The Council of Educators in Landscape Architecture

2020 Conference Proceedings

Edited by

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FOREWORD

Studying history is essential because it allows us to understand our past, which in turn will enable us to understand our present. Studying landscape architecture history can provide us with insight into our cultures of origin as well as customs with which we might be less familiar, thereby increasing cross-cultural awareness and understanding. Studying the collective history of the Council of Educators in Landscape Architecture (CELA) helps us develop a better understanding of our membership, organization, and landscape architecture education and its place in the world.

The CELA centennial 2020 conference, 100 Years of CELA: Deep Time, scheduled for March 18-21 in Louisville, Kentucky, was canceled due to the global COVID-19 virus pandemic. We were especially looking forward to the 100-year celebration of the CELA; however, as the pandemic unfolded, it became clear that in the face of such an unprecedented situation, this was the right decision.

The mission of the CELA is to support landscape architecture educators to advance the profession. The CELA annual conference brings together hundreds of passionate landscape architecture educators, professionals, and exhibitors to celebrate the teaching and scholarship of landscape architecture across the country and around the world. Our coming together not only ignites the mission of the CELA but also provides opportunities for attendees to explore and exchange ideas, and connect on a face to face basis.

In place of a face to face conference in 2020, the CELA developed this online publication of a selection of peer-reviewed abstracts accepted to the 2020 CELA Conference using the CELA conference tracks as an organizational tool. Three additional tracks incorporated for 2020 include the Geo-spatial and Digital Analytics Track, the Landscape Architecture for Health Track, and the conference theme track, 100 Years of CELA: Deep Time. Many thanks to the authors, reviewers, and staff behind the scenes who have worked to make this online publication of scholarship as accurate as it can be.

The 100 years of CELA Theme Track reflects on the past, present, and future of CELA and the profession of landscape architecture education. It includes, but is not limited to 1) documenting historically significant events which changed the course of landscape architecture education and the CELA, 2) evaluating and surmising the current state of the profession, and 3) proposing courses of action, direction, and vision that will propel CELA as a leader in supporting landscape architecture teaching, research and service for the next 100 years. Many thanks to Katya Crawford, Chair and Associate Professor in the Landscape Architecture Department at The University of New Mexico’s School of Architecture and Planning, and a Past President of the CELA, for making a banner to visualize CELA’s history. The banner captures a glimpse of how
landscape architecture education and the CELA worked way back when so that we can better understand how they work now. Be sure to look for this banner at future CELA annual meetings!

Finally, the CELA Board of Directors welcomes all to join together in continuing to reflect on this year’s theme. What are your dreams and ambitions for the next 100 years of CELA? Where are we going, and how will we get there? How will the global COVID-19 virus pandemic affect landscape architecture education as we now know it? What adaptations and changes will we need to make to advance landscape architecture education and the profession in the next 100 years? Let us continue to celebrate together the fond memories that we have of each other and past conferences as we forage ahead to plan a bold future for the CELA and landscape architecture education. Although the cancelation of the CELA 2020--100 Years of CELA: Deep Time conference was a great disappointment, the CELA is using this time to fuel the planning for an exciting and robust CELA 2021 Annual Conference, March 17-20, at the Hyatt Regency Tamaya Resort near Albuquerque, New Mexico.

I look forward to seeing you then!

Charlene M. LeBleu, FCELA, FASLA, AICP
Past President, Council of Educators in Landscape Architecture
Chair, 2020 CELA Standing Committee on Conference & Events
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100 YEARS OF CELA: PAST, PRESENT AND FUTURE
1969 – 2019: Fifty Years of Graduating Landscape Architecture Students at the University of Guelph

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Keywords: Poster, Pedagogy, 50th Anniversary, Design Education, Canada

