated to instant gratification photography through the phenomena of the smart phone—making Time 1 and 2 above seem like no time—it is important to consciously conceive of landscape photography as inhabiting thick time (Geertz). Our understanding of the landscapes represented in photography becomes richer, more critical and more useful when we conceive of all three types of time thickly contextualizing the meaning of the content of these photographs. All photographs of landscapes are landscape photography. Why one makes these photographs can be specific to genera, purpose, presentation, etc., but as Time 3 suggests, all landscape photographs instantly become more than a single type (art, data, document) as each new viewer encounters them. This paper will outline the benefits of thinking of time as thick, focusing on Time 3, for landscape architecture. Also examined is how thick time correlates more closely to the deeply valued concept of landscape time, which allows for the complexity necessary to make design choices under the conditions of the Anthropocene.

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Keywords: African American yards, culture, agriculture

For the last 25 years I’ve been thinking and writing about the yards in an African American neighborhood in South Baton Rouge. Their layout, design and construction were documented and analyzed, and their historic, economic and socio-political circumstances helped explain the context that contributed to their meaning. And it still seems, in my mind, that there are more questions to ask.

Last year I complied photos of the yards taken from 1990 to 2016 for a lecture to art students and realized, in the fading in and out of old and new landscapes, that there was a sense of continuity that I had not noticed before; that the spaces and objects in the landscape were being removed and replaced with similar spaces and objects, not quite the same but completely equal. This in many ways was a reflection of seasonal cycles in agricultural landscapes, as noted by Westmacott in his studies of African American gardens, but the visual time lapse gave a sense of something else, in addition to slow changes in the landscape.

A chance discussion with a comparative literature graduate lead me to John Berger’s Big Earth a book with a totally unappealing tile and dated references to French peasants, but a very important resource to understand African American yards, because like their French counterparts, these landscapes are not only reflect agricultural landscapes but are the product of a culture of survival. This presentation will revisit these African American yards in light of Berger’s work and frame new questions for future study.

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Keywords: modern historic landscape, conservation and removal, landscape of memory, demolition of the building of governor-general of Korea

In recent years, there has been a tendency to conserve and utilize “landscapes of memory,” which includes modern buildings, as well as buildings of industrial or cultural heritage. Among the various types of landscapes of memory, “the modern historical landscape” evokes a controversy between conservation and removal of landscapes in the process of their utilization. Many modern historical landscapes were constructed in the 19th and 20th centuries, when imperial colonization was prevalent and large-scale wars occurred and left in these landscapes the memories of the great tragedies caused by invasions, national disputes, and wars. Because of the nature of these memories, the moral judgment of the survival of this landscape, as well as national issues about conservation and demolition, is often disputed. Nevertheless, many modern historical landscapes are still conserved and utilized. For example, Shanghai has chosen a nostalgia for past colonial and socialist periods as part of an urban regeneration strategy. “Negative heritage,” which recently emerged as a term for landscapes of conflict, trauma, and disaster, is also related to this trend.

But do these landscapes really need to be conserved? How can a designer choose between the conservation and removal of modern historical landscapes, as well as choose what to utilize? To answer these questions, this study examines the controversy between the conservation and removal of Seoul’s Japanese General Government Building, which was the symbol of the Japanese colonial period in Korea. The Building was used as a national museum after the country’s liberation from Japanese imperialism in 1945 and dismantled with controlled explosives on August 15, 1995, which was the 50th anniversary of the day of liberation. There was an extreme debate on the process of the Building’s demolition.

By analyzing newspaper articles, videos, and related papers, this study aims to explore the social backgrounds and values regarding decisions about the conservation and removal of landscapes. First, this debate can be divided into five broad themes: (1) Finding and responding to new historical facts, (2) The responses and interventions of historically relevant nations, (3) Financial conditions, (4) Functions and uses of a landscape, and (5) Changes in relevant policies. These five themes are themselves divided into two aspects: symbolic and functional. In conclusion, this study explores the role of the symbolic and functional aspects that affect the valuation and utilization of modern historical landscapes while critically examining the tendency of value judgments to focus on the symbolic aspects.
Islamic Gardens and Cultural Identity in a Globalized World

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Keywords: identity and meaning construction, Islamic, globalism

The demand for Islamic-style gardens and landscapes from both Muslim and non-Muslim clients, and both inside and outside of the Islamic World, has grown in the late 20th and 21st centuries. There are many Islamic-style gardens and landscape projects that have been or are being built around the world in the US, UK, and Canada, among others. However, naming these as “Islamic” or “Islamic style” incurs an immediate problem: we do not know what it means to define a built space as Islamic, particularly in today’s globalized world. Is this an identification made through a reference to the historical tradition of Islamic civilization? If yes, then how is this connection made? Is it made through aesthetic visual connection, cultural expression, religious affiliation, and/or regional identity? Is this identity conveyed through human agents, or through the forms themselves? Or rather, is it a combination of some or all of these factors?

I will explore these questions by examining contemporary Islamic gardens located in Western countries in the US, Canada, and England that are self-consciously connected to Islamic cultural traditions. I will focus on the Bakewell Ottoman Garden in St. Louis (2008), the Aga Khan Park in Toronto (2014), and the Mughal Garden in Bradford UK (2001). I investigate the questions of how designers use Islamic tradition and culture as a medium in their design process to construct the visual identity of Islamic gardens in Europe and North America, what the role of patrons in forming the identity of these gardens is, and finally what these Islamic gardens mean for the users (both Muslim and non-Muslim alike). These are important questions for theorizing the social life of landscape history, but also for the history of art and architecture. I expect this paper will provide landscape designers with a comprehensive understanding of the multiple meanings of Islamic gardens and landscapes in a contemporary global context. In terms of their larger impact, this research will contribute to the broader understanding of how minority (or diaspora) communities in North America and Europe construct and project their identities onto the host’s built environment.
Terraforming as Environmental Design

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Keywords: terraforming, environmental design, geoengineering, climate change, Anthropocene, cultural landscape

This paper provides a review of emerging interest in planetary vocabulary, especially uses of the term “terraforming” is most often associated with science fiction to describe earthbound activities in increasingly earnest and applied contexts. Terraforming, in this emerging vocabulary, is often used to describe activities that initially resemble landscape architecture and land planning in scale and scope. These emerging usages include largescale geo-engineering proposals for climate and atmosphere modification; contemporary landscape or ecological manipulation at scales ranging from site to region involving substantial ecosystem restructuring; theoretical or critical discussions regarding the Anthropocene, global climate change, and ethics; environmental historical writings; and metaphorical descriptions in a variety of contexts.

Although they are often speculative, these nonetheless serious (rather than fictional) adoptions of “terraforming” raise new questions about how we understand entangled socio-physio-ecological systems as sites of intervention, and the ultimate ends of environmental design. Across the appearances of the term I identified, a number of variables emerge, that suggest many definitions of the term are being explored and negotiated. These include the intentionality generating terraforming instances; the agencies recognized as causing or participating in terraforming; scales and sites of terraforming; media engaged; target environmental effects; and time-scales.

These and other commonalities found across the emergent terraforming discourse are compared with conventional characterizations of landscape practice to identify areas of commonality, conflict, and possible clarification. Although the spectrums of use range widely, the emerging mid-ground of these uses resonates with contemporary and emerging modes of landscape practice. Collectively, these usages point to an increasingly elastic conception of site and scale; interest in atmospheric and climatic conditions as emergent properties which can be manipulated through activities targeted at landforms, soils, and vegetation, media familiar to landscape architects. These in turn point to an emphasis on habitability for humans and favored species assemblages as an end goal, which may encompass aesthetic, economic, and functional concerns.

An emerging thread of design criticism is the employment of “atmosphere” as metaphor and subject of analysis, evidenced in the work of philosopher Peter Sloterdijk and architectural historian David Gissen. Likewise, ideas of “lifeworld” and “worldmaking,” terms often used in
sociological and anthropological contexts are increasingly being applied to emergent socioecological systems. A synthesized definition of terraforming, drawn from this analysis, may provide a useful description of environmental design practice that foregrounds the issues that these lines of criticism open.
Native American Agroforestry of the Southeast: As Observed by Hernando de Soto and William Bartram

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Keywords: agroforestry, North America, American Indian agriculture, de Soto Expedition, tree crops, William Bartram, Mississippian agriculture, Muscogee Culture, Creek Confederacy

Temperate agroforestry systems are an important area of research and practice in Eastern North America with the goal of creating more diverse, productive, and environmentally sound agricultural landscapes using trees as key crops. There is extensive published research on contemporary temperate agroforestry models as well as tropical indigenous agroforestry systems. In contrast, we lack basic knowledge of the historical temperate agroforestry systems created by indigenous peoples in southeastern North America. Knowledge of historic practices in this area could inform the contemporary practice of agroforestry in the eastern United States and other temperate regions today. To understand the character of the landscapes cultivated by the tribes in this region prior to European settlement, we examined historical accounts from two distinct expeditions: the Hernando de Soto Expedition (1539-1542) and William Bartram’s travels (1773-1777). Though separated by over two centuries, these expeditions traversed much of the same territory, and offer glimpses into the diverse character of the landscapes and cultures the Southeast. While the explorers’ accounts do not always align, their attention to landscape character and productive tree species is detailed and useful to understand historical native agroforestry practices.

Analysis of the four extant reports from the de Soto expedition and botanist William Bartram’s journals shows that each expedition met with numerous native communities over the course of their travels. Each explorer observed and described the character of the treed landscapes they encountered and the agricultural yields at discrete locations during their journeys. All authors reported extensive managed forest plantings of nut and fruit trees. The over 620-person de Soto party survived in part on the abundance produced by agroforestry practices. When Bartram explored the Southeast, the Creek confederacy, who replaced the Mississippian culture encountered by de Soto, had taken advantage of the shellbark hickory groves of their predecessors. The Spanish explorers described the tree crops in terms of common European plant names and planting configurations such as orchards, parks, and vineyards. Bartram was a second-generation American botanist, and though in new territory, applied the best of his botanical Latin to the species he found. He too had a keen eye for agricultural practices, as the son of Philadelphia farmer and botanist John Bartram. Together, these sources suggest that there was a robust indigenous practice of agroforestry in the Southeast, but its details may be limited to the observations of these few astute explorers.
Resolving Conflicts between Historic Character and Sustainability Goals: Removal of Turf at Mission 66 National Park Service Facilities

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Keywords: Mission 66, Historic Register nomination, landscape character defining elements, sustainability policies, Park Service mission

This paper reviews practices of removing turf and other non-native vegetation at National Park Service Mission 66 visitor centers that are nominated for the National Register of Historic Places. Many NPS facilities developed during the Mission 66 era originally had extensive lawns or other forms of non-native ornamental plantings. As the Park Service embraced sustainable practices as part of its mission, replacement of the original non-native plantings has given rise to the question of how these original landscapes contribute to the historic character of Mission 66 facilities. This work is an outgrowth of a project to redesign the picnic area at the Craters of the Moon National Monument. Craters of the Moon has a well-maintained Mission 66 visitor center that is in the nomination process for listing on the National Register. Early in its history, the visitor center picnic area was simply one of the green spaces planted with turf to enhance the facilities. Although trees were planted, the area was mostly seeded with a mixture of European grasses. Preliminary studies at the monument note that one former superintendent spent an estimated $40,000 per year maintaining the lawn in a “golf course-like condition” during the 1970’s. Not only do today’s budgets preclude that level of expenditure, fundamental ideas about what National Park Service properties should provide in the way of education and visitor experience have changed dramatically over the intervening decades. The authors undertook a review of 23 National Park Service facilities in seven western states to better understand the potential impacts of replacing lawn with native vegetation, with respect to the impacts on the National Register nomination process. All 23 NPS facilities are located in arid regions where water resources are scarce, and lawns are generally considered an anachronistic landscape type. Along with review of the history of lawn removal at these facilities, the authors interviewed NPS staff and State Historic Preservation Office personnel to better understand the issues, concerns, and interpretation of the historic and cultural significance of lawns at arid region NPS facilities. The cases presented here highlight a range of concerns that are raised during the nomination process, including the relationship of the lawn to the original design and as a cultural landscape of the Mission 66 era. Removal of lawn at the facilities reviewed here did not impact the potential for Historic Register Listing.
The Exploration on the Ecological Ways of Building Construction and Landscape Construction in Traditional Chinese Settlement

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Keywords: ecological ways, building construction, landscape construction, traditional Chinese settlement

The characteristics of water resources in different regions of China vary considerably, and water resource is an important factor influencing the settlement pattern. This paper analyzed the morphological characteristics of traditional Chinese Settlement that was established before 1949 in different water resource conditions. Taking water as the key point and dividing the research regions into three types according to the distribution of water resources as follows:

1. Regions with rich water resources: Tulou settlement of Fujian, Huizhou folk dwelling settlement of Anhui
2. Regions with limited water resources: cave dwelling settlement of North Shaanxi Plateau, pit cave settlement of Central Shaanxi Plain
3. Regions short of water resources: oasis settlement of Turpan area of Xinjiang

According to the contemporary consumption-led social values, water is more viewed as a resource. But water is regarded as an important life element in traditional Chinese culture. Both the building and landscape construction of the settlements were based on the eco-ethnic consciousness. The settlement takes water as the vein, with the main vein running through the space construction of the settlement and the branch veins spreading to architectural form and courtyard arrangement. From the perspective of ecology, the harmonious coexistence of water environment and settlement is the basis of sustainable development. Different geographical characteristics influence the form, material, and eave structure of residential roofs and walls. A courtyard is the basic unit where public activities are conducted, and it serves as the spiritual center. From the ecological point of view, a courtyard also serves as the temperature adjusting space, and the ecological effect of water circulation has a direct influence on the comfortableness of living.

The study and summary of the excellent ideas of Chinese ancients will have great influence on the ecological construction of modern settlements. In present-day, the China’s City Beautiful movement is being replaced by the trend of building ecological infrastructure across the nation. Using porous pavement become prevalent in both public and primacy spaces. Constructed wetland is utilized to purify stormwater runoff, and the rain garden is considered as an innovative way to draw the public’s attention on the ecological significance. I think that people’s notion began to return to the period when humanistic conception is that nature
embraces man, and man lives in Nature. I believe this is the ideological basis of traditional Chinese settlement.
From Nature Represented to Nature Reconstructed: A Paradigm Shift

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Keywords: nature, representation, reconstruction, identity, narrative

Recently born and fast developing state, Singapore, as other emerging “Asian Tigers” constantly competing for cultural, political, and economic hegemony, has made nation-building and quest for identity in a globalized world, one of its primary goals in landscape planning (Kong & Yeoh 2003). Also addressed as “Garden City” or, more recently, “City in a Garden” (NParks, 2004), since its foundation the nation has chosen Nature as its emblem.

Research addresses manipulated nature in Singapore in the form of public parks, with the scope of uncovering if and how the goals of nation-building and identity making, achieved through the strategy of green urbanism (Newman, 2010; Newman & Matan, 2013; Johnson, 2008) are also associated to the achievement of a social, cultural and ecological sustainability. The paper expands on existing literature on green urbanism which increasingly informs planning of Asian cities (Hoffman, 2011; Zhao, 2011; Jim & Chen, 2003).

On-site survey and archival research are used to document design and planning strategies of Singapore’s public parks developed since post-Colonial times.

It is found that the parks take the form of a system, where nature has initially been represented, with designs ranging from large-scale sculptures to choreographic landscape settings, meant to infuse “character and identity” to public space (Eng 1996); then from mid-1990s reconstructed, with man-made wetlands, recovery of secondary forests and mangroves, and a restructuring the whole water system’s canals and reservoirs developed since Colonial times to shape a “water narrative” with parks and water bodies conceived as functional and ecological infrastructure and biodiverse social amenity (Velegrinis & Weller, 2007). In an unstable balance between representation and sustainability, Singapore’s public parks emerge as an on-going experiment of induced social narrative and ecological performance.
Environmental Aesthetics: A Nonexpert Perspective

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Keywords: environmental aesthetics, restorative environments, informational needs, preferences

What do we mean by environmental aesthetics? To what does it apply, and why is it important in landscape architecture? Employing a psychological approach, we address these questions through an overview of theoretical frameworks, and discuss it from a non-expert’s perspective. When asked to describe a beautiful landscape, many people, designers included, have an idealized setting in mind. They might describe pristine landscapes found typically on wall-mounted calendars. These descriptions, while interesting, tell us little about the characteristics of settings that humans find beautiful. This is a challenge for designers and planners because in designing human settlements, there is little opportunity to create replicas of pristine landscapes and thus understanding the underlying characteristics of environmental aesthetics is critical.

In this paper, we consider questions at the core of environmental aesthetics. What are the characteristics of landscapes that people prefer? What role does nature or natural features such as vegetation play in preference? Why do humans prefer natural settings? In built environments with natural features, what environmental characteristics do people find most aesthetically pleasing and why? Why do environmental aesthetics matter? Environmental aesthetics is more than scenic beauty or the narrow definitions of aesthetics used in fields such as philosophy and art. Here we consider environmental aesthetics from a broader perspective; an outgrowth of human needs “part hardwired and part influenced by experiences” that provides a window into the relationships among people and places.

A deeper exploration of environmental aesthetics helps us understand more about who we are as humans, and what we need in the built environment. Understanding people’s aesthetic reactions to places gives us insights into how well they imagine their needs will be met in those settings. There are many theories and models in environmental psychology that provide a foundation for environmental aesthetics as a reflection of human needs. Translating these findings into the design language is valuable in our profession. This exploration thus can provide insights into how to design and build environments with characteristics that help people thrive. We examine the role that information processing plays in environmental aesthetic, and explore our recurring battle with mental fatigue and the kind of settings to
which we are drawn in an effort to restore ourselves. We end by considering the implications of environmental aesthetics for planning and design in terms of creating restorative environments in which people are more likely to thrive.
Landscape Performance
**ORAL PRESENTATIONS**

5

**Economic Benefits: Metrics and Methods for Landscape Performance Assessment**

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**Keywords:** economic sustainability; post-occupancy evaluation; multifunctional landscapes; landscape performance

This paper introduces an expanding research frontier in the landscape architecture discipline, landscape performance research, which embraces the scientific dimension of landscape architecture through evidence-based designs that are anchored in quantitative performance assessment. Specifically, this paper summarizes metrics and methods for determining landscape-derived economic benefits that have been utilized in the Landscape Performance Series (LPS) initiated by the Landscape Architecture Foundation. This paper identifies 24 metrics and 32 associated methods for the assessment of economic benefits found in 82 published case studies. Common issues arising through research in quantifying economic benefits for the LPS are discussed and the various approaches taken by researchers are clarified. The paper also provides an analysis of three case studies from the LPS that are representative of common research methods used to quantify economic benefits. The paper suggests that higher levels of sustainability in the built environment require the integration of economic benefits into landscape performance assessment portfolios in order to forecast project success and reduce uncertainties. Therefore, evidence-based design approaches increase the scientific rigor of landscape architecture education and research, and elevate the status of the profession.
Factors Likely to Affect Green Roof Adoption in the US Midwest

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Keywords: green roofs, residential, adoption, barriers

Over a decade ago, Hendricks and Calkins (2006) reported that widespread misconceptions existed among architects and building managers concerning the installation and maintenance costs of green roofs in two large Midwest cities. This occurred despite the fact that the buildings were either designed by the architects or maintained by the managers, respectively. Their study is one of the few to date that actually addresses perceived barriers to green roof adoption in the United States.

In this paper, the authors examine the use of diffusion theory (Rodgers 1983) as a means to predict the speed and overall acceptance of residential green roof adoption among Americans based on the intrinsic characteristics of this form of green technology. This paper evolved from field studies conducted by the Michigan State Green Roof Team from 2008-2013 that expanded research on many of the eco-service benefits of green roofs systems. In 2011, the team participated in a State of the State Survey conducted by the MSU Institute for Public Policy and Social Research to determine resident knowledge of, and perceived barriers to, green roof technology within the state. Nearly one thousand households were surveyed. Data showed that less than 10% of the study population said they knew “a lot” about green roof systems, while the remaining 90% of participants said they had “never heard” of (45%), or “knew only a little” about green roofs (45%). Despite a lack of knowledge about green roof systems, the study population was favorably disposed to considering the systems on different building types, including their homes.

In an effort to promote green roof technology in the state, the team examined the socio-demographic and perceptual response data from the study population in relation to stated barriers and knowledge of the roof systems. Using propositions of Gatignon and Robertson (1985) that predict factors that affect diffusion theory, this paper discusses how green roof technology might be promoted within a population of potential users. It also discusses how quickly, and in what manner, information on green roof systems is likely to spread in the Midwest if no interventions (e.g., monetary incentives, social media blasts) occur to promote this green technology. The paper concludes with a case study strategy that might allow this form of green technology to get a foothold in the U.S.
Post-Occupancy Evaluation of the Landscape Environments in a Primary Care Clinic: The Environmental and Social Performances

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Keywords: landscape performance, healthcare, post-occupancy evaluation, restorativeness

Hospitals and other healthcare facilities are resource intensive enterprises (U.S. Energy Information Administration, 2012). Facing increasing challenges of global climate change and an imperative course of ecosystem re-establishment, healthcare facilities have taken the initiatives to design and build their campuses using sustainable strategies that reduce energy and water consumption and carbon emissions (Guenther & Vittori, 2013). Low impact developments and green infrastructures have been integrated into medical campus planning and design to support landscape performances. Meanwhile, landscapes and gardens in a healthcare facility have been recognized as contributors to a supportive and therapeutic care environment that positively impacts patients, visitors, and staff (Ulrich, 1999; Cooper Marcus & Sachs, 2013; Jiang & Verderber, 2016). However, in observance of the emerging studies and trending practices in the realm of healthcare landscape research and design, systematic post occupancy evaluations (POEs) to the built landscape environments regarding their performances and users’ experiences are insufficiently conducted and reported to date (Sidenius, Karlsson Nyed, Linn Lygum, & K Stigsdotter, 2017).

Funded by Landscape Architecture Foundation, this paper examines the environmental and social aspects of landscape performances in a primary care clinic following a holistic POE model. Evaluated environmental benefits include various low impact development practices and the impacts on stormwater management and carbon emission. For social performance aspects, three experts evaluated the levels of restorativeness of various green open spaces in the clinic using a site survey toolkit (Sachs, Cooper Marcus, & Barnes, 2016). Users’ behaviors were observed onsite and documented through behavior mapping. A focus group interview was also conducted to explore users’ perceptions and attitudes about the built landscape environments, including 13 user representatives consisting of doctors, nurses, administrators, educators and social workers. Narration data was analyzed following a predefined framework that adapted from the previous research findings (ibid.). Eight themes of the landscape environments were evaluated, including (1) access and visibility, (2) nature engagement, (3) path and paving, (4) places to rest, (5) sense of “being away” (6) aesthetics and maintenance, (7) other desired features, and (8) sustainable design strategies. Barriers to effective usage of certain green spaces were identified and further discussed. A mixture of qualitative and quantitative POE toolkits quantifying landscape performances were also reviewed in this paper.
Improving the Performance of Residential Landscape in a Semi-Arid Urban Context

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Keywords: xeric landscape, water conservation, performance-based design, baseline data, performance comparison

During summer months in the arid and semi-arid regions of the southeastern United States, nearly 70% of municipal water consumption is residential, 50% of which is for home landscape irrigation (Hurd, 2006). As water scarcity continues to be a growing concern in the region, the tremendous amount of water used for residential irrigation becomes even more critical. In 2016, with the support of USDA, the Departments of Landscape Architecture and Plant and Soil Sciences at a major University initiated the Greenscape Design Studio, a student-run design firm, aiming at promoting xeric landscape principles in the local community, improving homeowners’ understanding and acceptance, and consequently improving the performance of residential landscapes.

The purpose of this article is to describe the Greenscape Design Studio program, compare the performance of existing and/or traditional landscapes with proposed designs through multiple case studies, and estimate the overall performance improvement of residential landscapes in the city. The Greenscape Design Studio operates much like an in-house design office where students work as paid interns under the supervision of faculty. The designs promote the xeric landscape principles, within the context of a comprehensive landscape and site design service. Since the Design Studio is new, most projects have not yet been implemented. For this reason, the performance evaluation and comparison are based mainly on prediction. The methods used include Landscape Architecture Foundation Benefits Toolkit, modeling, survey, and comparing to precedents. After the projects are implemented, another set of data will be collected to compare with the prediction data. We focus on the following metrics: (1) water conservation, (2) energy savings, (3) maintenance, (4) wildlife habitats creation, (5) people’s understanding of xeriscape, and (6) people’s satisfaction.

This preliminary study shows that the landscape designs created by the Greenscape Design Studio can significantly reduce irrigation water usage, reduce maintenance demand, and save mowing labor and gas costs. In addition, many clients understand that xeriscapes do not have to be sparse, mainly rocked yards with a few cacti. More importantly, the intrinsic value of plants in the landscape, and the emotional and functional values to people, can be realized in arid and semi-arid regions. Since clients can reduce water consumption without compromising their desire for a greener landscape, we anticipate a significant level of satisfaction after
implementation. In the long term, we believe the Greenscape Design Studio will increase the acceptance of xeric landscapes and significantly reduce water and energy consumption.
An Assessment Framework of Cultural Ecosystem Service of Shanghai’s Urban Parks

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Keywords: Shanghai’s urban parks, cultural ecosystem services, evaluation framework, evaluation indicator

The urban park is a crucial form of urban space that not only provides fresh air, regulates microclimate, and supports nutrient cycling, but also provides space for recreation, activities, and socialization. It is a vital resource of cultural values for city residents. Currently, studies on cultural values of urban parks are mainly based on Cultural Ecosystem Services (CES), a concept from Millennium Ecosystem Assessment (MA). However, the definition of cultural ecosystem service remains pretty arbitrary, the interrelationships among service, value, benefit, function, etc., remain unclear, and the evaluation framework is incomplete since the indicators are not unified and the selection of evaluation method is not reasonable enough.

This paper aims to (1) sort out the status quo of CES evaluation and provide an expanded definition of related terms to better integrate CES into the research of ecosystem service; (2) develop an evaluation indicator selection framework as well as evaluation principles for CES in small-scale landscapes by taking Shanghai’s urban parks as an example; and (3) preliminarily propose an evaluation process model.

We made a critical review on CES evaluation and recommend to regard urban parks as an important type of cultural space, where CES is a dynamic process rather than the output to human society from the ecosystem. We clarify the linkage between “service” and other key terms based on the theory of cultural space and propose a value composition—value manifestation—spatial distribution model to better understand CES in urban parks. According to the nature of value, the value composition of CES in urban parks are divided into various divisions. In general, the value is manifested in three levels of benefit, activity and environment condition. We conducted fieldwork in 10 urban parks of different types in Shanghai to complete the indicator framework in the three levels above. The fieldwork confirms the importance of spatial distribution analyses. Then we propose the selection principles of evaluation methods and indicators.

Finally, we find that the interviewees might perceive more CES and give a more positive feedback if the interview is more targeted according to experts’ opinions. Thus, we recommend that the evaluation process conforms to an investigation—evaluation—validation model, which will be explained in the further research.
Using Flow-Splitters to Improve Green Infrastructure Design

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**Keywords:** stormwater management, green infrastructure, flow splitters, first-flush, nonpoint pollution

Flow splitters do just what the name implies: split runoff into parts. Splitting runoff addresses two important needs: first, diverting large flows that could “blow out” a rain garden; second, controlling which runoff is captured (treating the dirtiest “first flush”). Using flow-splitters is not a new idea, but the proper use is so lacking that most systems fail to actually capture, hold, and treat nonpoint source pollution as intended. Although many manuals and regulations suggest the use of flow-splitters, most built systems have no flow-splitters. As a result, pollutants that enter green infrastructure facilities are often discharged downstream. Proper flow-splitter design can easily correct this problem; however, many designers do not know how to design flow splitters into their green infrastructure facilities. This study presents and analyzes a collection of innovative case studies with the intent of challenging contemporary design norms and altering at least one important aspect of green infrastructure design.

Because some flow splitters work better than others, this study looks at different design goals and strategies including volume capture, filtration type, construction cost, maintenance, and retrofit opportunities. This presentation will therefore reveal some common design flaws, ways to improve designs, and some examples that function exceptionally well. For example, a retrofit constructed in Landover, Maryland is intended to capture, hold, and filter runoff from an existing parking lot. The design strategies also include reducing the construction cost by using existing inlets and not modifying the pavement grading. To achieve these goals, two simple curb cuts were made next to an existing inlet. A small asphalt strip was added in front of the inlet to redirect water to the curb cuts. A perforated underdrain was added to the retention area to drain filtered runoff to the existing inlet.

Because there are a variety of green infrastructure systems, this presentation will show flow splitters for bio-retention swales, flow-through planters, rain gardens, green roofs, right-of-way planter boxes, green street bump-outs, and retrofits for constructed facilities that can

- prevent erosive runoff velocities,
- assure capture and treatment of first-flush pollutants,
- assure holding specific water quality volumes,
- safely bypass larger destructive runoff flows, and
- reduce maintenance needs.
Evaluating the Landscape Performance of Railroad Park, Birmingham, AL

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Keywords: landscape performance, Railroad Park, sustainability

This study evaluates the landscape performance investigation and lessons learned of Railroad Park, Birmingham, Alabama. The study was conducted for the Landscape Architecture Foundation (LAF) Case Study Investigation (CSI) Program in 2015. Railroad Park is a 19-acre “trainfront” park that celebrates the eleven rail lines which bisect downtown Birmingham by linking the northern and southern halves of the city. Formerly a yard for rail and steel industry waste and warehouses, the park brings people into contact with the historic artery that pumped economic prosperity into the area. Upon the recycled and reclaimed materials employed in the park, sit several key gathering spaces that promote festivals and performances, bringing a new life to the region. The introduced topography that forms many of these spaces addresses stormwater concerns and provides a means for people to be level with the trains, thereby connecting the city to the historic force that built it. Knit together by the rumbling of the rails, Railroad Park has taken a city reputed for “division” and instilled a “togetherness” that looks onward into a lively and prosperous future.

This paper reviews procedures and findings that measure environmental, economic and social performance. Metrics used to investigate performance in this study included the National Tree Benefit Calculator, interviews with designers and scientist, and a citizen survey. Using the National Tree Benefit Calculator, researchers estimated that the park sequesters over 21,000 pounds of carbon annually through the planting of 531 trees, the equivalent of driving a car 30,000 miles. Furthermore, the park prevents over 92,000 gallons of stormwater runoff from entering into the stormwater sewer system annually due to the tree plantings alone, and biofilters over 1.5 million gallons of water within the parks circulating pond-stream system. Social benefits included results from survey respondents that show the park provides exercise opportunities for 77% of those surveyed. Additionally, the park has helped improve the perception of downtown Birmingham for 98% of survey respondents, and has helped unify the northern and southern sides of the city (92% of respondents). Economic benefits show that the park contributed to an increase in property values of up to 200% in the blocks surrounding the park, and the park influenced the housing choice of 43% of survey respondents who live near the park. Lessons learned, sustainable features and cost comparisons are also noted.
Examining Green Infrastructure Performance: Learning from Two University Campus Sites

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Keywords: green infrastructure, demonstration, performance assessment, campus, interdisciplinary

As educators, designers, and stewards of the land, we view green infrastructure projects as part of a larger effort to conserve and create ecosystem services and promote the value of such projects within our classrooms and communities. Well designed, implemented, and managed sites can improve ecosystem services and engage public audiences via informal learning about landscape performance (Echols & Pennypacker 2008, Grant 2012, Church 2015). On the Kansas State University campus in Manhattan, Kansas, two green infrastructure demonstration sites—the International Student Center (ISC) Rain Garden and The Meadow—are local exemplars of site-scale ecological designs supporting ecosystem services. Seeking to reduce stormwater runoff and improve water quality using native prairie and wet-meadow vegetation, these two sites challenge the status-quo campus aesthetic, illustrating that dynamic, less-tidy-looking landscapes can be beautiful amenities. Implicitly, the two sites provoke thinking about our designed environment as a socio-cultural construct, challenging the notion that environmental problems are “natural” and inevitable (Hodson 2003). Being in a campus setting, both sites are well-situated to offer opportunities for informal, outdoor learning. With this in mind, our EPA-funded project used the two sites as living laboratories, where we could monitor, learn from, and interpret the multifaceted environmental benefits of green infrastructure. Our project work (1) created research opportunities on campus, (2) developed a pilot monitoring program, (3) generated empirical data to demonstrate performance benefits, (4) strengthened institutional and community understanding of green infrastructure, and (5) sought to inspire, inform, and guide future implementation of green infrastructure sites on campus and within broader communities.

Our interdisciplinary team of faculty and students from landscape architecture, biological and agricultural engineering, ecology, and entomology developed and piloted monitoring protocols for stormwater runoff and infiltration capacity, ecological health, vegetation species diversity, insect pollinator species, and landscape maintenance practices. Findings show higher stormwater infiltration capacity than of typical campus landscapes, positive ecological health, and diversity of vegetation and insect pollinators at each site. Outcomes include easily usable monitoring protocols for both curricular and informal learning, and strategies for passive informal education at each site.
This paper details specific methods used in our performance monitoring, discusses educational benefits and challenges when conducting monitoring, highlights pilot monitoring findings, and discusses the knowledge and skills needed for effective implementation, monitoring, management, and public outreach related to green infrastructure sites.
Approaches for Obtaining SITES v2 Water Credits in Playa Hydrologic Systems of the Llano Estacado Region

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Keywords: Playa Lake, Llano Estacado, SITES, Sustainable Sites, depressional wetland

Playa lakes systems on the Llano Estacado High Plains shortgrass prairie plateau offer regionally unique and vital hydrologic and ecosystem functions. Anthropogenic influences including farming, ranching, energy exploration and production, and urbanization create negative alterations to these complex, vulnerable systems, undermining the important roles they play. While non-urban human-playa interactions have been addressed to varying degrees of success, urban playas receive little attention. Rapid urban growth in the Lubbock area exceeds global population trends of urban growth. Therefore, urban developments need to consider patterns and practices that preserve and restore important functions performed by natural playa systems on the Llano Estacado.

The SITES v2 Rating System aims to do just that, but its broadly generalizable system may create challenges when applied to unique hydrologic systems, like playas, that do not exhibit traditional linear streamflow dynamics. This paper examines the functions and services performed by playa lakes, the impacts urbanization has on these systems, the fitness of the SITES v2 Rating System to address these systems, and approaches to achieving SITES certification in the context of playa lake hydrologic systems on the Llano Estacado and achieving credit points in Section 3: Site Design—Water.
Living Architecture and the Ecosystem Service Signature

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Keywords: green roofs, living architecture, design process, performance

The ecosystem service theory provides the intellectual basis for living architecture, green infrastructure, and landscape performance-oriented projects. To advance the theory in the design disciplines, the concept of an ecosystem service signature is examined as an operational framework to help initiate ideas and organize communication in multidisciplinary projects. Studied here is the assessment of that framework in living architecture.

A history of the ecosystem service theory is provided followed by an examination of contemporary built works of living architecture using the concept of “benefits, tradeoffs, and synergies” (Costanza et al. 1997, Bennett et al. 2009). From the literature, projects analyzed for ecosystem benefits include Forest House (Japan), Sou Fujimoto; ASLA Headquarters (Washington DC), Van Valkenburgh/Conservation Design Forum; Se Jong City Municipal Building (South Korea), Balmori Associates; Moos Lake Water Plant (Zurich, Switzerland); and Bosco Verticale (Milan, Italy) Stephano Boeri.

The investigation shows that an ecosystem service signature can be created by examining a benefit, tradeoff, and synergy relationship. In turn, this can help identify and communicate performance in built work. Additionally, the discovery shows strong potential of signatures being useful in other phases of the design process including conceptualization and schematic design. Using an ecosystem service signature can provide an improved understanding and communication of performance projects possessing multidisciplinary goals.

The proposed framework is examined within the field of landscape architectural design where contributions, alignments, and separations from ecological planning framework (McHarg and Mumford 1969, Sp猩n 1984 Steiner 2012, Nudubisi 2002) involving the landscape ecology framework (Forman 2014) are overviewed and discussed. Ideas are further situated in contemporary exploration of the ecosystem service theory in planning and design (Ahern et al. 2014).
Landscape Performance Research: Findings from Harvest Community, Wayne Ferguson Plaza, and The Shops at Park Lane in North Texas

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**Keywords:** landscape performance, urban landscape evaluation, social performance factors, case study, online survey

This research reviews the procedures and findings from the landscape performance of three North Texas projects selected as part of Landscape Architecture Foundation’s (LAF) 2017 Case Study Investigation (CSI) program: Harvest Master Planned Community in Argyle, The Shops at Park Lane in Dallas, and Wayne Ferguson Plaza, Lewisville. The presentation specifically focuses on identifying criteria and performance procedures while revealing findings (social, environmental, economic, etc.) to highlight the importance of establishing a consistent and systematic framework to examine an array of projects to illustrate greater social value.

Although the origins of the discussion regarding the evaluation of completed projects can be traced back to the 1960s (LAF, 1966; Sommer, 1969; Hall, 1966), project evaluation and performance studies in design literature gained greater traction in the 1980s (Preiser et al., 1988). Beyond the understanding of human behavior in public spaces (Gehl, 1988; Whyte, 1990), the roots of such studies in landscape architecture go back to the 1990s (Marcus & Francis 1998; Bookout et al., 1994). While most evaluation literature tackles the performance question one case study at a time (Francis, 1999; LAF, 2017; TCLF, 2016; ULI, 2016), there is also greater interest to develop consistent sets of criteria and procedures for evaluating multiple cases in recent years (Whitlow et al. 2016, Ozdil 2008).

This research is designed to evaluate three landscape architectural projects’ performances while searching for a consistent and reliable set of criteria (social, economic, environmental, et al.) and methods for multiple cases. Research combines quantitative and qualitative methods (Deming et al., 2011; Murphy, 2005; Ozdil et al., 2015; 2014; Ozdil, 2016) and utilizes questionnaire and secondary data. While the review of LAF’s CSI Briefs (LAF, 2017) and the relevant design and planning literature (Francis, 1999; Whyte 1990) informs the criteria selection and procedures, findings from 240 online survey results (Dilman, 1978) and secondary data create a springboard for broader discussion. In conclusion, the presentation primarily reviews excerpts from the social performance surveys, as well as selected economic and environmental performance benefits. The research illustrates that while each project displays a unique range of performance benefits, character, and complexities depending on their project typology, size, location, and/or budget, the discussion highlights the importance of research.
for widespread applications to communicate landscape architecture’s impact at a broader scale to the greater society. The presentation also highlights performance studies’ relevance to landscape architecture practice, education, and research.
Small Green Spaces’ Type and Structure for Microscopic Urban Heat Island Mitigation

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Keywords: air temperature, microclimatic design, urban block, urban heat island, urban green space

Research to reduce urban temperatures and mitigate the Urban Heat Islands (UHIs) has focused primarily on the role of large urban green spaces as cool islands. The UHIs reducing of small urban green spaces (SGs) such as street trees and pocket parks also have been studied, but only a few studies have investigated the density, size, shape, and ratio of SGs. Although such an effect in urban areas can be a design for cooling cities, those effects has been underexplored. The purpose of this study was to find types and structures of SGs to reduce air temperature effectively in urban blocks.

Six highly developed blocks in Seoul, Korea served as research sites. They were classified into three pairs. Each pair consisted of two blocks and they had same urban settings except SGs' area. According to the difference of SGs' area, three of six blocks were the experimental blocks (high area of SGs) and another three the control blocks (low area of SGs). Air temperature was measured with mobile loggers on clear summer days, from August to September in 2012, at street level. These measurements were repeated three times a day for three days by walking around the experimental blocks and the control blocks at the same time.

By analyzing spatial characteristics, SGs within the six blocks were classified into their outward forms: polygonal, linear and single, or mixed. The polygonal and mixed types of SGs showed simple significant linear regression explaining that as SGs were getting bigger in their area and volume, they made the block cooler and cooler. Specifically, Polygonal and also mixed SGs (with more than 300 m2 and 2,300 m3) dropped the block's air temperature by 1 °C. Because of their clustered form, the polygonal SGs was more significant than the linear SGs in reducing air temperature. A configuration of the polygonal shape of SGs has an important role in delaying cooling air’s diffusion. The mixed SGs' area and volume showed significant linear regression models. Mixed SGs can effectively block heat inflow and easily make cooling zones with multilayered SG structures composed of tall trees and understory plantings such as grasses, bushes, and small trees. More specifically, SGs with increased tree volumes block solar radiation between the tops of the trees and the ground and absorbs heat reflected from surfaces, while their evaporation volume increases the latent heat flux and lowers the temperature through wind ventilation.
Parks as a Health Treatment: Measuring the Dosage

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Keywords: parks, greenspace, public health, landscape performance, active living

The concept of parks and greenspace as policy elements with which governments promote the health and well-being of citizens emerged nearly 200 years ago. The importance of this function for parks has varied over the years, but recent concern for public health has sparked heightened interest in the capacity of parks and other public greenspaces within the built environment to encourage and facilitate healthy lifestyles. For this study, an assessment of the evidence base correlating greenspace with five dimensions of health was conducted. The purpose was to look for potential indicators that could be used to assess the merits of a given site (park, greenway, etc.) or collection of sites in terms of public health outcomes. Based on the strength of current evidence (i.e., a wealth of research and literature in the past two decades in response to the obesity epidemic and other chronic diseases associated with sedentary lifestyles, such as type 2 Diabetes and cardiovascular disease, along with publication of a rating system for the metabolic energy expenditure associated with various park features) a decision was made to focus on the stimulation of physical activity as an indicator of potential public health benefits.

A proposed measurement was developed and tested to determine its practicality, utility, and efficiency for evaluating the potential of a park to generate physical activity. Using data collected through a direct-observation audit tool, an index was developed to measure the contribution of an individual park or greenspace location towards net physical activity within its surrounding community. The metric is based on ratings for Active Energy Expenditure (AEE) developed by researchers at North Carolina State University and published by North Carolina State Extension after a peer-review process. The proposed index for individual sites can be aggregated to produce performance measurements for a collection of sites or locations, such as that of a park agency, planning district, or other jurisdiction. The scores produced for the case-study parks in this study were analyzed using multiple linear regression to determine the relative contribution of each of three primary variables in predicting the total score for an individual park: park features, park quality, and park quantity (size).

The results showed the measure to be feasible and practical to use, and it has since been applied in two real-world planning studies to align municipal park systems with public health goals. The process can also be used to evaluate alternative design proposals for parks and other public landscapes on their potential performance in terms of public health outcomes. Application of the methodology for the metric to the other dimensions of health is also being explored.
Designed Experiments to Improve Green Infrastructure Performance: The Design Process

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Keywords: designed experiments, urban design, monitoring, landscape performance, co-production

This presentation discusses co-production design processes for designed experiments. Felson and Pickett (2005) proposed designed experiments or co-produced urban design projects as ecological tests to improve our understanding of how green infrastructure performs. Urban ecologists suggest co-production design processes support better and more socially contextual green infrastructure outcomes. The co-production concept links urban ecologists, planners/designers, city residents, and students to collaboratively generate (1) design documents, (2) maintenance practices, and (3) monitoring protocols for designed experiments (Childers et al., 2015). Designed experiments are intended to address a key disconnect between urban ecology and landscape architecture. Urban ecologists study green infrastructure projects after they are built, and they are not usually actively involved with landscape architects during the planning, design, maintenance, and monitoring of these projects (Steiner, Simmons, Gallagher, Ranganathan, & Robertson, 2013). The purpose of the study is to answer the central research question of how governance and institutions can support the design of equitable, sustainable, and resilient green infrastructure outcomes. The larger study has two components: (1) the design process phase and (2) maintenance/monitoring phase. For this presentation, we will discuss the design process only. For this study, we surveyed students, researchers, and practitioners working with three different designed experiment projects for undergraduate and graduate landscape architecture studio courses. The three courses had an alternative research-service-learning studio structure in which we had researchers and practitioners paralleling the course. The idea is to align major university research initiatives with external partners to create more socially robust knowledge (Nowotny, 2003). We also conducted several follow-up interviews to dive deeper into the effectiveness of the design process. The surveys and interviews allowed us to reflexively understand how existing knowledge production at the university (existing long-term social and biophysical data) could integrate into landscape architecture content to improve green infrastructure decision-making processes and project outcomes. Based on the surveys and interviews, we will discuss the opportunities and barriers to such an approach. The findings provide a direction for how universities can partner with green infrastructure governing organizations to create improved project efficacy for more equitable, sustainable, and resilient outcomes.
Improving Environmental Performance Evaluation of Landscapes: Lessons Learned from the Landscape Architecture Foundation’s Landscape Performance Series

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Keywords: landscape performance, environmental benefits, methodological limitations, lessons learned

Presented with broad-scale challenges such as urbanization and climate change, the discipline of landscape architecture has been increasingly demanding scientific rigor to achieve long-term sustainability of our landscapes. The integration of research and practice is absolutely essential to cultivate mutually supportive links between theory and practice. The Landscape Architecture Foundation has endeavored to promote such an integration by funding landscape performance evaluations through the Case Study Investigation (CSI) program. With 107 case studies in LAF’s database now, a need for a synthesis on research methods and their limitations arises in order to improve future evaluation of landscape performances.

As the first of a series of syntheses, this study focuses on environmental performance, expected to be expanded to address all the three categories of environmental, economic, and social performances that the LPS strive to evaluate. Through investigating the current 107 cases, we present an analysis of the state of art of the LPS Case Study Briefs to summarize the range of environmental benefits (e.g., stormwater management, habitat improvement) that have been explored, common methods for quantifying them, as well as limitations of those methods. Harnessing our own experience participating in the 2017 CSI program, we then identify the underlying reasons for the overall methodological limitations for environmental performance evaluation as reflected in the LPS Case Study Briefs. Recommendations are made in the end to both the researchers and practitioners on how to improve pre- and post-development site investigations and evaluative methods to enhance the quantification of environmental benefits of landscapes in the long run.
Faculty and Student Roles in Monitoring and Managing Two Largescale Prairie-Like Living Roofs in North-Central Kansas

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Keywords: prairie-like living roof monitoring and management; assessing vegetation coverage, plant species dominance, plant species richness

Providing diverse, native vegetation is vital to optimize ecosystem services on living roof systems in the context of prairie landscapes (Sutton et al. 2012). Kansas State University (KSU) researchers initiated studies of vegetation and soil moisture on two 3,900 square-meter green roofs on the KSU campus in spring 2016. The Memorial Stadium green roofs (MS-GRs) were seeded and planted with 25-30 native species in 2015 and 2016. Research includes (1) tracking vegetative change to understand what plant species do well on these steeply sloped, 12-15cm deep “prairie-like” systems (to suggest vegetative management strategies promoting reasonable coverage and supporting pollinator habitat and other ecological functions); (2) monitoring substrate moisture levels and supplemental irrigation (to encourage wise use of potable water and provide a measure of stormwater management); and (3) helping KSU Grounds staff manage vegetation on the two roofs (to reduce nuisance plants and favor seeded/planted and desirable native species). In June 2016, KSU faculty and students added nine soil moisture/temperature sensors and one solar radiation sensor on each roof. In late June 2016 and late June 2017, researchers completed vegetation identification along eight, 100-foot transects on each roof. May to September 2016 and 2017 observations documented total species richness. July 2016 and July 2017 color-infrared images taken using a UAS/drone are expected to support efforts to better understand vegetation cover and composition over time. Our collective monitoring and proactive faculty and student vegetation management efforts have aimed to enhance the ecosystem services provided by these two living roofs. Tracking substrate moisture has helped the lead researcher guide KSU Grounds staff regarding the frequency of irrigating vegetation using the automatic sprinkler system on each living roof. Researchers found that intentionally seeded and planted native Kansas species were more dominant on the West MS-GR along the 100-foot transects. The dominant native grass on the WMS-GR in late June 2016 was blue grama, while foxtail and prairie dropseed were the dominant grasses on the East MS-GR. Despite weeding and clipping of agricultural weeds, oxtail, marestail, oxalis, tall fescue, elm, lambsquarters, wild-sweet-clover, ragweed, and other species were abundant, particularly on the EMS-GR. This presentation highlights findings from vegetation monitoring and management of these two prairie-like living roofs, and identifies the pros and cons of steep-sloped living roofs. Our research transforms stakeholder dialogue from "we have two large green roofs on the KSU campus" to that which elucidates a multiplicity of functions, values, effects, and costs.
Synergy: Interdependent Relationships in Planning, Urban Design, and Landscape Architecture

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Keywords: synergy, synergistic performance, performance measurement, sustainable development, metric

Design disciplines have been recently focused on quantifying performance and measurable benefits. Such metrics are typically categorized in discrete independent lists, organized by environmental, social, financial, and sometimes aesthetic categories. Performance certification programs such as LEED and SITES focus heavily on environmental performance (NEAMTU, 2012). As measurement “silos,” these elements sometimes even occur in competition with one another (e.g., on a broad level, environmental health versus economic development).