This poster offers a condensed yet critical history of the landscape architecture programs offered at the University of Guelph, located in Southwestern Ontario, Canada. In 2019, we celebrated the fiftieth anniversary of our first graduating class, and acknowledged the first and now only, Bachelor of Landscape Architecture program available across Canada. The poster charts not only the numerous adaptations made to the undergraduate curriculum, but also documents the establishment of the MLA program, the change from the School of Landscape Architecture to the School of Environmental Design and Rural Development and includes the multiple physical modifications to the building to accommodate continual growth of our landscape programs. Through the use of a critical historical lens, this poster also reveals how the professional expectations and disciplinary demands of the profession have influenced our curricula and the skill sets taught to our 3,000 + graduates over the last 50 years. This work will also detail additional modifications that are currently being implemented to ensure that the study of Landscape Architecture at the University of Guelph remains in touch with the best pedagogical and disciplinary practices.
A Century of Thinking Like Designers: The Wellsprings of Design Thinking and its Future in Landscape Architecture Education

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Keywords: Design Thinking, Landscape Design Studio, Cognition, Procedural Theory

For the past several decades, design thinking, creativity, and innovation have been a popular subject in the academic and popular press. During that time, the Hasso Plattner Institute of Design at Stanford—the d.school—has co-opted the term ‘design thinking’ as something new and revolutionary. In fact, it is not; design thinking has been the subject of interest and research in design fields throughout the 20th century. This prompts a further line of inquiry into the teaching and learning of these skill sets in landscape architecture over the past century. By analyzing the content of selected books, articles, and other print documents beginning with Hubbard and Kimball’s Theory in Landscape Design (1917) to today, how landscape architecture has regarded design thinking can be charted. The cognitive skill sets are taken from Benjamin Bloom’s revised Taxonomy of Learning (2001), and Sparks of Genius (Root-Bernstein 2001), and corroborated by analyzing skills embedded in first year design studio projects. Although more nuanced, approaches to design thinking in education can be divided into four eras. At the beginning of the 20th century during the time of Lock, Thorndike, Dewey and Piaget (Wikipedia contributors “tk”), the first landscape design textbook (Hubbard and Kimball 1917) speaks directly to the kinds of cognitive and kinesthetic skills necessary to become a designer. As the post-WWII era brings rationalism and deductive logic to the fore, landscape architects begin to model the design process. Embedded in these staged process models (Swaffield 2001) are the cognitive skill sets. With the exception of analytical or critical thinking, the full spectrum of skills are very difficult to detect in this format (Sasaki 1950, Newton 1951, White 1953, Simmonds 1961, McHarg 1967). It isn’t until the late 1970s and 80s that landscape architects begin questioning the veracity of the staged process model, particularly how creativity is addressed in education (Halprin 1970, Kvashney 1982, Krog 1983, Lyle 1985). Today, as we find ourselves amidst an upsurge in brain science research and an evolving teaching and learning environment at the university, design thinking is entering the lexicon of landscape architecture education (Murphy 2016). However, as Robert Root-Bernstein (Creative Impact Michigan 03.08.12) reminds us, if thinking skills necessary for creativity and innovation are not part of our learning environment, we will not see their evidence in the world. The paper concludes with a set of propositions resetting studio education for the 21st century.
A Scoping Review of CELA Research Trend 2009-2019

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Keywords: Landscape architectural research, literature review, content analysis, thematic analysis, literature appraisal

Many scholars have acknowledged the necessity of extensive research in landscape architecture to improve practice and teaching, and evidence-based landscape architecture has been discussed consistently (Brown & Corry, 2011; Cooper Marcus & Sachs, 2013) Several recent studies have explored research trends to identify the factors behind changes in landscape design paradigm (Gobster, Nassauer, & Nadenicek, 2010; Milburn, Brown, Mulley, & Hilts, 2003). This study continues this exploration by reviewing the abstracts published in the Council of Educators in Landscape Architecture (CELA) conference proceedings during 2009-2019. A scoping review method was adopted in the study aimed to map the existing literature to identify key concepts, research gaps, research pattern, and trend, and types of sources of evidence to inform practice (Pham, Rajić, Greig, Sargeant, Papadopoulos, & McEwen, 2016). A total number of 3,230 abstracts were evaluated using the content analysis method (Powers & Walker, 2009). The analysis was conducted in three phases. First, publications were sorted and categorized according to 12 standard CELA tracks in addition to special theme tracks for each year aided by Microsoft Excel (Meyer & Avery, 2009). The characteristics of the primary research and key concepts were identified. Since many publications address more than one topic, in the second phase, the relationship between different tracks was analyzed and compared to determine which fields of study are influencing others. Relationship metrics were visualized through keywords analysis and citation analysis in each trend (Jiang, 2014). In the third phase, research methods and content of publications in the influential tracks were critically appraised, aiming to evaluate such publications' levels of rigor as empirical evidence (Taylor & Hignett, 2014). Preliminarily results suggested that certain tracks (i.e., people-environment relationship, history, theory and culture, design education and pedagogy, and sustainability) remained prominent research themes. Meanwhile, “climate change,” “resilience,” “energy performance,” and “health” became emerging research themes among scholars. The goal of this study is to identify long term trends and changes in research pedagogy among the scholars of Landscape Architecture and highlight the gaps in research to identify key areas for future contribution. The study will also provide a glimpse of the future dynamics of landscape study.
Does Digital Data = the Demise of Design?

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Keywords: design process, Beaux Arts, Bauhaus, data-driven design, design education

Is data-driven design unintentionally changing the way we explore and create? The ideas that have driven education and practice, and the methods of exploration used in design processes have shifted and changed over time throughout the history of landscape architecture. Often new thinking has been intentionally introduced, assessed, and either integrated or rejected to form the foundation of new means of design exploration. A profound shift occurred early in the profession as the Beaux Arts methodology was rejected and replaced by the thinking of the Bauhaus, changing how design education and practice would occur for years to come. Likewise, minor shifts, recalibrations within the fundamental framework, have influenced design processes, practices, and project outcomes. These shifts, including the addition of sociological and psychological considerations, the abstract shapes and forms of modernism, the ecologically-driven design process popularized by McHarg and the postmodern reaction it catalyzed, as well as the scientific rigor of early evidence-based exploration, have all contributed to the current state of design thinking in the profession. The digital revolution has likewise fundamentally changed the way that design professionals think, communicate, and create, largely, though not exclusively, in positive ways. Performance modeling and assessment through digital data has the potential to improve our understanding of those challenges addressed by design and the degree to which design “solutions” have in fact solved these problems. However, digital data also seems to have the potential to drive design process in ways that discourage the Bauhaus model of expression and creativity-driven design exploration, encouraging a focus on data driven rulesets and performance quantification. Rather than simply acting as tools to facilitate design, recent innovations and movements in data-driven design, BIM, geodesign, and parametric design seem to assign rules and quantitative data primary importance in design processes and outcomes, ahead of creative exploration and qualitative expressions. These shifts seem to have happened gradually and without declaration or purposeful intent by educators. While most program curricula continue to teach foundational design studios that focus on question-based exploration and problem solving, upper level design studios are focusing more and more on rules-based design and performance metrics. This paper explores several questions that arise from these observations. Not a technophobic declaration against data or its tools, the paper asks whether we are in the midst of a paradigm shift on the order of the movement from the Beaux Arts to the Bauhaus and seeks to begin a discussion regarding repercussions and responses within academia and practice.
The History of Landscape Architectural Education in the American South

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Keywords: Landscape Architecture Education; American South; Professionalization

The history of landscape architecture education in the United States is poorly documented. A few schools have written preliminary histories of their programs, but these are typically auto biographical or self-fulfilling narratives that lack critical inquiry. The more comprehensive of these are focused on programs in the northeast or west coasts. There are no critical histories of landscape architecture education in the American south. This paper will present a comparative history of the first three accredited landscape architecture programs in the American South. All were initiated in the late 1920's, started in departments of horticulture at land grant universities, and all three identify with a charismatic founding director. Hubert Owens started the program at the University of Georgia in 1928. The program at North Carolina State College also began in 1928 under the leadership of Joseph Pillsbury (who earlier initiated the program at Penn State University) although its modern form dates to the School of Design established in 1948. Landscape architecture instruction at Louisiana State University similarly dates back to the late 1920's, although the current program identifies exclusively with Robert Reich as the founding director in 1940. The paper will close by considering broader themes of early landscape architecture in the American South evidenced through the “Regional Survey Conference on Research in Landscape Architecture” held at the University of Georgia in 1959. The histories presented here consist of previously unpublished material compiled through primary source research at institutional and regional archives.
The Ideology of Critical Regionalism as a Renewable Resource for The Next 100 Years