The purpose of this study is to explore alternative, more integrated approaches to achieving comprehensive successful performance. Sustainable development practices should evolve toward measuring synergistic relationships between four primary realms: economic development, community development, environmental health, and the contributing role of art and culture (Ravetz, 2013). Largely supporting this notion, a recent UN Working Committee on Sustainability released an improved definition of sustainability, shifting from free-standing pillars to highest level synergies: Economy, serving society, within life’s earth support systems (Mavrič & Bobek, 2015). It is suggested that long-term project success relies on comprehensive and integrated performance, whereby individual performance realms enhance, if not drive, one another. Such relationships will prove to be both beneficial and co-dependent on one another. Synergy is defined as “the interaction or cooperation of two or more organizations, substances, or other agents to produce a combined effect greater than the sum of their separate effects.” A synergism is the combined action or operation, whereby a mutually advantageous conjunction occurs. Such relationships will be sought as a means of understanding improved overall performance in landscape architecture.

Case Studies: Synergism Precedent Inventory and Review

Based on this deepened concept of sustainable development, historic and contemporary synergism models in landscape architecture will be explored. Through extensive project case study review, important issues relative to substantiating and measuring relationships and correlations will be identified. This review will culminate with a recommended approach to synergistic performance in in planning, urban design and landscape architecture work.
Measuring Synergies: Cause and Effect Relationships

Academic and professional entities will be consulted to determine a range of performance measurement tools, performance indicators and establish protocols for fundamental reliability and validity. Specific topics and challenges, some of which are listed below, will be discussed:

- Scientific methods and validity;
- Correlation and isolation of variables;
- Impossibility of complete causality, and confounding variables;
- Quantitative and qualitative methods, performance indicators;
- Design performance, post-construction performance, long-term performance;
- Time, money and research expertise not available to designers.
Teaching Landscape Performance: Strategies and Lessons Learned

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Keywords: landscape performance, landscape performance education, pedagogy, LAAB standards

Landscape performance can be defined as a measure of the effectiveness with which landscape solutions fulfill their intended purpose and contribute to sustainability. By embracing performance measures, landscape architects can elevate the quality of designed and planned landscapes. This transformation in the profession begins through education. In today’s increasingly evidence-based marketplace, landscape architecture students need to be able to convey the environmental, economic, experiential, and social value of exemplary design. Incorporating landscape performance into landscape architecture education will give students the awareness and skills they need to design for, evaluate, and communicate the impact of their projects.

The Landscape Architectural Accreditation Board (LAAB), the official accrediting body for first professional programs in landscape architecture in the U.S., included landscape performance in its 2016 accreditation standards for all bachelor’s and master’s programs. Landscape performance is listed in the Professional Curriculum section as one of the topics to be covered under “Assessment and Evaluation.” The revised standards took effect starting with landscape architecture programs scheduled for accreditation reviews in fall 2017.

To support the adoption of landscape performance in design education, LAF offers five $2,500 Landscape Performance Education Grants (LPEG) mini-grants yearly to select university faculty. The LPEG grants support diverse pedagogic strategies and learning outcomes that advance performance-based design education. Participating faculty work with LAF to develop and test one or more models for integrating landscape performance into standard landscape architecture course offerings in various types of courses. The materials produced are published in the “Resources for Educators” section of LAF’s Landscape Performance website.

This panel will focus on lessons learned by landscape architecture faculty who have incorporated landscape performance into their courses and have participated in the LPEG program over the past four years. They will reflect upon lessons learned from courses...
developed specifically to teach landscape performance, and discuss ideas and implications related to the integration of landscape performance into the curricula of accredited landscape architecture programs as a response to its inclusion in the LAAB standards. The structure of the panel will include an LAF program administrator and four landscape architecture faculty members who have received LPEG grants. Each member of the panel will briefly discuss their unique background and perspective, share lessons learned from their courses, and then the panel will collectively explore recommendations for how a landscape architecture curriculum can most effectively incorporate landscape performance into their courses in order to satisfy the LAAB standards.
Ubiquitous Landscape Monitoring: Fitting the Landscape with Sensor Technology for Continuous Monitoring and Data Collection

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Keywords: performance monitoring, sensors, landscape architecture

Landscape performance investigations typically employ data collection methods designed for an individual report or case study. LAF’s Landscape Performance Series has now catalogued well over 100 case studies of high performance landscapes at landscapeperformance.org. These studies use temperature sensors, soil moisture sensors, flow gauges, time lapse photography, weather data, and other technologies for data collection that can lead to understanding of landscape performance. Other common sensors that have yet to be used for performance monitoring include cell phone tracking and security surveillance video. The explosion of home monitoring devices such as smart appliances, TVs, and thermostats is made possible by the significant increase in sensor capabilities coupled with the significant reduction in cost of these devices. The time has come when we should explore the possibilities for monitoring landscape performance in much the same way as buildings are now monitored: in real time, and across a broad spectrum of systems and functions.

Some critical questions need to be answered. For instance, what should be monitored? Just because we can monitor something does not mean we should. On the other hand, monitoring elements of the landscape that can lead to greater cost efficiencies, safety, and value would be promising candidates for a comprehensive monitoring program. Another question is what can we monitor? A broad accounting of current sensing abilities might reveal areas of deficiency, or areas where new developments are needed (research opportunities). It would also give guidance to clients and firms as to what can be done now to monitor performance. A third question is what would a comprehensive model of landscape monitoring look like? Where would these sensors reside? At what time intervals would the data be collected at? Where would the data be stored and analyzed? Who would have access to the data? How could the data help with maintenance regimes, safety assessment, the development of new standards, and informing future design?

This panel discussion will be led by four prominent researchers who are intimately familiar with the original development of landscape performance as a field and who have years of experience using sensors to measure landscape performance.
Microscopic Thermal Map through Transect Survey using a Ventilating T-type Thermocouple

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Keywords: cool island, microclimate, spatial analysis, street level, urban forest

The significance of urban green spaces (GSs)' mitigation on urban heat islands (UHIs) has been highlighted in previous studies and efforts to apply appropriate practices to reduce UHIs have been reflected in municipalities' planning and policy. Thermal maps in a large scale have let large GSs show their spatial cooling effects well by using remote-sensing or aerial images. Thermal maps in a fine scale can provide us with show small GSs' cooling effects and those effects can contribute to housing or street design guide to micro-UHIs mitigation. However, although thermal maps has widely indicated the GSs' cooling in previous studies, there are limitations to illustrate small GSs' cooling microscopic thermal conditions. Therefore, the purposes of the study are 1) to generate a microscopic thermal map through collecting air temperature data more accurately with a temperature-sensing unit with ventilated double cylinder shelter (TVC) and 2) to demonstrate small GSs' cooling effect using the thermal map.

The study site was the 7-acre Schob Nature Preserve located in College Station, TX. This site was ready to be analysed spatially and divided into the five land cover types including a fores, a lawn with several trees, a rain garden, and a front yard with trees; and a prairie. The air temperature data were repeatedly collected four times in a day (at 10h, 13h, 16h, and 20h) for eight different days from November 2016 to May 2017. This transect survey produced the air temperature data from TVCs and data loggers on the height of 1.5m above the ground in each section of different land cover areas. TVCs sensed air temperature very sensitively and accurately in every second blocking solar radiation. Then, the recorded data by the loggers were converted to spatial points to generate a thermal map using an Inverse Distance Weighted analysis of ArcGIS.

The thermal maps showed the air temperature distribution at 10h, 13h, 16h, and 20h, respectively. Based on the preliminary results from our thermal maps, the prairie and forest section showed the most effective in mitigating air temperature. But the rain garden and the lawn section didn’t contribute to reducing air temperature. The prairie's cooling reasoned its
Landscape Performance

Windy location. The air temperature of the forest section showed less fluctuation during the day. Several large canopied trees in the lawn established their cooling ranges. The results showed that small GSs needed multi-layered or large canopied vegetation, or highly efficient cooling locations.
Collaborative Design Strategies for Stormwater Runoff Heat Removal Using Low-Impact Development

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Keywords: low-impact development, thermal removal, pervious concrete, rain garden, collaborative research

Influenced by interdisciplinary trends, contemporary landscape architecture is a collaborative field of theory and practice. The inclusiveness and innovation of landscape architecture offer creative solutions for other disciplines. The Green Infrastructure Lab (GIL) at Auburn University is a joint laboratory that involves four different disciplines: building science, biosystem engineering, landscape architecture, and horticulture. The research team focuses on the thermal removal effectiveness of stormwater management construction, such as pervious concrete, brick pavers, sod, and rain garden. These construction technologies are well known as urban stormwater mitigation practice, but has not been adequately evaluated for thermal heat removal effectiveness. However, thermal pollution affects urban water environment (Rahn, Hein, Dougherty, & Gandy, 2015). In the case of Mobile, Alabama, Heated stormwater runoff in summer days flows into lakes, streams, and bays, where it mixes and potentially increases the base temperature of receiving waters, eventually damaging receiving water ecosystem (LeBleu, Rahn, Wright, & Dougherty, 2017).

To examine the heat removal effectiveness of these stormwater control measures, microcosms have been designed and constructed in the GIL. The purposes of this research are (1) To test the thermal removal effectiveness of stormwater runoff constructions such as pervious concrete, brick, sod, and rain garden; (2) To establish a baseline for future research on thermal removal effectiveness of stormwater management constructions; (3) To facilitate collaboration in landscape architecture, horticulture, biosystems engineering and building science. (4) To improve urban landscape performance in terms of material selection, construction techniques, and ecosystem health.

Methods: (1) Hypothesis: Porous surface can reduce the temperature of stormwater runoff in the urban realm; (2) Craft: Four stands are designed and installed to hold samples (pervious concrete, impervious concrete, brick paver, and sod). A rain garden is also created in the lab; (3) Compare: One impervious concrete is involved as a referential sample to the pervious
concrete; (4) Program: Cooling and heating systems mimic the natural sun heat and rain event, censoring devices transfer data to a computer.

This research explores urban stormwater management constructions from the view of thermal removal effectiveness. The outcomes of the research can guide urban design and construction in terms of material selection and construction techniques. It cultivates a better landscape performance on mitigating urban heat island effect. Moreover, this interdisciplinary team builds a new structural working relationship and framework. It enables landscape architecture better understand materials that are implemented in the real environment, rather than a theoretical understanding.
Landscape Planning and Ecology
Integrating Landscape Performance and Resilience Scorecard Analyses into a Geodesign Process

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Keywords: geodesign, landscape performance, community resilience, climate change, green infrastructure

The use of innovative digital tools to analyze and design geographic space is known as geodesign (Goodchild, 2012). Stenitz’s (2012) geodesign framework specifies six key models to be produced: representation, process, evaluation, change, impact and decision. Simultaneously, an initiative proposed by the Landscape Architecture Foundation advocates collaboration to quantitatively assess the environmental, economic and social benefits of urban design projects (Yang and Binger, 2016). This effort, known as landscape performance, encourages evidence-based designs that are grounded in quantitative performance measures. Unfortunately, many of these performance measures have not yet been fully incorporated into geodesign. Other analytical-planning methods, such as the resilience scorecard (Berke et al., 2015), use quantitative performance measures to reduce losses from hazard events through conditional analyses and policy review, rather than projecting or post-implementation evaluation metrics. While these types of analyses can provide a sound foundation for evaluation models, they are still quite separate from geodesign.

The effects of climate change, such as sea level rise, have had observable ecological, social, and economic impacts on the built environment in the Texas Coast. Sea level rise has already had a significant impact on Gulf Coast communities, resulting in wetland loss, increased coastal erosion/inundation, and increases in the duration and frequency of flooding from storm surge (Horton et al., 2014). The National Oceanic and Atmospheric Administration (NOAA, 2015) predicts that (in a med-high scenario) the mean sea level will rise by 6.29 feet by 2100 in the U.S. Gulf Coast. League City, TX, due to its coastal location, is highly vulnerable to flood events and other issues related to sea level rise.
The authors developed and executed a geodesign process which integrates the resilience scorecard (as the evaluation model), a vertical buffer tool (as a change model) to project sea level rise, and landscape performance (as an impact model). The process used the resilience scorecard to assess flood vulnerability using projections for the 100-year floodplain with sea level rise by 2100. Projections were used as a guide to spatially execute a resilient master plan for League City, TX, U.S. Future impacts of the plan were projected using landscape performance measures. Findings suggest that the design decreases the 100-year flood plain by 2100 with sea level rise from 74 acres to 15 acres (from 76% coverage to only 16%), 221,921 ft³ of runoff are captured, 2,400 new residents are protected, over 3,000 jobs are created, around $23 million in physical damage is avoided, and nearly $1.3 billion are generated by life cycle benefits by 2100.

Learning Outcomes:

- Attendees will learn about the geodesign framework and how to apply it.
- Attendees will be provided with a wealth of information on climate change projections and current hydrological circumstances in Texas.
- Attendees will learn about landscape performance and the capabilities of the Green Values Calculator.
- Attendees will be informed of innovative structural and nonstructural mechanisms to help attenuate urban flooding.
Public Aesthetics-Based Design Patterns of Urban Rain Gardens

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Keywords: public aesthetic, rain gardens, design pattern

This study explores design patterns of urban rain gardens considering public aesthetics. Recently, flood damage and pollution have made stormwater particularly topical, especially in China. The Chinese government has put much money into the construction of green infrastructure that deals with stormwater issues through new policies, such as the policy of sponge cities construction in 2015. However, some researchers argue that new green infrastructures may run in opposite direction with human experience in green spaces and bring negative effects. In addition, many people without an environment-related background cannot identify positive functions of green infrastructure such as rain gardens and bioswales. From their perspective, green infrastructure occupies green spaces but do not provide the social and cultural functions of other green spaces. In addition, they believe many infrastructures come with undesirable looking. And the public aesthetic was not considered well. Rain gardens are part of the landscape that we design for public; therefore, we should consider public perception.

In this study, we classify rain gardens into various categories based on several characteristics, such as land use, spatial and structure organization, and elements that form rain gardens according to previous work. For land use, we study residential area, commercial area, and green spaces in urban areas in China, with high density population. In addition, we collected rain garden images through site investigation, literature review, and websites, classifying these images into various categories. Next, a questionnaire was designed using the images we collected to explore human perceptions of those rain gardens. Specifically, we divide those questioned into two groups, environment-related (landscape architect/urban planning and design/architect/ecology/environment relative) vs. non-environment-related. For each group, we study their most and least favorite rain gardens on different sites and identify the elements that influence their perceptions. Furthermore, we used ANOVA to study whether people with environmental backgrounds have different opinions on rain gardens with others, and what exactly the differences are. In this research, we find that people with different professional backgrounds have different views on each rain garden category. Moreover, these differences are non-trivial and have significant impact on their perceptions. Focusing on public aesthetics, we propose several rain garden design patterns for residential areas, commercial areas, and open spaces. We expect these rain garden design patterns cannot only serve their ecological functions but also provide aesthetic functions for public.
Protection and Development of Ski Resort Landscape Resources Based on the Theory of Restoration Ecology: Thaiwoo Ski Resort of Zhangjiakou City

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Keywords: ski resort, ecological restoration, landscape resources, protective development, ecological tourism

How to balance development and protection is a topic that deserves concern in tourist exploitation against the backdrop of the rapid economic development in China; the same is true for Thaiwoo. Facing the increasingly rise of eco-tourism, Thaiwoo Ski Resort desperately calls for conservation and upgrading to realize sustainable development through the ecological restoration of the site and reasonable development of landscape resources. As Beijing has won the bid to host the 2022 Winter Olympic Games, a skiing craze has swept the country, and the planning and construction of ski resorts has reached a new level. Thaiwoo Ski Resort is located in Chongli County of Zhangjiakou City, 220 kilometers northwest of Beijing. It is a part of the core area of the 2022 Winter Olympics Games. The initial stage of construction of Thaiwoo has impacted the ecological environment, leading to the decrease of plantation and the bare rock of the mountaintop, for the lack of support from certain scientific theories. By analyzing the surrounding natural environment, climatic conditions, and vegetation types and distribution, the construction and planning status is fully understood. This paper teases out the existing problems and strengths through extensive literature surveys, GIS analytical methods, and field investigations. With the advanced experiences in the construction of ski resorts from foreign countries, a landscape exploration scheme for Taiwoo Ski Resort is presented on the basis of protective development.

This paper presents before-and-after data about the decrease in the area of forests and the fragmentation of ecological landscape through GIS techniques. The construction of the ski resort has caused a vast stretch of bare land on ski slopes and beneath cableways. The species of current plants are relatively unitary. We also classify the sites suitable for renovation, including skating zone, forest zone, rocky zone, and construction zone, and propose different ecological restoration technologies for different types of sites, in the hope of forming different levels of vegetation landscape and improving the stability of regional ecosystems. The paper also sets objectives for making Taiwoo a comprehensive, ecological, year-round resort, making full use of the advantages of seasons landscape resources and introducing new tourism formats, improving the plight of the management predicament and promoting all-round development of Skiing tourism. The research on protection and development of ski resort landscape resources will help to balance both the development of a tourism economy and the protection of the environment. An abundantly seasonal plants landscape will be built by eco-restoring in Taiwoo, and more visitors will be attracted at other times. The improvement of the
management predicament will not only benefit corporate profits but also help the sustainable development of Taiwoo Ski Resort. The construction of ecotypic Taiwoo Ski Resort will contribute a lot to green Olympics.
Landscape Archaeology and Historic Landscape Characterization in a Landscape of Intensive Energy Resource Development: Landscape Architecture, the Anthropocene, and the Appalachians

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Keywords: geopark, Appalachia, landscape planning

The Appalachian Mountains of the Eastern United States are the oldest mountain range in North America and one of the oldest in the world. The landscape had been occupied for thousands of years in pre-European times by native populations that were often using river valleys as migration routes moving between settlement areas to the south and Pennsylvania and New York to the north. European settlers moved into the region in the early 1700s, but the region was not intensively settled until the mid-19th century with the birth of the Appalachian coal industry. Prior to the first coal mining after the Civil War, the first European settlers established small classic mountain Scotch / Irish communities and farmsteads. The region is also home to numerous French and Indian War and Civil War battlefields, as well as Blair Mountain, the location of the largest civil insurrection in the history of the United States. With this complex and layered history, the Appalachians have been home to a very rich mosaic of archaeologic, historic, and cultural landscape resources. Beginning first in the 1950s, and more importantly in the 1970s, the region’s character began to change drastically with the onset of large-scale surface mining, often done with mountaintop mining and valley fill construction methods. Major ecological, hydrologic, human health, and cultural / community impacts have been felt in many of the most heavily mined areas of the Appalachians, and these impacts have been well documented. The presentation will review methods being implemented to understand aspects such as larger heritage landscapes and the roles mined landscapes can assume in providing ecological services to adjacent communities. This documentation is also potentially timely, at least for the rich industrial/mining history of the region, with the recognition of the shortfall of historic industrial landscapes, given the renewed interest in such sites and landscapes on the part of the USDI National Park Service and the Geoparks Program of UNESCO.
Green Roofs and Birds: Observations and Opportunities for Supplementing Wildlife Habitat

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Keywords: green roof, habitat, birds, wildlife, sedum, native plants, prairie, urban, rural

It is typical in design and planning that there are unintended consequences for the decisions we make for the built environment. A rural-context green infrastructure research area, home to 28 test roofs and an urban green roof pavilion were observed over a 24-week study, which yielded 110 hours of field observations. Across these two sites in Starkville, MS, we found opportunities for green roofs to provide habitat for birds. The primary research question was concerned with whether or not vegetation was a significant factor in attracting birds.

For the rural site, we used ANOVA to test whether there was a difference between the mean number of birds visiting the green roofs planted with Sedum spp., native prairie spp., or the asphalt-shingle control roofs. We found that there was no statistical difference between the mean number of birds visiting the two types of vegetative roofs, but there was a statistical difference between the mean number of birds visiting the vegetative roofs vs the control roofs. This indicates that whether it is intentional or not, green roofs function as islands of habitat in the greater landscape matrix.

Secondary research questions were concerned with what species were attracted to and actually using the roofs; and if so, how were they using the roofs? We wanted to know what the species composition of bird users was and if this composition changed through the seasons in response to the avian life cycle. Through direct observation, photography, and video capture, data were collected about use of the roofs at both sites. Observed behaviors were typical: foraging, singing/calling, resting, etc. and the data suggest that user species will change throughout the year.

We were curious if there was any difference between observations made in the rural context vs the more urban context. These data collected were more qualitative and will be covered in discussion; however, roof usage was similar, but local bird populations may have more to do with what species were observed than size of roof or quality.

This research is important because anthropogenic activity and land use/cover change is applying pressure to wildlife communities everywhere and birds are no exception. In general, green roofs around the world have been touted for their ability to provide habitat opportunities. This research discusses the findings, as well as incidental observations and thus, provides a foundation for theorizing design implications.
The Role of Forests as Green Infrastructure

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Keywords: forest, green infrastructure, watershed planning

The Raritan River Basin is a little over 1000 square miles in size with 100 municipalities partially or fully within the basin. It is in central New Jersey and average well over 1000 people per square mile. Because of New Jersey's “home rule” governance, there is little cohesive planning or watershed management at the municipal or county level in this system. Instead, there are three watershed management areas supported by a variety of NGO's. We would like to provide the NGO's with evidence that forest protection, especially in headwater and riparian areas, is an important part of their existing green infrastructure. Ongoing research into ordinances that support tree and forest protection indicates that there are neither guidelines nor regulations protecting the majority of forests in the Raritan Basin except in the north west corner of the study area, where the NJ Highlands regulations are in effect.

We have studied the distribution of forests, during the past three years, in the Raritan River Basin in New Jersey. We have focused on the relationship between water quality metrics and land use within sub-watersheds (specifically, those with 14-digit hydrologic unit codes). The water quality metrics we have used include macroinvertebrate sampling, visual habitat analysis, and water chemistry. We have found no statistically significant relationship between macroinvertebrate metrics and land use patterns. We have found statistically weak to strong relationships (using GLM for Regression models) between visual habitat assessments and forest cover. Chemical results can be best described as highly variable. When we start to integrate percent impervious surface into multivariate analysis, we find regression results that include forests, wetlands, barren land, and impervious surface as indicators of water quality. These results differ from some published results because of our emphasis on the presence of forest instead of impervious surfaces. Qualitatively, our results show that the presence of forests and wetlands buffer against the degradation of water quality that follows increasing impervious surface coverage.
Trans-scaled Landscape Planning with Landscape Information Modeling: Landscape Planning of Huanghua Town as an Example

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Keywords: landscape planning, landscape information modeling, trans-scaled landscape, town regional planning

A new method of landscape planning for the newly established Huanghua Town is discussed in this paper. The method focuses on the application of improved technologies, which conduct Landscape Information Modeling workflow for landscape planning in a trans-scaled context. As a new town established in the suburban area of Linzhou City, Huanghua Town sees its landscape not only as ecological and cultural settings, but also as dynamics of development in the new urbanism process in China, which articulates green growth of economics and environmental quality. Landscape planning becomes a key issue for the new town among other town regional planning issues, such as spatial layout, cultivation of new industries, and services to the people. The landscape planning concerns the constructed area of the town covering 2.1km² as well as the administrative area of 107 km² and the even broader scope connecting to the surrounding mountain scenic area. When facing such different scales, the landscape planning deals with different contents, such as conservation of ecological structures, protection of cultural heritage, the lifestyle transition of the villages, as well as the design and construction of the new town center. All these contents need to be integrated under the operation of landscape planning. However, with traditional planning techniques, landscape planning is hardly capable to sufficiently synthesize such rich contents nor to effectively play the role to promote the development of the new town. Thus, a new planning technology is required for the landscape planning of Huanghua Town.

This paper proposes Landscape Information Modeling (LIM) workflow as a potential systematic methodology to strengthen the capability and to optimize the process of landscape planning. LIM results from the transferring of the concepts and technologies of Building Information Modeling (BIM) to landscape architecture. A LIM workflow produces a 3D digital model that contains the information of the project within its lifecycle. LIM workflow defines the sources of
data that reveal the features of various scales and realizes modeling the objects with a fusion of multi-sources data. Therefore, with a LIM workflow, a trans-scaled integrated analysis becomes possible. The outcome of the object analysis can be recognized in various application platforms, such as GIS, Autodesk Infraworks, Civil 3D. It provides direct references to the process of making planning and design proposals. On the other hand, the proposals can be simulated and explored with the comparison of the analysis outcome. With LIM workflow, systematic operations including modeling, analysis, planning, simulation, and proposal revising can be integrated.

The combination of GIS and BIM forms the basic feature of LIM workflow. It is enhanced by the data input, which contains satellite remote sensing data, surveying data, as well as photogrammetry data. The data processing to configure a unified coordination system can be operated with the cooperation of GIS and Autodesk Civil 3D. With the combination of Autodesk Civil 3D and Infraworks, regional digital terrain model from the multi-source data of the scale 1:100000 to 1:500 is built. Such integrated trans-scale model brings advantage to analysis, exploration and planning decision making, compared to separated models of different scales or of different software. By using this model, the following themes can be considered with the scale of regional structure to that of individual objects: the conservation of ecological structures, the protection of the cultural heritage, the transition of the villages, as well as the design and construction of the new town center. The themes are overlaid in the model to achieve a deeper synthesis result so that they are coordinated in the plan to preserve the scenic value of the vast landscape when the new town is developed in a continuous process.

The landscape planning of Huanghua Town represents an emerging category of the projects, in which the focus transfers from urban to rural, in which the boundary of regional planning and site design is becoming vague, in which rational decision making has never been so indispensable. The new method discussed in this paper is a response to such emerging category. LIM workflow introduces information modeling to landscape planning. It provides chances for the practice of landscape architecture to integrate modeling, analysis, simulation, planning and design as one landscape planning process. With the empirical research of the landscape planning of Huanghua Town, the appropriateness of the component technologies that form landscape information modeling is verified. In the project of Huanghua Town, the BIM solution is expended from single building project to the themes of landscape planning in various scales. It also establishes a base for the future LIM researches, which engage the wider range of professions and the organizational collaborative operations.
Effects of Spatial Forms of Green Infrastructure in Block Scale on PM10 and PM2.5 Removal: A Case Study of the Main City of Wuhan

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Keywords: green infrastructure, PM2.5, PM10, block scale

Particulate air pollution is a common challenge in the process of rapid urbanization of developing countries. The problem is becoming more serious with high-density urban morphology, industrialization, and popularization of private cars. Urban green infrastructure is an interconnected network composed of natural areas and other open spaces. It emphasizes the preservation of the value and function of natural ecosystems to maintain clean air and water. There are significant differences in the concentration of particulate air pollution in urban blocks, and green infrastructure is an important factor. Previously, there are many studies on the influence of green space (parks, forests) on particulate matter, but almost no attention was paid to the green infrastructure in urban common blocks.

PM10 and PM2.5 are also known as inhalable particle and fine particle, whose aerodynamic diameter is less than 10 microns and 2.5 microns, respectively. To study the impact of green infrastructure on particulate matter in general blocks, and apply the study results in the regulatory detailed planning, urban design, and green infrastructure planning and design, the study focuses on these key contents: (1) Is there a correlation between the spatial forms of green infrastructure and the concentration of particulate air pollution in general urban blocks? and (2) What kinds of and to what extent spatial forms of green infrastructure that affect the concentration of PM10 and PM2.5?

According to the pollution situation in Wuhan in 2015, we analyzed PM10 and PM2.5 sample data of 36 days with the rate of 10% of the whole year based on the criteria of 2-4 days per month for different levels of pollution in sunny and breezy conditions. These data come from eight national controlling points and two self-controlling points by research group in Wuhan. Through remotely sensed imagery, we extracted green infrastructure of 10 blocks. Then, we calculated the landscape pattern index of green infrastructure in 10 blocks based on software Fragstats. Results show that (1) In the urban block, spatial forms of green infrastructure and PM10/PM2.5 concentration is highly correlated, and (2) PM10/PM2.5 concentration is negatively associated with the mean core area per patch (MCA1) and patch density(PD), but positively associated with patch mean nearest (MNN). Landscape shape index (LSI) is almost not associated with PM10/PM2.5 concentration. According to our findings, we can propose some planning and design strategies of green infrastructure for reducing the particulate air pollution, which can enrich a new dimension of green infrastructure planning and design. Due
to the serious particulate air pollution in China, it is also an effective way to reduce the concentration of particulate matter, rather than move it from one place to another.

Learning Outcomes:
- Propose some planning and design strategies of green infrastructure for reducing particulate air pollution.
Understanding Spatial Relationships between Flood Hazard Areas and Green Infrastructure: A Case Study for Phoenix, Arizona

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Keywords: urban drainageshed, flood hazard management, green infrastructure, spatial patterns, Geographic Information Systems

Fewer but more extreme monsoon storm events associated with climate change are being projected in the U.S. Southwest. Several past high-intensity precipitation events have led to significant flooding, such as the 500-year flood event in October 2014 in Phoenix, resulting approximately $17 million worth of damage, about 10,000 people lost their power, 200 homes were impacted, dozens of water rescues, and several causalities. As Phoenix metro area is growing fast in its population, more residents, particularly socially vulnerable groups, are likely to be exposed to climate change induced flooding hazards and increase their vulnerability. In preparing for emergency management and evacuation plans, Federal Emergency Management Agency developed the Flood Hazard Areas (FHAs) maps. The FHAs were based on a digital elevation model, a bare-earth raster grid referenced to a vertical datum, which does not include the built and natural features. Consequently, the impacts of urban stormwater systems on flooding in the watershed are overlooked. Green infrastructure (GI), defined as natural and man-made open spaces with potential hydrological connectivity, plays a significant role for stormwater management and flooding mitigation. However, its spatial relationship with FHAs has not been studied in desert cities of Phoenix. This study aims to understand the spatial relationships between FHAs and GI within urban drainagesheds. To counter the shortcoming of the natural watershed approach used for studying urban flood risk management, urban FHAs based on urban drainagesheds reflecting both natural and urban drainage systems were generated by a hydrological modeling and Geographic Information Systems (GIS). Spatial patterns of GI and urban FHAs and their relationships were analyzed by GIS spatial analysis function and statistical methodologies. This study revealed the significance of considering not only natural but also urban drainageshed systems combined with GI as a critical intervention for developing urban FHAs. The urban FHAs would help increase the accuracy of information where flooding hazards are expected. The spatial relationships inform decision-makers where GI intervention is necessary to mitigate flooding hazards and enhance resilience of desert cities.
An Ecological Tapestry of Urban Form: The Imperative of the Bioregion in the 21st Century

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Keywords: regionalism, urban form, sustainability

Historically, landscape architecture has two areas of accomplishment highly significant to the current era’s focus on sustainability, globalization, and urbanization. These are regional planning (bioregional in nature and often referred to as landscape planning and urban design. Compared with advances in urban planning and architecture, landscape architecture’s momentum regarding its legacy of regional planning and urban design has diminished. In addressing these developments, this paper reconsiders regional planning and urban design vis-à-vis sustainable urban form, globalization, and landscape architecture’s contemporary role.

The contribution by landscape architecture to the practice of regional planning with a bioregional emphasis is well established as is its focus on sustainability. Professional contributions in this regard date to Olmsted’s Yosemite Valley plan and more recently the profession’s embracing of the 1960s environmental movement exemplified by works of McHarg, Lyle, and others. Simultaneous with these developments and characteristic of landscape architecture’s “generalist” underpinnings is its embracing the contributions of John Wesley Powell, George Perkins Marsh, Gilbert Pinchot in the 19th century and more recent contributions (e.g., by Mumford, Lynch, Wendell Berry, E. O. Wilson, and Edward Relph). Landscape architecture also demonstrates a penchant for urban design dating to the 19th and early 20th centuries when physical design outcomes of urban planning were largely conducted by landscape architects including John Nolen, Elbert Peets, Warren Manning, George Kessler, the Olmsteds, and Henry Wright.

Reasons for landscape architecture’s diminished practice of regional planning and urban design are abstract. However, two factors are significant. One is the historic inability in the United States to realize implementable and enforceable planning on a regional scale, although this is changing with inherent opportunities for landscape architecture. The other is the preeminence of New Urbanism in architecture and Smart Growth in the planning profession. Landscape architecture has taken a back seat as these developments have evolved. In recapturing professional viability regarding regional planning and urban form, landscape architecture—as a generalist profession—is poised for leadership in the 21st century in a number of areas (i.e., to realize an “ecological tapestry of urban form” in a global era). Ecologically sustainable considerations of land and water in concert with addressing adversities of carbon emissions are essential. Therefore, ecology’s model of bounded interconnectivity within bioregions dictates broadly definition and reconsideration of urban form. To wit, interrelationships within urbanizing watersheds are paramount (e.g., sensitivity of carbon and hydrological cycles as
complex bounded systems, conservation of areas of high ecological value, multi-nuclear and multi-modal settlement with attention to scale, avoidance of sprawl, and practice of sustainable urban agriculture).

This work relies on analysis of published data and historical method in its development, presentation, and findings. As such, the literature is examined and synthesized with respect to the prevalent broadly varying definitions of the subject areas of regional planning and urban design. In addition—and in overarching terms—the methodology is hermeneutical (i.e., interpretive and reflective of the author’s longtime standing with the academic community and addressing of the subject matter, as is requisite within a hermeneutical approach). Therefore, in developing findings related to the topics of regional planning and urban design, the author concludes that while landscape architecture’s significant historic roles have diminished in recent time, its historic legacy speaks to both the capability and necessity of landscape architecture having a major role in addressing environmental challenges of the 21st century.
Saving the City’s Shade: Good Reasons to Seek UNESCO World Heritage Status for Winnipeg’s Elm Trees

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Keywords: ecological catalyst, urban forest, cultural heritage, tree protection, tree care, replanting strategies

The City of Winnipeg in Manitoba is blessed with the largest urban population of elm trees in North America. Planted almost a century ago, the elm sensationally structures 40% of Winnipeg’s unique streets and boulevards. Bearing witness to the near elimination in other cities, Winnipeg has still the chance to proactively engage in safe guarding its unique population of 160,000 elm trees. The city’s impressive forest of 8 million trees gives shape on the otherwise treeless plain, provides shelter from an extreme climate, raises property values, and most of all forms the city’s identity. The purpose of this presentation is to demonstrate why Winnipeg’s outstanding green legacy is deserving of the most ambitious heritage protection and how the elm tree could play a key role in this.

A recent survey undertaken by the City’s Forestry has shown that the unique population of elm trees requires further consideration than just addressing Dutch elm disease and the replacement of trees in boulevards. Thousands of American elm trees are lost due to Dutch elm disease each year, but the majority of these losses occur on private property. Considering this fact, it is quite surprising that there are no regulations to avoid the destruction or injury of significant and healthy trees on private properties. Furthermore, any tree replanting initiative is following the trend towards greater biodiversity in species, which will ultimately result in the loss of the characteristic homogenous canopy as elm numbers decline.

Emphasizing the importance of Winnipeg’s tree canopy for the city’s identity and citizens’ wellbeing, and drawing public attention to this silent topic, the author has been pushing the tree preservation discussions for several years. By applying a simple but effective trick, this presentation shows how the strict application of the selection criteria would result in only one conclusion: that the distinctive, declining resource gives enough reason to include Winnipeg in UNESCO’s World Heritage List. Such a status would provide Winnipeg’s elm tree population with the reputation and recognition necessary to guarantee the sustainable conservation to safeguard them for future generations—regardless of growing on public or private ground. Additionally, it would stimulate an important public discussion on the species of choice replacing diseased trees. Since a proposal like that stands in strong contrast to the city’s reality, the author expects a lively discussion about the perhaps naïve speculation.

Learning Outcomes:
• Recognize the ecological, social, land aesthetic importance of trees in large cities.
• Identify advanced standards for tree protection, tree planting, and tree care.
• Acquire knowledge about the selection criteria of UNESCO’s World Heritage list.
• Acquire knowledge of the pros and cons of inclusion on UNESCO’s World Heritage list.
• Learn strategies and conceptions for care and maintenance of tree heritage reflecting socio-economic circumstances and new political and/or administrative requirements.
From Golf Course to Community Park and Open Space: Who Is Doing It and How?

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Keywords: golf course, land use change, parks, open space preservation

Over 1,500 golf courses nationwide have closed in the past 10 years according to National Golf Foundation (NGF) research. Large parcels of once vast areas of green space are now being opened up for potential development. The purpose of this study is to identify closed golf course facilities that have turned into parks or preserves, and examine the details of how it is being accomplished. These case reviews serve as examples for stakeholders who are trying to figure out what to do with these closed golf courses. An initial search of local newspapers and business journals identified 380 closed golf course facilities nationwide. Future plans were determined for 47% of those courses using the same method. Aerial photography from 2016-2017 was then used to verify the current status of the properties. Of those courses with plans, 29 were identified as currently operating as parks or open space or were in the final design or redevelopment stages. The 29 parks identified were then contacted to answer questions having to do with ownership, land acquisition, funding sources for acquisition, conversion, and maintenance as well as new amenities including potential revenue generation. 18 of the 29 parks responded to the questions directly. Information was gathered for 4 more parks via municipal websites making the sample 22 of the 29 parks identified.

Results show that half of the 22 parks were public golf courses that are now public parks. The other half were privately owned courses acquired with the help of land conservation organizations, non-profit organizations, donations, and various state and local agency funding. Continued funding for conversion, restoration, and maintenance comes from diverse sources including grants, donations, bonds, municipal funds, neighborhood assessment districts, conservation funds. Currently, 86% of the parks are operated by public agencies with the other 14% run by non-profit organizations. 59% of the parks include active forms of recreation while 40% are nature preserves with only passive forms of recreation. Closed golf courses offer potential for conserving large parcels of open space to fill community needs such as ecosystem services, recreation, habitat, and stormwater detention. 53% of the 380 closed golf courses examined had no clear plans for future use. Identifying how other courses have been converted to parks provides valuable examples for golf course owners, municipalities, neighborhoods, and other stakeholders looking for ways to move forward with closed golf courses.

Learning Outcomes:
- Learn about the recent history of golf course closures in the U.S.
- Gain an understanding of how golf course facilities are going about converting into public parks and open space
• Discover ways in which stakeholders are finding money to preserve golf courses as parks, open spaces, and nature preserves.
• Learn about parks and open space amenities that are being included in parks on former golf courses.
The Rio Studio: Revitalization of the Informal Settlement of Santa Marta

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Keywords: informal settlement, virtual reality, design studio

The world currently experiences a significant growth in population coupled with fast urbanization processes particularly in the Southern hemisphere, which puts an enormous pressure on cities giving rise to numerous social, infrastructural, ecological, and urban problems. The formal sector is unable to provide enough appropriate dwellings to this growing population, who then resort to self-help processes giving rise to informal settlements. This paper describes an advanced design studio that focused on revitalizing one of these settlements located in Rio de Janeiro, Brazil, in an attempt to solve such complex problems using a computational design approach. The ultimate goal was to fully integrate it with the rest of the city by reinforcing structural stability, strengthening social activity, creating and enhancing open space, and developing the landscape as ecological infrastructure. Computation is understood broadly as a procedural paradigm independent of different technical substrates (e.g., computers). The goal of the studio was to give students the opportunity to create alternative futures for this disenfranchised community in the form of urbanism strategies and guidelines that will revitalize its social, economic, formal, structural, and ecological vitality. The tools that students used included cutting-edge computational technology, including advanced geometric modeling, virtual reality, digital prototyping, remote collaboration, and algorithmic design, among others, in a real-world context.

The design problem focused on the redesign and/or future expansion of the informal settlement of Santa Marta in Rio. This particular community was chosen as a case study for a variety of reasons: it possesses both urban and topographic complexity, it is a paradigmatic example of an informal settlement and yet it is possible to visit it safely. Traditionally, informal settlements have been segregated from the formal city but concentrate a significant part of the urban population growth in the Southern hemisphere. Students attempted to integrate the formal with the informal by applying an urban acupuncture approach to the targeted interventions within the existing fabric of the community and a variation of Gouverneur’s Informal Armatures methodology to create strategies for the future expansion of the settlement. This paper will trace the trajectory of the studio from pedagogical method development to initial data collection and analysis, followed by the creation of landscape strategies that formed the foundation for the final urbanism schemes that were presented to the community for feedback.
Resilience Thinking toward Transformation: Social–Ecological Vulnerability to Climate Change in the Sonoran Desert Region

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Keywords: resilience, vulnerability assessment, social-ecological systems, transformation

Sonoran Desert region is one ecosystem that is unique and fragile dominated by saguaros stretching between southeast California and west Arizona to northwestern Mexico. The Sun Belt sitting in the Desert (i.e., Phoenix-Tucson metro areas) with a population of over 6 million is one of the top 8 growing urban areas in the U.S. (2015-2016). Impervious surfaces derived from urbanization process affect increased flash floods and urban heat island effects. As climate change is imposing more frequent and intense extreme heat and storm events, the resilience of the inter-linked social-ecological system is under threat. To what degree has the social-ecological vulnerability of the system changed over time? This study applies social-ecological vulnerability assessment using GIS to examine climate change associated hazards (e.g., heat, floods), land use and land cover, population and social vulnerability change in the past decade (2005-2015) in U.S. Sonoran Desert region. The results from spatial and statistical analysis revealed increased social-ecological vulnerability as increased population exposed to climate change associated hazards and increased social vulnerability present in the Sun Belt. The findings suggest that mapping social-ecological vulnerability is a piece of critical information for integrating landscape and urban planning in urban development in order to minimize urbanization impacts on ecosystems as well as avoiding increased socially vulnerable groups to be exposed to hazards (aka climate justice). In turn, the adaptive capacity and resilience of the social-ecological system can be enhanced. Eventually, well-scientifically informed risk communication and decision-making plus innovations in integrated landscape and urban planning and design practices will help to transform the social-ecological system toward sustainable futures.
Integration of Green Infrastructure in Land-Use and Water Planning

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Keywords: green infrastructure, water, land-use planning, landscape performance

Colorado’s iconic landscape has drawn millions of people to visit and reside, experiencing our mountains, minerals, plains, ecologies, and wildlife. This population growth requires water. As new developments are planned and built, it is essential that there is an integration of land-use and water planning. The Colorado Water Plan states that by 2050, 75% of Coloradans will live in communities that have “water-saving actions” in their land-use planning. The purpose of this paper is to evaluate the economic, environmental, and social implications of green infrastructure on the Bucking Horse neighborhood in Fort Collins, Colorado. The research methods initiated with review of several Landscape Architecture Foundation Case Study Briefs, focusing on documented Stormwater Management Case Studies along the western states. This knowledge and background set the framework for conducting a survey of the residents within the neighborhood collecting data on their economic, social and environmental beliefs of their native neighborhood landscape. In addition to the survey, analysis of home value comparisons, landscape maintenance costs, irrigation or water allotments, and HOA fees are analyzed to compare neighborhoods with native landscapes.

The results of this research provide measured data on the social, environmental, and economic success of green infrastructure when incorporated with the land-use and water planning efforts. The survey provides data on the built green infrastructure and the residents’ opinions on the installed natural landscapes. The results identify the best green infrastructure design strategies that land planners, policy makers, water planners and designers can use to impact the success of water conservation in future developments.

Learning Outcomes:

- Assess the LAF Case Studies for use in project research.
- Assess the benefits of planned green infrastructure when combined with the integration of land-use and water planning.
- Assess the economic benefits of integrated green infrastructure on developments.
Shell-ter: Sculptural Forms as Infrastructure for Coastal Resilience and Education

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Keywords: coastal resilience, cohabitat, urban ecology, environmental education, visualization, interdisciplinary research

How can landscape architects use interdisciplinary research methods to increase coastal ecosystem resilience? In 2012, Rhode Island NSF EPSCoR funded a collaborative studio course at Rhode Island School of Design in which sculpture and landscape architecture students worked with scientists from the University of Rhode Island, Roger Williams University and The Nature Conservancy to research and design sculptural shellfish habitat forms with the objective of creating proposals for a highly visible coastal restoration project at an urban waterfront site in Providence, RI. This studio expanded on landscape architecture precedents, sustainable aquaculture practices, ecological research and investigations of the cultural value of oysters. Since then, the research team has moved forward to develop one proposal through material and formal studies into three prototypical forms. The team tested fabrication materials in the hatchery and in the field and monitored for successful bivalve larval settlement. The forms can be deployed individually or in aggregations, creating new models for urban coastal edges that contribute to the restoration of critical ecological systems and enhance their resiliency to withstand the impacts of rising sea levels and climate change.

In the summer of 2016, 9 forms were installed at an urban park in Providence, RI. The research team and local stakeholders collectively chose the site for its public visual access and its notable ecological potential. For the past year the research team has been monitoring the forms for shellfish settlement and other ecosystem services. This summer, the team was able to remove one third of the settlement plates and have them settled with larvae in the hatchery. The plates have now been reinstalled in the river, allowing the team to study whether the lack of settlement in the first year was a result of recruitment or survival. The endurance of the forms and opportunities for data collection are a direct result of an interdisciplinary design process that has emphasized craftsmanship and experimentation.

This presentation will describe the project in three parts. First, it will explore the unique interdisciplinary opportunities that arose from sculptors, landscape architects and scientists working together to address regional scale issues at the material scale. Second, it will describe the ongoing monitoring that aims to assess the potential of the forms to provide shellfish habitat and other ecosystem services. Third, it will speculate on the possibilities of modular...
design-build projects to be used as a platform for public engagement and outreach about ecosystem health.
LANDSCAPE PLANNING & ECOLOGY

PANEL PRESENTATIONS

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Landscape Architecture and Planning Faculty and Student Roles in Engaging Communities in Watershed Management and Riparian Restoration

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Keywords: watershed management, collaboration, riparian restoration, Portneuf River, Simeto River, Cane Run, Red Bud/Catalpa Creek

Over the past 20-years, stream restoration has been in the purview of the engineering fields, leaving landscape architects to produce planting plans and community engagement. The goal of the panel is to identify specific roles and accomplishments of landscape architecture faculty and students in the realm of watershed management and riparian restoration, learning outcome goals, and how those goals affected student career choices in the realm of watershed management planning, monitoring, and riparian restoration. Case study and results from the Portneuf River near Pocatello, Idaho, the Cane Run watershed in Lexington, Kentucky, the Simeto River near Catania, Sicily, Stroubles Creek in Blacksburg, Virginia and the Red Bud-Catalpa Creek watershed near Starkville, MS are presented as evidence for valuable community/university partnerships in watershed management and stream restoration. Lessons learned and recommendations for getting departments involved in visioning exercises, long-term planning, river agreements, and implementation are presented.

Landscape architects bring valuable knowledge in applying varying design processes and the ability to communicate potential outcomes at the site scale as well as extended stream reaches. Collaboration with allied disciplines, especially engineering and the biological sciences, is presented as a key element of success. In each of the cases presented, varying degrees of difficulty were encountered in the larger planning processes that eventually led to the planning and/or implementation of sub-reach and site-scale planning. The story of the Simeto River Agreement stands alone with regard to project impetus and scope at the watershed scale. In two of the cases, at the Portneuf and at the Contada Nicolo site along the Simeto, access to the river for local residents was a key goal. Impaired for sediment, Stroubles Creek research projects have been driven by water quality issues as urbanization and agricultural practices together have created problems in the watershed including stream bank
erosion, legacy pollutants, and damage to local benthic communities. The Cane Run and Red Bud/Catalpa watershed management plans arose in response to a need for major universities to implement best management practices on agricultural research properties, and are growing to include urban stormwater management strategies. Comparisons from each of these watershed experiences show a very broad range of activity on the part of Planning and Design faculty and students, including watershed-scale planning and partnership with governmental agencies, site-scale work projects, project monitoring, and facilitation of collaboration amongst varying disciplines.
Assessment of Ecosystem Services for Urban Planning Scheme Based on Traditional Ecological Wisdom of Polder Land in Southern China

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Keywords: polder systems; ecosystem services assessment; scenario simulation; urban green space; land use; biodiversity

Polder systems are widely distributed in rural areas in southern China, which are described as closed areas enclosed by dikes to protect lowland fields from occasional floods. The original polder structures with complicated river network and its complex biotope are considered as a kind of traditional ecological wisdom with its special ecological functions. However, the ecological benefits of remaining these traditional polder structures in urban space is still unclear. In this paper, we take Hangbu District in Shucheng, Anhui province of China, one of the most fast-changing rural area, as a case study. Two new urban planning schemes were made, and one was based on traditional polder land system. Based on land use data of two planning scheme and GIS method, a scenario simulation by FLUS model is developed to compare the land use evolvement process during a 30-year time period in the future and indicate the impact of planning decision of remaining the polder structures. We choose biodiversity as the study indicator of ecosystem service functions, and thus calculate and compare habitat suitability and ecological connection degree of two scenario simulation results, in order to make clear exact ecological benefits on biodiversity which the polder structures in urban space contribute to. We finally find obvious advantages on biodiversity of the scheme which meets the need of urban development but also retains the structures of original polder land. Proper planning and design actions which has been tested are suggested in those areas to lead to long-term ecological benefits.
People Need Urban Blue Space in Urban Landscape

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Keywords: urban blue space effect, urban landscape, human well-being

The purpose of this study is to explore the wide spectrum of effects of urban blue space published in peer-reviewed journals. The term “blue space” is broadly used to describe the aquatic environment that includes waterbodies (e.g., lakes, reservoirs, estuaries, marshes) or flow lines that are consisted of all surface waters drainage networks (e.g., streams, rivers, and canals) (USGS, 2015). Previous studies found that urban blue space played a critical role in creating public spaces that improved economic, symbolic, and experiential values (Wessells, 2014). Urban spaces with water features provide many opportunities in urban ecological systems, recreation, relaxation, and social activities (Raymond et al., 2016). However, urban water feature has much less attention from researchers than green space, since river area, stream bank, and riparian are sometimes under the green space along with urban park, open space, and trails (Roy, Byrne, & Pickering, 2012; Wolch, Bryne, & Newell, 2014). Moreover, urban blue space research has been mostly conducted in the field of microbiology and environmental toxicology but not enough in the field of landscape and urban planning area. This is interesting point because it results in a limited understanding of how urban blue space influences the urban environment and the people in that setting. As a detailed analysis of Landscape and Urban Planning and multidisciplinary journals, findings were classified into three categories: economic, social-cultural, and environmental effect. Significantly, the publications provide a variety of support for economic effect, which has benefits of proximity and abundance of facilities. Social-cultural effect informs that blue space is viewed as positive amenities and it gives residents to have a high quality of life as well as it has environmental effect on stream quality by base-flow ratio and conductivity. This review studies provide important factors that affect the quality of urban blue space, what urban blue space trends are and how urban blue space interacts with human well-being and environment by understanding urban ecosystem, urban water systems and built environments for future generation.
New Method of Practicing Habitat Creation in Ecological Urban Park

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Keywords: biodiversity protection, biodiversity enhancement, habitat design, urban green space, Beijing Horticulture EXPO

Urban green space became main carrier for biodiversity during rapid urbanization, which makes landscape architecture play a vital role in urban biodiversity protection. How to protect and enhance biodiversity in urban area has been a hot topic and longtime practice in landscape design. However, landscape design for natural reserve and common urban green space is different due to different functions; theories from landscape ecology work well in natural reserve planning especially, usually proposed simple or multi-layer structure as basic pattern, but vague for improvement strategies of ecological patch inside, which influence the cooperation between ecological team and landscape architectures. Thus, the framework need to be explored to better apply ecological theories from planning stage to designing stage. The goal is trying to make vague demands in planning layer into specific guidelines in design layer as well as maintenance period, especially for redesigning the existing and well-background urban park.

Zone No. 4 of 2019 Beijing Yanqing Horticulture EXPO, which is located in an old park of Beijing, was one normal urban park originally with well ecological environment. To better protecting and enhancing biodiversity, landscape ecology with other subjects such as restoration ecology were integrated into full-cycle landscape architecture, which includes (1) detailed investigation, contains site situation and biodiversity level; (2) function zoning based on investigation results; (3) distinguished design for various zones; (4) construction management; (5) post evaluation and management. In addition, the research on species and habitat management, consultation with expert team and construction team are two regular work in whole process.

Field investigation shows rich biodiversity level in the region, and several rare species appeared in site with more complex habitat feature and low management activities, but opposite results showed in monoculture artificial woods. Two main strategies were applied, one was preserving important areas and avoiding impact from surrounding design, the other was restoring monoculture woods by applying the forest gap theory, with rebuilding the indigenous vegetation community system. Further, various habitats for regional birds, butterflies, dragonflies, fish, and frogs were designed in suitable zones to enhance regional biodiversity level. In addition, guidelines were proposed in construction period and regular maintenance to...
achieve the sustainable semi-natural landscape in future. As the EXPO project goes, the integrated framework of biodiversity protection design in urban green space will be explored and summarized, and it will be reference for similar projects in future.
People–Environment Relationships
A Sensorial Approach to Design: Vermilion Riverfront Park, Danville, Illinois

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**Keywords:** eco-revelatory design, sensory experience, east-central Illinois, large park, situated event

The contemporary large park in North America is designed to promote resiliency and environmental sustainability (Czerniak 2007). The fifth model of park design is based upon ecological design principles and mostly evaluated in terms of ecosystem performance (Cranz and Boland 2004). Sensory responses do not drive the design process nor are they measures of park success, as is the case with the built environment in general (Malnar and Vodvarka 2004). But landscapes are defined by human experience and it is through the senses that the environment is experienced first-hand. Eco-revelatory design approach bridges the emphasis on ecological process with phenomenological experience of landscape (Brown, Harkness, and Johnston 1998). Using this approach as a framework, my paper focuses on sensory design of a large park on the banks of the River Vermilion and its tributary North Fork in Danville, a small town in east-central Illinois. The site was mined for its coal in the 19th c., then farmed, and is now envisaged as a riverfront park that will revitalize the adjacent downtown.

The design research process involved mapping sensory experience at the site and interviewing Danville residents and storefront owners in the downtown about their perception of the riverfront and its future. Panoramic views, natural sounds, and proximity to water received the highest score in locations where sensory input was evaluated. Results from the interviews indicated a clear preference for a riverfront landscape for fishing, hunting mushrooms and birdwatching, and bringing children and pets to play. In the proposed design, sensual engagement goes beyond the static picturesque convention in which vision is privileged, and encompasses haptic, kinesthetic, and acoustic experiences of the dynamic landscape. Landscape is defined as a situated event, experienced in the body through heightened sensory input. Natural processes are revealed and amplified in design strategies seasonal rhythms of the river as it recedes and floods and slower succession of plant communities, and movement of sun and wind. Sensory experience is augmented pleasant natural sounds are amplified, sightlines are framed, touch is enhanced, wind is felt, heard, and seen, and patterns of sunlight are the foci of attention. The design study of Vermilion Riverfront park makes a case for the centrality of sensory experience in revealing ecological processes.
The Usefulness and Meaning of Rural Greenways: User Experience at the Tanglefoot Trail in Northeast Mississippi

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Keywords: greenways, rails-to-trails, user experience, bike trails, active living, rural environments

The Tanglefoot Trail is a 43.6-mile greenway in rural, northeast Mississippi. The trail follows a portion of a now abandoned railroad corridor and consists primarily of a multi-purpose pathway that connects six, small communities with a total population of just over 20,000. Community advocates from the area first met in 2005 to begin discussing the idea of the trail. In ensuing years, supporters of the Tanglefoot Trail secured federal and state grant funding to construct the asphalt trail as well as a series of thistle stop rest facilities for trail users. The trail was completed in 2013 and is currently used for hiking, biking, running and associated community events.

The Tanglefoot Trail was a multimillion-dollar investment. Trail supporters tout the trail transportation, health, environmental and economic benefits (Interpreting the Trail, n.d.). Recent literature on urban greenways suggests that recreational benefits may outweigh the cost of construction and maintenance (Lindsey, Man, Payton, & Dickson, 2004), that trails may increase the value of surrounding property (Nicholls & Crompton, 2005), and that trail expansion is economically justifiable in some situations (Crompton, 2012). As a result, urban greenways have a fairly straightforward argument. For rural trails, the case is more difficult. The lack of surrounding density and services means that rural greenways are likely to have far fewer users. The health benefit argument may also be more difficult as a recent study of a metropolitan greenway was unable to demonstrate an improvement in the physical activity behaviors of proximate users (West & Shores 2015). All of this may make it challenging to defend a rural greenway expense against skeptics.

This raises the question: What is the usefulness and meaning of a rural greenway? Anecdotal evidence suggests that the Tanglefoot Trail is highly appreciated by its users, some of whom travel vast distances to use the trail. If rural greenways have a worth beyond simple quantification, perhaps the answer lies in the educational and experiential aspects of such trails or their increased significance to a smaller number of users. This paper explores these issues through examination of the results of an online survey of Tanglefoot Trail users; the survey examined user preferences, their motivations for using the trail, and what they found meaningful about the experience. This information is intended not only to increase overall understanding of rural greenways, but also to provide advocates and designers with data useful in their promotion, design and improvement.
Designing Urban Cultures' Nature: Ethnobotanical Gardens in a Multi-Cultural City

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Keywords: design studio, ethnobotanic, ethnobotanical, garden, multicultural

In developing studio problems how does one provide landscape design experience that is topical, holistic and multifaceted and at the same time structure students rigorous in-depth examination of particular landscape design fundamentals? In this presentation this general, ongoing pedagogical question is examined via a specific case, an Ethnobotanical Garden for Winnipeg, a design problem that was a major part of four fall studio courses at the University of Manitoba; the gardens were designed for various urban Winnipeg contexts. Here we ask more specifically, how can students deepen their skill and understanding of the use of plants in landscape design and at the same time consider the implications and complications of a multi-cultural society and the role of landscape architecture in it? Winnipeg, like many other Canadian cities, is increasingly multi-cultural. The project’s intention is to raise awareness of the city’s many different human cultures and of how landscapes, plants and crops can be part of cultural expression in peoples’ daily lives. At the same time, students must realistically grapple with opportunities and constraints inherent to designing with plants in a northern city. In this presentation the project's background and its incremental steps are discussed and pedagogical research results are considered based on the research students did to develop their designs, the designs themselves (two won Environmental Design Research Association awards) and a survey of former students’ reflections on the assignment some 1-4 years later.

The design problem was inspired by Mexico’s Ethnobotanic Garden of Oaxaca conceived by artist Francisco Toledo. However, Winnipeg’s ethnic make-up is markedly different from that of Oaxaca’s—35% as compared to 75% indigenous—and so the idea becomes more complicated. We proceed from a working definition of an ethnobotanic garden as a garden concerned with the relationships of plants and people, in particular people as members of a culture. This allows for considerable questioning about what the ethnobotanical should be and a range of interpretations. Each students’ approach, concept, and final design differs significantly from others. Some students take the opportunity to investigate their own background, some the culture of an “other,” some take a more eclectic or multicultural approach. One-to-one interviews with community members are required along with research on appropriate plants and design forms. Students consider plants in terms of their hardiness, medicinal and nutritional value, symbolism, food, aesthetics, role in vernacular landscapes and sometimes their physical resemblance to species of other climes. Taken as a whole students’ designs reveal a wide range of approaches and rich multi-faceted interpretations and understandings. In the survey effects of the emphasis on plants and human cultures are prevalent in the former students’ reflections, yet other aspects of the course and its structure are also cited as significant.
The Role of Plants in Archaeological Sites: Three Innovative Approaches

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Keywords: plants and archaeological sites, design of archaeological sites, management of archaeological sites, archaeological landscapes

The purpose of this richly illustrated presentation is to discuss three innovative approaches—two in Mexico, one in Greece—to plants’ contemporary introduction into landscapes of archaeological sites. These examples are considered in the context of plants more traditional roles as well as general issues common in publicly accessible archaeological landscapes today. Plants’ roles in how different human populations experience these sites are emphasized.

Plants—living and dead—can play multiple roles in archaeological sites and their landscapes. In excavating gardens of the past plant remains (and/or their shapes) are vital, telling elements in interpretation and “reconstruction.” More generally, plant pollen and seed can provide clues to prior cultures’ activities, foods and environmental conditions. Alive and above ground, plants can suggest materials and conditions of what lies below. Above ground remains may create unique conditions that favor specialized, even rare, plant species and communities. In some places, plants and remains become so entwined over time that they are difficult to distinguish. In others, many plants, especially trees, are unwelcome due to damage from roots to remains below ground. On the other hand, it is recognized that plants can help protect remains by creating human barriers, combating erosion and otherwise stabilizing soil. The plants of archaeological sites can also create habitats both for pests and desirable—even endangered—animals.

An obvious omission in the above litany concerns plants’ influence on how people experience these landscapes, and unsurprisingly that effect depends on the site as well as the people involved. Local and international visitors, archaeologists, residents of surrounding urban areas and site workers may tend to quite different perspectives. The somewhat unusual, varied, recent roles of plants in landscape design and programming at three publicly accessible archaeological sites—the Lykeion of Aristotle in Athens, Greece and Monte Albán in Oaxaca and Tzintzuntzan in Michoacán, Mexico—reflect these interacting perspectives and expand notions of what an archaeological landscape can be and its functions in larger social and ecological contexts.
Re-envisioning Community Outreach Methods

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Keywords: community engagement, outreach, open space, feedback, underrepresented

Productive community engagement is integral to the success of a future open space. Planning/design professionals outreach to community members to ensure that planning/design decisions reflect the community’s aspirations for their open spaces; resulting in engaged residents who are long-term stewards of their open spaces.

Traditional outreach involves formal committees and meetings that are typically accessible only to members of the dominant culture. Barriers to participation by historically underrepresented populations (HUPs) (e.g., youth, seniors, immigrants) include limitations in language fluency and exposure to civic engagement. Outreach is addressing these barriers by evolving away from design decisions made by external formal committees toward community self-determination in making decisions about open spaces. This presentation uses two case studies to demonstrate re-envisioned community outreach methods and their impact on open space design.

In the public sector, agencies endeavor to improve quality of life for their constituents. Portland Parks & Recreation (PP&R) prioritizes sustainable partnerships with HUPs, ensuring that its planning processes are responsive to the needs of participants. PP&R uses tailored, accessible outreach formats to invite HUPs to contribute to their communities’ place-making processes. In the Portland case study, methods included family-friendly events held in the park; and reliance on graphics and everyday language to communicate design concepts. Successful participation led to park designs that were well-supported by enthusiastic communities that demonstrated a newfound knowledge of civic engagement.

The users of private open spaces can also benefit from a similar approach. After Oklahoma State University landscape architecture faculty and students presented members of a retirement community with multiple memorial garden design concepts using easy-to-understand three-dimensional models, community members voted for their preferred design for implementation. As a result, final design decisions were made through the process of voting by residents in the community rather than being dictated based on designer’s favorites. The voting results showed that the design schemes that got the most votes from residents were not created by the students who got the highest grade for that project.

These case studies demonstrate that open space designers, working within established legal and project parameters, should engage the people who will use open spaces to determine their
goals and preferences, rather than imposing features onto the space without community input. The result is a space that will better serve its intended users, and a sense of ownership among those who participated in the planning/design process, enhancing the long-term sustainability of the open space system.
Student Place Attachment: A Longitudinal Study

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Keywords: place attachment, campus, longitudinal study, students

There are few places in the built environment that evoke a stronger sense of attachment than a college or university campus. Alumni often remark on the nostalgic feelings they get when they reflect on their college years and the shared experiences that collectively mark such a pivotal time in their lives. From a student perspective, place attachment to college and university campuses is cyclical. Students begin their freshmen year with little or no sense of attachment, yet after four years of study, their feelings about their institution have shifted dramatically and have been described as a warm feeling in the heart...that persists long after a person’s immediate physical relationship with the institution has ended (Kenney, 2005, 47).

Understanding how this relationship develops is at the center of this research. Specifically, this study is concerned with two aspects of place attachment on college campuses. First is to discover the time or duration it typically takes for students to feel attached to their institution and second is to identify the common sources of place attachment amongst undergraduate students.

To discover insights, a longitudinal study comprised of Likert-scale and open-ended questions was created. The study, which began in the fall of 2012 is part of a university wide freshmen seminar that focuses on sense of place and introduces students to ideas related to place attachment theory. At the end of each semester freshmen enrolled in the seminar complete a seven-question survey that requires them to consider the nature of their relationship and level of attachment with the university. Each subsequent fall, the survey is redistributed to former students and the questions are repeated in order to record change over time.

The five-year study consists of seventy-five students, 134 responses and 68% response rate. The results show that in terms of duration, entering freshmen have a low level of attachment which increases over time and peaks during their junior year. The largest year-to-year increase occurs between the freshmen and sophomore years. In terms of sources that contribute to feeling of place attachment, the data indicates that on-campus locations are slightly more important than off-campus locations. However, on-campus activities are more significant than activities associated with off campus locations.

The results of this study are meaningful for administrators and designers who understand that emotional attachments to campus are important for enticing perspective students to enroll, strengthening retention and improving student learning.
Promoting a “Healthy Places” Placemaking Approach in Urban Design

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Keywords: placemaking, health

Over the last several decades, a growing body of literature has emphasized the importance of place to people’s health and suggested that a person’s zip code may be a stronger predictor of health than any other factor, including genetics. Many studies now show that low-income groups and racial and ethnic minorities have limited access to well-maintained parks or safe recreational facilities, are more likely to live in neighborhoods that lack features to support walking like sidewalks, and lack access to supermarkets and places that offer healthy, fresh food options. In December 2016, Project for Public Spaces released a report titled The Case for Healthy Places to highlight the existing evidence connecting placemaking concepts and practices with positive health outcomes. This report introduces readers to placemaking practices and presents findings from a literature analysis in which 5 themes were seen to emerge. These themes were Social Support and Interaction, which emphasizes the use of resident-led, activities to instill a sense of belonging in community members; Play and Active Recreation, which encourages the design of parks and play spaces to promote physical activity and cognitive functioning; Green and Natural Environments, which involves the addition of natural green spaces to promote the visual appearance, comfort, and identity of a place; Healthy Food, which fosters the development of public markets and community gardens to ensure that fresh and affordable food is available to everyone; and Walking and Biking, which fosters the creation of community destinations, safe and attractive streets, and a local sense of community. The purpose of this presentation is to (1) share and discuss the key findings from this report with conference participants and the ramifications they have on landscape architecture practices, (2) present and discuss case studies describing how some of these best practices have worked in communities throughout the United States, and (3) allow participants to experience a small group teaching strategy, that can be used in both community and educational settings, to discuss and develop ideas and opportunities for designing changes in communities.
Implementing POD (Preventing Obesity by Design) and Its Implications for Landscape Architecture Programs

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Keywords: obesity, evidence-based, case study

The Preventing Obesity by Design (POD) program sponsored by the Texas Department of State Health Services (DSHS) could have a tremendous impact on the design of outdoor learning environments at Texas childcare centers. The adoption of POD also offers opportunities for applied and empirical research for the Texas University Department of Landscape Architecture. Between 1987 and 2010 the obesity rate among adults in Texas rose from between 10% and 14% to over 30%. In 2016, 14.9% of Texas children ages 2-4 were considered obese, while 15.6% were considered overweight. Research shows that well-designed outdoor learning environments (playgrounds) at childcare centers is associated with higher levels of physical activity and reduces sedentary behavior in preschoolers by 22% (Cosco, Moore, & Smith, 2014). In Texas, nearly 2.5 million children ages 0-5 are in one of over 8,800 childcare centers. Consequently, these facilities represent a significant, early intervention opportunity for combating the nationwide obesity epidemic. The evidence-based, Best Practice Indicators developed by the Natural Learning Initiative (NLI) informs the design of childcare outdoor learning environments that increases physical activity, food awareness, and healthier life styles in children.

As applied research, the Departments of Landscape Architecture and Interior Design at Texas Tech University (TTU) has assisted DSHS with a state-wide initiative to Implement POD in Texas. In August 2017, the first design workshop in the state was held at TTU for the Covenant Child Development Center. The center serves 160 children ages 3 months through 12 years and is operated by the Covenant Medical Group. The design team met with center staff and visited the site to document existing conditions. An intensive one-day interactive design workshop was held with faculty, center staff and local stakeholders to produce a schematic design implementing the POD principles at the center. Graduate students compiled comprehensive master plan based the schematic design that will guide the incremental completion of the project.

To present the project as applied research, the scoring sheet developed at NLI will be the context by which the project is presented. It is a methodology for evaluating the relative level of success in incorporating the Best Practice Indicators. Additional opportunities for empirical research using Behavior Mapping, which focuses on the setting and not the individuals, will also be presented, as well as the need to adapt principles and procedures to the unique culture
and climate of Texas. The implications for both applied and empirical research to the landscape architecture program will be presented, including the potential for a multi-disciplinary regional research and design center. Grant support for graduate students, multiple design projects, and expenses provides opportunities for the landscape architecture department for funded empirical and applied research.
Geospatial Research on Childhood Obesity and Potential Responses in Urban Community Design

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Keywords: human health, obesity, geodesign, community design

Community design has long been understood to hold the potential to shape the health of residents (e.g., Kweon, Sullivan, and Wiley 1998; Burdette and Whitaker 2004). Recent geospatial research provides a more detailed understanding of how specific factors contribute to the health of urban area residents which generates both guidance and questions for healthier community designs. This presentation will present research about the food and physical activity environments. Studio-generated examples testing community design responses will demonstrate applicability.

The food environment is a critically important spatial dimensions of a community’s health. Areas without access to healthy food are described as food deserts but the recruitment of new supermarkets can be a daunting task. With physical activity recognized as a significant component of health, parks and walkable communities also stand out as an important element in community health determinants. In urban communities, parks are important because they provide a free environment for activity.

Working with researchers in public health and epidemiology, a multi-year study has been underway to collect detailed data regarding health of children aged 3-18, their access to healthy and unhealthy food, and proximity to parks and other physical activity opportunities (Ohri-Vachaspati et al. 2013; Tang et al. 2014). The research team also acquired commercial data to develop a longitudinal database of food outlets including groceries, convenience stores, and fast food restaurants. Similarly, parks and physical activity outlets were also mapped. These data underwent a substantial improvement using outside sources including online materials, existing geospatial data sources, site photography and field checking.

For each respondent, proximity was calculated for each type of outlet (e.g., fast food, corner store, small park) based on walking distance. Analyses of these results relied on a combination of logistic regression models to assess the bivariate association between geospatial food and PA variables and child’s weight status followed by multivariate regression models of stronger geospatial factors. Parks were found to positively impact residents and corner stores had a negative impact on overweight and obesity status.

Design potential was tested through two graduate studios exploring how regional landscapes could be redesigned for healthier living. Each studio employed GIS to identify areas of greatest potential impact and developing site-specific conceptual designs applying the lessons from the
geospatial research. Repeatedly, two general strategies emerged: hubs and widely spread interventions. The paper will present lessons learned from the studio work as well as opportunities suggested by the data.
How Cognitive Factors Affect People's Willingness to Adopt Green Infrastructure Tools

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Keywords: cognitive factors, green infrastructure, environmental knowledge, environmental values, environmental attitudes

Cities have been changing over years in many ways. One of these changes is that impervious surfaces such as buildings, parking lots or streets have increased. In the United States, it is estimated that 10% of residential developments and 71% to 95% of industrial areas and shopping centers are covered with impervious areas (EPA, 2012). According to EPA (2012), this increase in hardened surfaces has increased urban heat, stormwater runoff, and water pollution. In addition, these changes can negatively impact human health, and the ecology of urban areas.

Gray infrastructures, consisting of a complex of underground pipes and tunnels, have been adopted as an urban stormwater management strategy but have also caused environmental problems. Based on this context, an increasing number of states and municipalities have been adopting Green Infrastructure as an alternative solution to stormwater problems. Green infrastructure planning provides ecosystem services and benefits human health through landscape design strategies including green roofs, rain gardens, bioswales, etc. (McDonald, 2005).

This holistic approach to stormwater management requires the integration of public participation and stakeholder involvement in decision making (Baptiste, 2014). Public acceptance is a key element to implementation of Green Infrastructures. According to Bowman et al. (2012), a well-informed public increases the demand for Green Infrastructures. Also, understanding community perception is especially important because Green Infrastructure systems are often more visible to public (Shandas et al., 2010). This paper contributes to the literature through providing a comprehensive overview of cognitive factors and the role they play in the influencing public's willingness to implement green infrastructure.
The Impact of Land Surface Cover on Neighborhood Microclimate in College Station, TX

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Keywords: urban microclimate, land cover, neighborhood thermal environment

Many studies focusing on urban heat islands have demonstrated that there is a close relationship between various urban land covers and land uses and urban climate at the broad scale (Thani, Nik Mohamad, & Jamaludin, 2013). However, few studies have been conducted on land cover changes with urban microclimate at a human sensed scale within a neighborhood. Also, the expanding impacts of urban hot spot or green space on surrounding microclimate need more exploration. In order to provide comprehensive measurements on microclimatic elements for different land surfaces, four sites in College Station, TX near College Hill neighborhood with different land surface characteristics were selected in this study (Parking lot in Post Oak Mall, Tennis court and basketball court in Thomas Park, Schob nature preserve area and 51 parking lot in TAMU campus). To compare the microclimates of the four sites under the same climate conditions mobile data were collected using a bike mounted with air temperature sensor with type T thermocouple, Hukseflux SRA01-05 albedometer, Vaisala HMP155 hygrometer, Wind Sentry 03002 and cylindrical radiation thermometer (Brown & Gillespie, 1986) to measure air temperature, albedo, humidity, wind speed and mean radiant temperature. The bike was ridden with an average speed of 8.5km/h along the four sites for a distance of 3.8 miles. A stationary tripod with all the same sensors mounted except the Kipp & Zonen CNR4 pyranometer instead of the Hukseflux were set up in order to test models for estimating the effects of different site characteristics on local microclimates. All of above instruments were wired to CR3000 data logger.

By analyzing data from both mobile and stationary collection for air temperature, humidity, wind speed, shortwave radiation and mean radiant temperature, this study will draw preliminary conclusions as to the impacts of land surface on different microclimate elements. Also the spread of the cooling effects of urban green space to the surrounding area will be examined. The microclimate boundary instead of the physical boundary of the hot or cool spot will be demonstrated. The result will be a guide for designers to identify how human sensed thermal environment can be modified by different land surface.
Considering Invisible Light in Playground Design: Ultraviolet Radiation (UVR) and Children's Skin and Eye Health

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Keywords: solar ultraviolet radiation, children health, skin cancer, eye damage

Exposure to intensive high energy solar radiation causes skin erythema and sunburn, and cumulative sunlight exposure over a prolonged period can lead to skin cancer (Hill & Dixon, 1999; Silveira & others, 2010). Some severe eye problems can also be related to exposure to UVR. Acute effect is inflammation of the cornea (photokeratitis), which is caused by UVB (and non-solar UVC) (Health & others, 1999; Silveira & others, 2010; Young, 2006). Chronic effects include cataracts, pterygium and even myopia (McKnight et al., 2014). Physical factors related to UVR and the risk of skin and eye damage include skin type, latitude, sun zenith angle and exposure time. Through outdoor recreation activities children can experience high levels of ambient solar UVR, causing skin and eye damage and the risk of latent harmful effects. However, there are major benefits of exposure to UVR due to the cutaneous synthesis of Vitamin D which can be initiated by UVB radiation. Vitamin D deficiency can be linked to many chronic health issues such as cancer and cardiovascular disease.

School playgrounds play a vital role in children’s outdoor activity. How can children receive enough UVR to generate Vitamin D that benefits their development while avoiding too much UVR that is harmful to their skin and eyes when they take outdoor activities? How to modify the environment of playgrounds through landscape design in order to provide proper UV light amount for children needs to be explored.

Students under 10 years old (8-9) in College Station, TX, wearing dosimeter badges were asked to play in their school playground and sport courts during mornings and afternoons in the middle of summer and the middle of winter. Playgrounds and sport courts with no shade, natural shade (trees) and artificial shade, with different surfaces (turf, sand, rubber and asphalt) were selected and compared to see the effect of design elements in protecting children from UVR. At noon time in mid-summer College Station, children are under high risk of getting too much UVR during their play.

Through demonstrating the current UVR receiving by children in low latitude area at different playground environments, this study will provide suggestions to ingest enough UVR for children’s bone and heart health and avoid UVR damage to their skin and eye. Microclimatic and UVR responsive children’s playground design implications will also be provided based on the measurements of different landscape design elements.
Installation Art as a Placemaking Approach in Urban Public Spaces

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Keywords: placemaking, urban landscape, installation art, public space

Gehl’s famous quote, “a great city is like a great party. You know people don’t leave when they are enjoying themselves,” emphasizing that the use of a city by its inhabitants is vital to its existence. However, in today’s cities, which are designed for more traffic and cars, urban open spaces quickly leave their places to more cars and traffic. Thus, urban open spaces, which are crucial as spaces that are accessible and well connected to other important places in the area, comfortable and project a good image, attract people to participate in activities there, as well as opportunities to meet and socialize with other people, are becoming increasingly not usable.

Placemaking, based on urban researchers’ efforts to create cities for people such as Jane Jacobs and William H. Whyte is a multifaceted approach to the planning, design and management of urban spaces. It focuses on the social and cultural importance of lively neighborhoods and inviting urban spaces. Supporting the everyday users of the streets to host the streets they use every day, with the idea of “eyes on the streets” now popular, it also underlines the basic elements of creating a living social life in urban spaces. Thus, today, it is being used as an important and effective tool to create Livable Cities.

The purpose of this study is to discuss the usability of the installation art as a creative placemaking approach in urban open spaces in terms of its contributions to the place and user through case study application analysis. It also offers installation as a placemaking practice which can use design as a transformative tool to produce creative and useful places. At this point, the idea of artwork as an environment brings with it the expectation that the observer not only looks but lives in the world as well as “life” in the work of art. Thus, “Installation” becomes a practice of producing a space/place. In the research, a series of urban open space installation case studies held by different artists were tried to be categorized according to their effect of creating space, such as border elements, seating furniture, ground cover elements, playing areas. In addition, as an effective urban space manufacturing policy, a series of installations applied at different times and locations in New York Times Square and Chicago Millennium parks were discussed in terms of their spatial and social interactions.
[In]visible Infrastructure in Rural Landscapes: Cell Phone Towers

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Keywords: cell phone towers, infrastructure, rural landscape, camouflage

During the Second Industrial Revolution, advances in manufacturing and production technology enabled the expansion of systems like the telegraph, railroad, electrical power and telephone. Parallel to these developments is a history of efforts to visually hide or conceal the presence of elements of technology in public spaces. These attempts to hide technology ranged from the development of green paints in the 19th century to make iron work disappear into foliage, to highway beautification based on roads that were designed to seem natural.

In the last two decades, the globalization of mobile technology has fueled the rapid proliferation of mobile telephony antennas that cover extensive areas, from urban spaces to national parks. Analogous to this development are a variety of concealment strategies for such devices, as these are considered “visual pollution,” a term generally used to explain distaste for ugly buildings, telephone towers, billboards, flags, signs and other elements that pollute the visual landscape. The responses to this type of pollution are toleration (e.g., environmental laws prescribe the tolerable amount of pollution in air or water), prevention (elimination by preventing it from occurring) and avoidance (as the dilution, filtering and separation of pollution and its victims).

This paper will analyze the idea of visual pollution in the context of cell phone towers, particularly their proliferation in rural landscapes, and the toleration and avoidance responses to this type of pollution. Interestingly, when the cell tower antenna is disguised as a tree, it draws more attention to the materiality of infrastructure in the very process of trying to conceal it. The paper will focus on the debate concerning the aesthetics of cell phone towers and the concealment strategies that borrow structures from other technologies, as it happens when towers are disguised as wind pumps and water tanks.
Rethinking Schoolyard: Outdoor Learning Environment for Connecting Children with Nature

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Keywords: outdoor learning, childhood maladies, healthy child development, nature therapy

Nature has a powerful developmental impact on children in every major way. There are many studies that show the significant statistical correlation between outdoor engagement and the overall development of children (Moore et al, 2008). In the past few decades, the outdoor interaction of children with nature has gradually been replaced by indoor sedentary activities. The consequences include some of the new frightening childhood threats including obesity, depression, ADD (Attention Deficit Disorder) along with other physical and behavioral malfunctions (Faber Taylor, 1998). A vast number of researchers suggest that exposure to nature can be a preventive treatment. Being outdoors can also facilitate children’s immune system, cognitive development, social skills and environmental awareness. In today’s rapidly urbanizing world, direct contact with nature is at loss. Thus, it is essential more than ever to create a re-connection with nature to protect children from these maladies. Natural outdoors motivates children with different learning abilities and schoolyards have the potential to become a place for learning, playing and neighborhood activities (HMSO, 2006), as this is the place where children have daily access. Even though the value of schoolyard is clear and a great deal of research has also been done on different aspects of child growth and the relationship with built environment; an effort to integrate these findings with design solutions and guidelines is yet to be accomplished (Moore & Marcus, 2008). The objective of this study is to address and understand these complex and multilayered set of issues from a design perspective. The methodologies include three phases- first, examination of the current body of literature which include the research and theories on different phases of child development and the relationship with the exposure to nature. The second is to develop a set of programs for the elementary schoolyard for different activities considering the scale and movement of the children. The final step is to synthesize a design scheme considering the prior findings and analysis by creating a site-specific proposal. It provides a functioning model of natural schoolyard design by utilizing the specific site forces and by addressing the physical, mental, emotional and spiritual demands of children of elementary ages found in research literature from a vast array of disciplines, along with reflecting on the environment responsive design strategies.
Bringing the Outdoors In: Designing a Mobile Sensory Garden for Children with Sensory Integration Disorders in Elementary Schools

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Keywords: sensory integration disorders; sensory gardens; horticulture therapy; mobile cart

The purpose of this research was to develop a mobile sensory garden to help alleviate or reduce the negative aspects of Sensory Integration Disorders in elementary school children. Sensory Integration (SI) is how an individual processes sensory information. Children can develop a variety of sensory responses, both over- and under-responding to one or every sense, or a combination of over- and under-responding. Sensory Processing Disorder, can affect a child’s ability to learn because they process and understand information differently. Problems can include: coordination problems; poor attention span or difficulty focusing on tasks; problems with self-care skills; over-sensitivity to touch or sounds; and unusually high or low activity levels. Access to nature and sensory gardens are proposed as a common solution but are not practical or accessible during much of the school year. Some schools have built sensory rooms as an alternative solution.

The research involved design/build of a mobile sensory cart, interviews, observation, and analysis. The existing sensory room of an elementary school in Topeka, Kansas and how the children used it was observed and analyzed and teachers were interviewed. A mobile cart was then designed, built, installed in the sensory room, and a second observation period took place to assess how the children interacted with the mobile cart.

During the first phase of observation, the engagement level and time the equipment in the sensory room was recorded. During the second phase of observation the children showed intense interest in and use of the mobile sensory garden cart. Both observation and interviews with school administrators and teachers indicated that the mobile sensory garden cart was beneficial to the school and the children. Several paraprofessionals stated the children had improved behavior after using the mobile sensory garden cart. Children the school identified with sensory issues were the only ones to use the cart.

A mobile sensory cart will make a significant difference in the lives of the many children with sensory integration disorders as well as their teachers. In addition to being cost-effective, the cart can be easily customized depending on the needs of the school and the children. If a school does not have a designated sensory room, the cart can be kept in a closet and moved to an office, library, gym, or hallway as needed. For schools that are considering creating their own sensory room, a mobile cart will demonstrate the significant benefits to the children.
A Study of Campus, Community, and the Built Environment

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Keywords: campus planning, town-gown relations

The landscape of today’s American college town is changing dramatically. A combination of aging downtowns, expanding campuses, and the rapid spread of student housing complexes puts the connection between campus and community, known as the town-gown relationship, to the test. While higher education institutions grow in both number and physically, their neighboring municipalities struggle to maintain a small-town feel. Most often changes made to the campus greatly affect the municipality, and vice versa. This is particularly true with built environment modifications at the physical edges between campus and community. While recent literature sheds light on the phenomena of contemporary campus planning and expansion, the effects of these changes on college towns and the physical connection between the two have received little attention. This gap becomes the focus for this multi-case study of Southeastern U.S. college towns.

Many large land-grant universities and their associated municipalities have undergone recent improvements near the shared physical edges between town and gown. With these changes comes an opportunity for municipal and university representatives to collaborate on design and planning projects. Interview, survey, archival data and observation methods explore the effects of collaboration on the social and physical environments of a college town. While interviews qualitatively investigate the perspectives of key players in the college town built environment design and planning process, surveys provide a more expansive look at how working together affects perceptions of the overall social relationship and the physicality of the campus-community edge. Furthermore, archival and observation methods tie the contextual history and place to each of three case studies. Results might inform how town and gown can effectively work together on physical design and planning projects towards an environment of mutual partnership.
The Role of Heritage in Displacement and Community Resilience

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Keywords: resilience; sense of place; cultural landscapes; ontological security

In the coming decades, natural and human induced wars and disasters will have an increasing effect on the world’s population (Collette 2007). For the over 65 million forcibly displaced people in the world—up from 19.4 million in 2005—the loss of place, and a connection to a landscape of home is a significant source of trauma and hardship (UNHCR 2015). This trauma of exile (Said 2000) refers to the unhealable rift forced between a human being and a native place, between the self and its true home (173). The trauma of displacement has developed a multidisciplinary body of research focusing on the short and long term psychological and health impacts of displacement. However, the focus on displacement has left a gap in our understanding of the processes of emplacement (Sampson and Gifford 2010) and its effects on community cohesion and resilience.

The trauma of dislocation is connected with the inevitable struggle of creating ties to a new place, with a new community of people (Turton 2005, 278). However, the literature is lacking when it comes to understanding these processes. Adjusting to new social environments, different physical ordering of space, as well as unfamiliar ecosystems and landscapes are challenges facing refugees as they pass into temporary camps and later again as they reach a resettlement location. There are several mechanisms by which people relate to a new environment, transform a space into a comfortable and familiar place, and create community. One is “to literally build, construct, and inhabit landscapes that enable the person to continue to live a familiar lifestyle” (Jean 2015, 50). For many, creating a garden is the expression of heritage by which they modify and inhabit their new landscape, often creating a microcosm of the former and beloved home place.

This paper expands research into the understanding of temporary emplacement in refugee camps to aspects of community resilience created by emplacement. Through a case study of the mapping and social media documentation available (2009 to 2017) of the Zaatri refugee camp, Jordan, we analyze the creation of outdoor spaces and their role in supporting community resilience. Those results are compared with interviews and observational site analysis at the camp. The results identify the connections between community cohesion, resilience and agency in the creation of a hierarchy of outdoor private, semi-public and public spaces. Our work contributes to an understanding of how refugees transition from displacement to emplacement through a process of place-making and the community resilience and cohesion that results from those actions.
Learning Math in Landscapes: An Experiment on the Effects of Landscape Manipulatives

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Keywords: learning landscapes, child development, landscape manipulatives

Many scholars have demonstrated that children and youth need more connection with nature to sustain their physical, mental, and spiritual health (Kaplan & Kaplan, 1989; Louv, 2008). Even though parents and teachers recognize the value of outdoor play, schoolchildren spend a diminishing amount of time engaging in outdoor activities (Clements, 2004). Furthermore, addressing strict state learning standards is the first priority for schools. Outdoor activities are often seen as extracurricular to those subjects typically emphasized and tested. As a result, outdoor landscapes such as science gardens, playgrounds, and experiential classrooms are often underutilized, discouraged since they can take away from more important, standard forms of pedagogy. Thus, traditional academic expectations associated with test scores can conflict with outdoor learning and play, this conflict becomes major obstacles to the implementation and use of outdoor learning environments. However, Lieberman (1998) has shown that environment-based education (EBE) actually facilitates standardized achievement in subjects like math, language arts, and science if specific EBE curriculums are developed based on a school’s surrounding natural resources.

By borrowing from the EBE and other relevant learning theories, a new environmental design framework called landscape manipulatives (LM) is proposed. It explores the spatial and behavioral possibilities associated with learning and looks at how the design of LM can enhance student mathematics achievement in concepts like geometry and fractions. The performance of LM was examined by conducting a quasi-experiment in a real middle school setting. A LM prototype was constructed on the school ground. The experimental design uses Pretest-Posttest design to compare the effects of the LM treatments between experimental group and control group by measuring student’s test scores and math learning motivational levels.

The goal of this study is to help increase student achievement, particularly math scores, using LM. This new framework of LM will help environmental designers and educators create learning landscapes that are essential counterparts to traditional math education.
A Study on the Stress Relief Effects of Teenager Physical Activity in City Parks Based on Psychological Evaluations

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Keywords: teenager, stress, city parks, physical activity, physiological experiment

Subjects are middle and high school teenagers living in Gangnam (Seoul, Korea) with the hypothesis that activities held in city parks will have positive effects in relieving stress. The argument was applied to teenagers and the hypothesis proven through physiological experiments. City park activities are then proposed as a viable plan to counteract teenager stress:

1. Physical activity during free hours to relieve teenagers’ stress is important. Therefore, this paper suggests city parks as a viable venue for such purposes.
2. Teenagers need a venue that is accessible, easy to visit multiple times, and open to various activities. this paper offers city parks as an accessible and healthy alternative to forests and gyms.
3. To increase the reliability of this study, physiological evaluations were conducted to strengthen the argument.

Results were as follows:

1. Cortisol levels before and after physical activity were 0.35 ug/dl and 0.28 ug/dl, (p=0.024) respectively. The significant correlation indicates that city park activities can have positive effects in relieving stress by lowering cortisol levels.
2. Heart rate levels before park activity were 81.85 beats per minute whereas levels significantly decreased to 75.18 beats per minute ($p=0.024$) post activity. Slower heart rate generally relates to less tension and a more stable mind and body.

3. Heart rate variability levels, on the other hand, significantly increased from 521.64msec$^2$ to 767.97msec$^2$ ($p=0.039$). The parasympathetic nervous system is stimulated when one is less tense and more stable.

4. From Heart Rate Variability, Low Frequency and High Frequency levels were assessed. These levels were significantly decreased from 1.81 to 1.21 ($p=0.002$). This shows that the sympathetic nervous system is inhibited and the parasympathetic nervous system is stimulated.

In analyzing cortisol levels and heart rate which are both an indication of stress, the experiment found that salivary cortisol levels and heart rate decreased significantly after city park activities. This can be interpreted as lowered stress levels. The high level of salivary cortisol and heart rate measured in Gangnam teenagers before city park activities proves the assumption that they are exposed to high levels of stress on an average day. In analyzing Heart Rate Variability before and after city park activities, results showed that the sympathetic nervous system is activated before the activities and the parasympathetic nervous system, after the activities. Park activities had in fact, physiologically stabilized the subjects. This conforms with the fact that the sympathetic nervous system becomes activated in response to something exciting, or a perceived threat or stress while the parasympathetic nervous system is dominant when a stressful situation ends. In addition, the results were statistically significant unlike prior studies because the subjects were given a wide array of physical activities.
The Relationship between Indoor and Outdoor Physical Activities among Full-Time Employees’ Mental Health Status

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Keywords: outdoor activities, indoor activities, mental health, occupational health

Numerous studies have shown that contact with nature promotes both physical and mental health by reducing stress, increasing air quality, physical activity, and social cohesion. The literature also shows that physical activity relieves stress, decreases the risk of depression and cognitive decline, and other mental health problems. Understanding causal factors of good health are particularly important in the working environment in order to avoid absenteeism and medical costs. However, few studies have examined the most effective types of exercise by place (indoor-outdoor) on occupational stress. This study examined the relationship between outdoor-indoor exercise types and employee’s mental health status respectively, and how this relationship can be affected by other factors. Logistic regression and descriptive statistics were used to examine data from the Behavioral Risk Factor Surveillance System Survey (BRFSS) gathered by the Centers for Disease Control and Prevention (CDC). To reveal more recent trends, data analysis was conducted on 2011-2015 survey results. Frequent Mental Disorder (FMD), Health Related Quality of Life (HRQOL), and Anxiety and Depression levels of employees were examined. Contrary to our expectations the analysis showed that full-time employees who spent more time on indoor activities were less likely to have poor mental health when compared to full-time employees who spent more time on outdoor activities. Employees who preferred indoor activities were more likely to have poor physical health than employees who prefer outdoor activities. However, the study did not find statistically significant association between outdoor-indoor activities and FMD (mental health was not good ≥14 days) and general health level of full-time employees. Other factors such as age, gender, marital status, education level, and income were also found to have a significant relationship to mental health, except for race. These findings recommend additional research and further assessments of the role of leisure time physical activities and its effect on employee’s mental health status, and worksite wellness programs that promote healthy lifestyle among employees. Creating green dominant outdoor break areas, promoting outdoor activities among employees, encouraging employer-based training programs that encourage outdoor activities are suggested. After implementation, combining the outcomes of a healthier workforce, greater productivity and less absenteeism will maximize work time and the amount of insurance money that can be saved.
Local Discussions for Healthy Communities: Policy, Systems, and the Environment (PSE) Approach to Transforming Communities in Kentucky

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Keywords: healthy communities, policy, systems, and the environment (PSE), focus groups

Exploration and considerations for innovative approaches in rural development have readily progressed; yet, outcomes to overcome the critical economic and social distress have not kept pace when compared to efforts to address urban development issues and needs. Environmental, socio-economic and cultural changes of non-urban communities and landscapes are influenced by policies and systems that in turn influence viability and resiliency of the very communities and regions that require facilitation from a variety of fields (Brown and Schafft, 2011; McCarthy, 2005; Woods, 2009). Although the state of Kentucky entered urban statehood, non-urban areas comprise more than 90% of the state’s landscape and many lack comprehensive plans or guidance to structure and strengthen their future systems that require an understanding of and need for complex relationships to work together.

As a component of the Supplemental Nutrition Assistance Program Education (SNAP-Ed), the Policy, Systems, and the Environment (PSE) project investigators over the last two years explored the relationships of local policies, systems, and environmental aspects of communities to identify and address potential changes that could influence individual behaviors for nutrition and health decisions (Story et al., 2009). The team worked with eight pilot communities in Kentucky defined at the county level and conducted two major engaged education activities: focus group conversations and local engaged activities. Resource maps were created at city and county scales to inform and engage communities to visually identify and acknowledge their health and wellness behaviors based on resources and services existing within and adjacent to them. Additional asset mapping activities further highlighted and educated participants about their local PSE connections and gaps.

This study highlights findings from the environmental perspective from 21 focus group meeting activities. Although, all communities have access to physical activity opportunities; we found that physical environments often were barriers limiting access to and understanding of the PSE elements impacting communities and their behaviors for healthy choices. The geographic placement or built patterns of communities were often not perceived as easily changeable aspects compared to much-needed transportation services as a systems or policy element.

The PSE findings initially provided a clearer roadmap for participants to effectively navigate and negotiate local policies, systems, and environmental factors. However, much emphasis was on tangible changes such as communication rather than foundational changes such as
environments. This project anticipates to build long-term capacity in the underserved communities through learning and change initiatives with the SNAP-Ed participants and community members.
Fear of Outdoor Falling Associated with Environmental Characteristics and Outdoor Usage among Assisted Living Residents

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Keywords: fear of outdoor falling, outdoor usage, outdoor environments

Fear of outdoor falling is a major barrier preventing older adults from engaging in outdoor activities. Residents of assisted living facilities have reported spending less than two hours per week outdoors, which may be partly attributable to fear of outdoor falling. Because increased outdoor physical and social activity promotes health and wellbeing, it is important to develop multifactorial interventions to reduce the fear of outdoor falling and promote outdoor activities. However, few studies have examined the association between levels of outdoor usage, perceptions of the outdoor environment, and the fear of outdoor falling among assisted living residents.

This study is to identify factors influencing the fear of outdoor falling among assisted living residents regarding outdoor usage and outdoor environments. A total of 925 participants aged 65 or older (mean age 85 years) were recruited between May and July 2007, from 68 assisted living facilities randomly selected in three urban areas: Houston, Texas; Chicago, Illinois; and Seattle, Washington. This selection reflected a wide geographic dispersion with different climatic conditions. Self-report survey instruments were developed to assess outdoor preferences, attitudes, and behavior regarding outdoor access and usage, including previous falls and current fear of outdoor falling. Multivariate logistic regressions were used to identify how outdoor usage and perceived outdoor environmental variables were associated with fear of outdoor falling among assisted living residents, after controlling for the demographic, health, social, and behavioral variables.

Preliminary Results: Almost one-third (31.2%, 289 out of 925) of the participants reported having a fear of outdoor falling. Results from the multivariate analysis showed that frequent outdoor usage (0.486, p<.001) was negatively associated with fear of outdoor falling. From the perceived environmental variables, well-designed outdoor areas (0.535, p<.001), well-designed walkways (0.426, p<.001), having enough different places to sit (0.508, p<.001), having good accessibility to outdoor areas (0.497, p=0.002), and having comfortable outdoor areas (0.458, p<.001) were all associated with decreased fear of outdoor falling. Findings from this study help identify aspects of the outdoor environment and its usage related to fear of falling in assisted living residents. Improved walkways, well designed outdoor areas, and comfort levels in outdoor areas are associated with reduced fear of outdoor falling, which can further contribute to promoting healthy outdoor physical activity among assisted living residents.
Psychophysiological Responses While Watching a Still Waterscape

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Keywords: biofeedback, on-site experiment, background information, landscape perception

According to the domestic tourism survey 2016 in Taiwan, watching scenery was rated the highest frequency in all activities, reaching 62.8%. Because of its special geographical conditions, Taiwan has rich and diverse natural landscapes to meet the needs of a wide range of visual experience. Based on the extensive literature accumulated over the last two decades, we already know that contact with nature is beneficial to health. Mechanism theories such as stress reduction theory or attention restoration theory have been supported. However, on-site and field survey data remain few, and the impact of contextual information on one’s responses to watching a landscape is unclear. This study explored how one may respond while watching a still waterscape objectively by examining visitors’ psychophysiological responses to 3 different watescapes with diverse contextual information, which are the Forest Scenic Pond, Garden Scenic Pond and Fish Farm Scenic Pond. This study recorded the viewer’s heart rate, heart rate variability, muscle tension, and brain wave. By between-group comparison, our results showed that the viewers autonomic nerve system performed to balance while viewing water. Participants became calmer and alters while watching the forest scenic pond compared to the other two. Their perception of biological variability seemed to moderate the effect. This study showed that the overall environmental elements and environmental contexts have a moderating effect on relaxation and recovery. At last, the scientific records should contribute to managers of recreational area for future planning and promotion.
Social and Environmental Determinants of Children's Outdoor Physical Activity: A Systematic Literature Review

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Keywords: children, physical activity, social environment, physical environment, built environment, healthy neighborhood environment

Children's physical activity is important for sustaining health, combating obesity, and promoting social development. Although the Centers for Disease Control and Prevention (CDC) recommends at least 60 minutes of physical activity each day for children, a national survey reported that only 42% of children met this guideline. Most children spend less time outside as their lifestyle tend to be sedentary and physically inactive, spending their time in watching TV, DVDs or playing on the computer (Verloigne et al., 2012). Of course, children's indoor activity is important. However, I want to focus on children's physical activity at the community level. Sallis et al. (1992) found that the lack of community levels approaches to encourage children's physical activities. My research question is, How can we encourage children’s opportunity for physical activity in their neighborhoods? This review identifies social and environmental determinants in the neighborhood correlated to children's outdoor physical activity and assesses the methods to measure both social and built environments related to children’s physical activity.

To understand the neighborhood characteristics, we focused on the social and environmental factors to determine organized physical activity rather than the spontaneous or free-form activity. We used four databases (ERIC, Ovid Medline, SPORTDiscus, and PsycINFO) to search relating studies, and searched the keywords: children, physical activity, exercise, recreation, social environment, physical environment, and built environment. Followed by this, two of the researchers in this project conducted screening independently based on the title, abstract, and full text. Our criteria include studies of elementary school-aged children (pre-K to 5th grade), published in a peer-reviewed journal, associated with outdoor physical activity and be written in English. We excluded home or indoor-based physical activity (e.g., fitness, gym).

Most studies about the social environment highlighted the importance of interpersonal relationships such as self-efficacy or psychological factors. Regarding physical environments leading to outdoor physical activity among children, several studies have conducted on the objective measurements of neighborhood environment, such as street connectivity, land-use mix, walkability and proximity and accessibility to open spaces. For the methods, social environments were likely to rely on subjective and qualitative approaches (i.e., interview or focus group), while physical environments tended to be collected by objective tools (i.e., GIS).
Future research should aim to comprehensively assess potential determinants of children’s physical activity considering both social and environmental elements to promote children’s outdoor physical activity in the neighborhood by suggesting the role of neighborhoods in children’s lives and the opportunities they offer to support recreation or sporting activities.
Healthy, Nature-Based Child Care Center Outdoor Environment: A Systematic Review of the Literature

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Keywords: early childhood health, social and emotional development, biophilic approach to outdoor designed environments

Children's early experience deeply impact the development of their brain architecture and lifelong health (Harvard University's Center on the Developing Child). A safe and supportive built environment has been identified as one of the three basic foundations (Cohen, 2017) for children's development in terms of their mental and emotional health. However, the current evidence for children's health indicates a rise in attention deficit/hyperactivity disorder (ADHD), anxiety and stress (Louv, 2008). Attention Restoration Theory (ART) suggests that the natural environment and its rich sensory affects, can provide the general population an alternative mode of direct attention (restorative experience) to recover from mental fatigue and stress caused by long periods of directed attention (S. Kaplan). The goal of this study is to understand ways that a naturalized or nature-based outdoor play environment can impact children's attention restoration experience. Three areas of knowledge: built environment; children's health; and natural environments, have been identified for an in-depth systematic literature review. To guide the literature review, the following has been formulated with the primary research question: how can the design of a naturalized outdoor play environment in a childcare facility be optimized for preschool children's attention restoration? And the review is also guided by secondary research questions: (1) How does the naturalized environment contribute to children's attention restoration experience and overall health? (2) How do preschool children in the childcare center perceive and interact with natural features in their outdoor play environment? (3) What are the methods for measuring children's attention restoration experience in outdoor play environments? Preliminary findings in the literature review indicate evidence from existing studies confirm: nature and naturalized outdoor environments positively contribute to children's attention restoration experience; and children's abilities to perceive physical qualities of different environments. Additionally, methods to measure the environment's performance for attention restoration include: testing before and after exposure to the environment; and surveys of children's perceived attention restoration. This presentation intends to report on the status of the study, findings of the literature review, research design including data collection and study approach. Preliminary next steps with the goal to close the knowledge gap involves a quasi-experimental study approach utilizing mixed methods to collect data as follows: children's preferences for natural features in outdoor play environments through structured interviews and visual preference surveys with children and teachers; field observations of children-nature interaction; and attention restoration performance of the outdoor environment through tests.

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Keywords: social welfare, settlement movement, community garden

The main purpose of this study is (1) to examine how the Settlement House movement affected community planning in the United States, and (2) to examine how it eventually affected community gardens in recent years. Although the movement affected the Playground movement and initiated community planning physically, design and planning disciplines have not paid as much attention to the movement as disciplines of sociology and social welfare. This paper studies eight community gardens located in the US with the focus on how community gardens are influenced by the Settlement House movement.

In the early 20th century, Progressive Movement developed as the problems of various poverty and the urban environment began to be perceived as social problems rather than individual ones. The Settlement Houses Movement, which aims to improve the lives of the poor by taking the revolutionary movement as its root, was developed. The legacy of the Settlement Houses Movement has been reflected in the community garden which has played a role as the realization space of welfare ideas or as the space for creating welfare benefit or as a place that practices social welfare.

Community gardens, similar to the settlement house tradition, provide and create institutional, programmatic, and natural situations for the residents to belong and contribute to the community. According to the cases study, comparing the characteristics of community revitalization shown on the creation of the community garden and on the creation of the Settlement Houses is as follows; (1) The settlement house movement and community garden are started in the aspect of social welfare for the purpose of making and this can be seen in the previous cases. (2) Invisible requirement and trust between members are developed. (3) The voluntary reciprocal rule is formed. (4) It is the aspect of creating altruism. (5) It is the role of learning and education in the aspect of using activity performance.

It is necessary to approach the matter of community garden comprehensively and to set up comprehensive and complex plans to form community gardens. For the plan, a systematic scheme focusing on the community that is agreed on the needs of the members and characteristics of a community is asked to come into existence. Moreover, it is suggested that the community taking part in social welfare, volunteers, and the program participants have a
hand in developing social welfare activities, succeeding to the mind of settlement as the original settlement movement and social welfare movement.
People’s Landscape Preference and Attitudes towards Community Gardens in the City of Roanoke, VA

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Keywords: landscape perception, community engagement, aesthetics, spatial arrangement

Community garden programs have become a useful tool in minimizing the impacts of food insecurity and strengthening communities by providing social, economic, and environmental opportunities. Thus, successful development and long-term survival of community gardens are important for the communities suffered from food insecurity and poverty. If designers, garden managers, and city officials are able to understand the way people react to community gardens, they could better contribute to the development of more successful community garden programs. However; there is very little research for community gardens regarding people’s landscape preferences and attitudes. The purpose of this study was to better understand the factors that influence people’s landscape preference and attitudes toward community gardens. This study focused on the neighborhoods that have suffered from food insecurity and poverty and have a community garden in the neighborhood limits. In the city of Roanoke, Virginia, there are four food desert census tracts that have 100% low access to a supermarket and have high poverty rate (Bohannon & Henry, 2016; Chittum, 2011). Six different neighborhoods with community gardens were selected in Roanoke as a focus area. A mixed method research design involved a landscape preference survey and semi-structured interviews was used. The Survey instrument was distributed online and face-to-face at neighborhood meetings and door-to-door visits. There were 185 participants for survey and 10 participants for the interview session. A factor analysis produced eight categories of landscape features named as “Gathering space with easy access”, “Pathways”, “Well organized garden plots”, “Flourished gardens without garden plots”, “Poorly maintained vegetation and garden structures”, “Seasonality”, “Entrance” and “Composting space”. The most preferred scenes presented the areas that are well cared for, easy to access, include clear paths with even ground texture, have built structures, moderate level of vegetation, and openness. The least preferred scenes presented the areas that are not well taken care of, difficult to access due to poorly designed paths, have damaged or poorly constructed structures, have dense scruffy vegetation or bare ground with no vegetation and limited openness. Findings were consistent with the findings of other landscape preference studies conducted for other landscape types. These findings can help designers, community organizations, garden managers, city officials and their higher education partners regarding the design, development, and management of community gardens to minimize negative impressions of community garden landscapes and to increase positive responses from its residents that can foster an increased involvement and more successful community garden and civic engagement programs.”
Exploring the Relationship Between Place Attachment and Therapeutic Landscapes

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Keywords: therapeutic landscapes, place attachment, landscape architecture, well-being, place bonds

An increase in the number of place attachment studies (Lewicka 2010, 207) is mirrored by an increase in therapeutic landscape projects within the field of landscape architecture. Place attachment can be understood as a person-place bond that evolves from specifiable conditions of place and characteristics of people (Schumaker & Taylor 1983, 221). Therapeutic and other healing landscapes are defined by their ability to facilitate human health and well-being and may be designed or natural (Therapeutic Landscapes Network, 2016).

The relationship that forms between visitors and therapeutic landscapes can be considered place attachment. Existing literature has not explored this specific bond to the extent it has with other forms of place attachment.

This paper explores this relationship over an individual’s life course. Its objective is to bring about deeper understanding of the multi-layered relationship and offer a new perspective from which to design these spaces. It is developed from a meta-analysis of the most influential (i.e. highly cited) place attachment and environment behavior studies literature as well as expert interviews. The topic is explored in this paper through an abstraction of text and graphic summary of information. Finally, this paper offers methods for studying the intersection between place attachment and therapeutic landscapes for researchers and practicing landscape architects.
Place Meaning between Female Adolescents Undergoing Substance Abuse Treatment and a Japanese-Inspired Healing Garden

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Keywords: place attachment, adolescents, substance abuse, women, meaning of garden objects, meaning of places

The purpose of this research in progress is to explore female adolescent substance abuse patients’ meaningful experiences with a healing garden using storytelling. Existing research overwhelmingly supports that interacting with nature is beneficial to physical and mental health. However, much of this research is focused on either adults or children and results are generalized across gender. The adolescent brain is unlike that of other age groups. Adolescents perceive the external environment differently and are driven to seek out new, stimulating and often risky experiences such as drug-use.

Healing garden design operationalizes nature interaction research in order to address the physical, psychological, spiritual and social needs of users. The healing garden design requirements of the population at hand are unique and require careful attention and have not yet been studied. Further, a meta-analysis of literature revealed a lack of research regarding the role that place meaning of healing gardens holds in the lived experiences of garden users.

This case study utilizes semistructured go-along interviews and photovoice methods to elicit participant’s storied experiences with the layers of a healing garden (e.g., overall spatial arrangement, affordances, objects). Semistructured go-along interviews enabled a shared experience of the garden that elicited stories of participant’s meaningful nature-based interactions before treatment, during treatment and visions for connecting with restorative greenspaces post-treatment. Photovoice afforded participants the opportunity to document memories of meaningful experiences whilst on participant-led garden walks. Data subsequently underwent multi-modal coding for experiential and spatial patterns in the participants’ stories and images.

This research aims to expand prevailing conceptualizations of healing gardens and their design with emphasis on the experiences and design needs of at-risk adolescent women.
Living on the Edge: Creating Healthy Public Space for Foreign Domestic Helpers

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Keywords: human right, social conflict, public space, privacy, social balance

The purpose of the study is to benefit both the foreign domestic helpers (FDHs) and local people by creating healthier public spaces in an interactive way. The social integration of FDHs has become a global issue since the 1980s, and the conflicts between FDHs and local people have been witnessed worldwide. Hong Kong is one of the cities in possess of a large amount of FDHs, where the right for FDHs to take one day off per week has been legalized. During their legal holidays, usually Sundays, FDHs stay at parks or other public places for rest and form a temporal yet special urban landscape. The usage of urban public space in such a unique way has engendered impact on social justice, which is a long-term controversy between the inevitable needs of FDHs and social right of other local residents. So this research, with participatory fieldwork mode, has focused on different aspects and examined important environmental factors in the perspective of domestic helpers in the certain context, and found out their own ideas and interpretation of the space.

After a critical scrutiny of the research result, it is clear that what they really appreciate and desperately need should be small-scale spaces with a good sense of privacy with a very strong interpretation of cultural elements, sharing with their social connections of the same religious belief. Religious behavior, food sharing, chatting, learning, and reading, are very important and dominant activities for them. However, attention also should be paid to the fact that all these spaces occupied by FDHs during weekends are also served as mutual public spaces for other citizens, which are also major components of the city population. So a flexible landscape intervention for the FDHs is in desperate need. Pins (on the ground, wall, and fence), strings, hooks are combined in several ways with the certain context, and FDHs could use their own traditional curtains to build their own space, with different sizes or shapes which can serve different purposes. And these places will always be able to be reset to the normal situation and return back to other local citizens. Hence, a multi-functional space is accomplished for both parties.
10', 35', and 90': Multifunctional Landscape in the Compact Manufacturing Plant

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**Keywords**: compact manufacturing plant, multifunctional landscape, human right, social impact, environmental impact

The purpose of the study is to find the opportunities of landscape intervention in the context of compact manufacturing plants. The pervasive globalization has witnessed the expansion of numerous industrial parks, so-called sweatshops, in underdeveloped regions. The impact towards the environment, social justice, and human well-being demands critical scrutiny. This project took the Pearl River Delta, a typical manufacturing heartland both domestic and worldwide, as a persuasive case. After multiple times of interactive field work in Long Hua Foxconn, in Shenzhen, China, it has been discovered that the workers there do have opportunities to enrich their lives and access for recreation in the factory. It has been found that the worker’s time threshold could play a key role in the shaping of the access. Respectively, the first is 10 minutes before work or a brief break for smoking during working, the second one is 35 minutes after lunch, and the third one is 90 minutes after work.

A testing area has been chosen to showcase the design intervention. For the 10-minute-threshold, additional lightings and flowers are added alongside the road in working area, movable smoking houses are offered in the smoking area. For the 35-minute-threshold, a wooden seating-out area with canopy is placed in front of the canteen. The huge amounts of workers having lunch there will guarantee the adequate visit to this seating-out area. And this will act as a premise of the exploration of this recreation area and cultivate multiple purposes of usage. Some of the existing trees are also kept as shelter. Other latent possibilities also exist for the 35-minute-threshold.

In the 90-minute term, the intervention can be a plaza or multi-functional open place near the dormitory, 60 cm wide and broad benches, which is long and soft, can be set there to provide a comfortable place for workers to take a brief rest. Soft pavement (e.g. rubber or grass) with bright color is implemented as an activator in the monotonous built environment with only decolorized concrete and steel. The variegated materials could ameliorate their mood and cultivate their emotions. At the same time, these time thresholds may overlap with each other, which also serves as an important aspect of the design intervention.
Racial and Socioeconomic Distribution of Public Green Ribbon Schools

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Keywords: school environments, children, environmental justice, green ribbon schools

The purpose of this study is to investigate whether all students, regardless of racial and socioeconomic status, have equal access to the Green Ribbon Schools. Recent research on the benefits of green schools and green school programs have demonstrated positive effects correlated with green spaces, particularly with enhanced attention, improved academic performance, fostered outdoor education, and overall well-being (Berman, Jonides, & Kaplan, 2008; Matsuoka, 2010; Söderström, et al., 2013; Kweon, El, & Storie, 2016). The Green Ribbon award is a recognition award for schools that are environmentally conscious and focus on sustainability (U.S. Department of Education Green Ribbon Schools, n.d.). Any school may apply for this award through their state. If a state nominates more than two schools or districts, at least one of the schools must serve at least 40 percent of students from disadvantageous backgrounds (U.S. Department of Education Green Ribbon Schools, n.d.). This specific aim of this study is to find out whether the majority of awarded public Green Ribbon Schools served at least 40 percent disadvantaged students.

The list of ED Green Ribbon public schools for the years 2013 through 2015 was collected from the Green Ribbon School website through the Department of Education. Racial/ethnic and socioeconomic data was collected from the Elementary/Secondary Information System (ElSi), which is a database created by the National Center for Education Statistics (NCES). The data was then analyzed to determine racial and socioeconomic distribution.

The study found that the majority of awarded public Green Ribbon Schools did not serve at least 40 percent disadvantaged students. The majority of Green Ribbon Schools (61%) are primarily attended by White students. Just under 50% of Green Ribbon Schools serve at least 40% socioeconomically disadvantaged students. The chi-squared test found that race/ethnicity and socioeconomic status of the students were not equally distributed for the ED Green Ribbon Schools ($O_2=30.60, p<0.0005$). This determined that race and socioeconomic status are related factors, and it is not just due to chance that the majority of Green Ribbon Schools are White and Not Disadvantaged. This study is important because it shows that disadvantaged populations are less likely to get an education that may allow their students to learn about sustainability while also potentially becoming a more sustainable school. With this knowledge, the recognition process of bestowing Green Ribbon awards can become more conscious in reaching out to schools that serve more disadvantaged populations.
By-Products of the Anthropocene

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Keywords: Anthropocene, paradigm shift, lexicon, socio-ecological narratives, post-environmentalism

The Anthropocene can be recognized as both a stratigraphic marker and a paradigm shift that destabilizes entrenched theories of human-environment relations. For example, within the geophysical sciences, recognition of human geologic agency has resulted in a reconsideration of landscapes as novel geomorphology and anthropogenic stratigraphy. Within the humanities, theories of post-environmentalism, the hydrosocial and other nascent socio-ecological narratives are recasting human-environment relations in ways that challenge long-established environmental discourse and ethos. Anthropocene-based theories not only present new conceptualizations of environment and n/Nature, but these theories also catalyze a paradigm shift in how we think of landscapes—and their planning, design, and management—relative to the newfound human geologic agency of the Anthropocene. Given this paradigm shift in human-environment relations, the author asserts that Anthropocene-based theories emerging from allied disciplines now provide an opportunity for landscape architecture scholarship and critical practice to examine, question and renew its discourse and pedagogy for the 21st century. As Thomas Kuhn established, a paradigm shift within a discipline necessitates not only a recognition of alternative theories but also a critical examination and redefinition of a discipline’s operative lexicon. Through a brief examination of recent Anthropocene-based scholarship and pedagogy, this paper establishes a basis for an emerging Anthropocene-based landscape architecture lexicon. This lexicon is examined through several examples, with particular emphasis on emerging conceptualizations of nature and socio-ecological systems that have arisen from allied disciplines. Demonstrations of an emerging Anthropocene-based landscape architectural lexicon are discussed through the critical examination of recent landscape architectural scholarship. The paper concludes with speculation of key questions for future Anthropocene-based research and pedagogy.
Activity in Green Space and Children with Autism Spectrum Disorder

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Keywords: Autism, daily activity, nature, mood and affect

Across the world, the percentage of children having autism spectrum disorder (ASD) is growing at an alarming rate. For example, CDC estimate that about 1 in 68 children has been identified with ASD by 8 years old. Previous studies have demonstrated that contact with nature may promote positive affect, help children develop social relationships and reduce problematic behaviors. As a result, contact with nature might be effective in relieving ASD symptoms. However, children with ASD also show higher risk of limited outdoor activities and a smaller range of activity settings, especially those who live in high-density cities. Therefore, understanding their outdoor activities and the effects of the different activities in reinforcing positive affect and behaviors is an important first step to investigating whether nature can be an effective intervention for children with ASD. The main purpose of this study is to examine the activity patterns of children with autism who live in high-density cities, their exposure to nature, and whether this exposure help alleviate symptoms or negative emotions.

This study was conducted using a questionnaire followed by a semi-structured interview with parents of children diagnosed with ASD in two cities in China, Shanghai and Yantai. The questionnaire consisted of three parts: an adjusted home and community activities scale (HCAS) based on the common activities in China and reported favorite place of their children; a group of questions regarding the usual behavior settings and rated on the extent to which the setting impacted ASD symptoms or emotions; and open-ended questions about the perceived benefits and caveats associated with spending time in green space. After the survey, we conducted a semi-structured interview and invited parents to recall and describe the most recent experience when they took their children to a park or green space, as well as their perceived benefits and risks associated with nature exposure.

For children with autism, playing with toys, adult-child play, watching TV, going shopping and going to a park emerged as the top daily activities. Among all activities, going to a park was perceived as the most beneficial to children’s mood states. According to the parents, children’s top favorite places included parks and green space, plazas and waterfront areas. Those who preferred parks and green space were more likely to become calmer after visiting their favorite place than those who picked other types of environments. Besides mood and affect, activities in different behavioral settings did not impact the severity of key symptoms of autism, including social deficit, language problem and repetitive behavior. However, content analysis of parents’ narratives suggested that some settings, such as green space, may facilitate
behavior interventions. The advantages and caveats of using nature as a therapeutic environment for children with ASD are then discussed.
Designing Green Space as Part of an “Ideal Neighborhood” within a Museum-Based Urban Ecology Exhibit

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Keywords: urban planning, neighborhood design, participatory planning, museum exhibit design, urban ecology

Planning for a sustainable urban future requires understanding the type of neighborhoods that local residents imagine as ideal or preferable. Often times, certain segments of the population are left out of the public participation or visioning process, especially children and adolescents. While approximately half of the world’s children live in urban environments, they are often segregated from public places, their mobility is limited and they are not typically included in planning processes (Derr & Kovacs, 2015; Frank, 2006; Chawla, 2001). Yet the lives and health of children, in both the present and future, are heavily influenced by the land use decisions of policy makers and planners (Lynch, 1977; Wells, Evans & Yang, 2010; Derr et al, 2017). This study explored the use of one participatory planning and design activity to imagine an ideal neighborhood as part of a larger study to prototype an exhibit within a science museum. The aim of this study was to explore the kinds of green space elements and arrangements that are most important to children when they construct an imaginary “ideal neighborhood.” This study uses the results of the NSF-funded “City-Science” museum exhibit at the EcoTarium Science Museum in Worcester, Massachusetts. The exhibit is a unique collaboration between museum exhibit designers, landscape architects, and urban ecologists to develop a model for researching urban planning attitudes within a museum setting. Preliminary results suggest that green space such as parks, gardens and street trees are a high priority for study participants who are free to choose among a wide range of land uses when constructing their imaginary neighborhood. The results of the study provide insights for urban land use planning and neighborhood design. In addition, the project also discusses the benefits and challenges of including the views and experiences of children in participatory planning within a museum setting; and the use of this activity beyond the museum walls.
An Investigation into the Intricacies and Relationships among the Riverine Ecology, Landscape Narrative, and Cultural Expressions of Literature and Music in Ganga-Brahmaputra Delta

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**Keywords:** Ganga-Brahmaputra Delta, riverine ecology, cultural expression, landscape narrative, literature and music

Two major rivers, Ganga and Brahmaputra along with their confluence and tributaries form a combined delta that is ecologically intricate and unique. Over the centuries they shaped the landscapes of Bengal (Bangladesh and West Bengal State of India) along with its distinct spatial organization influenced by agrarian imperatives, and their cultural expressions.

This paper explores and examines the intricacies, connections, and the symbiotic relationships among various aspects such as the riverine and delta ecology, and function and meaning of spatial organization, and the cultural expressions in terms of literature and music. This investigation aimed (1) to attain a distinct clarity of these aspects and their components, (2) examine how do they connect with each other, and (3) observe and reflect on whether there is any symbiotic relationship among them.

The study was able to distill the archetype of landscape components and the spatial organization as well as trace the ecological and sociocultural history. They were also viewed and interpreted through the lens of landscape narratives. The investigation exposed a level of complexity with regard to several aspects that are intertwined and to an extent, symbiotic. It also uncovers some of the traditional and vernacular approaches of trial and error methods in designing and organizing landscape components. Though archaic as methods, they proved to be very useful and yet sustainable.

The study draws examples from the literary work of prominent authors such as Nobel laureate Rabindranath Tagore and demonstrates how his encounter and experience with major rivers was provocative, inspiring and influential in his work. It also shows how Tagore became increasingly familiar and engaged with studying the related aspects such as the riverine ecology, the rural landscape archetype and their organization, the spatial phenomena, agriculture, and their socioeconomic implications. All of these are reflective through both literal and metaphoric use of them in his stories, novels, poems and songs. In turn, his massive literary work and educational reform including the establishment of a university in the tradition of open air teaching continue to be culturally very influential.
Water and Campus Culture: Taking Care of Our Sinkholes

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Keywords: sink holes, perception, campus, water

The University of Florida's Gainesville campus features several sink holes-turned ponds, which have been integrated into the stormwater management plan over the last fifty years. The four ponds, called Dairy, Ocala, Gator, and Liberty appear on early campus master plans suggesting culture a built around human connection to water. In present, however we’ve lost connection to these systems.

Once a distinguishing feature resulting from Florida’s unique karst geology, the ponds have become largely ignored spaces sometimes used as dumps for waste and exotic animals. The concept of where our water goes and how it gets cleaned has become abstract and distant. These ponds can serve as places where campus culture embraces the network of vital water movement. Interactions with water bodies lead to stewardship, a stewardship developing into an institutional knowledge embracing a system that replenishes our most valuable, natural resource.

Our goal is to better understand the user and their current connection to water. Participant perceptions, both negative and positive, influence the direction of design solutions for these spaces. Four questions drive the study. Who uses the space? How are they using it? What do they think of it? What do they know about it, what can they learn about it? The survey is designed to capture on-site and off-site responses gauging awareness and perception of the sinkhole ponds and stormwater on campus. Participants engaged in interviews adjacent to the sinkhole allow the researchers to gesture to features, gauge real time reactions, and pose follow up questions. Off-site participants are provided fliers that direct respondents to an online survey. Collection of both on-site and off-site responses provided researchers with respondents reacting to a degree of disassociation to the sinkholes. Results from the survey surprised us. More than 70% of survey respondents had some knowledge of sinkhole activity in North Central Florida with over half not realizing that such phenomena occurred on campus. Further, nearly 80% of those surveyed were unaware of how stormwater was managed on campus.

This study describes environmental knowledge, aesthetic preference for use, and how the participants would like to be educated about the ecology and function of the sites. Gathered results allow designers to address and highlight the geological and hydrological fabric of
campus. We can design these spaces to achieve the goals of creating an institutional knowledge of their resources and functions, creating a better stormwater system, and reestablish a campus culture around water.

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Keywords: play, play environments, outdoor learning environments, school grounds, physical activity, biophilia

The purpose of this literature review is to deliver a holistic perspective on two critical themes that inform the conceptualization, design, and research of outdoor play and learning environments (environments) for children. The information collected in the review was synthesized into a set of Landscape Design Guidelines for supporting physical activity and connections to nature. This applied research approach draws upon the work of Brittin et al. (2015). The Landscape Design Guidelines will undergo a peer-review process among academics, practitioners, and institutional stakeholders, leading to further refinement and dissemination to the diverse constituents that play a role in designing, maintaining and facilitating the use and programming of these environments.

The design of children’s environments is informed by a wide range of issues, such as child development and socialization, physical activity (PA), risk and safety, and facilitating connections to nature and classroom curriculum. Research in these areas is growing and common themes are emerging, pointing to the importance of more careful consideration, design, and programming of these environments. In particular, integrating the findings from a key set of research focus areas is a fertile ground for further design research and application.

I conducted a literature review that demonstrates the connections between the built designs and characteristics of these environments, and their impact on children’s connections to nature and PA. I analyzed the literature for key findings illustrating correlations between built design elements and commonly-accepted desirable outcomes, such as increased PA levels as a foundation for improved physical health. I identified areas of overlap and synthesized this information into a series of landscape design guidelines. Common design strategies among the different research focus areas emerged. I organized these into a series of Landscape Design Guidelines, examples of which include: distinct and overlapping zones of use to support a greater range of play and educational opportunities; and increased quantities and diversity of planting to facilitate differentiated educational opportunities and a more diverse set of spatial conditions to engage children.

The goal of this work is to transform the discussion surrounding the design of outdoor play and learning environments from a single-issue focus shared among like-minded stakeholders, such as nature play or physical activity, to an integrated approach reflecting the foundational, as
well as latest research on the myriad positive impacts that well-designed environments can have on children, and often their families and surrounding communities.
Supporting Informed Coastal Landscapes: An Assessment of Preferences in Carolina Tidal Creek Communities

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Keywords: preferences, assessment, tidal creek, ecology, coastal, resilience, sustainability, adaptability, study, survey, research, Dillman, landscape, residential

North Carolina is home to more than 12,000 miles of shoreline in the transition between fresh and salt water. These shorelines encompass large estuarine bodies like the Albemarle and Pamlico Sounds, however much of these interstitial waters represent hundreds of tidal creeks that are hubs of species diversity. Tidal creeks and marshes not only provide important habitat and ecological functions but also serve as ideal “mini-estuaries” that can be used as testing grounds for research that would be expensive and unwieldy at the large estuary scale. While there is substantial research on the need for integrating human preference and ecologic function in residential landscapes (Peterson et. al 2012, Nassaur 2009, Tallamy 2007, Mozingo 1997, Nassaur 1995), findings that characterize residential landscape preferences in the coastal context do not yet exist.

This paper presents a 2016 study of resident attitudes and motivations within two North Carolina tidal creek neighborhoods. The study objective was to characterize landscape features that reflect resident preferences and ecological best practices in the context of single-family homes in tidal creek watersheds. Goals included capturing resident preferences alongside their understanding of: stormwater quality interventions, native plant communities of high ecological value within the residential context, transitional shoreline characteristics, low-maintenance and water-saving landscapes, and resilience to and mitigation of storm-related impacts.

Site, desire, and feasibility were key variables. The survey was created to elicit responses related to four metrics: (1) satisfaction/willingness-to-pay, (2) individual landscape preferences, (3) desired improvements, and (4) barriers to improvement. Results found homeowners generally dissatisfied with their current landscape (-27.3 Net Promoter® Score) with a desire for similar improvements between front and back yards. Most residents prefer either some or majority turf alongside increased areas of flowering perennials (75%), naturalized spaces, and better-quality turf. Improving drainage was also a priority. Willingness-to-pay for improvements indicated that most residents are interested in small- to medium-sized ($400–
$2000) do-it-yourself projects. Respondents also indicated a strong preference (85%) for waterfront improvements that address flood and hurricane resilience.

Results for this study reflect similar outcomes from recent research published by Peterson et al. in 2012 and Huang and Sherk in 2014, all three studies found significant preference for landscape conditions that favor sustainable landscape practices and non-dominant turf ratio. Two findings from this study strongly support the potential for successful sustainable landscape interventions: (1) 85% of respondents value their landscapes as a means of protection from flooding and hurricanes, and (2) the majority of respondents reported wanting less turf than they currently have.

Survey findings were used to develop an initial set of recommendations aimed at community education and design assistance. Recommendations include but are not limited to the development of planting design templates to reduce the learning curve related to “right plant, right place” and education programs related to bulkhead-free waterfront edge conditions as a means of flood protection. Lastly, design concepts must frame waterfront views to strike a balance between function and valuable view-sheds.
Transitional Urban Landscapes

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Keywords: impervious surface, urban environment, transitional landscape, contextual, temporal, grey fields, meadows, fields

In the wake of recent hurricanes, it is time to reconsider the amount of impervious surface that covers so much of our country and come up with a plant-forward alternative. Much attention has already been devoted toward questioning the amount of area given to cars. Any proposal for a new use for city streets and the parking spaces that accompany them is worth consideration, and all strategies for getting people to think differently about the car are positive. However, it is time that equal thought be given to the empty lots that dot the urban fabric, those oceans of paving that surround big-box retail developments and sports complexes and are only full a handful of days out of the year. In *Space and Place*, Yi-Fu Tuan writes that its location place is one unit among other units to which it is linked by a circulation net; and that place, however, has more substance than the word location suggests: it is a unique entity, a special ensemble with a history and a meaning. Landscape Architects have the skills, and the creativity, to turn these paved vacancies from locations back into places that can benefit both city residents and the urban environment.

Today’s current and accepted green parking lot design strategies begin to address these paved vacancies, but keep to the accepted formula of aisles, parking bays and medians. Why stop there? Why can’t parking lots be dynamic parts of the urban fabric—active fields where the median and the bays become one continuous planted whole? The process of aerial analysis will reveal the cyclical nature of particular lots in and around Baltimore. A presentation of a palette of plants will yield the appropriate species and their sequencing.

These fields will soften the site and decrease the heat island effect during slow retail months and can easily be mowed down during periods of high traffic. Let the choreography of the planting reflect the choreography of our activities as consumers. The parking experience becomes an adventure—which areas will be wildflowers and grasses? Mowed and accessible? The field to fallow ratio illustrates the temporal—high on plantings in the off-season, more parking available during holidays or football seasons. Thus the landscape becomes the framework for the program, turning a location back into a place while addressing the variabilities of its users and imperviousness in the city fabric.
Creating a Community of Acceptance: Increasing Job Opportunities and Access to Nature for the Developmentally Disabled in Mexico, Missouri

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Keywords: community gardens, de-stigmatization, rural community engagement, developmental disabilities empowerment, access to nature

The mental healthcare system in rural America, specifically Missouri, does not adequately address many needs of the developmentally disabled. Due to the inadequacies of the built environment and related social programs many individuals lead a sedentary life indoors, spending little time outside. Frequently, they lack job opportunities or ability appropriate employment. This lack of contact with the community contributes to the stigmatization and severe marginalization of a group of people with a lower quality of life.

In contrast, the city of Geel, Belgium has been accepting the mentally ill and developmentally disabled for hundreds of years. Geel has been a pilgrimage destination for the mentally ill seeking healing from their patron saint, Saint Dymphna. Over time, so many pilgrims remained in Geel, that villagers began to foster them in their homes and continue the tradition today. The mentally ill and developmentally disabled became such a cornerstone of the community, that the there is no stigma for this population and residents cannot imagine living another way.

Although Geel is entirely unique, another town pioneering rural mental health is Mexico, Missouri situated with a concentration of mental health services for the developmentally disabled. Throughout the town are Independent Supported Living homes, where the developmentally disabled have been moved from state mental hospitals to live in the community with 24/7 care by staff. While gaining physical inclusion, they are still socially isolated and victims of stigmatization.

The goal of this thesis is to develop distributed income-generating gardens that help foster personal connections with community members and a phased plan aimed at reducing stigmatization of developmentally disabled residents. In addition, teaching all involved about growing food, making healthy choices and providing exercise for the caregivers and the developmentally disabled. Providing spaces to access the outdoors will better the lives of the developmentally disabled as well as connect them to the community in a way that is long lasting. The long-term goal is to reduce stigmatization, increases job opportunities and access to nature, and promotes acceptance of the developmentally disabled in Mexico, MO. This project will set the precedent and model for other rural communities in the U.S., and demonstrate that bridging social gaps is possible if approached in a sustainable, systemic way.
Research Methods
Beyond McHarg: Mapping as a Speculative Practice for Hybridizing Systems with Waste

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Keywords: speculative mapping, GIS, design research, waste, research methods, cultural geography, material lifecycles

Mapping is a meaningful cultural act that draws geographical relationships between biophysical and anthropogenic systems. Maps, a product of this activity, collapse time and space. They uncover what is invisible and intangible on the ground by depicting our planet’s spatial organization and physical characteristics from an increasingly accessible viewpoint. In landscape architecture, mapping has become an essential methodology of design research: the creative process of selecting and overlapping layers of information uncovers questions and opportunities for speculative design approaches at territorial, systems-based scales. As a design research tool, mapping is one of the most creative and influential acts of any design process—it reveals and orchestrates the conditions for new realities to materialize. In this light, mapping is a venue for testing alternative futures to push back against conventional forms of individualistic, separatist systems-based development.

Design research in landscape architecture employs geographic tools to reach deeper and more engaging approaches of using geospatial information as an index and instrument in site design. These practices have evolved from other disciplines, such as planning, cultural geography, and even meteorology. In tracing the lineage of mapping in landscape architecture beginning with Ian McHarg to the present while highlighting historical influences, this paper explores the emergence of speculative mapping practices as a methodology for design-research. In landscape architecture, mapping has evolved from overlaying multiple layers of geographic information to generate thorough site inventory and analysis to a contemporary practice that moves beyond documenting physical attributes to revealing spatial networks, cataloging ecological processes, visualizing invisible or buried systems, and unearthing temporal flows. Speculative mapping is a form of spatial, social, and ecological research that empowers designers to pursue social action.

My work is centered on landscape lifecycles—a design approach that integrates diverse programs rooted in economy, ecology, and culture to form hybrid assemblages on waste sites for multispecies users, forging these relationships through the exchange of waste materials. Using a series of research projects, I illustrate the application of speculative mapping as a methodology to understand the waste-generating relationships between material lifecycles.
and landscape change, and contemplate the potential for hybridizing multiple systems by using waste as an impetus. Speculative mapping provides the telescopic means to employ a landscape lifecycle approach that reactivates waste as a dynamic contributor to local and regional contexts. It engenders new integrative landscapes of multiplicity, rather than singularity, through the transformation of perceived physical and spatial wastes.
Semiotics as Method for Interpretation and Analysis of Cultural Landscapes

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Keywords: advertisement, aesthetic ecology, cultural geography, cultural landscape, landscape analysis

A common goal in landscape architecture practice and education entails sustainable design through a culturally sensitive process. To this end we apply site inventory and analysis to describe location attributes and limitations. Yet, unlike cultural geographers (Cosgrove, 1998; Czepczynski, 2016; Duncan, 1990, Jaworski & Thurlow, 2010) and semioticians (Chandler, 2002; Sebock, 2001), project designers, planners, and academics seldom utilize the formal study of cultural signs to contextualize cultural landscapes. Our analyses rarely investigate how we create and communicate landscape meaning. Thus, in an effort to enhance our current practice, this study engaged and assessed semiotic method for landscape interpretation using case studies in Montana and Napa Valley, California (Britton, 2016).

Utilizing a qualitative research strategy based in the semiotic study of advertisements, with their variable ideological significance in a capitalist society (Rose, 2001), this research collected and evaluated magazine advertisements depicting the study locations. Montana’s sample included randomized ten-year data sets for each of the six oldest, still in publication U.S. periodicals along with the four widest circulated travel magazines, and a present-day magazine windshield survey. Napa Valley’s sample comprised a contemporary lifestyle magazine windshield survey over a one-year period. To interpret the data, advertisement signifiers were identified and tested for connotative/denotative messaging and classified into quality types. To ensure interpretive accuracy, these classifications were triangulated with historical reference and phenomenological experience. Analysis of the dominant quality “escape” revealed in both locations communicative themes that transcend realities when expressing cultural values of pleasure, paradise, and power. Montana had an additional significant association with adventure.

Findings suggest that incorporating semiotic interpretation into site analysis merits attention and could prove beneficial to landscape architects and professionals who shape, interpret, and analyze landscapes. The method provided a practical and accurate topical portrait of place. Integrating this method with conventional site analysis techniques would provide valuable clarification of cultural values attached to landscapes.
Fieldwork Hybrids: Learning from Other Disciplines How to Read, Record, and Reveal the Landscape

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Keywords: fieldwork, hybrid methods, landscape analysis, site representation

Fieldwork can be described as the immersion by the researcher in a setting, group, or area of study in order to conduct inquiry (Wolcott, 2005). While supplementary information is gleaned through literature reviews and background collection, primary data collection occurs outside a controlled laboratory environment. Various disciplines use the fieldwork heuristic ranging from biology, through the observation of certain animal species in their natural setting, to anthropology, through observation of social settings or cultural groups. Fieldwork requires immersion in a particular setting, observation of the subject matter, and recording of observations in a systematic manner. Results and conclusions are reached based on information gathered and documented while in the field. For landscape architecture, traditional site analysis also relies on observing conditions in a field setting. With these actions, the designer immerses him/herself in the context of the landscape and project site in order to observe, record, and reach conclusions for the direction of a design project.

The purpose of this study is to learn from other disciplines fieldwork methodologies in order to derive new methods for researching and interpreting the landscape. This paper reports on the development and use of fieldwork hybrids as an analytical methodology to understand, document, and visualize the landscape. The method forms hybrids among fieldwork techniques and the disciplines of art, ecology, landscape studies. The presentation examines three examples of fieldwork hybrids, two academic student projects and one professional development project. Drawing from the environmental and social sciences fieldwork methodologies, these projects included research question development, site immersion, observation and recording, findings analysis, and presentations of results/findings. Examples showcase how fieldwork hybrids were utilized as a research endeavor, an analytical tool, and as part of a design process to better inform a design response. In describing the landscape as an opportunity for discovery, scholarship, and research, J.B. Jackson writes that “a rich and beautiful book is always open before us. We have but to learn to read it.” In looking at fieldwork methodology used by other disciplines, landscape architecture has the potential to build on existing analytical and visualization methods and expand into new territories of reading, recording and revealing the landscape.
Prairie Meadow Establishment and Management for Temperate Piedmont Regions

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Keywords: meadow, piedmont prairie, landscape management, public perception, meadow design, seed establishment, designed plant communities

Landscape architecture must offer regionally appropriate design solutions nuanced to address the character, context, and perception of green infrastructure in public spaces. A growing body of work lies at the intersection of ecology, landscape architecture, horticulture, and planning and points to need for economically viable, low maintenance planting solutions that meet human aesthetic needs and provide greater ecosystem services.

This paper outlines the methods and results of nearly two years of a five-year research study of designed seed mixes for the southeastern Piedmont of North America. Following protocols for in situ seeding methods developed by Hitchmough and others, this study proposes two unique seed mixes featuring native forbs and grasses. The approach is novel in that the conventional grass dominance has been reversed with forbs comprising 80% of the seed mix to meet public aesthetic goals. Two seed mixes are trialed on two soil types times two management regimen: Mix A on clay, Mix A on clay plus sand blanket; Mix B on clay, Mix B on clay plus sand blanket. Each test plot measures eight feet by eight feet square and each combination is repeated four times, randomized, resulting in thirty-two test plots. Plots are irrigated overhead during the first two months following spring sowing. All plots are randomly burned or cut once yearly in late winter just before spring emergence. This first phase of the study will report seedling emergence and success rates by quadrat sampling, as well as competitiveness with locally aggressive weed species.

Preliminary results show greater forb success and competitiveness on sand mulched plots versus clay. Establishment methods and species mixes must be tested and developed for each specific ecoregion leading to unique place honoring approaches that meet human and ecological needs.
Community-Based Methods in Documenting Cultural Landscapes in the Case Study Area of Findikli, Rize, Turkey

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Keywords: community-based methods, documenting, cultural landscape, Turkey

Community-based studies encourage people to speak out, lending their voices and memories to studies that seek to document community awareness and perceptions of local landscapes. Sanoff (2000) states that “residents are more aware of the realities of their own environments than outside professionals.” Through community-based methods, participants can be engaged in cultural landscape studies individually or in groups.

This is a reflective critique of a community-based approach used to document the cultural landscape elements of Findikli in Rize province, located near the Black Sea in the northeast of Turkey. The critique reveals advantages and limitations to research methodologies that researchers should consider as they design their community-based studies.

This paper reviews six methods used in the study to document people’s awareness and perceptions of their current and past physical and social landscapes. The methods include survey, photo survey, oral history interview, mapping, photo-voice recording, and discussions. Group sizes were designed as individual, small groups with 2 or 3 participants, and large groups of 4 to 8 participants. For example, survey and photo-voice recording methods were done with single individuals, whereas oral history interviews were conducted in all group sizes. The critique reviews the opportunities and challenges to collecting quality and quantity of data encountered with the different methods based on group size. Some of these included the ability to recall, language barriers, individual and group dynamics, time, flexibility to work with participants, and effort to record and transcribe results. This review offers researchers a practical perspective on factors to consider when implementing community-based survey methods.
Disparity between Proximity-Based Park Accessibility Standards and Stratified Users’ Access and Willingness-to-Walk to Parks: Findings from the City of Los Angeles

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Keywords: proximity-based park accessibility standards (PPAS), income disparity; walking-to-local-parks, Los Angeles

Geographic accessibility is one of the critical factors that affect people’s willingness to walk to a park. Universal proximity-based park accessibility standards (PPAS) have been recommended and applied to measure park poverty and guide park management and planning since the 1980s by academics, professionals, and park managers to address environmental justice issues involved in park provision and usage. There has been little knowledge of whether and how people’s actual travel to park and their willingness to walk to park among different population groups is in disparity with such universal standards. With this study, the authors provide new evidence on the issues using income as the basis of population stratification with findings from the City of Los Angeles, in the United States, a major city well known for its park availability and accessibility issues.

Specifically, the authors study people’s travel behavior to local parks through different transportation options (e.g., driving, taking public transits, biking, walking). Local parks in urban areas were sampled evenly from communities of low-, medium-, and high-income levels. Then 420 face-to-face surveys were randomly conducted on visitors in the sampled parks. Results of statistical analyses showed different patterns of travel behaviors to parks by visitors from communities of different income levels. A similar huge difference was found on the disparity between PPASs on the one hand and actual travel and willingness to walk to parks on the other, within different communities. In Los Angeles, people’s actual access and their willingness to walk to parks are highly stratified among different income levels. While pedestrian travel behavior and willingness to walk to park of visitors from medium- and high-income communities match well with the ½-mile PPAS, that of visitors from low-income communities is rather matching with a stricter PPAS of ¼ mile. For this reason, the authors recommend different PPASs for communities in different income levels instead of a single universal PPAS to achieve better equality, especially in pace with the improvement of income level. In addition, walking is still a secondary travel mode to local parks in Los Angeles and has great potential to improve if the reported higher willingness-to-walk-to-local park by visitors is fully realized. The case study indicates that in a highly-motorized society, improved outdoor walking environment to parks and further walking-to-parks promotion will help realize this. This study provides important evidence in addressing the strengths and weaknesses of current
PPASs and offers practical recommendations to park planners in achieving better environmental justice among communities at different income levels.

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Keywords: water quality, artificial neural network, machine learning, watershed, low-impact development

Land use practices including urbanization, agricultural intensification and deforestation are dominant drivers of stream water contamination. Assessing the relationship between landscape and water quality is recognized as an imperative step in predicting pollution levels and helping control land-based pollution in the watershed. The difficulty lies in the fact that the non-linear behavior of ecosystem could not be efficiently investigated by the conventional linear model. Machine learning algorithms are with flexible mathematical structure that is capable of identifying non-linear relationship between explanatory and response variables. While machine learning techniques are becoming increasingly popular to model complicated ecological processes such as rainfall runoff modeling and river flow forecasting, they are seldom applied to model stream water quality.

The purpose of the presentation is to experiment the use of decision tree (DT), support vector machine (SVM) and neural network (NN) to model a large watershed with landscape predictors. We focus on The San Jacinto River Basin with a total drainage area of 5,600 square miles. There are 77 water quality monitoring stations in this watershed. We will use 2011 yearly-average water quality data as model outputs. The water quality indicators include total suspended solid (TSS), nitrate, total phosphorous (TP), dissolve oxygen (DO) and fecal coliform bacteria (E. coli). We will use land cover composition features, including the percent coverage of forest, pasture, cropland, urban, water and some land cover configuration features to predict each pollutant concentration. All the input land cover features will be derived from 2011 National Land Cover Database (NLCD).

We will apply trial and error approach and cross-validation process to select some model hyper-parameters. To evaluate different machine learning models, we will consider both predicting accuracy and interpretation capacity. We will compute the correlation between predicted water quality and measured water quality and compute the amount of variance in the measured water quality which our models can explain (R² value). We expected that SVM model will have the best predicting accuracy while DT model is the most explicit model to interpret and understand. By introducing machine learning algorithms to the field of landscape architecture, we aim to explore advanced analytical tools to predict complex landscape processes with more confidence.
Methodological Review of Sustainable Landscape Education Research

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Keywords: research methods, sustainable landscape education, methodological review

The purpose of this study is to explore the possible research methods for future studies focusing on sustainable landscape education. Sustainability is to manage interactions between humans and nature in a dynamic, evolving, resilient mode that maintains the ability of social systems, economic systems, and environmental systems to support human life and well-being for the present generation without compromising the future generations’ equity. The growing and changing nature of landscapes decide that landscape architecture is the possible medium of sustainability and resilience, which brings increasing attention to sustainable landscape practice and education. "As sustainable landscapes are increasingly requested and required" (Dinep & Schwab, 2010), sustainable landscape practice and education become more and more critical. Theories, methods, and strategies for sustainable landscape practice are widely discussed (Dinep & Schwab, 2010; Calkins, 2011; Beata, 2014; Yokohari, 2016). Compared to that, studies focused on sustainable landscape education are insufficient, resulting in significant research possibilities. To help with the future studies focusing on sustainable landscape education, we raise the following research questions: (1) What are the different types of research methods used to explore sustainable landscape education and the relevant area? (2) What successes are seen in the existing research with different research methods? (3) What gaps are seen as salient in the current research with different research methods? (4) What are the possible research methods for exploring sustainable landscape education in the future? A methodological review will be carried out to explore these research questions. Study range includes open access publications that focus on sustainable landscape education and relevant areas, such as education for sustainability, general design education, and sustainable design education. The reviewed materials will be divided into three categories according to current research focuses emerging in the review. The first category is research methods of testing pedagogy and teaching methods in individual courses or projects. The second category is research methods aiming at exploring the fundamental situation of sustainable landscape education and the relevant area. The third category is research methods of collecting faculty perspective on the topic. Expected findings are as follows. First, different research focuses require specific kinds of research methods. Second, significant research possibilities of sustainable landscape education will be identified as long as the corresponding research methods. Results from this study are important to help researchers find research possibilities with corresponding research methods for the future sustainable landscape education research.
Landscape Plasticity: A Method for Designing Sao Paulo’s Future Amphibious Landscapes

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Keywords: Sao Paulo, landscape infrastructure, fluvial geomorphology, dynamic modeling

Over the last century the rivers of Sao Paulo were remade. They used to be a part of the social life of the city, provided critical habitat, and modulated floodwaters during monsoonal rain events. Today, after a hundred years of canalization and rectification projects, they are primarily corridors for conveying sewage and stormwater downstream quickly. Low-order streams have been culverted and rivers channelized with floodplains mostly paved. It is an extreme case of a common condition. Concurrent with these issues, the water quality of the rivers and streams throughout the city is extremely poor. Over the last 20 years Sao Paulo has been dealing with these issues through the construction of super-large concrete detention tanks known as piscinoes. Nearly 60 currently exist scattered throughout the metropolis, with over one hundred more planned. The most recent development plan for Sao Paulo identified the limitations of the current piscinoes strategy and called for new sustainable infrastructure projects and initiatives.

The current situation provides an opportunity for rethinking urban rivers to help address contemporary social and ecological problems. In this research the confluence of public open space, flooding infrastructure, and water quality is taken as a framework for rethinking Sao Paulo’s rivers to address current needs and anticipate future issues such as risk reduction, minimizing maintenance, and improving human and ecosystem health over time.

This presentation will identify, characterize, and categorize a series of landscape phenotypes that are relevant to the rivers of Sao Paulo, especially for the purpose of creating value-added function and program. In it I will show how computational fluid dynamics modeling (CFD) and geomorphology experiments are being used with conventional landscape architectural tools including models, maps, and data visualizations to structure the interdisciplinary research and discover new formal possibilities for the rivers. The methods to be discussed are primarily morphological. In both urban and river systems, morphology is a result of historical processes as well as a driver of future performance. It offers a way into questions about ecology, social acceptance, cultural significance, and hydrological function; at the urban scale it can be analyzed using surface modeling programs such as Rhino 3D and computational software, which interface well with GIS. Changes in morphology—articulated surfaces and slopes, extensions into surrounding areas by changing the edge conditions of these places—offer a way to expand the functionality and types of value that are operative in Sao Paulo’s river landscapes.
Droning Mud Lakes

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Keywords: drones, photogrammetry, fieldwork, novel plant communities, industrial landscapes, dredged material management

This presentation describes drone and photogrammetry methods for studying plant communities and industrial processes in tandem. Landscape architects increasingly work with disturbed sites, such as industrial, post-industrial, and infrastructural landscapes. Designing for these sites requires new research and analysis methods. Our project focuses on developing methods specific to plant communities on Dredged Material Management Areas (DMMAs). Our findings also contribute generally to the nascent field of remote-3D sensing, modeling, and spatial-temporal representation in landscape architecture.

DMMAs are landscapes constructed to receive, dewater, and store dredged sediment. In addition to this primary function, these landscapes present a range of potential benefits to local communities and stakeholders, including ecological, cultural, and recreational uses. Plant communities that colonize DMMAs are central to the capacity of these landscapes to perform according to broader criteria. Understanding the relationship between industrial processes and plant communities thus helps us work toward a pair of broader research goals: first, understanding the composition and evolution of novel plant communities on industrial sites, and, second, shifting DMMAs from being monofunctional disposal landscapes toward productive multifunctionality. However, studying plant communities on these landscapes presents challenges that make traditional fieldwork methods difficult. DMMAs hold wet, near-liquid soil, making it impossible to walk transects or examine plants directly. DMMAs are large, often hundreds of acres. The processes of deposition, dewatering, and earthmoving that manipulate them are topographically subtle, occurring in vertical increments of inches across horizontal expanses of thousands of feet, generating rapidly-changing microtopography. Drones permit us to overcome these challenges.

For this study, we identified DMMAs near Charleston, SC. We repeated surveys at intervals responding to dredged material placement and dewatering. A DJI Phantom 4 Drone flies an automated path, acquiring imagery of the study area. Resulting georeferenced images are used for plant identification and processed with the photogrammetric software Agisoft PhotoScan to generate a 3D point cloud. Using Rhino, we processed this point cloud to track changes in the landscape and interpret industrial-ecological rhythms. This process permits us to make spatio-temporal observations in a manner that is precise, scale-appropriate, relatively inexpensive, and suited to physically inaccessible terrain. If we are going to learn to more intelligently design and manage industrial sites like DMMAs, landscape architects will need
both fieldwork and representation methods for studying the co-evolution of plant communities and industrial processes. Drone and photogrammetry fieldwork methods enable us to understand, map, and represent industrial landscapes that are frequently anthropogenically disturbed.
An Approach to Identifying Landscape Character at the Campus-Community Edge

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Keywords: site assessment, landscape assessment, landscape character, parametrical indicators, site observation

What determines the character of an outdoor space? There is a broad range of literature on the perception and usage of place. However, the majority of this literature focuses on the internal structure of physical components needed to create landscape and urban character, the space as it is socially constructed, or the combination of both of these approaches. Ode, Tveit, and Fry (2008) created a landscape assessment framework that highlights that site assessment characteristics commonly applied on a large scale in the science of landscape ecology can be useful in the evaluation of outdoor spaces at the site level as well. The framework is based on well-established theories in landscape preference and environmental psychology.

The purpose of this study is to employ the Ode et al. framework within the context of the university campus edge, where campus meets downtown. The study applies both quantitative and qualitative approaches for an encompassing look at what constitutes desirable landscape character. Parametrical indicators such as Simpson’s diversity index, heterogeneity, edge density, aggregation index, shape index, and autocorrelation indices combine with field observation techniques which rely on researcher observation. This exploratory research aims to provide a foundation for analytic site assessment using modern landscape metric software combined with a mixed field-study approach. Results might inform a more critical way to identify desirable landscape character within a site, either prior to construction or as it occurs in the realm of the existing built environment.
Using Discrete Choice Experiments in Landscape Preference Research

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Keywords: discrete choice experiments, visual preference, Multinomial Logit

Visual photos have been extensively used by landscape architects, urban designers and planners to gain insights on people's preferences for design proposals. As photos convey more information than could have been described textually or verbally, the visual preference surveys (VPS) is a familiar method through which preference is understood. A conventional VPS entails combining a catalogue of carefully selected photos related to the subject matter to be evaluated by participants on a rating scale (Kaplan & Kaplan, 1989). However, the VPS suffers from the unstructured nature of the components of photos compiled by the researcher, and the fact that every participant will eventually rate every photo. Although researchers often try to control some variables across photos (photo brightness, the angle of taking the shot, avoiding unusual scenes, etc.), there are still unintended features (Ewing, 2001; Nasar, 1994). Therefore, for visual preference research to be recognized as a rich and valid data source, as Gaber and Gaber (2004) argued, components of visual materials should be quantifiable and identifiable. This urges the need for a robust methodology to systematically construct the photos to increase the validity of visual preference research.

A commonly used preference elicitation method in other fields of inquiry is the discrete choice experiment (DCE). As people's choices entail a trade-off between competing alternatives, the DCE allows preference to be elicited based on the observed choices made by participants. The presentation is intended to guide applied researchers on constructing a DCE and will use a pilot study as an illustration. The pilot study was performed on Saudi students currently in the US (n=84) to elicit their preferences for transit-oriented developments (TOD) in Riyadh, Saudi Arabia. A city-wide metro is currently under construction and is expected to operate in mid-2018. With plans to increase housing densities along transit lines, people's preferences for lower housing densities seems to be at variance with these densification strategies. TOD features were operationalized into density, land-use mix, walkability, proximity to parks and transit (Cervero and Kockelman, 1997). These attributes were systematically manipulated and visually presented to participants in eight choice sets each. The results were used to predict the probability of people's choices for competing development scenarios based on their preferences. Following the demonstration, the use of advanced methods that incorporate attitudinal questions is briefly presented (i.e., Mixed-Logit and Latent Class Models), along with software packages used to conduct a DCE.
Fieldwork as Description and Action

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Keywords: anthropology, fieldwork, methods, Bahamas

This paper will focus on the relationships between landscape architecture and anthropology, primarily through an example of collaborative field research conducted in The Bahamas. Recognizing different epistemological forms, the project challenged designers to be more sensitive to the myriad reasons behind their work, and anthropologists to consider the activation of their observations. Using anthropological methods to better understand patterns of everyday life and to translate these patterns into design proposals, fieldwork becomes both active and reflective.

Anthropology offers a set of tools to understand relationships. Through participant observation, often for a year or more, anthropologists try to unearth relationships, making “the strange familiar.” But anthropology takes a very long time, not just for fieldwork but for the necessary reflection and writing-up. In adapting anthropological research for landscape architects, we asked what if the role of the individual fieldworker becomes part of a collective? What if rather than one anthropologist spending a year in the field, fifty-two fieldworkers spend a week each? The data will be different, but can it have a similar level of thickness? Over three years, in a course offered between Harvard Graduate School of Design and Faculty of Arts and Sciences we conducted an experiment in collective fieldwork. The site, the Exuma archipelago in The Bahamas is 180 kilometers long with 365 islands and cays, and unmanageable for a single researcher.

We found that the data gathered by multiple fieldworkers, while of course different from that obtained by one fieldworker, was of a high level of “thickness,” yet still needed a long time for the necessary reflection. The main challenge was that the field notes needed to be shared among the collective. To this end, an online tool was developed for the indexing and sharing of field research, allowing key topics to be identified. While these notes themselves have the capacity to become agents for change, one unexpected outcome arose when it became clear that fieldwork had become more than observation: it is also about action. Notes informed field projects (not necessarily in a linear way but) by offering a deeper understanding of spatial relationships which in turn could be utilized to initiate and design projects.

There is a fundamental question of method: If we are to design more human-centered—or anthropological—landscapes, then we need ways and means to understand the relationships that comprise those landscapes. It is in the bridge between anthropology and landscape architecture, between reflection and action, that really rich opportunities arise to activate the various relationships in a landscape, whether urban or rural, large or small.
Responsibility in Landscape Drawing: Critical Reflections on the Origins and Implications of Representational Methods

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Keywords: critical representation, cultural geography, semiotics

Drawing is the most effective tool landscape architects have to position our work and communicate amongst ourselves and to others. That drawing is biased is not a new idea. While drawing has been instrumentalized by hegemonic agendas, its role in landscape architecture has also benefited deeply from disciplinary reflection and critique on the origins and limitations that each convention has. Through interrogations of the plan, the map, and the aerial perspective, landscape architecture has articulated the roles of these drawings within the field as successful communication and design development devices, while also recognizing their roles in shaping and reinforcing hegemonic projects of colonialism and modernity. Investigations into the implicit power dynamics embedded within drawing conventions have successfully resulted in visual literacy and awareness that affords designers the opportunity to directly address the limitations and subjectivities of drawings in addition to working toward subverting dominant narratives of linear progress and colonial models of land tenureship.

As landscape architecture continues to grow in scope and evolve in approach, synthetic drawings, digital models, and videos are becoming increasingly prevalent in the analysis of landscape and the projection of design. Because these visual outputs are undeniably significant in shaping the ways we perceive and act upon the land, their production and dissemination comes with a responsibility. Recognizing the role of visual media in our perception of the material world, this paper suggests that the emerging forms of landscape representation must be subjected to a critical analysis of their origins and use in the discipline and through practice. Inspired by the work of semiotics and cultural geographic methods of analyzing visual culture, we suggest a critique of the underlying assumptions of these synthetic and temporally-based techniques of visualizing landscape processes. This approach emphasizes the responsibility of designers to understand the salience and origins of their drawings, and to continuously challenge the normative capacity of emergent representational techniques.
Stress Recovery by Exposure to Nature in Virtual Reality

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Keywords: virtual reality; unreal engine 4; stress recovery; environmental psychology

Exposure to the natural environment has shown to reduce stress levels. In his seminal work published in 1991, Roger Ulrich showed how movies of urban versus natural scenes influenced stress recovery rates. We aimed to further this research by asking if exposure to nature in virtual reality causes a similar effect? The purpose of this research is to identify if varying degrees of exposure to nature in virtual reality influences stress recovery at different rates. Virtual reality provides an opportunity to create a novel environment which has spatial controls, but also offers insight into the biophysical effects of the virtual world compared to the real world. For this study we adopted from Ulrich’s 1991 study by including a baseline assessment of stress, a stressor, and a stress recovery period. Two environments with varying degrees of human intervention were tested. The virtual reality environments were strategically designed along a same path to minimize the addition of extraneous variables. During this test, biometric data was taken in addition to stated stress levels and stated affective response. We conducted an ANOVA to determine the extent to which various demographic variables, prior experience with VR and stress responses influence one’s stated response to the virtual environments. The study concluded that regardless of the environment type, participants lowered their stated baseline stress level, offering insight that high quality immersive virtual environment could provide some temporary relief from daily stress. Lessons learned from this study could be used to inform future studies investigating the effect of VR environments on stress and mental health. Attendees will gain insight into how to build virtual environments, conduct statistical analyses and envision future research opportunities using these techniques.
Sediment Design, Climate Change Adaptation, and California’s Bay-Delta

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Keywords: sediment, sedimentshed, infrastructure, climate change adaptation, Bay-Delta, dredging, estuaries, flood management, flood control channels, tributaries

Sediment is crucial to the present and future of California’s Bay-Delta. Like many estuaries, the Bay-Delta is experiencing a shortfall of this land-making resource. Due to a wide range of engineered hydraulic works that includes dams, levees, bank armoring, river straightening and flood control infrastructure, sediment is systematically displaced and no longer gets to where it needs to go. Climate change and accelerated sea level rise compound this shortfall. The Bay’s wetlands, where tidal and fluvial forces converge, are critical to sea-level rise adaptation, but many of them are diked and thus subsided below sea level. It is estimated that 200 million cubic yards of sediment are needed to effectively restore the Baylands to established goals, and this projection does not begin to account for the on-going need to keep pace with rising seas. Significant change and landscape innovation is needed to meet these challenges.

As sediment as vital infrastructure for estuaries and deltas, we call for the intentional design of sedimentary processes, meaning the orchestration of the distribution, placement and displacement of sediments for desired outcomes. Using our current work on the Resilient By Design (RBD) Bay Area Challenge as a case study, we present our methods for regionally assessing and visualizing potentials for sedimentary design for diverse and public constituencies. The RBD challenge is an international design competition organized by the region’s public agencies and many other organizations, and is dedicated to community based adaptation strategies to climate change and other vulnerabilities.

A central aim of our work has been to develop integrative landscape architectural methods for the design of sediment as infrastructure, spanning regional to site scales. This design research blends existing landscape architectural methods for studying related hydrologic and geologic phenomena, the direct study of sediment within geomorphology, and new methods developed in the course of this study. Our work includes cross-scalar investigations of the entire Bay-Delta sedimentshed, examining the range of potential sources of sediment and the various tools and techniques available for effectively deploying it. In particular, we focus on multi-factor comparisons of the Bay’s tributaries, which we have used to identify where action could be taken for the greatest benefits, focusing on communities and services most vulnerable to climate change impacts, particularly disadvantaged species and communities. We conclude with a set of site-specific design proposals that both build on and have informed this analysis.
Water, Infrastructure, and Feral Landscapes in the California Delta

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Keywords: deltas, logistics landscape, landscape approach, coevolution, pluralism, complexity, aesthetics, ecological restoration, conservation

California’s Sacramento-San Joaquin Delta (Delta) can be considered an infrastructural or logistics landscape. One of its primary uses is serving as a central hub for conveying water within the state’s massive water infrastructure projects. Logistical landscapes typically operate on an economic calculus of distribution efficiencies that mediate between abstracted goals of profit margins and the physical realities of the landscapes they must use and traverse to provide these services. This reductive calculus creates inherent friction, as the medium of landscape exceeds those abstractions through social, cultural, and ecological domains that are not accounted for in logistics’ math.

Current planning and legislation in the Delta call for large-scale ecological restoration, which will require significant design effort and changes in land uses. These mandates have emerged in response to the damaging effects of water exports on aquatic ecosystems in the Delta. But as mitigatory response to infrastructural side effects, restoration planning continues some of the same abstractions, exclusions and inequities of its origins by failing to account for the Delta as an urbanized, cultural and unique place.

To engage this situation, an empirical research study was performed to examine how people are using existing restored and naturalized Delta landscapes and to assess how these landscapes are planned for, managed and designed. This project adopted a coevolutionary and integrative landscape approach that seeks to reconcile multiple competing land use agendas. The experimental research methodology consisted of six customized and interrelated methods which included a (1) planning, policy and law review specific to the Delta; (2) a survey inquiring about perceptions of land uses and physical landscape boundaries (3) semi structured interviews with land managers, scientists, landowners, law enforcement personnel, agency representatives and Delta residents; (4) nine detailed case studies of existing restored and naturalized delta landscapes; (5) GIS mapping, and (6) extensive field work. Findings derived from the synthesis of these mixed methods showed that human uses of the Delta’s re-wilded landscapes are diverse and pervasive, a reality which science and planning have failed to account for, which in turn, has rendered such efforts less than successful. The presentation will discuss how these results were arrived at, demonstrating the utility of a pluralistic and integrative approach to interpreting complex, conflictual planning environments and landscapes, and how more synthetic, grounded research can serve as a basis for more effective design intervention.
Multifunctional Urban Stormwater Wetlands

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Keywords: stormwater, wetlands, hydrology, ecology, public space

Using fluid dynamics testing, this interdisciplinary MIT research project developed new designs for stormwater wetlands that integrate hydrological performance, ecological benefits, and urban programming into one cohesive form. In contrast, typical constructed wetland design (driven by engineers) tends to focus on hydrology, missing opportunities for other functions such as recreation and habitat (Connor and Luczak, 2002). With climate change, more stormwater is in our cities’ futures, posing serious water quality and flooding risks that could be mitigated by constructed wetlands. In the United States, stormwater impairs around 60,000 miles of rivers and streams, 767,000 acres of lakes, reservoirs and ponds, and 17,000 square miles of bays and estuaries (U.S. EPA 2017). The year 2016 saw the most billion-dollar flooding events since 1980, and in 2017, Hurricane Harvey broke the rainfall record in the continental United States (NOAA 2016; Arndt 2017). Cities are ill-equipped to meet the challenge of increased stormwater due to inadequate infrastructure and the long legacy of destroying protective natural systems, notably, wetlands. Los Angeles County, for example, has lost 95% of its original wetlands (Greater Los Angeles County, 2012).

To address these risks, an MIT team of designers and civil engineers tested 32 physical models of innovative wetland designs using dye tracer tests in a fluid dynamics lab. These modular, scalable designs were based on sculptural landforming. The dye tracer tests measured each design’s ability to improve water flow, quantified by metrics calculated from the experimental data. Next, using the Shannon-Weaver entropy index formula, each design was scored according to its potential to provide four ecological habitats: upland, emergent, submergent, and open water (Shannon and Weaver 1949). From the 32 tested models, a few optimal designs emerged. These optimal designs and our lessons learned about landforming and water flow will be useful to practitioners, as well as the urban design framework developed to employ these designs on an urban site. Using Los Angeles and Houston as case studies, we created an urban design framework that offers the flexibility to connect the wetland to its urban surroundings and provide diverse habitats and public programs. Thus, a wetland site can become a stormwater landscape that contributes as much to hydrology as to urbanism. This research was funded by the MIT Abdul Latif Jameel World Water and Food Security Lab and the MIT Norman B. Leventhal Center for Advanced Urbanism between 2015 and 2017.
Understanding Urban Attractions Using Volunteered Geographic Information: A Flickr Study of Ten U.S. Cities

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Keywords: volunteered geographic information, Flickr, resident, tourist, urban attraction, U.S. cities

Nowadays, the intricacy of urban forces and dynamics require our cities to be more inclusive and supportive of a diverse group of users that give each other mutual support at the street level. As part of the diversity, the sociospatial interaction between tourists and locals became increasingly important for planners. Meanwhile, the increasing availability of volunteered geographic information (VGI) has empowered us to acquire citizen-generated data about their local neighborhoods and places they visit. This article aims to use VGI to explore the spatial patterns of tourists’ and locals’ destinations and examine the extent to which they overlap across different cities.

The data we used were extracted from the Yahoo Flickr Creative Commons 100 Million Dataset (YFCC100M). The dataset contains 48,366,323 Flickr photos uploaded between the inception of Flickr in 2004 and 2014. To analyze the locations where photos were uploaded, we used a combination of density-based spatial clustering algorithm, dissimilarity index, spatial scan statistics, and location-based tag clouds to explore the potential static, dynamic and semantic social interactions between tourists and local residents with Flickr data. We compared the sociospatial interactions between tourists and local residents in ten U.S. cities, namely New York City, Los Angeles, Chicago, Houston, Orlando, Atlanta, Houston, Seattle, Washington, D.C., Boston, and San Francisco. At the city-level, we reported the spatial distribution of visitors and locals and compared the level of potential social interaction across the ten cities. For example, New York City and Los Angeles show low levels of dissimilarity between tourists’ and locals’ destinations where Atlanta shows a high level of dissimilarity. Within the cities, we identified the hotspots that were disproportionately more likely to attract visitors versus locals. For most cities, the results showed tourist destinations were clustered around the city center while residents’ destinations were scattered around. Regarding the type of attractions, tourists were particularly attracted to city landmarks, historic buildings and structures, museums, theaters, headquarters of famous brands, airports, and high-end hotels. Residents, on the other end, are particularly attracted to commercial areas, parks and plazas, libraries and performing centers, as well as neighborhoods public space in high-density areas. By analyzing the tags of the images, we were also able to identify programs and other non-physical features that serve as major attractions of the cities. The implications of tourism-local interaction and segregation are discussed within an urban design and landscape planning framework.
Benefits of Granite Fines to Suppress Unwanted Vegetation During Meadow Establishment

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Keywords: granite fines, meadow establishment

As the era of implementing sustainable landscapes expands, knowledge of establishing attractive, indigenous vegetation to substitute chemical infused carpets of lawn is necessary. The demand of establishing desirable vegetation, while reducing pressure from aggressive exotic vegetation without herbicides, is challenging. This study seeks to understand the role of mulching with granite fines to reduce competition and improve likelihood of successful establishment of intended vegetation. Past research suggests granite fines are beneficial propagation media that ensures seed to soil contact while minimizing organic fraction of growing media. Our study investigated establishment of two mixes of indigenous species in two different media with two different maintenance regimes to detect differences in establishment and maintenance of intended vegetation. Our approach tracked the visual appearance with periodic site photographs and ecological metrics of a D Optimal factorial design to profile interactions. Initial results indicated a significant difference between medias; results from the first growing season will be discussed with implications for future research and student learning.
INTERACTIVE PRESENTATIONS

Material Futures: Alternative Grounds

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Keywords: digital technologies, information systems, mapping, materials, representation

Scientific research entails a body of techniques to investigate a particular phenomenon; and it asks for the acquisition of new knowledge sets or the rectification or integration of previous knowledge sets. This method of inquiry is based on measurable, quantifiable, and empirical evidence that is developed through controlled and replicable experiments. The linear progression based on the formulation of a question—whether broad or specific in nature—can be characterized as a prototypical model of scientific inquiry based on logical reasoning. Although fields of inquiry and modes of practice may be similar between the spatial design and STEM (Science, Technology, Engineering, Mathematics) disciplines, both entailing a systematic approach to the observation, formulation, and testing of a proposition, the process of pursuing research and developing conclusions are very different.

Fundamental to design’s agency is its capacity to suggest varied meanings and interpretations; to capitalize upon opportunities and efficiencies; to expose vulnerabilities and unforeseen complications; and to envision projective models and alternative scenarios. The dichotomy that exists between the design and non-design disciplines can—and should—be cultivated, in order to bridge the practical with the impractical, the logical with the imaginative.

Urban landscapes are the physical manifestations of adaptive modes of exchange, economy, and production; and they require multiple representational models through which to assess and comprehend their complex spatial structures. The role of the designer is to interpret how they should be visualized and materialized, with an understanding that the latitude of the world we occupy is not just to be conceived as information-based systems and environments alone, but rather as an assemblage of constituents, municipalities, and circumstances. This paper presents a body of work from a design studio taught at the University of Virginia, where students researched construction materials as individual parts, as built assemblies, and as integrated systems. Through information visualization, mapping, and fabrication, students negotiated between systems-based and material-based design methodologies to generate a critique on how designers can utilize these knowledge sets to make more informed decisions for architecture, landscape architecture, and urban planning.
Construction of Spatial Structure of Green Space in Urban New District Based on Landscape Ecological Security Pattern: A Case Study of Xiong’an New District, Hebei Province

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Keywords: landscape security pattern, the landscape ecology source-sink theory, spatial structure of green space

From the perspective of landscape architecture, scientific urban green space is principle method to prevent the urban sprawl, the wanton occupation of ecological land, increase biodiversity and address the ecological problems from urban development. The theory of landscape ecological security pattern proposed by landscape ecology is an analysis on the spatial pattern of urban landscape, which provides corresponding theoretical reference for urban green space construction. Therefore in this thesis, based on the theory, Jinzhong city in Shanxi Province is chosen as the object of study. By the means of GIS and from the macro perspective, the study aims at producing a regional ecological suitability plan, basing on analysis of the suitability theory. And from the micro perspective and based on “the landscape ecology source-sink theory” to build the model of ecological source, the basic patch and corridor, and combine the above research findings with urban green space planning so as to produce the regional structure of urban green space and to serve as a reference to optimize the ecological environment of object area.
Service Learning and Community Engagement
Transdisciplinary Participative Approach to Tourism and Community Planning

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Keywords: trans-disciplinary, planning, cultural tourism, extension, development

Current models of academic collaboration seek to implement trans-disciplinary (Bergmann et al. 2012) modes of inquiry. Extension specialists in landscape architecture find themselves in team-building situations that allow for the opening of their classrooms, occupying collaborators’ laboratories (Committee 2004), in order to address project needs more fully and to expose their students to allied disciplines. This project brings together a diverse array of disciplines and expertise to establish a robust approach to community development and planning with a focus on recreation and heritage tourism in rural West Virginia.

Typical of many rural counties in West Virginia that were once dominated by extractive industries, Tucker County is categorized as “transitional” by the Appalachian Regional Commission (ARC 2016). The once thriving timber industry is stagnant and the coal and coking industries that built railways and communities to provide for commerce and housing left the area in the mid-twentieth century. The Tucker County Cultural Tourism Planning project includes faculty from multiple academic programs at West Virginia University (WVU) and the WVU Extension Service, specifically the Community Resource and Economic Development (CRED) team. The core goal of the project is to build capacity within the Tucker County Cultural District Authority (TCCDA) with their primary partner- the Tucker Community Foundation (TCF) to forward coordination and progress in tourism and economic development.

A survey administered during the project identified themes and goals in cultural tourism development in the county with a focus on heritage, art, music and outdoor recreation. The project team’s composition allowed flexibility and diversity in addressing these needs including: a small business survey; identification of partnership opportunities with other groups; review and revision of comprehensive planning documents; visioning workshops (Condon 2008); and service-learning studio courses (Angotti, Doble, & Horrigan, 2011). The trans-disciplinary approach provides a scaffolding of outputs to the community. Outputs range from the quantitative economic modeling to social perspectives gained through resident and visitor surveys. Spatially-explicit maps of assets are created through an online
participatory geographic information system (GIS) (Elwood 2006). Design workshops (Hester 2014) visualize alternative futures for those sites in programming and character development. As team members learn from the findings of fellow team members and actively participate within each’s “laboratory” what follows is a more profound understanding of the context for planning, and a more relevant and vigorous product, cultivating citizen control (Arnstein 1969) of the planning process.
Building Effective Partnerships for Sustainable Landscape Education Programs

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Keywords: sustainable education, partnerships, networking

Developing new statewide public education programs, such as through the Cooperative Extension Service, is challenging to accomplish today due to increased budget cuts (USDA 2017). The reduction of state and federal agency budgets results in loss of personnel, reduction of program support, and reduced funding opportunities (Reardon, et. al., 2017). Because of this, initiating public education programs, including those for sustainable topics is problematic. Funding constriction compounds the already existing difficulty of educating the public about complex topics such as sustainability (McKeown, 2002).

In 2017, the authors conducted an online survey of Mississippi residents to gauge their interests and current practices concerning sustainable landscape best management practices in residential settings. Results from 257 respondents showed a strong interest in sustainable residential landscape topics and support for the development of informal workshops and materials. A team of statewide Extension experts was assembled to develop and implement the program, which was termed Smart Landscapes. The Smart Landscapes program is comprised of six categories of residential landscape sustainability, which include: soil health, water quality, plant biodiversity, wildlife, integrated pest management, and energy efficiency. Based upon the user survey results, the program would deliver sustainable residential landscape practices to the public and Extension personnel via the development of website material and face-to-face workshop trainings.

Available funding opportunities for the program were limited so program personnel reached out to state and federal agencies located within the state of Mississippi as well as non-profit organizations to establish partnerships for the program. Because there is no one agency or organization devoted exclusively to all six education topics, a variety of related organizations within the state were contacted about their support for the program. As example, the Mississippi Wildlife Federation and Audubon offices provided information and links to their existing resources; U.S. Fish and Wildlife offices and Natural Heritage programs provided documents and consultations on state-listed animal and plant species; and water-related state agencies and non-profits provided specific data on water quality and resources. The project personnel developed a set of topics in conjunction with partners to determine the information required and to avoid redundancy.
Agencies were asked to provide links to content material for the Smart Landscapes website, as well as educational materials and resources for trainings. Each of these specialist organizations saw the value of a comprehensive program to tie together greater public education of residential landscape sustainability. They also built public support by advertising the program to their organizational contacts. In short, the development of the Mississippi Smart Landscapes program pulled together the loose threads of complimentary existing state agencies and experts and developed a method for statewide cooperation to make up for the lack of organizational resources, and to take advantage of existing information and materials. This strategy may benefit other educators and agencies in similar economic situations developing public programs and this presentation will provide keys to networking. Currently the website has been developed and the first training workshops have been conducted.
Together We Plan: Engaging Community in Creating the China Trail Garden at the Acton Arboretum

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Keywords: community engagement, culturally sensitive, planning, design, China Trail Garden, Acton Arboretum

This paper discusses community engagement in planning, designing and building the China Trail Garden at the Acton Arboretum and analyzes the key processes of how the community is engaged. Both qualitative and quantitative methods are used in the study. Acton is a suburban town, 25 miles away from downtown Boston. This diverse community offers natural beauty, open space and great school systems. It has become a big draw for Chinese families in recent years. Founded in 1986, the Acton Arboretum is situated on 65 acres of town conservation land in the town center of Acton. Former Director of the Arnold Arboretum, Dr. Howard retired to Acton and became one of the founders of the Acton Arboretum and helped immensely in acquiring the significant tree collection today (Acton Arboretum website).

Inspired by the Chinese Path at the Arnold Arboretum, the author initiated the China Trail Garden project in April 2016 to connect the existing Rhododendron Garden and the Fragrance / Lilac Garden via a 150-foot long trail across a small, intermittent brook. The landscape design aims to integrate nature and culture; expand cultural understanding, and demonstrate the aesthetics of the Chinese garden. There will be a harmonious flow of plantings integrating native species presently on site with new non-invasive plant species of Asian origin. A stone dust path with wooden board walks will lead to a red Chinese-style footbridge across the wet part of the trail, providing a highlight of the garden.

This project is supported by the local government and a variety of non-profit organizations and ethnic groups. It has received grants and funding from multiple sources including a successful community fundraising campaign. The community engagement process in this project involves informing the community about the project initiative and providing group tours to the project site, inviting the public for design input via online and paper surveys, collaborating with community members to generate design solutions, and partnering with community volunteers to build and maintain the trail garden.

Community engagement promotes community cohesion and enables the community to take ownership of final outcomes. This study acknowledges the mutual efforts made by many community members and various groups with different backgrounds, and demonstrates the significant role that community engagement can play in culturally-sensitive landscape planning and design.
Places for Welcome and Lived Integration

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Keywords: intercultural communication, gardens and archetypes, community engagement, non-domesticated environments, everyday landscapes

This presentation highlights gardens as an archetypal conception of humans trying to coexist with nature and thus create a platform for the “post-boom generation” in search of moments of happiness. Against the current global challenges of sustainable development, climate change and migrations, the innocent garden indeed plays a key role as a place for welcome and lived integration.

We live in a time of thrilling but also challenging tumultuous change in which a return to social solidarity, tolerance and participation is becoming increasingly important. In our search for innovative ways to apply landscape architecture as a social and spatial transformer for everyday landscapes, the innocent notion of a garden remains a very powerful and ubiquitous medium for cross-cultural exchange of ideas.

Core of this presentation is a series of realized pro-bono community projects in Winnipeg, Canada. Volunteering his time to support communities and schools in Southern and Northern Manitoba, has given the author the luxurious freedom to radically ignore the conventional procedure of project design and implementation. Reclaiming the concepts of Arte Povera, Bricolage and their ecological application in the design process plays a major role in some of these “little paradises” in Winnipeg. The controlled re-use, upgrading and transformation of materials into a new context is the key to finding beauty in spontaneity and imperfection. The “worth of the worthless” takes on an important role and enriches the discussion on the state of urban nature for children, adults, and butterflies.

Processes of aging and decay, speculative projections, uncertainties, and the deliberate integration of the uncontrolled are crucial to all projects. None of these projects aim to reach an ideal state but rather to record the changes and everything that has happened to them. The results facilitate community, beauty and learning through the life and health of non-domesticated environments. The aesthetic results in spaces, which are vagrant, lively, ephemeral and wild.

These garden models also include the establishment of new local communities through education and intercultural communication, as well as promoting self-sufficiency. Participating children and students have learned at an early (st)age that equal opportunities and treatment, irrespective of ethnic origin, skin color, sex, religion, or nationality, are based on democratic principles and tolerance.
Healthy Communities: A Guidebook for Small Towns

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Keywords: rural communities, healthy, development

Healthy communities are characterized by a clean and safe physical environment, access to healthy foods and physical activity, the presence of active transportation, wide participation of residents in decision making, protection of the natural environment, and opportunities for social interaction. All communities experience changes that affect the industrial, technological, and land use patterns that form the basis of their local economies. Healthy communities adapt to changing environments and even reconstruct their economic foundations as needed. However, smaller rural communities (population <25,000) can experience greater difficulty in adjusting to changing growth and development influences. These communities often rely on a single economic facet and do not have the tax base or expertise to tackle many of the problems that arise. Consequently, many small towns have shrunk. Many residents commute or move to larger towns and cities with more opportunities, leaving behind those with few other options and concentrating poverty in struggling communities. As a result, community health is negatively impacted. Small-town decision-makers often neglect essential planning due to a lack of funds, knowledge, and human capital. Significant research exists for cities of 50,000 people or more, but knowing how to translate that for a town of 5,000 remains a problem.

For the last five years, the researchers have partnered with state government officials and residents of small rural towns with limited resources throughout South Dakota to promote healthy communities. Major goals of the collaboration have been to provide safety, accessibility, walkability, sociability, and an overall higher quality of life for each citizen living in these communities.

We used the Pedestrian Environment Data Scan (PEDS) to assess community infrastructure and then collaborated with city officials, led design charrettes, participated in community meetings to gain public input, and developed case studies. These methods were then used to generate guidebooks for the target community tailored to their specific needs. After five years of research we have found that small communities struggle with similar problems, including a lack of identity, inadequate infrastructure, a small tax base, and a misconception of community resources. Our research is now being compiled to formulate a set of general recommendations.
to overcome these and other issues. It is the intent of these findings to show all small towns how they can remain healthy, vibrant, and resilient communities that provide their residents with a higher quality of life.
Educating for Process and Partners

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Keywords: experiential learning, authentic learning, social learning, empathy, service learning, community engagement, life-long learning

Our approach to educating the next generation includes more than creating excellent designers, it includes developing civic-minded citizens as everyday practice. It is about changing the way we educate our students to support well-rounded adults with the 21st century core skills needed to navigate the world of hybrid competencies; students who are life-long learners, who can lead and at the same time be empathetic. We strive to develop professionals who view design as holistic, integrated, collaborative and inclusive, which are values that are critical for the next wave of professionals. To support this, we have created the Lab for Urban and Social Innovation (LUSI). As the research and community outreach arm of the College of Architecture and the Built Environment, LUSI plays a key role in the educational opportunities for our students. Coordinated through LUSI, communities, students, faculty and stakeholders are united in collective action to address longstanding environmental and health challenges, as well as create new opportunities for neighborhoods. This type of engagement with communities offers our students authentic, active learning while participating in an inclusive design process.

One of the Lab’s main objectives has been to formalize our community outreach framework. By bringing our methods under one umbrella, we have created an assessment and feedback loop across courses and programs in order to make better decisions for student learning as well as ensure quality interactions with the community, students, faculty, domain experts, government officials and community members. Some of the learning outcomes include providing an authentic collaboration experience for higher impact learning for our students and creating a studio setting with external opportunities where students are responsible for their own learning. Through these goals, we expect students will assume leadership roles to be agents of change and make meaningful contributions to society. We achieve this through various means such as employing Asset Based Community Development (ABCD) and Participatory Interest Design Methods, which includes co-creating a vision and goals with the community, working with public schools, design charrettes and collaborative training for the students. Both summative and formative assessment of student learning is conducted each semester. Some of the metrics for assessing the impacts of this interactive process for student learning, empathy, and intercultural competency, as well as for community satisfaction and interest include:

- Surveys and interviews of the community for their satisfaction with the process
• Survey and interviews of the community for their interest in future efforts and initiatives
• Participation in community meetings and soliciting feedback
• Participatory Action Research in collaboration with our Public Health program and others
• Reflective essays for students
• Self and peer evaluations for students
• Team contracts for students
• Teamwork rubric
• Pre- and post-surveys of student understanding of social justice

Going beyond service learning, this pedagogical model merges authentic, social and inquiry based learning resulting in a higher impact learning for our students and a valuable experience for the community. In addition, having the opportunity to work and interact with consultants who are domain experts and understand their discipline relative to others further prepares them for their future careers. As a pedagogical model for public interest design, students are more receptive to feedback, develop a greater sense of self-efficacy and exhibit higher motivation about their work. This translates to their professional careers in which employers value the abilities to collaborate, empathize, and think critically.
Disruptive Engagement: Exploring Uneven Geographies in Appalachia through Community Engaged Design Research in Landscape Architecture

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Keywords: community engagement, transformative education, Appalachia

This presentation focuses on the impact of a community engagement course in Landscape Architecture that integrates transformative learning experiences with Appalachian communities to introduce students to theory, methods, application and implications of community engaged design. This research demonstrates specific examples of how students were engaged as learners and citizens, while working with communities, to develop the knowledge, skills, and capacities necessary to solve complex issues with a social and environmental justice focus.

Community Engaged Design Research (CEDR) has the potential to empower student learning and faculty teaching and research, but also positions community members as active contributors to decisions that impact the built environment. The presentation seeks to (1) demonstrate how Community Engaged Design Research encourages students be civically responsible designers, (2) illustrate a case study of community engagement in Landscape Architecture in Appalachia and (3) to explore the potential for CEDR to unpack the entangled social, political, and environmental ecologies that are productive of uneven social geographies.

Surveys, semi-structured interviews, and community mapping were utilized to actively engage community members in two engaged research projects in Southwest Virginia. The case study explored individual and collective narratives about life in the Coal Fields and shifting imaginaries about the future of Appalachia.

The presentation will explore the implications of CEDR on the profession of Landscape Architecture. How do CEDR experiences prepare future landscape architects to be more aware of complex issues in the built environment? The results from this presentation will contribute to current discourse in design education research about transformative and community engaged research processes.
The Mountaineer Effect: Falling Run Greenspace—Creating a New Central Park in Downtown Morgantown, West Virginia

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Keywords: urban parks, service learning, pedestrian counts, trail planning, greenspace, urban forest

Falling Run Greenspace, a 60-acre woodland, links downtown Morgantown to West Virginia University’s Organic Farm. A representative of the West Virginia Land Trust called the project “the most important development for Morgantown green space since the Rail Trail,” for its potential as a central park for Morgantown. Acquired by WVU in 2012, Falling Run features steep slopes and accompanying challenges for planning, which began in 2014.

One landscape architecture professor dedicated 1,414 service hours to masterplanning and design, collaborating with 13 administrative units. The $140,000 construction budget was extended by intense volunteer involvement. Landscape architecture students helped with the analysis, planning and implementation of Falling Run. Students of Landscape Architectural Construction II calculated stormwater runoff to help plan drainage crossings, and adjusted and flagged planned trail routes in the field. Students of Natural Systems Design removed invasive shrubs, surveyed tree canopy dominants, and installed restoration plantings. Eleven landscape architecture majors and three faculty members volunteered during trail construction. Volunteers, by the end of 2017, built 2.7 miles of trail.

Knachmuths, Farmers and Reynolds (2017) found service learning in urban woodlands improved team skills, built awareness of biodiversity and environmental stewardship. MacFall (2012) found positive effects of service learning eight years later for environmental stewardship. Conway, Amel & Gerwien (2009) found service learning benefitted students especially academically, but also personally and socially, while promoting civic engagement.

This presentation describes the innovative process through which this new urban park on University property was created. Falling Run's volunteer structure hinged on a handful of experienced trail crew leaders, who first trained 48 trail crew leaders. In 2016, Falling Run was the first Welcome Week trail building project for the University’s incoming freshman; 495 volunteered over three days. Falling Run's trail crew tool trailer (stocked with tools, gloves, and hardhats to equip 200 volunteers at once) now can be borrowed for different trail construction sites. There were fifteen trail projects around Morgantown during Welcome Week of 2017. By August 2017, 1243 volunteers had dedicated 3984 hours to trail building. Falling Run energized local greenspace planning and volunteer service in Morgantown.
Falling Run provides an example of involving landscape architecture students in the development of new urban parks. With few new large parks being established in central urban areas today, the service-learning based design process and detailed volunteer organization strategies provide insights for greenspace planners.
Studio Praxis: Starting a Dialogue toward Social-Ecological Resilience

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Keywords: resilience, engagement, climate adaptation, social-ecological systems, studio program

Advances in resilience theory have improved our understanding of complex adaptive systems (Folke, 2006). As understanding of the interdependence of social-ecological systems has grown, so too has the valuation of adaptive co-management for achieving resilience goals (Galaz, Olsson, Hahn, Folke, & Svedin, 2008). Resilience-related research suggests the nature of connectivity of social capital in the form of bonding, bridging and linking relationships (Woolcock, 2001), in combination with other capital assets, may influence adaptive capacity (Harrison, Montgomery & Bliss, 2016).

In recent decades, service learning has explored new pedagogies for studio-based community engagement, as described by Forsyth, Lu and McGirr (1999), Lawson (2005) and others. The Cornell Climate-adaptive Design studio program (CAD) incorporates a service learning approach to generate alternative adaptation strategies with at-risk communities. Working directly with municipalities in the Hudson River Valley, CAD seeks a trio of benefits—technical and interactive gains for students, alternative design strategy benefits for participating communities, and advances in climate-adaptive design research. Earlier development of a comprehensive climate-adaptive design framework (Cerra, 2016) focused on physical design within hydrological, terrestrial, and built environment systems, viewing resilience primarily in terms of ecological and material assets. Recently, CAD has evolved to also incorporate social factors of resilience.

This engaged approach has continued to grow via new partners and resources for a more robust program with municipalities. Reflection suggests that while the alternative design strategies created by the studio are clearly beneficial to municipalities, the design process—itself—when stakeholders come together to discuss opportunities in the face of change—may have at least equivalent value for awareness and inspiration. Inspired by social capital research by Harrison et al. (2016) and others, in 2016 we began expanding the spectrum of participating stakeholders by understanding participant groups by sector (public, private, academic, non-governmental) and scale of place/power. This approach has allowed us to identify gaps in participation and involve additional actors such that bonding, bridging, and linking opportunities may be introduced.
This paper discusses key program partnerships to improve its catalytic potential beyond the studio itself. It also shares evaluation methods we are conducting to measure studio effectiveness in achieving the trio of benefits described, including student reflection exercises, stakeholder surveys and interviews. Acknowledging social-ecological systems within the design process may have important implications for both academic and professional practice, and the participating municipalities we serve.
Addressing Open Space Needs and Ecosystem Preservation Using Green Infrastructure Strategies: A Case Study of El Rio Open Space Preserve

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Keywords: green infrastructure, ecosystem preservation

Disturbances to natural areas from neighboring cities is becoming increasingly more common as fast-growing urban areas quickly expand their boundaries. Subsequently, planning for impacts of new infrastructure in these areas can be limited and natural areas may be fragmented and subsequently isolated from neighboring green spaces. Many communities in the Southwest and worldwide are investigating sustainable strategies that support preservation of these impacted natural areas while providing additional green infrastructure benefits to the surrounding urban matrix. This work highlights strategies used to guide development and design outcomes that incorporated green infrastructure approaches while supporting the preservation of existing habitat of the El Rio Open Space Preserve in Marana, Arizona, U.S. The 42-hectare preserve is a former borrow pit that has naturally regenerated and is currently supporting over 200 bird species. It retains a connection to a watercourse on one border and retains water following storm events, which increases its habitat value.

The Town of Marana wished to focus on future development strategies that would protect existing resources while addressing open space needs for the community. Collaboration with Marana staff focused on development of guidelines and a master plan that addressed current preservation and future open space needs for the site. Outcomes emphasized: (1) preservation and enhancement of existing riparian habitat, (2) interpretive opportunities related to the site and its context, and (3) passive recreational needs for the community. Methods included: (1) review of precedent studies emphasizing stormwater management in open spaces, riparian habitat rehabilitation, and interpretive master planning; (2) a site inventory and analysis; (3) community input through surveys and focus group meetings; and (4) reviews with Marana staff and community members. Project outcomes were used for communicating possibilities for future site development to various stakeholders and guiding development adjacent to and within the site.

This work provides an example for communities aiming to increase green infrastructure benefits while preserving valuable natural areas within urban areas. In addition, results highlight some of the issues raised by rapidly developing urban areas lacking green infrastructure practices and subsequent solutions for enhancing existing conditions to meet future needs. As communities expand, green infrastructure will continue to serve as a key development strategy for creating benefits that meet needs of the human and non-human dwellers of diverse city ecosystems.
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Harvesting Water—Harvesting Community

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Keywords: water Infrastructure, water resources management, community participation, empowerment, rural development, sense of ownership, India

Water issues in India are about basic survival. Without sufficient water, agriculture and the livelihood of thousands of rural villagers are in jeopardy. The lack of water management systems is the major culprit of the acute water crisis (Briscoe, 2008), which has led to tremendous environmental, social, and economic dilemmas of rural communities. In this context, decentralization that involves participation of communities becomes essential (R.T. Hester, 2010).

This research uses literature review and case study analysis to examine the power of participation in water management landscape design in developing countries. Three of the most successful decentralized water management projects in India that have transformed the entire village are analyzed. Other than discussing the different scales and settings of effective water harvesting methods applied, lessons learned regarding to participation in these case studies will be analyzed to inform landscape architecture practice in participatory design for effective, equitable water-harvesting landscapes.

Ralegan Siddhi used to be a marginal village associated with poverty, depleted natural resources, alcoholism, domestic violence, etc, due to the insufficient irrigation water for harvesting crops to support the villagers’ livelihood. Under the leadership of a local activist, Anna Hazare, villagers realized the priority of community interest and became committed to collaborate efforts to conserve rainwater for self-sufficiency.

Its success inspired another village, Hiware Bazar to adopt the framework of participatory governance. The village collectively prepared an integrated village development model with water conservation as the core to address socio-economic issues. Partnering with the local government, villagers across gender and age were empowered in the planning and execution of low-cost, low-maintenance water projects that accumulated to archive the long-term goals.

As the Water Cup Champion in 2016, Nagadi managed to set a shared vision for the whole community and collaborated with NGOs to equip the villagers with knowledge in watershed management. With more understanding of the motives and benefits behind the scheme, the community were motivated to be a part of the solution and hence cultivated a sense of ownership. The project hence became the engine of hopes and sustainable growth.
These precedents share four critical components: visionary leadership, community participation, communication and education, and partnership with the local government or NGOs, as the prerequisites to success. In this process, landscape architects can leverage the participatory power of an equitable design process to transform stakeholders’ visions into a holistic water management plan as a guiding framework for community participation.
Systems Thinking, Collective Intelligence, and Geodesign: The Need for Public Participation

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Keywords: systems thinking, collective intelligence, geodesign, geographic information system (GIS), Planning Support Systems (PSS), Volunteered Geographic Information (VGI), Crowdsourced Geographic Information (CGI), public participation

Interest in geodesign as a design and planning methodology has grown steadily in recent years. Geodesign provides insights into closer relationship between GIS and design (Goodchild, 2010), sustainable development through dynamic design process and advanced geospatial technologies (Dangermond, 2010), complex socio-environmental systems (Borges, Jankowski, & Davis Jr, 2015), and ability to design for future (Perkl, 2016). The incorporation of public participation processes into geodesign procedures, although emphasized by some scholars, is still somewhat limited. Collective intelligence reinforces the use of crowdsourced geographic information by aggregating information of individuals. Surowiecki (2005) identifies the significance of such collection of individuals which has more power than even the smartest individuals of the group, called the wisdom of crowds. Some suggest a lack of theoretical and technical development linking Collective Intelligence (CI) to Geographic Information System (GIS) and more broadly Planning Support Systems (PSS) as a part of both the problem and a potential solution (Borges et al., 2015; Campagna, 2014; Spielman, 2014). We consider the problem more theoretically. We consider concepts of systems thinking and collective intelligence as likely constructs for understanding and facilitating public participation in geodesign processes.

In this paper we use systems thinking as a theoretical basis for developing more interactive processes for incorporating collective intelligence sources (Volunteered Geographic Information (VGI) and Crowdsourced Geographic Information (CGI)), which might improve public participation in typical geodesign planning and design activities. The major concerns for current collective intelligence studies are credibility and accuracy (Spielman, 2014). Aiming at these issues, we apply key principles of collective intelligence to foster credible public participation in geodesign, including: diversity, redundancy, decentralization, and aggregation. This paper provides theoretical framework and guidelines for understanding and developing collective intelligence in geodesign. Our framework considers three aspects - substantive concepts, operational approaches, and procedural infrastructure. First, the concepts of systems thinking and collective intelligence are proposed as a substantive approach for enhancing geodesign participatory processes. Second, after interpreting the substantive concepts, we propose a theoretical guide for comprehensively applying VGI and CGI.
techniques for its operationalization. Third, a procedural framework is proposed for the application of systems thinking and collective intelligence in geodesign.
Design and the Self-Built Landscape: A Vision Plan for the Sustainable Living and Learning Communities at UC Davis

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Keywords: participation, community engagement, service-learning, informality, community gardens, DIY urbanism

The Sustainable Living and Learning Communities (SLLC) is an interdisciplinary, project-based educational initiative that fosters student leadership in environmental, agricultural and social sustainability. Through hands-on projects, coursework, research, internships and on-campus living, the SLLC has established itself as a model for experiential learning at UC Davis. It has also created an informal landscape that offers a respite from the highly managed spaces of the rest of campus.

The well-known projects that comprise the SLLC—the Student Farm, the community garden, the Domes/SCHA housing cooperative—thrive because they all share space on campus, which has developed incrementally for nearly 50 years without formal planning. The self-built nature of the site is visible in student-built housing, garden spaces, experimental agriculture plots, a wildlife sanctuary, and the farm. However, years of piecemeal development and the lack of continuity that comes from the transient nature of student tenure has also yielded ill-defined programs, abandoned projects, and some disfavor. In order to secure the SLLC’s unique place and value, students, faculty and SLLC staff have initiated a collaborative visioning process that seeks to think holistically about the site and integrate it into broader long-range planning processes.

This paper evaluates the values of informal landscapes and the visioning process that intends to give more structure and cohesion to this particular site. It identifies the trade-offs involved in using formal design practices to define inherently informal processes, and it offers recommendations on how vision plans and participatory design can accommodate and encourage user engagement, capacity-building, and a sense of ownership. The research is based on a review of documents and plans, participant observation, and a series of community engagement workshops and fieldwork.
Leadership and Governance in Organized Gardening Movement in the United States

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Keywords: organized gardening programs, leadership, governance, citizen participation

This study aims to get a better understanding of the meaning of leadership in the historical trajectory of organized gardening programs through the lens of citizen participation. Recently, several publications have revealed the significance of leadership for successful community gardens (Milburn & Vail, 2010). However, research that seeks to understand the relationship, if any, of leadership, governance and citizen engagement has hardly been conducted in the context of organized gardening programs. For the purpose of this research, the chronology of organized gardening programs since the late 19th century in America is reviewed and analyzed using leadership theories as well as the citizen participation model proposed by Sherry Arnstein (1969) in the sense that power distribution between gardeners and governing bodies corresponds levels of participation in gardening programs.

More traditional approaches to leadership tend to focus on work efficiency and productivity, by which individual leaders with particular positions wield strong force and influence over followers. The dichotomized relationship between leaders and followers is dominant, which represents a mechanism of command and obedience (Northouse, 2015). The hierarchical relationship between program authorities and the beneficiaries in the initial organized gardening programs represents this task-oriented conventional leadership, as the main goal of the programs was to produce a large amount of food in a cost-effective way (Lawson, 2005). On the other hand, there are relationship-oriented leadership approaches in which positive reciprocal relationships and interactions between leaders and followers are emphasized. Recently inclusive leadership theories, such as adaptive and distributed leadership, are emerging, which support shared power and responsibilities among leaders and followers. Contemporary community gardens, where grassroots groups have taken the lead, advocate the idea of creating communally and voluntarily managed garden spaces.

The expected achievement of this research will accrue to academia, authorities in local, federal governments, and nonprofits and gardening-advocacy groups through an improved understanding of the significance of leadership to facilitate community engagement in gardening programs. Along with the growing interests of governance and management of community gardens as an essential factor for the sustainability and longevity, the findings generated from this timely research will contribute to deepening our knowledge of leaders and their roles in successful community gardens.
Community Design Centers (CDCs) on the Upsurge: Investigating Perceptions among CDC Leaders and Administrators in Texas

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Keywords: community design centers, perception, administration and leadership, multidisciplinary practice, urban design, landscape architecture, project typologies

For decades, community design centers (CDCs) have specialized in providing professional design and planning assistance to non-profit groups, agencies, and individuals that lack the funding or resources to otherwise receive such services (ACD 2016). Especially since the year 2000, the number of CDCs has nearly tripled in North America, from just under 70, to over 200 active organizations, covering ever-expanding geographic, disciplinary, and strategic territories (ACSA 2014). Yet, this growth aside, CDCs remain a somewhat silent partner in the world of design (Curry 2004) with limited information regarding the spread of their multidisciplinary practices nationwide.

The purpose of this research was to explore the recent surge of CDCs in North America. Specifically, this study attempted to elucidate, from the perspective of CDC directors in the state of Texas, what economic, environmental, and social factors underlie the proliferation of CDCs. Furthermore, this study pursued to answer what roles do landscape architecture, architecture, and urban planning play in the operations and the recent growth of CDCs. By studying the rise and decline of these organizations and the multi-disciplinary services provided, it is believed that these patterns can historically be linked to social, political, and economic conditions of the times (Castells 1983; Levy 2000; Sanoff 2000). Similarly, the current expansion of CDCs across North America may indicate a shift in any number of social, cultural, political, professional, or economic ideologies.

This research utilized qualitative methods informed by the “research act” of Gaber and Gaber (2007). Semi-structured interviews, using open-ended questions to build upon respondents' current knowledge of community design practices, were conducted with the leaders and administrators of CDCs in the state of Texas. Information obtained from the interviews was analyzed to draw themes (Gaber and Gaber 2007; Taylor and Bogdan 1984) explaining the upsurge of CDCs and to gain insight regarding the continued spread of CDCs and their practices. The findings of this research illustrate an increased economic, environmental, and social need for the services CDCs offer in Texas. The findings also suggest the blending of disciplinary boundaries amongst landscape architecture, planning, and architecture, under the unifying identity of urban design. In conclusion, equally driving the growth of CDCs across the nation, an increased awareness of perceived issues along with an individual capacity and
determination, proved influential not only in regard to CDC operations, but through service-learning and community-engaged design practice and education, and an open appreciation for multi-disciplinary practices.
Participative Cultural Landscapes? Two Case Studies from Singapore

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Keywords: participatory, methodologies, Singapore

Public participation in envisioning the re-purposing of a disused railway track into a green, cultural and ecological corridor, and collective recollection of a rustic island into a cultural landscape are the two most recent projects undertaken by Singapore’s government to address design and management of large open spaces in a holistic and participative manner. Singapore shares with emerging Asian megacities similar problematics related to rapid urbanization, as the exponential growth of the city raises the difficulties of urban planning and management. Together with solving functional issues a matter of debate that in recent years has become central, concerns striking a balance between urban growth versus retaining city-identity, goal recently being achieved by preserving structures and sites that promote continuity of place (Yuen 2005).

In the evolution of this concept, dealing with city planning, emphasis is shifting from conservation of single artifacts to preserving areas of cultural significance, recognizing the importance of the social, cultural and economic processes involved in conservation of urban values. A further step towards preserving the social and cultural in the urban landscape is the active participation in the design process of citizens and various stakeholders, who can best reflect on and share values and significance of the place.

The research presents participatory methodologies used in on-going Singapore’s Rail Corridor Project, initiated in 2011 as conversion of the former Keretapi Tanah Melayu (KTM) Railway Line, built in 1903 and dismantled in 2011 (URA, 2015) and Pulau Ubin Project, initiated in 2014 to preserve Singapore’s last undeveloped offshore island, lying north east of Singapore along the Straits of Johor (MND, 2016. These strategies are recollected from my direct experience as course leader at the Department of Architecture of the National University of Singapore, which engaged both efforts as stakeholder and advisor, involving in the Pulau Ubin Project almost 2/3 of the students enrolled in the architecture program.

The purpose of this research is to identify some of the potentials and challenges related to the engagement of a community in the building of an appreciation for areas of historical significance, and a consequent commitment to their conservation. It is also to have closer insight on the processes of engagement used, and the actors which shaped these processes. It is noted that, started as grassroots initiatives, where groups of interested parties built a critical mass of discussion around the cited historical areas, debates on the possible values and conservation of such sites have been consequentially assisted by the government.
Participatory methodologies supported by governmental authorities have included group discussions open to community, also in the form of NGOs, followed by brainstorming with invited specialists in fields of ecological, historical and cultural significance; sponsoring of community on-site events and exhibitions; building of an on-line archive to collect oral history; launch of design ideas competitions; involvement of educational institutions in survey of the cultural landscapes and management/design proposals for such sites. Research finds that participatory methodologies prove successful in moving beyond implications in the on-going debate of what to conserve and for whom, related to what history is told in terms of political message and the thematization of the urban landscape to suit touristic purposes—the objectification of history in the landscape, but it also acknowledges what has already been recognized in the Asian debate that, although the less powerful do attempt to redefine the constitution of heritage using particular sites of resistance and negotiation, these efforts are due to fail if not supported by state initiatives (Yeoh and Kong 1997).
Aggie B.L.U.E.print Laboratories: A Multi-Disciplinary Teaching and Service Learning Opportunity

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Keywords: low-impact development, service learning, hydrology, green infrastructure, landscape performance

Drought has had a statewide impact on Texas with current groundwater reservoirs at only 67% fill level (down from 81%) and reservoir storage rapidly declining with losses of up to 64,000 acre-feet per week from lack of rain, lack of stormwater infiltration, and over-consumption of water. Groundwater has declined in most Texan aquifers while areas closer to the Gulf have simultaneously subsided up to 8ft since 1940 due to excessive groundwater consumption. Planning and design strategies emphasizing stormwater management, such as Low Impact Development (LID), are increasingly utilized in sustainable design/development, minimizing the impact of impervious land cover. LID is an innovative approach treating stormwater at the source, using uniformly distributed facilities such as stormwater collection devices, filtering systems, and water reuse mechanisms. Aggie B.L.U.E.print is a campus-wide program that is intended to educate and train students in LID alternatives to traditional stormwater management through hands-on outdoor classroom activities involving development, installation, monitoring, management, and evaluation within interactive test plots. A master plan was developed for the northwest Texas A&M University (TAMU) campus as well as a detailed set of construction documents for a rain garden site within this master planned area, one in which the primary challenge is runoff from building roofs, a large parking lot and turfgrass area effluent, were developed. Tasks were conducted by faculty and students across three colleges (agriculture, architecture and engineering), including the Landscape Architecture and Urban Planning, Horticultural Sciences, Civil Engineering, and Biological and Agricultural Engineering departments. Provisions for solutions to complex hydrologic issues were explored, assessed, and showcased and an outdoor campus labs was designed, implemented, and monitored by TAMU students. Landscape Architecture and Urban Planning students provided the designs, Horticultural Sciences students provided plant materials (both
propagating and growing plants for the project), and Engineering students monitored environmental quality measurements. The three-year project employed long-term involvement in hands-on learning activities by an estimated 300 or more students and resulted in solutions to long-term water management problems on the Texas A&M University campus. This program is an exemplary model that involves landscape architecture students and faculties with relevant disciplines to increase the awareness of landscape architecture practices in built environments.
Sustainability
**ORAL PRESENTATIONS**

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**Escaping the Flood: The Impact of Climate Change on Transit Desert Communities**

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**Keywords:** geographic vulnerability, environmental disaster, transportation access

Transit Deserts are about geographic vulnerability in regards to access to employment and other services that impact quality of life. As Robert Bullard states in the book *Race, Place, and Environmental Justice after Hurricane Katrina*, “when a location lacks access to technology, communication, and transportation, and when the residents of that location lack financial means to overcome these issues, this also renders the location geographically vulnerable.” Bullard is speaking, in this instance, about the thousands of residents who had no means to get out of the city of New Orleans during Katrina, due to the lack of affordable and available transportation, and this statement is ringing repeatedly true as residents in particular regions of the country suffer the impacts of climate change. One just has to look at the recent record-breaking rainfall and flooding in Houston, Texas. If it had not been for individual residents with their own private vehicles, boats, trucks, etc., the death toll would have risen much higher. Most urban dwellers assume the availability of transit, not thinking of those in the outer urban neighborhoods, ring suburbs or even other areas of the city that lack efficient public transportation access. Less thought is given to how the very form of a neighborhood would impact one’s ability to escape rising water. Although a substantial number of people in suburban areas own a vehicle (Bullard and Wright, 2009), there are additional forms of public transportation including taxi cabs, ride sharing services, subways, and light rail that are missing. This phenomenon becomes even more detrimental when coupled with the impact of climate change and the increasing frequency of environmental disaster. This paper will look at communities in the Gulf South (Louisiana, Texas, Florida) that have had increased rainfall over the past 10 years, and examine the transit access variables in these areas at a local and regional scale. Research methods for the paper include mapping areas with reoccurring environmental disasters, including rainfall counts, locations of and intensity; and mapping transit desert characteristics such as neighborhood form and physiography, demographics, and type, time, and ease of transportation access and system connections. Polices and strategies for change and mitigation, including prestaging of transit vehicles, making connections to inter- and intra-state systems, reducing sprawl, increasing affordable transit-oriented development, and increase rain fall collection areas and systems, will be presented.
How Can Paving and Planting Affect Microclimate Conditions and Thermal Comfort in High-Density Apartment Complexes: Empirical Findings from ENVI-met Simulations

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Keywords: microclimate, heat island phenomenon, plant, pavement, temperature, thermal comfort

The urban heat islands (UHI) that result from intense urbanization and climate change threatens quality of life and health of citizens. In the high-density city of Seoul, South Korea, heat is often trapped in the city, and heat events are becoming increasingly frequent and strong. Urban planners are finding interest in climate change and thermal comfort. Researchers have studied mitigation strategies against UHI and ways to promote thermal comfort by adopting green infrastructure and cool paving in the city.

While the conventional way of city building using asphalt and impervious pavement is already known as a key factor that exacerbates UHI, new approaches in paving and planting may perform as effective solutions. This study aims to improve the microclimate conditions and thermal comfort by suggesting design strategies that make high-density apartment complexes more comfortable in summer.

An apartment complex was selected for analysis. This study compares its present condition with five alternatives with different paving and planting conditions. Each are analyzed using ENVI-met, a software that microclimate conditions and thermal comfort based on the arrangement of buildings, vegetation, and pavement. ENVI-met simulation outcomes, which include temperature, wind speed, and directions, and the predictive mean vote (PMV), are compared. Results show that the temperature is lowest and PMV level is better with grass paving. Thermal comfort levels for clustered trees are better than individual trees. Likewise, the comfort levels are better for conifers than hardwoods. In sum, this study finds that a combination of grass paving with clusters of conifers is the most effective way of improving the microclimate conditions and thermal comfort in summer. Findings of this study may provide lessons to planners and designers in high-density cities that seek enhanced livability and sustainability.
The Legacy of Dynamite in a Prairie Landscape

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Keywords: landscape rehabilitation, eviscerated landscapes, speculative drawings, geodiversity

Many landscapes have gone through deeply searing traumatic experiences as the world's appetite for resources is forever unsatisfied. The methods used to exploit these resources are also violently demanding. Winnipeg in Manitoba would not exist without the sediments and deposits left by the vast oceans 450 million years ago. However, very few people even know where the aggregates for their buildings, roads, and squares were originally sourced. Even fewer have seen the resulting impact on the landscapes from the highly explosive charges. These landscapes are as near as they are distant. Unfamiliar. Mysterious. Alien.

Limestone has been extracted and processed due to the unique geological formation in the Interlake Region of Manitoba for almost 100 years. Paradoxically, quarry mining left behind an exotic world of white cliffs and turquoise colored, crystal-clear lakes. The visual power of these landscapes and their inherent sculptural qualities are impressive. Fossil-rich cliffs with purple layers quietly tell of the complex relationship between the prairie landscape and its formative processes. It is not clear how to deal with the remnants of these industrial operations. The landscape is laden with a whole host of sometimes contradictory interests and expectations.

A round table has been set up to coordinate the different views, and the author was invited to join this proactive body. Test designs for various sites developed speculative drawings to project scenarios for possible futures by attributing ecological and aesthetic value after economical exploitation. The speculative designs have proven to be the most intuitive method for a discursive dialog with the consulting actors. The drawings showcase how eviscerated landscapes can increase the geodiversity of a whole region.

In positioning interventions in the quarry, determining dimensions, and designing new sediments, it has been possible to review essential questions and, ultimately, to take individual positions to the task:

- Is it really possible or even desirable to rehabilitate this landscape?
- What visual forms might the newly emerging landscape take?
- Does the new landscape offer practical uses?

The big dream is to turn the Manitoban quarry district near the town of Stonewall into a pilot region and a laboratory to test innovative concepts and new ideas, as well as becoming a center of excellence for post-traumatized landscapes.
Sculpting Hybrid Shorelines

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Keywords: hybrid shorelines, soft infrastructure, hard infrastructure, climate-adaptive, ecological resilience, social resilience, sculptural hybrid shorelines

Hybrid shorelines, also called living/eco/bioengineered shorelines, are emerging globally, particularly as shorelines become more vulnerable to sea-level rise and increased storm intensity associated with climate change. To date, the most typical form of flood mitigation along urban waterfronts has been hard infrastructure (i.e., flood walls, levees, bulkheads). While this may provide shoreline protection from erosion, it has significant disadvantages including limited life span, limited ecological value, and a false sense of safety (Smith et al. 2017). In contrast, soft infrastructure (e.g., wetlands, sand dunes, reefs), can contribute to shoreline protection, enhanced ecosystems, and hold capacity to regenerate after damage (Hartig et al. 2011). I propose to combine the benefits of both hard and soft infrastructure with a sculptural component that creates an allure to the shoreline and its changes.

Hybrid shorelines combine soft and hard infrastructure types to take the most beneficial characteristics of each while eliminating their negative aspects. This investigation takes original design research on hybrid shorelines through a literature review that paired multiple relevant terms within Science Direct, and expands on it by examining dozens of case studies within the fields of engineering, science, landscape architecture, and art that address shoreline conditions. It compares project objectives (ecological, climate-adaptive, aesthetic, structural); materiality (media type, form, structure); and spatial distribution (scale and frequency) of these case studies within a comparative matrix. Conventional engineering tends to focus on building hard (Smith et al., 2017). These hard engineering techniques, however, are increasingly intertwined with shoreline protection work that scientists are doing via more “natural” materials, with the idea that a hybrid approach may be more cost effective, provides more ecosystem services, and establishes greater social and ecological resilience to climate change-associated impacts (Sutton-Grier et al., 2015; Dyson & Yocom, 2014). This paper shares conclusions about form, material, and structure of soft infrastructure, hard infrastructure, and hybrid shoreline case studies. Based on this review, there appears to be further opportunity for designers to adopt an interdisciplinary approach that addresses the dynamic interface between land and water, while drawing attention to these benefits to inspire public discussion about climate change preparedness. Bringing a designed aesthetic into hybrid shorelines by means of incorporating sculptural elements presents just such an opportunity, enhancing aesthetic value, sense of place, and drive to learn. Additionally, thoughtful design of sculpted hybrid shorelines has potential to enhance ecological and physical resilience while contributing to social resilience, inspiring community conversations.
about the merits of hybrid shorelines and the need to prepare for climate change on our urban waterfronts.
Universal Adaptive Strategy Theory in Planning and Design: Lessons in Sustainability from J.P. Grime and Simon Pierce

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Keywords: landscape architecture, environmental design, ecological management

Over the last decade, planners, designers, governmental officials, institutions, organizations, and citizens have been widely interested in ideas associated with sustainability. Often this focus is based on the shift from a resource-plentiful world to a resource-limited world, along with maintaining a viable planet suitable for life. Yet in the late 1970s plant ecologists developed a three-factor-based theory and model to explain and predict vegetation survival strategies. While developed to explain phenomena in the plant ecology academic area, the theory (Universal Adaptive Strategy Theory or UAST) is also applicable to animals, businesses, as well as cities, planning, and design. UAST is the focus of this presentation, being primarily descriptive and informative in narrative form (not a research investigation). The model developed by J.P. Grime and S. Pierce ordinates the optimal strategy based on the availability of resources, stress in the environment, and the level of disturbance. In the environment, different organisms may employ a different set of approaches to survive in abundant resources, extreme cold, drought, constant water, shade, erosion, browsing, disease, and fire. Similarly, businesses employ competitive, stress, and disturbance response strategies to endure. For example, big box stores exploit a competitive strategy in an attempt to dominate the consumer, boutique stores adopt a stress tolerant strategy as a specialist, and street vendors capitalize on a ruderal strategy, selling quickly during optimum but brief times. As an example, China has responded to a series of adaptive changes, reinventing itself and is an example of enduring sustainability, responding to the disturbance of many internal wars and rebellions, and as a major competitor producing a large proportion of the world’s GDP for thousands of years. China experienced a major downturn during the Qing Dynasty when it attempted to remain the same and not adapt as it had for centuries, and the industrial revolution of the West surpassed China’s competitive ability. The lesson from the Qing Dynasty is that often sustainability means evolving change, responding to competitive forces, evading destructive stress, and managing disturbance, as nothing is truly everlasting and ideally sustainable. Employing an inappropriate sustainability strategy in the wrong environment can lead to eventual premature demise. Even applying the correct strategy does not guarantee success. The theoretical investigation by Grime and Pierce establish a framework to understand sustainability and stability beyond the trends of the immediate moment.
A Systems-Thinking Review of Geodesign: The State-of-the-Art and Future Perspectives

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Keywords: systems thinking; geodesign; GIS; coupled human-environment systems; sustainability; elements and interconnections; environmental, social and economic conditions

Over the last decade, geodesign has gained increasing momentum in both research and practice communities (Janssen, Eikelboom, Verhoeven, & Brouns, 2014; Moura, 2015; Muller & Flohr, 2016; Steinitz, 2012). Geodesign provides insights into closer relationships between GIS and design (Goodchild, 2010), sustainable development through dynamic design process and advanced geospatial technologies (Dangermond, 2010), complex socio-environmental systems (Borges, Jankowski, & Davis Jr, 2015), and the ability to design for future (Perkl, 2016). A mature understanding of geodesign requires studies to adopt a systemic lens understand the interconnections of social, ecological, and economic conditions in multiple spatial and temporal scales. Yet the field of systems thinking in the context of existing geodesign research is fragmented and can be fixed through a comprehensive review to understand the disparate body of existing research and to suggest future research directions. To fill this gap, we conduct a review of geodesign from a systemic consideration, focusing on elements, interconnections, and functions of systems. More specifically, we integrate systems thinking to study geodesign and its relationship with the elements and interconnections of the coupled socio-environmental systems through a large range of socio-ecological processes, which ultimately achieve the function of sustainable development.

In this review, we first review the existing literature on evolving perspectives and definitions of geodesign. We elaborate four major perspectives of geodesign: geography-centered multidisciplinary science, iterative design process, community participatory planning, and landscape-based sustainability. After characterizing each perspective, we achieve a range of synergetic definitions of geodesign. To gain comprehensiveness, in the second section, we integrate systems thinking concepts with these geodesign perspectives and definitions. For example, hierarchy theory provides systemic insights for the first “representation model” of geodesign system (Steinitz, 2012). An important concept in hierarchy theory is decomposable systems which are “arranged in level, the elements at each lower level being subdivisions of the elements at the level above. Multi-celled organisms are composed of organs, organs of tissues, tissues of cells” (Simon, 2000). Representation model in geodesign is to identify the significant systems/elements that the study area includes (Steinitz, 2012). The study area represents the studied landscape as a whole system, which is in the highest tier. The second-tier systems, for instance, might include biological creatures, environmental features, human beings, or related organizations. Second-tier systems can be unpacked in deeper levels for
further analysis. In the representation model, we should reorganize all the significant systems into hierarchy for subsequent geodesign steps. Systems thinking helps us identify how to use geodesign as an approach to understand the elements and interconnections of coupled human and environment systems to achieve the sustainability function. In the end, we conclude with a remark on the potential challenges and prospects forward.

Since systems thinking is useful to enhance the substantive rationality of geodesign, this study reflects what systems-thinking concepts are critical to comprehensively understand the geodesign approach and process. At the same time, this review also provides a guidance for landscape designers and planners to organize the complicated geodesign elements and processes that affect and are affected by interconnections and outcomes reached at multiple spatial-temporal scales to address the sustainability challenges we face.
Assessing Relocation as a Strategy for At-Risk Populations and Municipalities in the Upper Susquehanna Watershed

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Keywords: flooding, relocation, FEMA, Susquehanna

Community adaptation to climate change will increasingly involve moving at-risk populations out of unsafe, disturbance-prone areas. A number of converging factors make the strategy of relocation from flood disturbance areas more likely. These factors include the ongoing remapping of flood hazard zones by the Federal Emergency Management Agency (FEMA) that often involves the expansion of flood zones to include structures previously outside hazard areas; the rising cost of flood insurance; and the increasing frequency of large storm events causing catastrophic flooding. Property acquisition and relocation of homeowners seems an attractive and viable alternative to the repeated, costly rebuilding of flood-damaged homes, especially as the risk for flood events increases. However, the strategy of relocation needs deeper investigation to understand its social, ecological, and economic impacts. Relocation can adversely affect socially vulnerable groups as they have less capacity to cope with disruption of their social networks and distancing from income-generating activities (Marino, 2011; Meoni and Pesaro, 2008). Furthermore, there is some evidence that risk may increase after relocation, as vulnerable populations may move to other high-risk areas where properties are more affordable.

This paper contributes to the current discourse on creating sustainable environments by examining the policy of relocation in several municipalities in Broome County, New York, within the Susquehanna watershed. After a 100-year storm in 2006 and a 500-year storm in 2011, municipalities have sought a buyout option for flood-damaged properties through the Hazard Mitigation Grant Program (HMGP), which provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act and includes "acquisition of real property for willing sellers and demolition or relocation of buildings to convert the property to open space use." Methodology includes mapping social vulnerability combined with environmental risk, through mapping demographic data of concern in conjunction with FIRM maps, parcel data, historical inundation maps, and hydro-geological features. The study relies on primary interviews to understand the challenges municipalities face in going through the buyout procedures and the decision-making courses of affected homeowners. Lastly, the effectiveness of existing methods of communicating flood risk is examined and new tactics are explored. Collectively,
these methodologies are used to assess the effectiveness of the buyout option, to suggest strategies for improvement, and ultimately to create a more sustainable relationship between people and rivers.
Comparison of Sustainable Design and Korean Traditional Feng Shui Design

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Keywords: feng shui, sustainability, climate change

Through a comparative analysis of the concept of feng shui in relation to recent sustainable design guidelines, this study explores feng shui as a knowledge generator of sustainable design. This study also makes suggestions in terms of how feng shui can be incorporated into sustainable design in the 21st century. Today, global climate changes are an undisputable fact, with catastrophic hurricanes such as Harvey and Irma becoming more frequent. We posit that feng shui has an intellectual potential to provide design guidelines for dealing with climate change. Feng shui, which literally means “wind and water,” is comprised of Eastern knowledge of climate and environment that has been accumulated over thousands of years. Feng shui has been implemented for protection from winds, water management, and flood control. For instance, feng shui recommends that buildings and communities be located at the foot of the mountains so that the mountains will block prevailing winter winds. It also recommends placing buildings and communities with a body of water in the direction of the summer-prevailing winds so that the air is cooled by moving over the water before it reaches the buildings and villages. Additionally, feng shui emphasizes that waterways and groundwater need to be carefully considered within any site-selecting efforts. In order to prevent flooding and diseases borne of the groundwater table, feng shui suggests avoiding siting structures in the direction of surface water and groundwater, as this area has negative feng shui energy (chi). If such site selection is inevitable, feng shui recommends ways to reduce the negative chi of the water using methods such as planting trees that can absorb groundwater or reduce the flow rate. Numerous East Asian villages and homes have been built using these lessons learned over thousands of years.

Methodologically, this study examines well-preserved traditional Korean houses that are sited with feng shui principles. It delineates the relationships between dwellings and open spaces and climate factors such as wind, water, and sunlight. The knowledge gained is then compared to sustainable design principles. By doing so, we demonstrate the effectiveness of feng shui as an important epistemological tradition in sustainable design; it is a blueprint that will save energy while avoiding floods and other natural disasters simultaneously. In comparison to the approximately 50-year history of modern sustainability principles, feng shui design guidelines are thousands of years old. Hence, we posit that there is a large amount of sustainable design knowledge embedded in feng shui. Overall, the major implication of this study is to synthesize some of the best practices in feng shui to incorporate in modern sustainable design.
Social Equity through an Eco-Cultural Trail: The Ngäbe-Buglé Migration under Capitalism in West Panama

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Keywords: indigenous tourism, capitalism, social inequities, environmental care

The Ngäbe-Buglé Eco-Cultural Trail Program resulted from evidence of economic and social disparities between the capital city of Panama and the countryside. While the Panama Canal is Panama’s biggest source of income and is key to understanding Panamanian history, identity, and economy, this study focuses on the overlooked western area of Panama. This study looks toward exposing the economic and environmental threats this region faces and to unveil the social disparities between Latinos and indigenous peoples living in this area. In so doing, this study uncovers a new path of action for designers to empower communities to take action on environmental injustices, social inequities, and the economic burdens imposed by capitalism and global climate challenges.

The study analyzes the western provinces of Bocas del Toro, Chiriquí and the “Comarca” (indigenous autonomous territory) Ngäbe-Buglé in the context of capitalist growth models imposed on them. The study employs a graphics-based research method, Think Pad, to analyze social inequities in the Ngäbe-Buglé community by examining the material, political, and symbolic aspects of the region, and analyzing them at global, systemic, communal, and individual levels through graphic and mapping representations. The analysis reveals migratory challenges of the Ngäbe-Buglé community as the primary issue because of the many social, economic, and environmental burdens they face. To understand these problems and their relation to the Latino community, phone interviews were held with indigenous and Latino people from the region. The interviews revealed specific risks along the journey that were mapped to develop a visual analysis of vulnerabilities. The first phase of the indigenous migration journey was identified as the most critical. Based on these results, this paper proposes the Ngäbe-Buglé Eco-Cultural Trail Program, a design that promotes the care of the environment alongside better economic conditions for the most vulnerable groups in the western region of Panama. This program aspires to provide the Ngäbe-Buglé a sense of self-respect and to empower them to affirm their customs and revitalize their traditions and economy while caring for their environment.

The importance of this study lies not only in its solution but in demonstrating to other researchers and practitioners that multilevel analysis can be a core factor in designing sustainable solutions. This research suggests that when problems are analyzed at different levels early in the process, and take into account material, political, and symbolic dimensions, solutions can better target social, environmental, and economic issues.
**INTERACTIVE PRESENTATIONS**

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Regenerative Gardens: Technologies and Precedents for the Residential Landscape

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**Keywords:** regenerative landscapes, residential garden, technology, precedents

For landscape architects, residential design is currently the largest market sector, and private homeowners represent the largest client group. (ASLA). In California alone there are over 9.1 million single family residences. (U.S. Census, 2015). With the increasing goals of incorporating sustainable technologies and landscape performance into projects, the residential landscape provides a ripe opportunity to explore and test new methods and practices. One such practice involves the use of regenerative design principles. Regenerative design can be traced to the work of John Lyle (Lyle, 1996) and has evolved today to refer to built projects that “evolve from an ethos of doing less harm towards doing good” (Nicolette, 2012). The approach is not meant to replace sustainability principles or assessments (LEED or SITES), but to push goals for sustainable practices.

The purpose of this study produces new landscape prototypes incorporating regenerative design technologies for the residential landscape. The scope of work was honed to the arid West with an emphasis on California. Using literature review in combination with evaluation of technical resources and built precedents, the faculty/student research team classified technologies into eight categories: water, soil, habitat/biodiversity, food, waste, air quality, temperature, energy. Technologies were then rated for applicability to the residential setting, availability of resource information, and adaptability to the arid West. The poster represents a first phase of work and presents technologies and precedents for review and recommendations. Discussion points reveal that “how-to” information is widely available from sources ranging from municipalities to utilities to non-profits, although few comprehensive or multitechnology resources were located. Resources focused on water (runoff reduction, use reduction, retention/infiltration), food (production), and waste (primarily compost) can easily be found, while few resources can be identified focused on soil, air quality, temperature, and energy. Detailed precedent information is limited, particularly that identifying technologies, systems, or quantified benefits in relation to regenerative design principles. Findings support further investigation and the creation of a compilation of resources on landscape technologies for the residential setting. This collection of precedents and technologies will support further efforts for landscape architects, students, and professionals, to theorize, design, and construct new regenerative landscape prototypes for the residential garden.
The Suitability of Green Infrastructure Strategies to the Arid Middle East: A Design Feasibility Case Study from Jeddah City, Saudi Arabia

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Keywords: sustainability, green infrastructure, stormwater management, resiliency

The intention of this paper is to learn from the possibility of replacing concrete channels with green channels, which would generate multiple benefits that exceed flood prevention measures to better the quality of life in arid regions. The selected case study is Jeddah City, a rapidly growing urban region located along the arid west coast of Saudi Arabia. The city is subject to serious seasonal flooding as water rushes from an inland mountain range to the sea. A network of concrete drainage channels, covering 81,937,673 acres, alongside fourteen dams, have been constructed with the intention of preventing flooding. These channels do not entirely eliminate the flooding or the associated property damage and loss of life. However, they provide a unique scenario for testing the application of green infrastructure principles and strategies in an arid urban bioregion. This study explores the use of water harvesting and channel greening to further reduce flooding; this would improve Jeddah’s overall water budget and urban watershed health, while also providing much needed public recreation space. The study includes an estimation of irrigation needs for channel greening based on a model (referred to as a planting palette) selected for its regional suitability. This study will be of interest to arid countries that are looking to implement green infrastructure practices as an alternative to concrete channels, and to the Saudi Government in their ongoing Vision of 2030 that advocates for more resilient and sustainable cities.
A Sponge City Design: Landscape Planning and Design of Peiyang Campus of Tianjin University

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Keywords: landscape, design, Sponge City, Ecological, Tianjin University

Tianjin University’s Peiyang Park Campus was opened in 2015 as a demonstration of the Sponge City concept. The term Sponge City was introduced to China by General Secretary Jinping Xi at the December 2013 Central Urbanization Conference in Beijing. The campus is one of the first built examples of this concept. This presentation elucidates the Sponge City concept by detailing the design of the campus as a case study.

The campus is located in the Jinnan District, Haihe Education Park, Tianjin, China. The site is approximately 2.5 km² in area with a complex of waterways, wetlands, and uplands. It was designed to serve 35,000 students and 5,000 faculty and staff. The design goals include protecting the site’s original ecosystem, using ecological restoration and mitigation to repair damage caused by construction, and using low-impact development (LID) practices in design and construction. Essentially, the concept resembles resilient design, with particular focus on stormwater management. Specifically, the construction guide states that “planning leads with ecological priority and safety as the most important, according to local conditions and overall construction.” The triangular site of the campus is challenging, with three sides defined by historic canals and a highway system, as well as shallow groundwater and saline soil. Agricultural fields have been transformed into 1.55 km² of buildings, 0.15 km² of water and 0.8 km² of restored and designed landscape. The landscape is subdivided into three sub-drainage systems to handle stormwater. The sub-basin that forms an outer ring infiltrates stormwater to groundwater, with excess going to the adjacent canals. Within the inner ring of the campus, there is an integration of green infrastructure within the overall landscape elements through use of concave green spaces, pervious pavers, bioswales, and green roofs. This drops the runoff coefficient for the built-up area from 0.9 to 0.5. In this area, there are also water features, such as ponds and wetlands, that collect overflow, and thereby reinforce the sponge-like function of the area and reduce flow from the campus to surrounding waterways.
A Study on Green Space Environment under Urban Viaduct: The Case of Wuhan, China

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Keywords: sustainable landscape, urban viaduct, lighting environment, planting design, rainwater harvesting and utilization

Greening is one of the typical treatments under urban viaducts, yet sites are generally affected by six shortcomings, such as less light, water shortage, traffic air pollution, poor soil, blocking traffic, and lack of maintenance, which are harmful for plant growth. Six typical sample viaducts in Wuhan, China, have been selected, and six environmental factors, such as natural sunlight, temperature and humidity, wind, water, and soil in green spaces have been measured on site, checked in labs, and modified by ECOTECT software. We discovered the following:

Natural lighting under urban viaducts is positively correlated with the shaded space’s depth-width ratio and the width in the middle of the two adjoining viaducts. The average sunshine condition under the north-south viaduct is better than that of the east-west direction viaduct, and the lighting distributes a symmetrical situation from the middle space to the two sides. The lighting intensity under the east-west viaduct is ten times stronger on its south side than the north side, and the planting spaces which adapt shade plants in the south five times wider than that in the north. There is an acute shortage of water under the viaduct, yet the rainwater on the viaduct surface is polluted by heavy transportation and road construction so that the rainwater cannot be used directly in watering plants. The main pollutants in it include COD, SS, TN, TP, which may be harmful to the greening, and small quantities of heavy metal materials, Zn, Cu, Cr, Pb, and Cd, which can cause harmful cumulative effects to the soil and plants. The soil under the viaducts is mostly construction backfill, which is unstable, barren, water shortage, internal impurity, and poor water holding capacity, and is becoming worse because of poor management after the completion of construction.

This paper puts forward that we should choose adapted plants based on three important factors: natural lighting, water, and soil pollution under the viaducts, and classify the different shaded resistance vegetation for planting design; at the same time we can use “rain chains” in a multi-layer rainwater filtration equipment to purify polluted runoff on the viaduct surface as well as to safely replenish groundwater. Moreover, with the reduction of the pollution of the backfill soil, and strengthening of artificial management, we may construct scientific greening under the shaded urban viaducts.
Transforming the Discussion
Urban Ecosystem Services: A Critical Review

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Keywords: urban ecosystem services, urban greening, greening cities, urban ecology, urban health, urban design, landscape urbanism, interdisciplinary research, critical discourse

Municipalities worldwide are showing substantial interest in urban greening, defined here as the introduction or conservation of outdoor vegetation in cities. Singapore has established a goal of “pervasive greenery ... wherever the eye could see” (ULI 2013, 26). Berlin, Malmö, Seattle, and Washington, D.C. have adopted Green Area Ratios, innovative planning policies that require the minimum surface of a site to contain flora (e.g., Keeley 2011). Over 30 North American cities have green roof and/or wall policies, incentives, or guidelines (GRHC 2014); and some 100 living walls have been installed in Paris, where street trees have increased since the late 1990s by more than 12% to over 100,000 (Laurian 2012). U.S. municipalities, in turn, are pursuing ambitious canopy cover goals and tree planting initiatives (Young 2011), exemplified by New York City, where a million trees were planted in less than a decade. This bloom of greening may be the most significant effort to integrate “nature” with city since the 19th century, when large parks, parkways, and street trees transformed the urban fabric (Eisenman 2016). Today, this movement is undergirded by the mainstreaming of ecosystem services, a social construct predicated on the quantification and monetization of environmental processes that may generate human health and well-being benefits. Yet, ecosystem services logic reflects a departure from the aesthetic, experiential, and landscape design approaches that have historically guided urban greening (Schuyler 1986; Silvera Seamans 2013). By extension, urban ecosystem services have emerged as a distinct subcategory of ecosystem services research and discourse (Hubacek and Kronenberg 2013); and some argue that commonly cited benefits of urban flora are poorly supported by empirical evidence (Pataki et al. 2011).

These issues problematize contemporary urban greening theory and practice. They also raise important questions about the conceptualization and application of ecosystem services in urban settings—a discourse that is dominated by environmental sciences and ecological economics. Building on the 2018 CELA conference theme of challenging contemporary norms, this talk will present a critical assessment of scholarly literature on urban ecosystem services focusing on three themes: (1) definitions of urban ecosystem services; (2) conflations of ecosystem functions with ecosystem services; and (3) interdisciplinary gaps. The ultimate purpose of this inquiry is to strengthen the theoretical bases that underpin urban greening practice, which has direct implications for landscape architecture and urban design, and has the potential to transform 21st century cities.
Post-Structuralism and the Liberation of Landscape Architecture

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Keywords: poststructuralism, postmodernism, binary opposites

Structuralism, a theoretical position that was manifest in the modernist movement, and post-structuralism, a theoretical position that was manifest in the postmodern movement, are both rooted in linguistic theory. Language is a powerful force in shaping the way in which we see the world, and this paper explores how post-structural linguistic theory has a significant potential impact on re-positioning landscape architecture as a discipline and a profession. Architecture’s flirtation with the postmodern paradigm, generated in large part by Venturi’s seminal work, Complexity and Contradiction in Architecture, resulted in historicist gymnastics that made a superficial attempt at expressing resistance to the way in which meaning is established in the structuralist model. With few exceptions the early postmodern legacy in architecture has been, at very least, fleeting and forgettable. This paper suggests that for landscape architecture the opportunity offered in the post-structural paradigm is not stylistic, but in repositioning the discipline within the constellation of actors that generate our built environment.

A basic unit of structural linguistic analysis is binary opposition—two terms placed in an opposing relation to each other (e.g., good and bad, positive and negative). While each element of the binary can only be understood in terms of the other, the structural pattern recognizes the dominance of the first term of the binary pair. Jacques Derrida proposed the idea of deconstruction to look at binary opposition in terms of ambiguity rather than dominance and subordination. By deconstructing the binary, he questions the assumptions that produce a hierarchical structure of meaning and, in the process, destabilizes that structure. Typical spatial binaries clearly place the landscape in a position of subordination. This paper examines how, in deconstructing the binary, we remove its assumptions of meaning and hierarchical status. When we no longer privilege the first term in the binary pair, the result is a major step in repositioning and liberating landscape architecture.

One of the foundation blocks of the emerging theory of landscape urbanism is the binary of architecture and landscape. However, it is important to realize that deconstructing the binary is not simply reversing the hierarchy of terms, but rather questioning the hierarchy and exploring different kinds of oppositional relationships. This paper discusses the enduring power of the binary opposite, examines several spatial binaries that show how the idea of landscape is subordinated, and proposes that the deconstruction of spatial binaries liberates landscape architecture from its subordinate status.
Breaking Bad: A Call for Landscape Architects to Influence Radical Change in Education

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Keywords: pedagogy, design education, design thinking, creative thinking

In this presentation I challenge landscape architects to step outside of their traditional role and answer a call to action to innovate our current education system. This step outward would extend beyond the landscape and environment while looking inward to share a way of seeing and experiencing the world. This proclamation is based on the realization that landscape architects are uniquely qualified to transform the model of education in the United States. Landscape architects can become agents of change on a much larger and impactful scale, helping shape the minds of the next generation.

Design education is built upon the development of creative problem solving, a skill that is largely absent in the majority of K–12 education. This iterative process of discovery is fundamental to how designers solve problems and ultimately engage landscape and societal issues. In addition to this skill set, landscape architects are trained to serve as mediators, communicators, and empathizers. They acquire a fundamental understanding and establish a shared language across many disciplines and ways of thinking. This way of seeing the world and understanding how to frame problems is essential to ensure that future generations are equipped with the creative capacity to thrive. Most importantly this transformative shift will only occur if landscape architects help lead on various fronts. Planning, guidance, modeling, and evaluation must all be part of seemingly our most ambitious and challenging design problem. We must accept the challenge to help build a culture equipped to collectively innovate.

This presentation will highlight a collection of projects led by landscape architecture faculty, professionals, and students. These projects demonstrate the power landscape architects possess when moved to respond to this call for action. Each example highlights the tremendous impact landscape architects can have in the effort to reimagine education at all levels. Projects range from primary and secondary school all the way through higher education, and address the role of landscape architects across various modes of engagement. For example, one project involved working closely with middle and high school students to design and implement a new curriculum in their school based on design thinking principles. Another project focused on collaborating with administrators at one of the top universities in the United States in establishing an enhancement plan built around design as an immersive experience. Moving forward, these case studies and others represent a model upon which a larger effort can build to effect change in education.
People, Parks, and Politics

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Keywords: community outreach, environmental planning, parks, diversity, conflict

We face a critical moment in time in the landscape architecture profession. The role of urban plazas, neighborhood parks, or community gardens as places where people of diverse backgrounds can still meet, interact, and possibly learn about each other, is becoming even more important. There is a trend that the welcomed diversity within our communities is more and more turning into self-selected segregation. Groups stay among themselves, watch their own news—even the open forum of the Internet is becoming an echo chamber. This unfortunate development makes open spaces and public parks even more important for a just and stable society.

This was a leading thought when the Rutgers Center for Urban Environmental Sustainability (CUES) took on the task to develop a master plan for the park system of Bergen County, New Jersey. This relatively affluent but also very diverse suburban county within the New York City region is home to approximately 1,000,000 residents living in one of the most densely populated counties in the most densely populated state in the U.S. The challenging political situation demanded a sensitive and multilayered community outreach approach to develop trust in the process. Even more so because New Jersey’s population is formed by numerous immigration waves creating a highly diverse population, which is self-segregating along economic and ethnic lines in 565 highly independent municipalities. Environmental conflicts caused by rapid urban growth helped to establish a significant environmental community. Although the membership of local environmental groups include wealthy, well-educated, and outspoken individuals, their communication with the county administration has often been hindered by a high turnover of county government officials and changing alliances between the County and interest groups.

The example of developing a master plan for the Bergen County Park system will illustrate how the public process of creating guidelines for a complex park system is closely tied to the context of evolving societal values. These at times conflicting values turned out to be core challenges for developing a masterplan. Discussing the chosen strategy of identifying and addressing conflicts through the planning and outreach process of a particular case study will contribute to the general discussion on the politicization of public open space and the structures of power.
Determining and Designing Cultural Aesthetics for Landscape Infrastructure

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Keywords: landscape infrastructure, resource management, water, aesthetics, urbanization, globalization

As participants in urban development, landscape architects are well positioned to balance the ecological and cultural needs of growing cities. Due in part to shifting climate patterns, design professionals are playing a larger role in resilient infrastructure development. However, ecologically sensitive investment is not evenly distributed and often carries with it a repetitive aesthetic of urban renewal. Furthermore, in the era of globalization, local urban infrastructure development affects global resource management. Looking at the global water crisis, for example, local water infrastructure practices affect water access and flood risk downstream. As Alpa Nawre argues in her work on water management in India, “urbanization . . . presents an opportunity for landscape architects and urban designers to actively address water security.” So when landscape architects find themselves managing global resources through urban development at a critical juncture in the history of anthropogenic climate change, how do they translate ecological and climatic relationships through culturally-relevant design? How do landscape architects promote ecologically sensitive infrastructure in underserved and vulnerable communities?

This paper investigates the application of cultural aesthetics to landscape infrastructure as a means of decreasing the scalar disconnect between the global water crisis and local water practices. It compares water infrastructure design in two underserved urban areas, Kolda, Senegal in Sahelian, West Africa and the Historic Anacostia Neighborhood in Washington, D.C. Landscape architectural mapping methods and analysis of cultural water use practices reveal distinct urban identities. A Halprin-inspired scoring method was used to notate water flows across transects in both cities. Information was gathered through on-the-ground observation, photo documentation, interviews, and geo-spatial data. Sectional geologic studies informed underground water movement, storage, infiltration, and daylighting. In Anacostia, spigots on front porches water flowers and wash cars, 3-foot square inlets drain the yards of the newest homes, and an underground municipal reservoir is hidden in plain sight. In Kolda, two villages grew together into a bustling market town, where residents access water from ground wells, rainfall, and a limited municipal system, and build site-specific interventions for erosion and inundation. Examining how these cultural water-use practices interact with the urban fabric informed the development of a universal kit of parts malleable enough to meet specific cultural and ecological situations. The kit consists of water sources at springs and wells, swales, rain gardens, depressions, berms, and paving options. Elements from the kit of parts were then re-interpreted as “experiential equivalents” of cultural and natural water systems in suites of
speculative designs across Anacostia and Kolda. For example, berm and swale earthworks were interpreted as rice paddies in Kolda and sculptural streamways in Anacostia.

Application of the kit of parts necessitates sensitivity to local soils and plant materials, to the amount of space available, and an awareness of existing and desired water flows based on cultural water use patterns. The comparative study between Kolda and Anacostia demonstrates that with ecological and cultural understanding, a universal kit of parts can be interpreted to create meaningfully distinct water infrastructure. Taking an aesthetic approach to infrastructure development provides context for its construction and maintenance, and offers public legibility. In a world where global water risk is on the rise due to hard engineering, integrating municipal hydraulics with local hydrology and cultural water use will create greater awareness of the anthropogenic effects on the water system and foster cultural habits that protect and preserve the local water supply.
Identifying and Meeting Climate Change Information Needs for Landscape Architects

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**Keywords**: climate change, web resources, survey, information needs

A recent survey of landscape architects in Florida found that a strong majority of respondents (81%) believe climate change is relevant for current or future landscape architecture projects (Volk et al., forthcoming). However, many landscape architects indicated that they needed more specific information about climate change, and they were unsure or divided on specific approaches to address the impacts of climate change in their projects. Based in part on these results, this presentation and paper will describe a project currently underway to develop a website and online clearinghouse of relevant information for landscape architects regarding climate change, with the goal of filling information gaps identified in our survey.

To develop this product, the team is analyzing the results of the survey including Likert-style and written comments to determine landscape architects’ information needs, while also conducting a review of relevant literature and projects, which will inform the material to be included on the website. The team is planning to test the beta-version of the website with a focus group of landscape architects and other key users to obtain feedback before the final site is publicly released. This project will fill a critical need identified by landscape architects in Florida by providing a centrally available source for climate change scenarios, research, and the latest information on best practices and strategies for addressing climate change in projects. Final public release of the website is anticipated to be summer 2018.

The proposed presentation and paper will summarize the results of the survey as they relate to climate change information needs identified by landscape architects, provide an overview of the methodology being used to develop the website, and summarize next steps for releasing and maintaining the website and evaluating success. This information may be useful for other institutions, planners, and organizations seeking to identify and address climate change information needs for landscape architects, and an approach for disseminating information and developing a related web presence for practitioners.
Rethinking “Appomattox”: A Student Competition to Reimagine a Civil War Memorial in Alexandria, Virginia

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Keywords: Civil War memorials, African American history, commemorative landscape, design competitions

Standing in the middle of a busy intersection in historic Old Town, Alexandria, Virginia, is “Appomattox,” a bronze statue of an unarmed Confederate soldier, head-bowed and facing south. Local soldiers who survived the Civil War erected the statue in 1890 to commemorate their fellow soldiers who did not return, and it marks the spot where the soldiers had formed a local brigade and retreated from advancing Union troops. Like many other Civil War memorials, this statue has been under intense scrutiny, and its existence has polarized debate among the local population. The statue also sits in the midst of the small constellation of buildings that form the campus of Virginia Tech’s Washington Alexandria Architecture Center (WAAC), hence the national debate over Civil War monuments has immediate relevance to the design community of WAAC.

At the start of fall semester 2017, students were charged with a one-week design competition to engage the existing memorial and/or commemorate African American history in Alexandria. The goal of the competition was to explore the potential of design to transform the discussion from a dichotomy of preserving versus removing the monument to a more complex discussion about the ways the form of the monument and its urban environment shape its interpretation and the meanings projected onto it. It was hoped that the student work would illustrate the potential of design to reframe the debate and open doors to other potential solutions to the polarized political debate surrounding the memorial.

This paper focuses on the actual competition and critiques the submissions to understand better the issues they reveal and the ways they engage the memorial and its urban and cultural contexts. Specifically, it addresses such questions as the kinds of framing devices that guide interpretation of the statue, the impact of its removal or redesign on the urban context, the role of the plinth versus the actual statue in the act of commemoration, whose history is told, and the role of artistry in the design. The list is not intended to be exhaustive; it reflects the issues raised by these works and discussed in jurors’ comments. Though focused on the competition, the paper will situate it within the larger national debate about Civil War memorials and also in the local context and history of this specific memorial and the histories of African Americans that are already commemorated (or not) in Alexandria.
Transforming the Surface: A Proposed Theory for Surface Design in Landscape Architecture

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Keywords: surface design, surface operations, landscape surface, surface transformation, surface categories

This paper transforms discussion of surface in landscape architecture, creating a new framework for its understanding, in order to deepen its design practice. Within landscape architecture, we often refer to a primary medium of our field—the ground plane—as topography or topology. Less so, if ever, do we call this medium “surface,” which risks association to the superficial, artificial, or abstract. Whereas the term surface is actually a more encompassing concept that relates geometry, geography, materiality, mediation, effects, and perception into a unified field. Since many other research and design disciplines—such as philosophy, history, psychology, new materialism, art, and architecture—have created and employ theories and concepts of surface in interesting and productive ways, I conducted interdisciplinary discourse analysis of surface to construct deeper knowledge of material and cultural mediations, performances, and effects enabled specifically through surface in landscape.

This reading of surface from other fields expanded my evaluation and interpretation of twenty case studies of landscape projects constructed since 2000, wherein surface is a particular focus by the designers. Within the case study projects, I recognized that design relations and outcomes among site context, materiality, depth, and text were taking place through the surface itself. I further sorted the projects into categories of surface design operations such as deconstruction and hybridity that characterize emergent principles and processes in designing urban ground. I use the design operations categories to explicate the critical role of landscape architecture in regenerating the surfaces of cities and other urbanized contexts. This work aims to transform insight and analysis of surface into new areas for landscape surface research and practice.
Beijing and Boston: A Comparative Study of Urban Landscape Evolution and Transformation from 1998 to 2018

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Keywords: Beijing, Boston, culture, landscape ecology, transformation, analysis, social performance

A landscape is a holistic system in which nature and culture co-evolve (Wu, 2010). How to preserve history and culture, and restore a disrupted ecosystem in urban landscape evolution and transformation? This study addresses emerging issues in landscape preservation and cultural and natural resource management across disciplines. It attempts to compare how two cities—Beijing and Boston—have changed over the past 20 years in understanding urban landscape evolution and transformation, and recognizing cultural distinctions. Both cities have elements of old and new, and have evolved over centuries to become modernized historic cities. This multidisciplinary study provides a venue where the Known meets the Unknown, the Old meets the New, and where the West meets the East. Our study encompasses this evolution from multiple angles including built environment, culture, and landscape ecology.

Both authors have personal connections to these cities. One of the authors grew up in Beijing and now lives and works in Boston; the other grew up near Boston and now lives and works there as well. These personal histories offer significant photographic material to work with, captured over several decades. Anthropological photo analysis techniques are explored as part of our methodology. This offers objectivity to the meaning we take away from the changes in photographs. We hope to capture moments of disappearing cultures and landscapes in both tangible and intangible ways while reveal new trends and persistent phenomena as time passes. Our principal findings are that both Beijing and Boston have undergone significant changes in urban infrastructure, transportation, and land uses in some parts of the cities in the past 20 years. Challenges associated with population increase, economic growth, and climate change have had impacts on both cities’ urban environments. Our study attempts to gain insights into how to create more sustainable urban environments and how to preserve cultural heritage for cities with a rich history in this ever-changing world.

This research project is a pioneer study in exploring divergent ways of thinking and tolerating ideas we may not initially understand. It will foster understanding of design through the use of Beijing and Boston’s urban contexts from a new, nontraditional angle. We would like to demonstrate that we are influential in resolving the rapid expansion of cities, yet in more socially and culturally constructive rather than imposing ways.
The Arid Debate: Transforming the “Wet” Discussion

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Keywords: arid, urbanization, climate change, cartography

In landscape architecture, the “inundation” of climate change discourse is primarily focused on the littoral territories found in jeopardy due to rising seas. This is rightfully timely, due to the destructive nature of aqueous phenomena. However, another scenario—a dry one—equally requires our attention but is constantly being overlooked. This lack of urgency and consideration can be attributed to such designations of arid regions as “barren,” “deforested,” “overgrazed lands with little value,” and “aberrations that need to be repaired and improved,” which was embodied by the 1994 UN Convention to Combat Desertification (UNNCD). Classified arid landscapes account for more than one third of the Earth’s total surface and are anything but “barren.” They are rich with urban life, agricultural necessities, and biological diversity—reinforcing their need to also be critically evaluated by landscape architects.

Situated within the Mojave Desert, Las Vegas is home to two-million residents, with a population projection to reach about three-million people by 2050. This increase in population, coupled with the threats of climate change, pose serious challenges to the city’s resources and landscapes. Las Vegas, like many other arid cities, cannot survive independently and relies heavily on distant territories for its sustainable existence. To transform the discussion within climate change discourse to include arid landscapes and cities, students at the University of Nevada, Las Vegas conducted a series of investigations analyzing the issues through the lens of a landscape architect. Students framed the research around the speculation that urban resiliency is an issue of territorial resiliency—that the success of the city is only as strong as the territory that supports it. Therefore, the projects viewed Las Vegas’ climate readiness through a series of territorial flows, both anthropogenic and biophysical. Through cartographic explorations, students focused on the current state of water, food, mobility, waste, urban form, ecology, and quality of life measured against the projected climatic threats to impact the supporting territories. Composed as an exhibition and atlas, the analysis revealed several fragilities and opportunities for intervention that ultimately position the landscape architect as a critical agent in the design transformation of our arid cities and territories. This paper is the presentation of the initial outcomes of this two-semester speculation that transforms the discussion from a predominantly “saturated” conversation to an arid debate.
The Blurring of Landscape Architecture: BIG's Amager Bakke Waste-to-Energy Power Plant

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Keywords: waste-to-energy, globalization, infrastructure, designed landscape, hybrid, transdisciplinarity, civilization

It would seem that, in recent years, the boundary of what constitutes a landscape architecture project has become increasingly blurred. With an ever-growing panoply of technological advancements to choose from—often tempered by globalization’s unarguable fetish for immensity, projects today are characteristically unfettered by the unspoken segmentation of the design disciplines in academia. Mexico City’s New International Airport, for instance, boasts a “continuous lightweight gridshell” that encloses the entire terminal—an impressive architectural feat. Yet, the necessity to plug into a vast transportation network, both aerial and terrestrial, might warrant the of infrastructure. Moreover, the airport’s colonization of a vast territory in the outskirts of Mexico City might even qualify it as a quintessentially modern landscape project. So, which one is it? All three? Neither? It would seem this troubled identity is not a question of authorship or scale. While Mexico City’s New International Airport is a collaboration between two “architecture” firms, a more modest-in-size and landscape-architect-authored project, Lisbon’s Alcântara Wastewater Treatment Plant is equally ambiguous. The title alone might suggest an infrastructural project, yet its design hinges on a varied collection of terraced rooftop gardens and promenades—most assuredly a “designed landscape.” These two aforementioned projects are among a few of a growing list that straddle disciplinary boundaries and resist straightforward labels. To this effect, the focus of this essay is a project that similarly resists categorization. Slated to open later this year, BIG’s Amager Bakke Waste-to-Energy Plant will not only be one of Denmark’s tallest structures but also feature a ski slope, parks, trails, a rock-climbing wall, and gardens. Contextualized within the historical genealogy of the landscape architecture profession and the discipline’s discourse today, this paper will analyze and interpret BIG’s Amager Bakke Waste-to-Energy Plant as a designed landscape. Additionally, the project’s position at the intersection of public park and private plant, cultural amenity and energy infrastructure, and local response to a global concern, will reveal a hybrid condition whose language should be of special interest to landscape architects seeking an identity beyond both the more pastoral images that often dominate the field abroad and the ever-increasing needs of our connected civilization.
Design Research as a Means for Urban and Environmental Regeneration in Latin American Cities

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Keywords: Latin America, design as research, hybridity, design implementation

Latin American cities have long been a global case study on rapid urbanization and the negative effects derived from this growth. The pace of development has primarily focused on the delivery of housing and, by doing so, on the construction industry economy and large-scale land-ownership development. Unfortunately, this rapid growth has paid little attention to the precedent armature of natural systems and local ecology. While not in the mainstream discourse surrounding the discipline of landscape architecture and ecological planning, Latin American cities have found significant ways to plan, design, and implement projects striving to establish a more harmonious relationship with their natural environments. These projects have hybridized ecological knowledge and local urban, professional, and academic cultures in order to convince decision leaders and communities on their intrinsic value.

This paper focuses on design research, as produced in academic and professional environments, as a successful model of exploration to inform local “project cultures” or design culture. This paper analyses investigations and the trajectory of what were initially speculative projects, emerging from academia, which have had a capacity to become or inform the implementation of projects in various cities of the continent. The investigation is framed in a synthetic review of the concept of design research as approached from North American, European, and Latin American perspectives coming from academia. It then develops a series of case studies dissected to explain how these found a balance between the general disciplinary discourse, the local professional environment and regulations, local community, and particular intellectual ambition. As such, these projects result in hybrids which range somewhere at a broad center balancing conservative status quo–oriented solutions and radical but transformative approaches. These projects illustrate explorations and discussion in the disciplines of urbanism and landscape. The projects are defined in various phases and configurations, from collective dialogues promoting a stronger environmental urban focus to design projects. This includes impactful workshops organized to discuss urban issues in a series of events known as Los Seminarios de Montevideo held in Uruguay, projects like the Barigui and Iguazú parks in the planning of Curitiba of the 1970’s and contemporary case studies of Latin American design as research such as the Mapocho 42K project in Santiago, Chile, and the Rio Medellin Project in Medellin, Colombia.
City Play: Post-Affordances and the Transformative Power of Place

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Keywords: urban design, affordances, appropriation, urban ecological theory, nested systems

Landscape architecture research and practice often focus on demand or instrumental value of the land to serve some need, like a healing garden or playground, or the intrinsic value of the land due to unique characteristics, like a protected wilderness or geological phenomenon, but rarely does the discipline concentrate on the transformative power of the environment. Sarkar (2012) suggests that transformative power refers to those unanticipated experiences with the environment that change or transform our worldview. Both natural and cultural entities may contain a transformative power that, for good or bad, go beyond either preference (demand/instrumental value) for an experience or a well-known, intrinsic value. In other words, the aura of the place is always subject to the changing values placed on it (i.e., Confederate monuments), for good or ill (Benjamin and Arendt 1986). The transformative power of the environment is similar to the Gibsons’ (1979, 127) well-known concept of affordance: “the affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill.” However, affordances measure visible instrumental or intrinsic values. The presentation suggests that the transformative power of the environment captured and shared through social media provides a socioecological post-affordance (Brofenbrenner 2000). Social media makes the real “real” through reflexive properties unconsidered in functionalist ecological models. Using big data on human play in cities from across the globe, I will discuss how social media challenges the instrumental or intrinsic value of place. Through a combination of place-focused study and the analysis of big data across multiple sites, I will discuss how post-affordances—place affordances that are neither here nor there—express the transformative power of public space. Landscape architecture strives to create places that enable everyone, regardless of age, gender, race, ethnicity, ability, and combination thereof, to successfully participate in public space. Here, I build on affordances and urban ecological theory (Nassauer 2012) to suggest that social media is a socioecological process nested within place, and that landscape architects can enable others to benefit from the transformative power of place through the analysis of post-affordances.
Landscape Architecture Researchers and Practitioners under Transformation of Pasteur's Quadrant

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Keywords: transformation, Pasteur's Quadrant, scholar-practitioners, usefulness knowledge

In the field of landscape architecture, the separation of researchers and practitioners is rather obvious. Because of different professional ideologies and communication groups, there is usually a tense relationship between researchers and practitioners. Researchers often complain that their knowledge cannot be correctly understood and applied in practice, and that knowledge is quantitative, objective, and practical from the perspective of technical rationality. However, practitioners believe that knowledge is qualitative, subjective, and practical. Researchers’ knowledge plays a limited role in practice, and few researchers are committed to producing relevant knowledge for practitioners. Perhaps practitioners care about relevance and effectiveness rather than scientific rationality and preciseness. To put it in another way, practitioners work based on their own values and experiences. In fact, researchers and practitioners have a common goal: improve people's living environment so that people and nature can live in harmony. Stokes (1997) proposed an eye-catching view in his seminal book *Pasteur’s Quadrant: Basic Science and Technological Innovation*. He argues that the dichotomy between basic research and applied research as well as the traditional mode of linear thinking should be broken. The motivations of basic research and applied research are not opposed to each other; instead they can be combined in many ways. The traditional paradigm cannot contribute well to the sense of identity between two groups, so we need a new paradigm (Pasteur’s Quadrant) to reshape the relationship between the two. Moreover, with such a paradigm, researchers can provide practitioners with relevance, actionability, and efficacy knowledge.

We interviewed more than 20 researchers and practitioners in the landscape architecture industry, among whom researchers are mainly educators (teachers from technical colleges and universities) and practitioners include managers, designers, and frontline workers. As indicated by the interview, we learn the current situation faced by researchers and practitioners in this field, their dilemma and real thoughts, and we try to explain how basic or applied researchers convert themselves to practical researchers. Pasteur has never considered himself as a basic or applied researcher. He is good at finding prudent problems about basic research during the solution of application problems in practical projects. Ultimately, he not only developed his theory while solving practical problems, but most importantly, he summarized knowledge that is useful to practitioners. We must learn from Ian McHarg, the great scholar-practitioners, to face the challenges and break the chrysalis in landscape architecture.
Professional Culture Mindsets in Planning, Design, and Construction: Transforming the Discussion through Understanding

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Keywords: professional culture, mindset, values

Professional culture mindsets are defined as the beliefs and values held by members of a profession about the basic qualities that define the profession and their contributions (adapted from Carol Dweck, 2006). The professions involved in planning, design, and construction have a strong sense of “who they are” and how they contribute to the built environment. This strong sense of professional cultural identity can foster opportunities for integrative work or create barriers between the professions. The need for addressing these opportunities and barriers is critical as climate change and urbanization are increasing the magnitude and complexity of built environment projects (United Nations, 2014; Hustwit, 2011) and clients are seeking firms who provide collaborative services across planning, design, and construction (Coleman, 2002; Lichtig, 2005). To explore the idea of professional cultural mindsets, 478 practitioners completed a survey using semantic scales to identify professional identity descriptors (beliefs, values), rating the value of academic training, and rating statements about contributions to built environment projects. The respondents represented entry to upper level positions, with over half having 16 plus years of experience. For the study, practitioners in urban and regional planning offices represented “planning,” landscape architects represented “design,” and construction managers represented “construction.” Semantic scale dimensions for the values variable include tradition-innovation, understanding limits-pursuing “what if,” expert knowledge-generalist knowledge, and working independently-working collaboratively. High-low rankings of the contributions variable include six characteristics: design, engineering and construction, regulatory compliance, visual communications, public input, and integrating multiple voices. Principle component analysis revealed a strong link between contributions and values, supporting the proposition that what we contribute is what we value. Mapping the variables on a continuum, planning and construction are the furthest apart with design in the middle, mirroring the linear process often used in practice. So how can we enhance communication and integrative processes across planning, design, and construction? Making professional cultural mindsets transparent can create a platform for transformative dialog. Using the middle position of design as a bridge, design thinking (a reiterative process combining scientific thinking, idea/solution generation, and comfort with ambiguity or uncertainty; Brown, 2009) can support venturing into the “unknown world of possible solutions” (Marusic, 2002, p. 100). Design thinking can also support webs of inclusion (Helgesen, 2005), in contrast to industrial-era hierarchies and linear systems, that allows participation across professional cultures, tapping into diverse talent, and fostering new partnerships.
Finding the Way: Transformation through Engaged Dialogue and Action

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Keywords: design education, wayfinding, branding, user experience

The theme of this conference emboldens us to “engage in the layered dialogues that call to account their positions and reflect upon their actions” (Conference Call for Papers). As such, this paper revisits the opportunity to debate the assumed roles that wayfinding and branding play in transforming a campus’s accessibility, legibility, and community identity. In his book, *Information Anxiety*, Richard Saul Wurman suggests that the city exists as an aggregation of systems where order does not necessarily secure awareness. It is our contention that, nearly 30 years after the publication of Wurman’s work, university campuses can also be categorized as environments where, despite a normalized appearance of order, one’s cognition and experience of place can be distorted into an unacceptable norm.

This presentation focuses on the cyclical responsive process of dialogue and action that occurred between students of landscape architecture, faculty members, and university administrators. The work that accompanies this text is the product of an undergraduate design studio that was asked to assist a major metropolitan university in crafting a wayfinding and branding master plan. The campus that this work focuses on was one of the three national university campuses that hosted a 2016 U.S. presidential debate. After the national news media departed from the campus, its administrators were forced to admit that the overall wayfinding and branding scheme employed throughout existed in parallel with Wurman’s thesis that order does not necessarily secure awareness.

This work illustrates a multi-tiered methodology that includes case study analyses, an iterative and direct design feedback loop with representatives from the university president’s office for special projects, and as such, access and use of that unit’s database of survey mechanisms used in identifying the critical components needed for the successful completion of the master plan. In our findings, we will concentrate on the completion of the wayfinding and branding master plan, and the documentation of the activities that continue to take place between students, faculty, and the university stakeholders involved. An emphasis of importance will be placed on how the methodologies used enabled the students to distill the lessons learned throughout the cyclical process to “challenge conventions, habits of mind, and those deeply held meanings that guide our thinking about the contemporary urban campus” (Conference Call for Papers).
Feminist Political Ecology and the Challenges of Contemporary Landscape Design

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Keywords: feminism, political ecology, urbanism, infrastructure, intersectionality

“The politics of identity—however they may be defined around gender or race or neighborhood—are an inescapable and important aspect of dealing with the urban built environment, from the perspectives of public history, urban preservation and urban design” (Gandy 2014).

Feminist political ecology (FPE) is a valuable resource for landscape architectural practice because it engages important shifting knowledge bases in the world. Climate change adaptation, women’s rights, and challenges to Eurocentric knowledge are all related to FPE. Adding these concepts to studio challenges the notion that landscape is a fixed entity where idealized final products fit into existing typologies.

The purpose of this study is to promote diverse perspectives in design. FPE-specific readings, interdisciplinary faculty engagement, and image analysis were all integrated into the studio to promote new ideas and discussion. Incorporating FPE perspectives in design refutes the dominance of historical spatial configurations and public perceptions of [marginalized] women, and promotes the unpacking and implementation of safe space. Landscape projects produced within this framework engaged the marginalized, the natural, and the invisible while acknowledging the inequality of public space.

This paper will reframe some of the paradigms of landscape design, including project typologies, spatial relationships, and vocabulary that reinforce the masculine of feminine through a discussion of a few very well-known works. It will suggest ways that academics can deconstruct these ideas with students, promote alternative perspectives, and create more varied and rich projects that envision new futures for landscape architecture. FPE offers alternative avenues for thinking about how, why, and for whom we design landscapes.
Un-thinking Gentrification: Engaging with Bias and Privilege in Landscape Architecture Education

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Keywords: gentrification, equity, social design, bias, education

Gentrification can be broadly understood as the process of creating urban fabric that conforms to needs and tastes of middle-class residents. The process is often accompanied by physical displacement of low-income residents, feelings of loss and exclusion, and a sense that the city is unwelcoming to certain social groups. Gentrification is a complex process, embedded in political, economic, and social structures that operate both within and beyond the scope of landscape architecture. The American Society of Landscape Architects (ASLA) describes the field as one that “nurtures” the built environment and suggests that practitioners have “a significant impact on communities and quality of life.” To achieve these goals equitably for all residents across diverse socio-economic backgrounds, there is a need for practitioners who are knowledgeable in the history, processes, and practices of gentrification. Such awareness is part of developing a more critical approach to the social aspects of design practice in our diverse world, in order to better serve diverse clients and to address patterns of development that privilege only portions of society.

This paper examines cross-curricular methods to engage students in exploration and critical thinking about gentrification and socio-economic diversity in design. This work is premised on the understanding that, to an extent, patterns of exclusion in the built environment are rooted in the assumptions and unexamined values of design professionals. Methods examined are drawn from an introductory theory lecture course, and upper-division design studios. Beginning in the theory class, students encounter the writings of radical practitioners and theorists such as Walter Hood, Randolph Hester, and Dolores Hayden, as well as histories of redlining and urban renewal. During the discussion portion of the theory course, students participate in collaborative activities designed to activate engagement with sociological and psychological processes that can contribute to gentrification such as social norming, perception bias, fundamental attribution error, and projection bias. Methods used in design studio to examine these issues include partnering with environmental justice groups from underserved communities, as well as focused critique on modes of representation used to describe both existing communities and design proposals. The impact of these teaching modes has been assessed using surveys, course evaluations, juried reviews, and interviews with alumni students and will be presented, along with discussion of the challenges of addressing controversial social issues in undergraduate programs.
Urban Health–Public Space Systems: A Cure for What Really Ails Us

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Keywords: public health, public space, social equity, cultural vitality, urban health

Crisis in public health was a leading rationale for the creation of public parks systems in rapidly industrializing cities of the nineteenth century, as well as a catalyst for flight from cities to suburban communities. The twenty-first century has seen a significant pattern of migration of populations back into cities. Simultaneously, we see a new crisis in public health, driven by issues of equity and access, overreliance on medical intervention, and awareness of mind-body connections. The regulatory charge of the landscape architecture profession to protect the health, safety, and welfare of the public has devolved to a “do no harm” mentality, but the ever-growing societal focus on public health suggests a broader potential to reframe our work in the context of “health of place.” The performative health benefits of designed landscapes have been promoted most effectively through the work of Clare Cooper Marcus and others in their research and design for therapeutic landscapes in healthcare settings. Yet contemporary trends are all converging to signal the need to extend this lens to the broader complex of public space in urban areas. While many traditional urban parks systems struggle to maintain relevance and essential support, they remain the de-facto face of landscape space in cities. Several new typologies and tools for urban design and landscape architecture have arisen to respond to specific needs and opportunities for creating healthy communities, though these typologies (e.g., green infrastructure, complete streets) and tools (e.g., GIS) have generally been more focused on technological, environmental, and biotic problems rather than the social, emotional, and mental wellbeing of citizens. The work of urban theorist Richard Florida in chronicling the rise of the urban creative class and defining a new urban crisis of inequality and gentrification highlights the need to realign our community planning and design efforts toward the heavily social and cultural dimensions of the most pressing problems of contemporary and future cities.

This paper will present a comparative analysis of traditional public space typologies (e.g., parks, squares, greenways) and new public space typologies (e.g., complete streets, urban agriculture, tactical urbanism) for their general urban design relevance, health impacts, and their specific potential to impact social and cultural dimensions of health and wellness. Case studies of research and planning projects in New Haven, CT and Philadelphia, PA will help illustrate how this analysis might transform the discussion around urban health and public space systems.
A New Model Integrating Landscape Architecture within Global Health: A Case Study with an Informal Community in the Peruvian Amazon

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Keywords: landscape architecture, built environment, health, landscape performance, cross-disciplinary collaboration, community participatory design and research

We have known for a while now that the built environment is a determinant of health; that the health of humans, animals, and their environment is profoundly intertwined; and that deep collaboration across disciplines and with communities enhances sustainability and knowledge building. Despite this knowledge, there are very few applications of landscape architects collaborating with health and sciences professions to strategically identify, address, and assess health issues on the ground and with communities. Furthermore, vulnerable communities that greatly interact with their environment are especially in need of such efforts to find sustainable solutions to the multitude of intertwined human and ecological health issues cause by their environmental conditions, as global burdens of disease steadily increase. The 2016 New Landscape Declaration issued a call for action for the profession of landscape architecture and their allies to make big moves to address the ever-growing global health and environmental justice issues of our time. This paper responds to this call and challenges the way we view landscape architecture by: (1) proposing a new professional model of integrated collaboration and knowledge exchange with the health and natural science disciplines, academia, and marginalized communities; (2) grounding the discussion with a case study of this model in which 40 researchers, practitioners, and students across 15+ disciplines (e.g., landscape architecture, nursing, ornithology, dentistry, microbiology, environmental engineering) and 5 institutions from 2 countries are working together with indigenous migrants in an informal urban community in the Peruvian Amazon; (3) explaining the integrated methods used to identify and prioritize health issues and inform the design of a landscape intervention that strategically addresses those issues in the community; and (4) showing preliminary results of how the landscape intervention improved human, ecological, and environmental health systems in this community (e.g., mental and social health, biodiversity, improved water and soil quality, parasitic disease reduction, access to food and medicine).

This presentation aims to “transform the discussion” around built environment and health into a new model for action-oriented collaborative research in communities that need our services the most. Landscape architects can be a critical piece in the One Health Initiative and global health efforts. It is time for a deeper collaboration between disciplines, with communities, and across practice and academia so we can train the next generation to think and do beyond societal boundaries to address our damaged systems contributing to poor health.
Topology in Landscape Architecture Theory and Education

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Keywords: landscape theory, landscape design, design education, computational methodologies, phenomenology, landscape history

This presentation introduces topology in landscape architecture to the academic discussion in the U.S. Conceptualized at the ETH Zurich between 2011 and 2015, topology comprises a theoretical framework, a method, and tools to reintroduce the capacities and methods of landscape architecture into the current theoretical discourse and actual shaping of our environments.

Landscape architecture is understood as an integrative discipline with a deeply rooted tradition in shaping and preserving nature. The goal of establishing “topological thinking” is to merge ecological concerns and a design approach that considers the basic factors of modeling a site: understanding of both the terrain and the history of a place, its spatial qualities, the condition of its soil, the proper use of plants and building materials, and the adjustment to the expectations of its users while challenging aesthetic sensitivities. Topology links the use of computational methodologies to improve the education of design disciplines with a deep understanding of the history of landscape design. In some sort it was developed as a counter position to landscape urbanism, which functions very well as a strategic tool on a large scale but seems to repeatedly fail when it comes to the topological and phenomenological qualities of specific designs at a small scale. Topology as a theoretical framework, a method, and tools to reintroduce the capacities and methods of landscape architecture into design was founded on the observation of a schism between the way landscape is understood scientifically or economically and the way the same place exists emotionally for people. This disparity called for a change of approach. Topology can, according to the hypothesis of the group that developed it, pay greater attention to deeper spatial, physical, poetic, and philosophical values, embedded in a long tradition of designed nature. Its strength is to weave together different fields of action, improving the understanding of landscape as a cultural task with all its inherent beauty.

In the presentation the principles of topology are laid out and illustrated by successful work from “topologists” of the past and the present (from Peter Josef Lenné to Kathryn Gustafson). Furthermore, the potential computational methodologies offering a change of approach to landscape design (especially) in urbanized areas is reviewed in the light of this thinking.
Why Is Landscape Architectural Research Not Read by Practitioners?

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Keywords: research method, readership, communication of research, landscape architecture

While the research community in landscape architecture expanded with increasing numbers of papers, conferences, magazines, and grants, many notice that research products have not been widely read. Scholarly journals publish few hardcopies, and most research papers have seldom been downloaded or cited. To partially address this phenomenon, this study investigates the condition that practicing landscape architects update knowledge and communicate understandings. Why is landscape architectural research not read by practitioners? Does the production and authoring of research, such as research subjects, research tastes, research areas, writing styles, and presentation means, give rise to this phenomenon? Or, are there other reasons?

The main body of this research is a survey. The questionnaire asked the reading habits of practicing landscape architects, such as the frequency, formats, contents, research methods, subjects, and writing styles of possible reading materials. The questionnaire also asks practicing landscape architects their sources of new knowledge, as well as their choices in conditions when they felt short of knowledge. Basic population and career information are also asked. This survey will be conducted in an online format in U.S. and China. 500 survey invitations will be sent out.

It is absurd to assume that quality research products in landscape architecture should be read by practitioners. However, understanding readership among practicing landscape architects may inform the authoring of scholarly research. This study seeks to transform the discussion paradigm in landscape architecture in aiding researchers in reflecting on their research subjects, research tastes, research areas, writing styles, and presentation means.
Sowing Indeterminacy: Eco-Urban Hybridization in Pittsburgh Vacant Lots

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Keywords: eco-hacking, autonomous, computation, community interface, open-ended, robot, vacant lots, plant communities

This is a speculative project that proposes the automation of ecological participation in neglected urban landscapes. By pairing urban ecology with computational landscape methods, we seek to actualize the academic position that open-ended design is desirable and allied with contemporary understandings of ecosystems as fluctuating compositions of ever adapting agents. This work engages ecosystem health via simulation and intervention: a rover becomes a catalytic agent of mutant urban environments through autonomous planting behaviors derived from a framework designed to transform urban lots into culturally valuable and environmentally productive land.

Pittsburgh is full of spaces that have been evacuated or left behind, often mowed as a part of a maintenance cycle born from an archaic construction of human comfort and safety. Maintenance like this has emerged from the conceptual exclusivity of habitability and untamed vegetation, and inhibits social and environmental production. This project challenges status-quo maintenance ideologies by incorporating the dynamism of human and non-human interaction into urban ecological process by way of a robotic framework tuned to the production of urban plant and animal communities that are functional, resilient, and robust, but also emotional and engaging. The framework operates at four scales. At the regional scale, a database categorizes plants and sets up grouping logics for successful ecological communities. At the community scale, we have created an interface which invites community participation to determine what kind of urban wilds will be welcomed in specific neighborhoods. At the site scale, the rover continually monitors its plot, using sensors to gauge site conditions to make decisions about seeding and terraforming. A networking simulation describes the materialization of urban-scale patterns which engage larger landscape dynamics like stormwater management, habitat connectivity, and soil health.

The computational logics developed in this project operate as a flexible schema rather than a rigid instrument. They encourage behaviors which are participatory—the rover becomes an actor rather than manager. It enhances environmental systems interrupted by lawnmowers and backhoes, disinvestment, and siloed urban infrastructures by interacting with the landscape at the scale of the individual, building hyperlocal adaptability into the ecosystem as a strategy for urban resilience by way of its slow, incremental, and nondeterministic activity.
Restorative Gestalt: Making the Unseen Imagined, the Unheard Felt

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Keywords: creative process, synthesis, gestalt, phenomenology, therapeutic design

The concept of gestalt has been favored in studies of environmental perception and design, but its theoretical and methodological principles need reexamination in the context of urban landscape study. The paper aims to review the ontological significance and pitfalls of gestalt theory and design principles and their relevance and applicability to social communication and participatory design principles. Lynch’s classic notions of imageability and durability (1960, 1981) are analyzed for conceptual test and methodological validity.

First, the paper argues that imageability provides descriptive criteria that help to detect cognitive cues and metaphors in space; durability provides guiding references to a more engaging, visceral, and empathetic design in action. Imageability is “a quality of attention, association, and sensation through a two-way process: between the observer and the observed” (1960, 11). In contrast, the notion of durability remains value-neutral and unexplored, although it offers a phenomenological view regarding biological, social, and ecological functions and meanings in life and for good urban performance. Second, the paper seeks the practical character of durability to test its applicability in light of the experiential gestalt. Vitality is a metaphor for the biological and emotional energy in a living body. Sense is all about memory, feeling, and value. Fit refers to a personal ability or a sense of competence and adequacy. Access means maintaining the appropriate social and ecological relationships within the city’s organic function. Justice and efficiency serve our sense of well-being.

Finally, the paper concludes that Lynch’s notion of durability and principles for good city form are not only meaningful percepts but also affecting the empathetic capacity and visceral character of a city. As the experiential gestalt, it helps us make the unseen imagined and the unheard felt, and thus it promotes a truly transformative contribution to the wholeness of a community.
Cultural Landscape Inquiry: Preserving and Reviving a Park Dedicated to Civil Rights Icon, Chester I. Lewis

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Keywords: participatory design, civil rights history, public space, memorial, urban nature

Chester I. Lewis Reflection Park in Wichita, Kansas commemorates the life of a prominent lawyer of the “young turks” era of the NAACP. Part of Lewis’ legacy, the Dockum Drugstore Sit-In of 1958, was the first sit-in of the Civil Rights Movement. Although the park opened in 2000, it was not designated to commemorate Chester Lewis until 2007. At that time, the city installed a sculpture representing a lunch counter. In its current condition, Lewis Park is underutilized but does provide respite for homeless individuals. In the contemporary context of dialogue on race and memorials in public space, the design team sees its role as advocates for a redesign of the park to strengthen its historic significance and provide inclusive green space in the downtown. The park’s location within blocks of the Dockum Drugstore Sit-In site broadens the scope of design to include the adjacent streetscape. The design team addresses the future potential of Lewis Park through three lenses: cultural inclusiveness, theories of nature and psychological restoration, and linking strands of civil rights history through city streetscapes.

The research phase of this design project began with an essential aspect of empowering community members: input from knowledgeable locals to guide the process (Juarez and Brown 2008). An initial convenience sample snowballed to a network of participants selected for racial, cultural, and housing status diversity. The design team used focus groups, one-on-one interviews, participant observation, passive observation, and co-design methods to learn about community needs and dreams for the park. Content analysis of the engagement data ensures that not only pragmatic needs are prioritized, but also what Randy Hester referred to as the emotional aspect of community input: people’s feelings about the place (2012). Findings from community input result in a series of design proposals intended to promote community dialogue and fundraising for the future of the park. The designers provide critical lenses for the community and act as mediators of community needs and goals (Melcher 2013). The design process includes deep participation to increase the chances that a broad audience will find the design meaningful and connect to the history of Chester Lewis and the Dockum Drugstore Sit-In. As current events in the U.S. generate controversies rooted in lack of historical understanding, knowledge of our collective Civil Rights history, investment in participatory process, and development of inclusive public spaces can transform the public dialogue.
Adaptive Urban Design

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Keywords: systems theory, co-design, placemaking, socio-ecological systems

The idea that a landscape is a physical manifestation of dynamic processes has transformed how many landscape architects approach design. They have shifted from focusing on compositions of form to an adaptive design approach, where they create initial conditions on a site and then manage the unfolding of processes within that site. Drawing from landscape ecology, adaptive design projects are now commonly used for developing site ecologies. However, they have not been as successful in integrating people as active agents in the ongoing creation of place. Humans largely remain outside the processes—as either decision-making value inputs or as end users—rather than being designed into the creative dynamics that shape the place.

This paper explores the question: Can we create an adaptive design approach that nurtures and supports the human involvement in the creation of a place as much as it does ecological life? This question is explored through the general framework of systems theory, as well as its application to ecological systems through landscape ecology and social systems through organizational management and co-design. Case examples of programs that encourage residents to creatively adapt and use their everyday spaces are used to illustrate and expand this framework. The cases fall into four types: tactical urbanism projects, the Bajo Puentes project in Mexico City, vacant lot programs in the U.S., and the commons building movement in Europe. In these cases, the integration of humans in the process of placemaking occurs when there is a local, community need that is complementary to the goals and objectives of the official governing agency. An opening for participation is created within the organizing structure (government officials and regulations) surrounding the place. The governing agency can catalyze participation through idea contests and other creative, fun activities. The ongoing management of the project relies on continued support (monetary, tool lending, knowledge-sharing) from the organizing structure and clear roles and responsibilities for all parties.

Applying this type of adaptive process to other urban design and planning projects would require further transformation of the urban design professions. It would require a continued shift in the designer’s role from one of artistic form-maker to more of a facilitator and conductor. Additionally, it would require a shift in design objectives from aesthetic unity and measurable outcomes to unpredictability, complexity, diversity, and vitality.
Challenging Current Interdisciplinary Education Approaches in Landscape Architecture

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Keywords: interdisciplinary, education approaches, teaching and learning, challenging curricula

If landscape architecture professes to address complex issues that are necessarily interdisciplinary, how can degree programs better prepare students, be catalysts for this process, and provide forums for engaging varied disciplines in the learning process? Through an investigation of best practices in interdisciplinary education, this investigation addresses whether fundamental changes in the landscape architecture curricular structure are necessary and proposes curricular approaches and methods to increase the breadth and depth of interdisciplinary interaction beyond the traditional lecture, studio, and charrette approach. Landscape architecture’s ability to address and integrate the various aspects associated with promoting and enhancing quality of life and sustainability in the built and natural environment requires an interdisciplinary foundation. Courses in landscape architecture curricula commonly address interdisciplinary topics in lecture courses with application and integration occurring in the studio (with interdisciplinary interaction sometimes enhanced by a multidisciplinary design charrette). Although this method introduces an interdisciplinary approach to the teaching of landscape architecture, it does not bring the perspectives of the non-design disciplines (e.g., social sciences, business, education, criminal justice, public health, public policy) into the classroom on a consistent basis to discuss comprehensive approaches to solving complex problems. Since landscape architecture courses are usually open only to students in that major (with the majority requiring prerequisite courses), it is difficult to facilitate true interdisciplinary discussions among students of relevant topics on an ongoing basis. As such, does the current interdisciplinary education model facilitate interdisciplinary learning? Can introducing interdisciplinary students into the classroom and learning process achieve this objective?

This study is the beginning of research on this issue and as such will review the current literature related to interdisciplinary teaching methods and their application to landscape architecture education. The objective is to challenge current thinking about the teaching of landscape architecture by evaluating existing curricular methodologies and proposing possible curricular futures. The results will include proposed methods for changing curricular structure and course format (primarily the restructuring of elective and lecture / core knowledge courses) in a way to allow greater interdisciplinary interaction with students. The resultant conversation will yield frameworks and strategies to begin to transform the current landscape architecture education model into a dynamic and more comprehensive experience in which students gain a truer understanding of the built environment’s complexity.
The Myth of the Moral Heartland: Transforming the Discussion of America's Agricultural Landscapes

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Keywords: agricultural landscapes, racialization, homesteading

A deeply held myth in our social ethos holds that family farms and residents of rural agricultural regions constitute an American “moral heartland.” To embrace this fallacy is to ignore historical events, policies, laws, and resource allocation that favored the settlement in agricultural areas of white Americans over others and that has resulted in assumptions of white privilege.

Agricultural landscapes can be perceived on multiple levels; we can appreciate their productivity, beauty, and orderliness while recognizing their intense carbon footprint, tendency to erode, and lack of biodiversity. But what is often missing in the discussion is that they include some of the most racialized places in America, and not just in the South. The American West is largely arid; the economies of its inhabitants prior to Euro-American settlement did not rely on extreme transformations of landscapes on a regional scale. But when opened to settlement through homesteading programs and transformed by the Bureau of Reclamation’s hydrologic interventions, the development of Western farmland has repeatedly and intentionally favored the settlement of white Americans while displacing or otherwise inhibiting opportunities for others.

This paper does not seek to impugn the character of farmers or rural inhabitants, individually or collectively. Rather, it seeks to challenge the “heartland” myth surrounding them and to expand our understanding of agricultural landscapes. Methods include reviews of laws, literature, and public records; comparison of agricultural landscapes across Western states; and a focus on the Tule Lake Basin in northern California as a case study. Findings reveal that there is almost no point in American history where government measures promoting the development of agriculture in Western states has not resulted in the racialization of agricultural landscapes and communities.
Ephemeral Landscapes for Social and Environmental Change

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Keywords: ephemeral landscapes, activism, art, pedagogy

Ephemeral, or temporary, landscape installations have the power to draw attention to a particular social, political, or environmental issue, and to transform the mundane into a place of curiosity and wonder. The ephemeral landscape has a diverse and rich history, with roots in guerrilla gardening, street art, and tactical urbanism. Ephemeral landscapes intersect art, science, theory, and research, yet not much has been published on them within the field of landscape architecture. This paper uses built case studies to answer the question: What would be the benefit of incorporating the ephemeral landscape into a design curriculum?

The author posits that the research, design, and implementation of ephemeral landscapes give students the following experiences:
1. A chance to design and actually build their ideas;
2. A chance to think about their social and environmental context beyond the typical site analysis;
3. It introduces students to a nontraditional body of work and literature about democratic space and empowerment;
4. It allows for cross-disciplinary participation;
5. It gives the public a deeper awareness of landscape architecture and issues that concern the future generation of designers; and
6. It gives faculty and students the opportunity to seek external funding in a collaborative manner.

To set the foundation, the paper offers case study examples of cogent ephemeral landscapes from around the world in the categories of participatory art, tactical urbanism, guerrilla gardening, and landscape architecture. The author then provides specific methods for bringing the ephemeral landscape into design studios or building an independent, elective, 3-credit course on the subject. The author discusses both options, the successes and challenges of each, and the course structures. The findings, from student feedback, are that the research, discussion, design, and building of ephemeral landscapes offer empowering learning tools for students embarking on an environmental design education.
The Role of Landscape Architecture in Sub-Saharan Africa

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Keywords: landscape architecture, Sub-Saharan Africa, developing countries

There will be an estimated seven billion people in the developing world by 2030 (UNFPA 2011). The developing world’s population, “is both a challenge and an opportunity with implications on sustainability, urbanization, access to health services, and youth empowerment” (Ibid). Landscape architects can contribute to solving such challenges and expanding opportunities by encouraging stewardship, increasing community involvement, and facilitating sustainable design methods. However, landscape architecture is still an emerging practice in much of the developing world, and there is often a lack of education and knowledge about the profession. This paper addresses the profession’s current status in Sub-Saharan Africa and speculates on the discipline’s future in the region. The International Federation of Landscape Architects held the 2008 Africa Forum in Dubai in order to record the observations of several prominent landscape architecture professionals and students (IFLA 2008). This paper expands on those observations through surveying a representative sample of key design professionals, academics, non-government organizations, firms, and community members involved in the designing and planning of Sub-Saharan Africa. The survey uses purposive non-probability sampling with survey questions derived from recent literature on the subject. This paper examines, inter alia, the following questions: What is the current role of landscape architecture in Africa, both regionally and from the perspective of external landscape architecture firms, universities, and non-governmental organizations? What are the key issues behind the underdevelopment of the profession of landscape architecture in Sub-Saharan Africa? What projects are being done in Sub-Saharan Africa that do not include, but directly affect, the work that landscape architects may do or assist with? What are the benefits of developing landscape architecture in Africa? What could be the modes and operations of landscape architects and how could they be applied (i.e., what are unique aspects of landscape architecture practice in Sub-Saharan Africa)? The survey results indicate there are a number of landscape architecture projects in Africa, but the profession is generally underdeveloped and misunderstood. There are projects designed and implemented by architects, engineers, and planners that do not, but could and likely should, include landscape architects. It is also evident that landscape architects in Sub-Saharan Africa are underrepresented due to some key support and communication issues, such as limited support from local governments and an overall lack of public understanding. These results point to needed areas of focus for the future of landscape architecture education and practice in Sub-Saharan Africa.
Tipping Point: The Future of the Profession

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Keywords: profession, education, growth, seed corn

This is a study of the growth of the landscape architecture profession from 1973 to date (34 years). The author draws upon several sources of data including a review of the literature, the U.S. Department of Education, U.S. Department of Commerce, the Landscape Architecture Accreditation Board, the Council of Registration Boards and the websites of LAAB-accredited landscape architecture programs. The researcher examines the growth of the profession from several perspectives by asking the following questions: How much has the number of landscape architecture graduates increased over this period of time? How does the growth of landscape architecture graduates compare to that of allied professions? What are the primary drivers that influence the number of landscape architecture graduates? Have changes in landscape architecture curricula influenced the number of graduates? Will there be enough graduates to sustain the profession? Are we approaching a tipping point for the decline of the profession? This research generates more questions than it answers, but it does provide some interesting insights and identify some important challenges to sustaining the landscape architecture profession.
**TRANSFORMING THE DISCUSSION**

**PANEL PRESENTATIONS**

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**Living Architecture and Landscape Architecture: Adjacencies and Overlaps**

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**Keywords:** living architecture, green roof, green wall, education, curricula

This panel elevates the discussion of living architecture in landscape architecture curricula by discussing the boundaries where the two fields overlap and run adjacent. We seek to better understand points of intersection to map future directions in academia for the rapidly expanding practice and study of living architecture. Living architecture (which includes the planning, policy, design, implementation, management, and study of living roofs and facades) is emerging as a separate field due to its tremendous multimillion-dollar economic growth in the last decade. This discussion debates the role of living architecture content in accredited North American landscape architecture education under a guiding question: Should the field of living architecture be separated from landscape architecture or remain within the discipline?

To investigate the question, the panelists will engage in three major areas of discussion:

1. **Domain Knowledge and Activities**, which maps the territory of how living architecture content and knowledge exists within landscape architectural curricula, scholarship, and professional practice
2. **Peer Knowledge and Activities**, which explores the efforts and initiatives occurring in allied disciplines within living architecture organizations including the professional training, education, certification, and research occurring through peer organizations.
3. **The Leadership Field**, which records and examines the current leadership of landscape architecture faculty who serve, research, teach, and practice living architecture, contributing to and directing its current growth.

Audience members will be invited to comment, share experiences, and ask questions directly to the panelists. The panel discussion will provide a forum for inquiry and conversation to faculty currently working in the areas of vegetation roofs and walls. For those considering the subject and curious about its impact on landscape architecture, the panel will offer a contemporary understanding of the field, including pros/cons of practice specialty.
The forum will provide faculty access to peers currently engaged in the topic of living architecture and offer a broader awareness of the status of living architecture within academic institutions, peer settings, and governing organizations. Discussion pieces pertaining to the relationship between landscape architecture curricula and living architecture practices are envisioned for *The Journal of Living Architecture*, *Landscape Journal*, and *Landscape Architecture Magazine*. Several of the panelists will give complementary presentations that expand on the panel discussion content.

**Learning Outcomes**

- Comprehension of the contemporary field of vegetated roofs and walls and the current roles of leadership and peer organizations.
- Understanding of social and ecological benefits of living architecture.
- Awareness of the status of living architecture within academic institutions, peer disciplines, and governing organizations (LARE, GRP, LAAB).
- Opportunity to form an academic community connecting peers for future knowledge-sharing on the topic of living architecture.
Contested Histories, Memorials, and Public Memory

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Keywords: contested histories, memorials, public memory, public narrative

What knowledge can effectively and successfully ground a community’s actions to ensure that our public landscapes remain, as the architect Friedrich St. Florian envisioned, a place for the “finest celebration of democracy,” a place for peaceful and engaging “debate and disagreement.”

This panel will present and discuss emerging scholarly approaches to one of America’s most public and contentious discourses: the ongoing public debates focused on Confederate and problematic public monuments and their place in our shared public realm. Those debates have resulted in a wide spectrum of approaches, strategies, and actions to retain, remove, relocate and recontextualize not just Confederate memorials but any public memorial considered offensive or memorializing individuals or causes with problematic histories. The varied perspectives on the meaning and symbolism of problematic memorials, the depth of public passion, and calls for quick and decisive action in response to acknowledged past inequities and in advance of violent protests and anticipated confrontations are propelling debates and decisions about not only our public memorials but also about the very nature of a shared public realm and civic space.

What is the role of landscape architecture, architecture, and urban design in this singular moment of public discourse and debate about our public memorials and the nature of public space? What can our professions offer communities as they seek to understand the purpose and power exerted by memorials and monuments (Danto, 1985) and, most importantly, to make informed decisions about existing, contested memorials, monuments, and landscapes of imposition? With Richmond, Virginia’s ongoing efforts to re-examine its landscape of public Confederate memorialization as a locus, this panel will examine the city’s historic debates about its memorials, and those recent actions and strategies undertaken in response to problematic histories, memorials, and narratives in the American South and internationally. What are the varied approaches taken by other communities and what have debates and actions elsewhere revealed about the power of design in re-imagining public narratives and memorials to successfully propel new narratives and discourses? Might the continued transformation of Richmond’s landscape of memory inspire new discussions and negotiations.
to fulfill the capacity of landscape, as identified by the landscape architect Walter Hood, to bind the past with “current use, and future dreams” (Hood, 2001).
Emerging Models for Doctoral Studies in Design

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Keywords: doctoral studies in design, PhD, Doctor of Design (DDes), distance learning, professional knowledge base, history of profession

This panel discussion explores the role of post-terminal degree studies in landscape architecture and describes how doctoral programs in professional design schools have responded to changing needs in the academy, the professions, and in society at large. In particular, PhD degree models are compared to D.Des and post-professional MLA degree models. Panelists include administrators and faculty advisors with key roles in American doctoral programs.

In traditional PhD programs, students typically undertake lengthy residential studies of research methods and theory (“why” questions) which prepare them, also typically, to enter the professoriate. However, this model of doctoral study tends to present obstacles to practicing mid-career professionals wishing to work on advanced problems and topics in applied design practice (“how” questions). And although PhDs in related but extra-disciplinary fields can be instructive and useful for advancing landscape architecture, they sometimes lack a clear understanding of how designers think, work, and conduct research in a professional context. Meanwhile, emerging models for doctoral studies (both PhD and DDes programs) include flexible, self-paced, and independent programs. Some, for example, are modeled after European tutorial studies, utilizing tools from online/distance learning, interdisciplinary studies, and hybrid research partnerships, and may engage universities, practitioners, and firms in research grants and studies conducted over time.

Invited panelists offer perspectives on a range of doctoral models (normative and alternative) to discuss how they may best serve students of design. What educational strategies, structures, or goals distinguish a DDes degree from a PhD? What benefits does each program offer (whether for practice or tenure-track teaching) and what resources do they demand? How might doctoral students interact with faculty and each other in using platforms for either individual learning and/or group instruction? The panel will also discuss the relative merits and functions of disciplinarity/interdisciplinarity—both in the context of curriculum design and the kinds of design problems now faced by the design profession.
This panel discussion contributes to understanding changes in doctoral education as integral to this history of the profession. Current professional context, both in academia and in practice, expects effective research that can increase the measurable benefits of landscape architecture, thus to advance the impact and stature of professional practice. The goal of the panel is to understand doctoral education in design as a strategy for formation of applied knowledge. Insofar as “advocates for design as research who seek wider recognition for its legitimacy will be obliged to present their case in terms that are familiar to other parts of the academy” (Manuel deLanda), the panel hopes to entertain challenging questions and debate ways to “transform the discussion” about the role, research methods, and changing modes of doctoral study for professional design.
INTERACTIVE PRESENTATIONS

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By the Sea: Discussing Patterns of Destruction, Retreat, and Rebuilding on the Jersey Shore

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Keywords: climate change, coastal leisure, disaster spatial patterns, retreat, mapping

This presentation seeks to understand the embedded cultural meanings and design language of waterfront construction, specifically in the resort towns, or so-called boardwalk towns of the Jersey Shore. In particular, we will discuss the way in which the homogenous design elements of these ocean-front communities relate to the sea, and by so doing, create particularly static understandings of the dynamic nature of the coast as a landscape.

Beginning in the mid to late eighteen hundreds as the burgeoning middle class in New York City and Philadelphia sought outlets for recreation, developers built these communities rapidly, and a number of similarly conceived shore towns sprang up in the span of a few years. While all have experienced cycles of destruction, through the past century they have also made some divergent design decisions and taken various paths of retreat, restoration, and rebuilding. Through these case studies, it is possible to examine the question of what and where the coast is, and how we, as a society, and as designers, construct it.

Through visualization of the patterns of destruction and reconstruction on the Jersey Shore and historical overview of these cycles of rebuilding, we seek to explore the typological expressions of construction on the shore. Specifically, we will discuss the history of two different communities on the Jersey Shore that share a common history of leisure development but different approaches with regard to retreat. Asbury Park followed a history typical of shore towns and has been rebuilt as it was before every time, whereas Cape May (specifically the town of South Cape May) was abandoned and replaced with dunes. This latter course is more unusual, and we will discuss the relationship of these different paths to their different coastal morphologies and historical context. As climate change makes these themes ever more urgent, the question of what we rebuild and why is pressing. Can we preserve the successes of the waterfront community without perpetuating this ecologically and economically unsustainable cycle of destruction and rebuilding? Can drawing and imagining new conceptions of the coast and what, when, and where it is, help us conceive of it and design it in a more resilient way?
Prospect: Beyond Survival—Refugee Resilience Planning for Europe and Beyond

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Keywords: refugee resilience planning, self-reliance, culture exchange and integration, sustainable environment

Each year millions of people are forced to leave their homes and countries to seek refuge from conflicts, violence, human rights violations, persecution, and natural disasters. Globally in 2017, over 2.25 million were forcibly displaced and became refugees (UNHCR 2016). The migration journey is dangerous, even fatal. Living conditions in refugee camps subject already stressed populations to harsh climates, poor facilities, and health problems. Refugees must endure long and uncomfortable periods without work, education, cultural life, and depleted savings. They also suffer the trauma brought by war or loss of relatives, especially for children and women. Finding sustainable solutions for the forcibly displaced is a challenge. Some in host countries perceive refugees as a threat to domestic employment and stability. Yet, research on refugee surge economic impacts shows that they can have a positive impact on native labor market performance. Many refugees are well educated and have industrial skills. When allowed to integrate into their new countries, they tend to become productive citizens, start small businesses, and put more money into the local market.

In 2016, the European Commission produced a report called Lives in Dignity: From Aid-Dependence to Self-Reliance, outlining a new development-led approach to strengthen the resilience and self-reliance of both the displaced and their host communities. This presentation will focus on developing a model for resilience planning to combine landscape restoration with refugee community construction to respond to the current wave of refugees in destination countries in the EU. The goal is to improve the lives of the refugees in the short term and the prospects of the economy and resilient development of the host states in the long term. The test-case sites are located in Sicily and Naples, Italy. The presentation will advance the concept of a three-step phased placement of refugees which are (1) temporary camp—rescue, survival and safety; (2) permanent community—education, job opportunities and health; (3) assimilation or repatriation—becoming a productive and integrated part of local society or going back to rebuild the home country. Site selection is crucial for orderly rescue and arrangement of refugees, and also important for taking advantage of these labor resources to improve local economy. For the first step - temporary camp, the selection of site involves the considerations of accessibility, safety and efficiency for landing, registration, short stay and relocating. As to the second step—permanent community—the considerations include local connection, working opportunity, appropriate environment to facilitate a better living condition and economy zone. For the third step - assimilation or repatriation, the ideal scenario is the refugee settlement become a part of local community, local people and
migrants contribute to economic development together, and jointly build a harmonious society with diversified cultural and religious context.
Informed Consent

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Keywords: uranium, nuclear, atomic age, environmental justice, environmental regulation, object-oriented ontology, hyperobjects

On December 4, 2017, President Trump reduced the size of Bears Ears National Monument, a sacred Navajo site in southeast Utah by 85%. Since even before President Obama designated the area a national monument in 2016, Energy Fuels, US, Inc. has been lobbying against the designation in order to protect its current and future uranium mining and milling operations in San Juan County, Utah. This paper uses the debate between uranium mining claims and environmental health in Bears Ears to inquire into the boundaries of a site in the nuclear age.

The U.S. EPA and DOD have established safety standards for radioactive waste and more ordinary byproducts of the nuclear industry, assuaging public health concerns connected with uranium industry activities in many communities in the Colorado Plateau. Anthropologist Sarah Malin refers to these as “sites of acceptance.” The Navajo Nation is fighting the decision to open Bears Ears to uranium mining both because of high cancer rates in the community linked to uranium mining activities near the reservation south of Bears Ears, but also because of a cultural association with the land as an active community member, not as an object. Scientific methods that establish public health standards offer an important reference for understanding local and present-day environmental effects of radioactive waste, but we need different access modes in order to interpret the magnitude of temporal and spatial effects of the nuclear age. This paper argues that landscape architects overlay scientific digital modes of interpreting territories with more sensory modes with which to access information without defining the site in a moment of time.

The objectives of this research project are threefold: first, to interrogate the current socio-political definition of property and responsibility without regard to the magnitude of spatial and temporal risks in the nuclear age; second, to apply current ecological logic to reconsider the definition of site boundaries in the atomic era; and finally, to strategize methods for landscape architects to participate in the processes that shape today’s nuclear landscape. The methods include primary and secondary government-sponsored public and environmental health materials, a literature review of anthropological, economic, and public health findings focused on the uranium industry in the Colorado Plateau, and an interpretation of object-oriented ontology.
Urban Design
The Promenade in Nineteenth Century America: Precedent and Form

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Keywords: promenade, public space type, nineteenth-century America

The promenade became firmly established in Europe as a public space type in the seventeenth and eighteenth centuries, appearing on the North American continent in the late eighteenth century. By the mid-nineteenth century a number of American cities offered designated outdoor settings for citizens to engage the social practice of "seeing and being seen" in locations as diverse as cemeteries, fashionable streets, waterfront embankments, resort beachfronts, and later, in urban parks and along parkways. These public spaces attracted diverse populations, from working and middle classes to social elites, fulfilling a range of social and recreational goals in a variety of contexts. The promenade endured as a highly popular public space type over many generations and across diverse cultural and geographic contexts, prompting the question whether there are certain formal qualities that enhance the success of the promenade as a public space? Are there are particular physical and spatial conditions that have persisted, contributing to its capacity to endure?

This paper describes the evolution of urban promenades in Western Europe and in the United States from the sixteenth to nineteenth centuries, before applying typological analysis to a set of promenade precedents drawn from several countries and across a span of several hundred years. The analysis reveals that factors such as location, connectivity, adjacency, alignment, dimensions, scale, and amenity features have contributed to the qualities of accessibility, activity, and comfort that have attracted people to promenades and supported their popularity over time. The paper concludes that nineteenth century American promenades were legitimate successors to earlier European precedents, exhibiting similarities in physical and spatial attributes that place them squarely within a typological tradition. As ongoing processes of twenty-first century urban redevelopment yield new promenade opportunities on post-industrial sites and repurposed urban corridors, understanding the typological features that have contributed to the success of historic precedents could be a valuable asset in designing these contemporary public spaces.
Soft Architecture: A New Look at Forests, Design, and Resilient Urbanism

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Keywords: architecture case studies, forests, urban design, ecological thinking

The purpose of the presentation is to share three to five case study projects that span the discipline of Architecture/Landscape Architecture/Urban Design. In this presentation the term soft architecture will be discussed as both a type of architecture and the practice of designing buildings and public spaces as an integral component of larger urban landscapes and green infrastructure. The forest, as soft ecological and cultural infrastructure, is a theme that links the case studies together.

The broad context for this study is the conversation about urbanism in the field of landscape architecture and green infrastructure as an alternative and/or supplement to more traditional hard infrastructures like dams and piped sewer systems. Architects are becoming more involved in these conversations and this talk will discuss the potential of projects that link architects to landscape architects and urban designers.

The case studies will be presented with original site photographs and case study analysis drawings by the author. This discussion is connected to a new book by the author titled Architecture and the Forest Aesthetic (see citation). The emphasis of the book is on the forest as a medium, model, and metaphor for urbanism and architecture.

Learning Outcomes:

- Learn about 3-5 case study projects that span the discipline of architecture/landscape architecture/urban design.
- Identify the types of Landscape Ecology diagramming that can be used for cross-disciplinary case study design Analysis and understand its pedagogical importance.
- Learn about the history of the forest as it relates to the design disciplines.
The Means of Moving People: Urban Regeneration through Transportation Alternatives

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Keywords: urban decline, public transportation, Geographic information systems, suitability modeling, urban regeneration

Neighborhood decline is a critical issue in shrinking cities—areas which have been experiencing significant losses in population for two or more years—across the U.S. (Hollander et al., 2009). Shrinkage has been reported to be a predominant causal factor for increased vacant land and structural abandonment in urban areas (Wiechmann and Pallagst, 2012). The collapse of the American housing market in 2008 amplified the effects of urban shrinkage, resulting in massive foreclosures and widespread housing abandonment throughout many U.S. cities (Immergluck, 2008). Research on how to deal with urban vacancy and abandonment, along with the accompanying symptoms of decline such as poverty, has become a crucial urban issue. While depopulation has widely been discussed as a primary contributor to urban decline, the specific aspects of sustainable urban form which can potentially aid in counteracting this decay have not been thoroughly evaluated.

The city of Dayton, Ohio lies within the U.S. Rust Belt, a historical region that has experienced massive depopulation since the 1960s, primarily as a result of deindustrialization and manufacturing decline. Dayton has suffered a 47% population decrease since 1960; these conditions have resulted in an abundance of declining area in neighborhoods within the city. It has been shown that cities developed around sustainable public transportation systems tend toward growth and stability as opposed to decline. This research (1) develops an index for measuring areas of extreme urban decline using causal factors from existing literature, (2) maps urban decline in Dayton using an equally weighted suitability model in ArcGIS, and (3) compares the spatial location of that decline to proximity of three primary public transportation hubs. The research seeks to better understand the relationship between proximity to public transportation and the spatial distribution of urban decline and whether greater availability of and access to public transportation can encourage urban regeneration. Results indicate that proximity to multi modal transportation options is related to lower amounts of decline. Therefore, stronger policies encouraging complete streets and related alternative transportation options may be a strategy for preventing decline or spurring regeneration in declining areas in shrinking cities.
Ecological Performance and Sustainability Criteria in Contemporary Urbanism Paradigms: A Comparative Analysis of Landscape Urbanism and New Urbanism

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Keywords: landscape urbanism, new urbanism, ecological performance, urbanization, urban paradigms, contextual and local conditions, quantification, digital modeling

In recent years, Landscape Urbanism and New Urbanism have become pseudo-platforms for landscape architects and architects, respectively, to fight for their claim for dominion in the realm of urban design. However, despite all their clear differences, and attesting to environmental problems that arise from urbanization and make up a major part of contemporary urbanism’s concerns, Landscape Urbanism and New Urbanism both claim to be ecologically-informed and sustainable models for urbanism.

As such, this paper seeks to offer a thorough and scientific dissection and comparison of the two paradigms and their initiatives pertaining to ecological performance in the form of an itemized list of various aspects in each that offer agents contributing to such bold claim as evidenced through existing case studies. The method used to achieve desired findings comprises of thorough comparative theoretical reviews, alongside critical analysis of literature and built projects. Moreover, when overlaps in ideologies are detected, a direct comparison is offered, making the argument that various tools fitting various schools of thought can be applied in order to achieve virtually identical goals. The difference lies in contextual necessities and local conditions. As such, the purpose of this study is to argue that both paradigms can still be relevant in a world of specific local circumstances and extremely complex urban conditions.

The paper concludes by suggesting further development of the findings comprising of itemized initiatives contributing to urban environmental performance through quantification and use in associative urban modeling techniques. This is exceedingly important as it is intended to fill a gap in existing literature regarding the lack of any quantified approach to the discussed subject.

The learning outcomes of this study include: the ability to organize and directly compare components of two urbanism paradigms that are presented very differently in literature and graphics, associate various initiatives claimed by each paradigm to their respective real-world case studies, assess the degree of success for each paradigm with regards to their claimed ecologically-enhancing criteria, and apply the discussed criteria as quantified parameters in appropriate urban modeling tools.
Barcelona's *Superilles* and the Necessity of Participation

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**Keywords:** Barcelona, participation, sustainability, urban design, tactical urbanism

Last year, I strolled through an urban design experiment in the Poble Nou neighborhood of Barcelona's *superilla*, or super-island, where traffic is being diverted through nine blocks to create a haven for pedestrians and bicycles. Oddly deserted, people wandered through the centers of Cerd, vast intersections, which appear to have been commandeered by all of the city's tactical urbanists, then abandoned. At a few intersections, cars honked impatiently. Delivery vans cut through despite the signs. A city worker watered dozens of potted trees haphazardly arranged. People waited at crosswalks, even though they could proceed, seemingly unsure of how to manage their new freedoms. On the city's website, photos of children in sandboxes and architecture students playing games attest to an enlivened urban environment, but the emptiness that I witnessed looked more like a street festival that was never cleaned up, and in this vacuum the project has created more critics than fans. On a few surrounding balconies hang signs reading “No Superilles”. The neighbors want to decide.

Within a few months of the opening, a movement against the superilles had generated over 3,000 protest signatures. Opponents say they weren’t consulted, that the design is absurd, that businesses and neighbors are being made to suffer. Some city staff call it a failure of process; they cling to the merits of the proposal itself but worry that the lack of real community input has put the entire initiative in peril.

In this paper I describe the project that was conceived by Barcelona's mobility director, Salvador Rueda, 14 years ago and is slowly being implemented ultimately in 14 neighborhoods across the city. The case study draws from documents, observations, and interviews with city staff, neighbors and people on the street. It contrasts the quick and fun games of tactical urbanism with the commitment that it takes to design and maintain a community collaboratively. It also questions whether radical change of the urban design fabric is possible through a deliberative, consensus-based process, or what value the quick, tactical approach brings. The analysis of these contradictions is important, as cities will increasingly need to balance local impacts and broader ecological agendas.
No Parking: Transformations of Public Streets in the Driverless City Project

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Keywords: Driverless City Project, autonomous vehicles, landscape architecture, Illinois Institute of Technology, Nayar Prize, scenario builder, parking

The Driverless City, a project based at the Illinois Institute of Technology (IIT) in Chicago and funded by the Nayar Prize, investigates the urban design implications of driverless and autonomous vehicles by developing social scenarios, technical solutions, infrastructure prototypes, and model urban codes to transform streets into twenty-first century human infrastructure. Among the urban design implications which the project investigates is the transformation of parking on public streets.

As cities around the world leverage the opportunities and manage the impacts of driverless cars, The Driverless City Project speculates on transformative advances in transportation and communication technologies - the kind that have always changed cities and demanded new forms of physical infrastructure. In the next decades, we can leverage this change in technology to improve urban social life by increasing the ecological performance, safety, and efficiency of streets while continuing to add vitality to our cities.

In the case of parking, what areas of public space may be freed up from car storage? What are other uses for that public space?

This presentation describes scenarios for transformation of parking on public streets (transition from parking to delivery zones, for instance) that emerged from this funded multidisciplinary investigation by faculty with expertise in landscape architecture, architecture, urban design, social media, technology, critical futures, transportation engineering, public policy, and law. Investigation methods included literature review, technology review, technical experiments and digital modeling, stakeholder and constituent interviews, policy assessments, test driving, and visionary urban designs that imagine the social impact of The Driverless City.

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Keywords: ethnic integration, post-communist urbanism, waterfront, Baltic

A relic of the Soviet occupation of Estonia built for the 1980 Olympics, Linnahall is a contested urban site located on the coast of the Gulf of Finland. Infused with complex narratives, Linnahall’s imposing Brutalist architecture occupies a prominent position in central Tallinn’s waterfront. Originally dubbed the Lenin Palace of Culture and Sports, Linnahall was renamed after the restoration of Estonian independence in 1991, and found new civic uses as a concert hall and ice skating rink. Complex social, economic, environmental, and regulatory obstacles hindered public-private redevelopment efforts, however; formal programming was gradually abandoned as the building became increasingly derelict. Today, only the structure’s exterior remains in use, and sea level rise will likely overtake portions of the structure by 2100.

In stark contrast to Linnahall’s entropy, detailed urban redevelopment plans address parcels surrounding Linnahall. In 2017, the port authority released Masterplan 2030 with initial redevelopment concepts for the port area. With a strong focus on development, connectivity, and economic revitalization, this plan fails to acknowledge important historic, cultural, and environmental conditions-- most notably omitting sea level rise and Linnahall’s integration.

In previous work (Authors 2017), we identified design priorities for Linnahall based on: first-hand site investigation, urban systems analysis, archival review of historic documents, projections of rising sea level, area redevelopment plans, and case studies. Our goals include reactivating use of the Linnahall site, planning for sea level rise, and enhancing civic accessibility, while acknowledging the site’s importance as a point of inter-ethnic civic pride and simultaneous imposing presence as a Soviet relic.

We imagine Linnahall can provide a gritty and culturally significant complement to the port authority’s redevelopment proposal, unfolding in three phases: The first phase, Testa [Lift] strives to enhance Linnahall’s occupiable civic space, elevate awareness of sea level rise, and attract visitors through temporary programming (international graffiti competitions, markets, and outdoor concerts). In the second phase, Temba [Pull] reflects port redevelopment objectives by: improving access to Linnahall’s rooftop plazas, enhancing market structures, and creating an immersive art installation for the building’s interior. In the final phase, Vajuta [Imprint/Submerge], acknowledges that storm surges will likely flood the entire port by 2100, by which time Linnahall will have fallen further into disrepair. Inspired by the bastion-like geometric landforms bounding Linnahall and Tallinn’s Old Town wall, we plan for the...
sculptural reclamation of Linnahall by the Baltic Sea, memorializing the site’s history and encapsulating culturally significant civic space.
Vertical, Massive, Extensive, On-Structure Landscape Assessment and Management: Potential UAV Applications

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Keywords: drones, UAV, urban design, landscape assessment

Research on unmanned aerial vehicles (UAVs or drones) have increased across a wide range of disciplines relevant to landscape architecture, such as: ecological and agricultural assessment and management, public space security, and personal privacy protection (Nemeth, 2010). Use of drone technology has also increased dramatically with more than 616,000 drones registered just with the US Federal Aviation Administration (FAA). Recent projects and proposals for intensely integrated architecture, infrastructure and landscape architecture. These emerging integrations suggest greater acceptance of blended landscape; combining forest, park, agriculture, and aquatic eco-system as part of traditional urban land uses. These projects aspire to create ecological, agricultural value in landscape on structure, including vertical walls with multiple exposures enclosing residential housing and other very tall or massive structures. Monitoring and managing these new, complex living forms, especially in larger multifunctional urban conditions requires technological solutions best addressed through the use of UAVs.

The paper presents results of an examination of landscape architecture-related UAV use for post occupancy agricultural, ecological and security assessment using case study method. Case study analysis of 100 sampled research projects suggests 24 drone type/uses 16 characteristic uses across 14 proposed vegetated structure urban uses identified in 10 highly integrated vertical, massive, on-structure projects globally. Sample UAV uses include, plant lifecycle charting and profiling, wind profile and wind shear assessment, temperature and air quality, soil condition and hydrology, forest cover, species distributions and carbon sequester assessment (Koh, 2012 and Tripicchio, 2015). Sampled land uses include: clustered vertical towers (above 20 floor), vertical towers (below 20 floor), vegetated roofs, massive floor area (100,000 sq. ft.), vegetated floating structure and infrastructure. Sampled case studies, include: Bosco Verticale in Milan, Chongquing Hortitecture District, and Forest City in Shijiazhuang (Boeri).

Study findings suggest that the size and scale of existing and planned vegetated structure projects exceeds 15 sq.km. The use of specialized drone technologies enabling agricultural, ecological, security assessment capable of monitoring ecosystem services on vegetated structures varies according to land use, UVA, and data typologies.

The study is relevant to landscape architecture design, assessment and management of ecosystem services for increasingly complex urban vegetated structures. It adds to the body of
literature on drones (UAVs) research as it relates to new techniques of examining human, cultural and natural systems.
Assessing the Aesthetic Values of an Elevated Transportation Infrastructure through a Visual Analysis of YouTube Videos

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Keywords: Morgantown WV, West Virginia University, Personal Rapid Transit System, inside view

West Virginia University’s Personal Rapid Transit (PRT) in Morgantown was built in the 1960s. It is a 5-station, 3.6-mile guideway, 71-driverless vehicles system that transports approximately 15,000 people every day during the school year (PRT Fun Facts).

The PRT mainly operates above ground, with 65% of its route along raised concrete platforms or bridges. For most part of its itinerary it is a linear elevated infrastructure that runs through the city fabric generating leftover spaces that are often undefined, and underutilized. The PRT has been designed to adapt to a pre-existing urban environment. The guideways are narrow and the small vehicles are able to steer with a very small turning radius. The guideways can lace around to existing structures with the minimum uses of ground space, they are supported by relatively small concrete piers.

Considering these physical attributes, the PRT visual appearance and aesthetic value have often been criticized by local community. The system is perceived as intrusive and as an interruption of the city landscape and fabric. The unappealing aspect of the PRT seems to be influenced by the spatial relation with the context it traverses (Bernasconi et al. 2009). However, a remarkable difference can be noted between the infrastructure perception of passersby and PRT riders. The number of videos posted to YouTube that are shot from inside a PRT car showing what can be seen during the ride, proves the attractiveness of the system.

This paper presents a visual analysis of 36 videos shot by amateur videographers from inside a PRT car while in motion. The videos were retrieved from YouTube using the YouTube Data Tool Video List and were further selected through a manual screening. For the analysis, the compositional interpretation qualitative approach was employed (Rose, 2007). Through this method, the mise-en-scène and the montage of the videos and the sounds accompanying the images have been analyzed. The depicted content and the depiction were examined to identify and assess specific aspects that contribute to enhance the visual experience of the PRT. One of the main findings of the analysis is that people like the PRT for the riding experience and not for the beauty or uniqueness of the passing scenery. Movement, speed, elevation of the guideways, the view of the city from above seem to be the most attractive aspects of this elevated infrastructure. This study challenges the common negative perceptions of the PRT by showing that perceptions might differ if considering different points of view. The research offers to policymakers, planners, and designers who plan and project elevated infrastructures,
new assessment tools that can counterbalance the only bystanders point of view, possibly changing the overall perception of elevated infrastructures.
Microclimatic Urban Design for Protecting Human Health

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Keywords: microclimatic urban design, human health

Cities are becoming hotter through urban heat island (UHI) intensification leading to a growing interest in the study of urban climate mitigation. As climate change progresses, one of the main problems is the effect on human health. While much research is being done on the potential health risks associated with urban climate change, there are still many gaps to address the future health need of urban residents. Most of the studies are quite general with only a few studies investigating the relationship between urban microclimate and human health. Microclimatic Urban Design (MUD) shows designers how to work with nature to create a climatically comfortable space, and can be an important alternative to addressing current urban problems. Improving understanding of health impacts of MUD is an important step to drive the change needed to decrease urban climate change and mitigate the consequences for human health.

This study conducted a systematic literature search of studies that investigated the influence of MUD on human health using the Scopus databases and searched terms related to MUD, urban microclimate, and human health (in articles, titles, abstracts, and keywords). Reviews of MUD and human health literature published until 2017 were searched using the related keywords. The following questions were asked to provide more concrete evidence of the relationship between MUD and heat-related human health: (1) what elements of MUD affect human health? (2) how are the MUD elements measured? and (3) what kind of human health does MUD influence?

Of the 728 articles considered for the initial search, 14 were selected in the final review. The results showed that MUD has a positive impact on heat-related health and this study derived the following conclusions. First, this study found MUD elements, such as urban green space, surface albedo, tree cover, rooftop green, water feature, and their influence on heat-related human health. Second, the result showed how MUD elements can be measured according to their scale. For the large scale, most studies used census tract or zip code as the unit of analysis and they used satellite images to understand MUD. For the small scale, MUD elements were measured by on-site observation. Lastly, this study found the human health elements which are influenced by MUD. There are two types of health results: chronic and acute outcomes.
Landscape Globalization: Global Networks and Global City Landscape Formation

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Keywords: global cities, urban design, landscape globalization, network analysis

The paper is intended to provoke discussion and debate to transform, challenge and inform conceptions of globalization and landscape change, particularly in the context of continuing global urbanization. Prominent globalization scholars describe the characteristics of what have come to be called global cities (Sassen, Friedmann), yet very little has been published concerning landscape formation processes in these cities. Taylor and Castells offer global city models suggesting the importance of place in the support the sustenance of global city formation (Castells), and the importance of advanced producer service firm (APSF) networks related to financial services, accounting law, media, advertising, technology, insurance, trade and their related fields in that process (Taylor).

The paper proposes that (1) global city landscape formation is in part a process of network creation by global multi-disciplinary service firms integrating landscape architecture, engineering, and architecture services; and (2) to support the creation of environmental settings conducive to global city formation, these firms develop global macro-networks, with firm concentrations in prominent global cities and extensive global reach through hundreds of smaller hinterland cities.

The methodology emphasizes critical realism, incorporating quantitative and qualitative research as basis for theoretical excursus of urban change. Study data is derived from published information on 100 global multidisciplinary landscape architecture/engineering/architecture firms (MLAEFs) measured by number of employees and gross revenues. Sample data includes: approximately 1800 firm office locations in nearly 900 cities, firm headquarters locations in 34 cities, with approximately 12,000 firm projects. Network analysis compared data from 315 global cities derived from advanced producer service firm (APSF) networks and MLAEF networks (Taylor).

Findings: The Global MLAEF Network is broadly consistent with accepted models of advanced service firm networks involved in global city formation. Comparative analysis of the MLAEF network and existing advanced producer service firm (APSF) networks suggest: 1) differences in global city hierarchies between the two networks based on the greater emphases of environmental and technological contexts in MLAEF landscape formation; and 2) differences between the two global hierarchies suggesting very different MLAEF global city landscape formations related to spatial organization and project typologies.
The findings are relevant to design and planning of global city landscapes, to understanding global city landscape formation processes, and to analyzing the effects of globalization on hundreds of economically and culturally significant cities worldwide.
Finding Invisible Patterns: The Use of a Big Data Approach to Explore Urban Activity

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Keywords: Social media, mapping, urban design social activities

In the last few decades, the size of data has been exponentially growing. Social media, smartphones, sensors, and the internet create, copy and transform data with unprecedented speed and scale (The Economist, 2010). Big data has never been more accessible or more powerful. A variety of industries including finance, marketing, energy, telecommunications, agriculture, and real estate have been adopted big data technologies to make more informed decisions and to be able to predict trends. Many social media platforms such as Yelp, TripAdvisor, and Facebook provide a large scale of information regarding behavior and perceptions associated with places and communities all over the world. Analysis of societal needs and public opinions becomes key to building a more equitable urban environment that is beneficial to a broad spectrum of people (Dobbins, 2009).

However, few studies have been published in the fields of urban design and the built environment to examine the application of Big data. This paper presents a case study using the social media website TripAdvisor to inform the concept development of an urban design project in Chicago, Illinois. A database of all the attributes on the attractions of the TripAdvisor’s ‘Things to do’ category was developed. By extracting, processing, and analyzing large amounts of geocoded information in TripAdvisor, the study identified the patterns of urban activities that were previously inaccessible to designers using a parametric indexing method. It also displays how data in TripAdvisor assists a better understanding of the relationship between urban environments and people, and the processes of urban transformation.

As a response, landscape architects and urban planners might realize the potential of implementing the data from social media, influencing the future of design and research related to the built environment.
Participatory Democratic Design and Planning: Lessons from Newark’s Zoning for Democracy and Riverfront Projects

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Keywords: community participation, participatory zoning, land use decision-making, case study research

Participation has been defined as a means of redistributing power and resources by involving excluded populations during the decision-making process (Arnstein, 1968; Saxena 1998). This definition undermines the legitimacy of traditional top-down decision-making by government officials and technocrats and poses many challenges to the new realm of democratic decision-making (Horrigan & Bose, 2017). The capacity of a community to collectively influence and decide policies hinges on many factors, such as constituency organization, mobilization, education, and on the professionals’ side, the ability to navigate the difficult landscape of the micropolitics of their everyday work environment (Forester, 2009).

This paper examines and evaluates the award-winning participatory zoning project that took place in Newark, New Jersey from 2013 to 2015, resulting in the Newark Zoning and Land Use Regulations (adopted February 2015). Central to this paper is the inquiry: What did citizen participation achieve in this project, and how was it realized through both their and the professionals’ efforts? The author undertook case study research (Yin, 2014) using document analysis and in-depth interviews with two key planners, one community organizer, and six participants from the community. Key conclusions confirm and complement existing theory: (1) In this case, participatory planning and design went beyond professionals collecting information and opinions from residents and incorporating them into the final product. Instead, it was a process of professionals and community members working with each other, using appropriate methods and tools, through joint fact finding and dialogues, toward shared goals. During this process, a two-way education took place, and both professionals and community members were elevated into greater capacity to make better planning decisions for the community. (2) This case creatively transformed a regulatory subfield of planning into a more open and interactive forum. By doing this, it disseminated knowledge both on levels of everyday practical uses and of empowering citizens for greater awareness and control. The final result was not only regulations that reflect communities’ needs, but also deepened understanding and support from communities gained through a sense of ownership by participation. (3) Planners’ role in this project went beyond technocrats or experts. They were professionals with expertise, advocates for community welfare, translators turning abstract terms into everyday language, and negotiators dealing with different powers. Such multifaceted roles were essential to the realization of the project.
The Research of Strategy to Transplant the Local Cultural Landscape into the Space under the Bridge in the Case of Chengdu Viaduct

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Keywords: cultural landscape, viaduct, spatial vitality, landscape design, Chengdu

The rapid development of the city threatens the city's original cultural memory and local cultural landscape. The city is facing an unprecedented crisis. How to retain the city's own local characteristic culture effectively is a hot topic in urban design today. At the same time, in order to meet the needs of urban development and transportation, urban viaduct construction is spreading like a raging fire, and creating a large amount of negative public space under the bridges. Newer landscape designs that merge local cultural landscapes into the space under the city bridges and create new urban space vitality is a new topic. This paper uses Chengdu as an example. Through the methods of literature review, field investigation, case study analysis, unearthing deeply the cultural connotations of old Chengdu city to explore the methods of landscape materialization in the space under the bridge such as People South Road viaduct, Su Po viaduct and Yang Xi viaduct. Then trying to put forward four landscape construction strategies: morphological explanation and expression, place simulation, space-time synthesis, story description and others about traditional local culture, suitable for a large number of city's space under the bridge, to transplant the cultural image, which has disappeared or has been disappearing, into the space under the bridge of city. Not only can it intensively use limited urban public space, but also retain and show the cultural mark, which once been here, reflecting the characteristics of urban public space. It also plays a role in orderly display about urban cultural landscape and public education, highlighting the characteristics of urban landscape and repairing the city culture.
Urban Design the Landscape Way

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Keywords: urban design, landscape architecture, design methodology

All civic landscape architecture, some would argue, constitutes urban design. We beg to differ. But if the two disciplines are indeed distinct, and if, as we assume, the urban design project is both worthwhile and necessary, what can landscape architecture offer that the other partnering disciplines—architecture, urban planning, and, lest we forget, civil engineering—cannot?

As many contemporary critics have argued, the idea, central to landscape architecture's ethos, that nature is an antidote to urban ills is a double-edged sword: it helped the profession secure a place in urban affairs, but it often pigeonholed its practitioners into the role of supporting cast, as an added value to urban design endeavors led by others. These same critics argue that we should, instead, consider how landscape architecture's specific conceptual and methodological scopes could be applied across the full spectrum of urban design concerns. James Corner, for example, proposed four “provisional themes” on which to anchor a new landscape-centric urbanism: process over time, the staging of surfaces, the operational and working method, and the imaginary. As a counterpoint, Jusuck Koh proposed his own “ten defining characteristics of landscape urbanism.” There are many others.

In good polemical spirit we'd like to introduce our own provisional list, reflecting on twenty years of teaching urban design in the context of landscape architecture education:

- Scale shifting
- Time warping
- Dynamic tectonics
- The in-between
- The situated imaginary

Each of these themes will be illustrated through the help of examples borrowed from both academic and professional settings, with a particular attention to how each found tangible real-world applications.
To Build a Metaphor: Reinterpreting L’Enfant’s Design for the City of Washington

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Keywords: urban design, L’Enfant, Pierre Charles (1754-1825), Washington, D.C. history, public space

The City of Washington in the District of Columbia is not only the capital of the United States, but is also one of the world’s few planned cities. In 1791, President George Washington directed the Frenchman and Major in the Continental Army Pierre Charles L’Enfant to design a Plan of the City intended for the Permanent Seat of the Government of the United States as the new capital city for a new nation. L’Enfant’s intent was to design a city that physically represented the highest ideals of the new nation exemplified in its name: United States of America. L’Enfant’s accomplishment, current scholarship claims, arises from an urban design that is based on geometrical patterns, sometimes considered symbolic, which ignores the central role that the landscape played in L’Enfant’s design.

Today, Washington is known for its expansive diagonal avenues, named for the states, with monuments and memorials located in traffic circles at their intersections, and a street grid filling the remaining areas. While many scholars have claimed that the garden design of Versailles and eighteenth-century portions of European cities inspired this pattern of avenues and generated the urban design, an examination of recent scholarship and original letters provides evidence to the contrary. This paper argues for a reinterpretation of L’Enfant’s design process using terrain maps that show the land as he found it. More about his process is learned from L’Enfant’s early sketches and letters revealing that he first examined the land and waterways to locate public buildings and fifteen public squares on higher ground with better prospects and then spaced the squares to provide a “reciprocity of sight” thus linking distinct areas visually. Only then were the avenues laid out to connect the buildings and squares. L’Enfant further proposed that the land around the public squares be purchased and developed by each state in a manner that reflected its individual character, which would guide the means to populate the new city. Although L’Enfant did not identify which public square would be the center of each state’s district, this paper includes original research that follows a process of elimination based on known avenue names to assign each public space to a state, which further clarifies L’Enfant’s full urban design intent. Thus, the urban landscape of the capital city, with its individual but visually linked districts, can be understood as a metaphor that demonstrated a new nation’s ideals of independence and unity in built form.
Case Studies for Planning and Designing a Thriving Student Farm

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**Keywords:** student farm, campus planning, urban agriculture, sustainable agriculture, sustainable food systems

The student farm is becoming a significant place in the campus landscape, considering continued rise in the number of student farms and sustainable food systems programs at higher-education institutions across the United States (Leis, Whittington, Bennett, & Kleinhenz, 2011; Parr & Trexler, 2011; Sayre & Clark, 2011). These sites contribute to a myriad of education and experiential learning opportunities, broader community health and outreach programs, and campus open spaces and green infrastructure. Planning for and building a successful student farm is not a trivial undertaking. Long-term commitments to support the necessary people, funding, and land resources requires significant efforts (Leis et al., 2011; Ratasky et al., 2015). Existing research on successful student farm planning and design primarily focuses on farm administration and student experience (Leis et al., 2011; Ratasky et al., 2015), and educational programming (Biernbaum, 2006; LaCharite, 2016; Parr & Horn, 2006; Parr & Trexler, 2011). However, there is a gap in the literature specifically on how to successfully approach the physical planning and design of student farms, both on site as well as its relationship to offsite campus resources.

In a broader, related study, I investigated how physical design relationships may be at play in contributing to a thriving student farm. To do this, I used grounded theory and content analysis to analyze 27 semistructured interviews with student farm personnel and direct field observations from 19 student farm sites at 12 public universities across the U.S. This study explored site planning and design elements including land use, management, programming, layout, aesthetics, and placemaking. In this paper, four case studies illustrate successful planning and design principles for student farms outlined in a complimentary paper (VanWieren, 2017). Results demonstrate the value of strategically establishing the identity, design, and systems of a student farm within a focused category along campus landscape transect. The transect organizes student farm initiatives on dimensions of scale, production systems, and aesthetics. Findings incorporate site diagrams, montage drawings based on field observations, imagery, and analyzed data. These exemplary cases are most applicable during early planning stages for new or evolving student farms.
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