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Keywords: Critical Regionalism, Design Aesthetics, Design Ideology, Creativity

Since its introduction as a term by Alexander Tzonis and Liane Lefaivre, critical regionalism has emerged as a significant, though never dominant, topic in contemporary landscape architectural discourse worldwide that continues to merit closer attention. Kristine Woolsey, a participant in an important conference on critical regionalism held at Cal Poly Pomona in 1989, wrote in the proceedings that the only constant in the process of critical regionalism is the quality of the ideological position of the architect that evolves over time through practice, experience, and the international debate of the profession. Looking towards the next 100 years of CELA, it is worth reflecting on where we are ideologically as a profession in relation to critical regionalism. Personal ideological positions related to critical regionalism are informed and modified by influences of region, contemporary culture, and aesthetic components such as environmental psychology, cultural rules, and the appropriation of regional ecology and environmental forces. Critical regionalism enhances “the practical, the social, and the educative.” The creative and expressive qualities of critical regionalism designs transcend both the prosaic and art for art’s sake. The author has used research into critical regionalism as a guiding ideology for both practice and education for the past 25 years. The research is informed by continuing and extensive literature reviews, interviews with dozens of regionalist practitioners throughout The United States, criticism and documentation of regionalist built projects in 11 countries, and the use of critical regionalism as the overarching theme of a graduate landscape architecture design studio taught yearly since 2004. This presentation will make the case for the future viability of a critical regionalism that is resilient, continuously adaptive, open to continuing influences from throughout the world and made relevant by the creativity of individual designers that anchor it in the present. It is a framework for designers that maximizes what Nina-Marie E. Lister refers to as the transformative capacity of regions, as they undergo ever-accelerating waves of cultural, environmental, and ecological changes. A critical regionalism that will help landscape architects, and the people who facilitate their education, pursue a lifelong quest to design landscapes that are “contextual, legible, nuanced, and responsive”.
Trends in CELA-based Research: A Comprehensive and Track Separated Longitudinal Analysis of Submission Content

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Keywords: content analysis; landscape architecture; design; longitudinal analysis; text evaluation

With over 120 institutions and over 300 members globally, the annual CELA conference has showcased the most relevant topics related to LA research for 100 years and is the primary vehicle through which LA research and education are integrated. Despite the abundance of narrative overviews of LA research trends, systematic and longitudinal examinations of topics covered at CELA and their semantic structure have never been conducted. The purpose of the study is to evaluate tendencies in CELA abstract submissions through time to determine 1) what topics have been most relevant to landscape architecture (LA) based research and 2) how these research trends have changed. To achieve this, we gathered CELA abstract submissions and compiled them comprehensively and by individual research track. Despite its century long legacy, thorough data only exists on CELA abstract submissions from 2013-present, yielding a total of 2426 abstract entries over a 7-year period. We applied a state-of-the-art topic model known as a Latent Dirichlet Approach (LDA) on these abstracts to identify the top 20 topics across CELA submissions through time. An adapted LDA generative probabilistic model was applied based on the approach utilized in Blei et al.’s (2003) research, which focuses on developing statistically clustered themes within word and text content. Based on the model results, we examined topic distribution over time and across CELA tracks. Results showed the top topics, comprehensively from 2013-2019, are water, green infrastructure, community engagement, landscape performance, pedagogy and programs, environment and walkability, ecosystem and its services, climate change, student learning, form making, urban growth, public health, engineering and construction, waste and energy, visuals and representation, landscape theory, history and culture, vernacular landscapes, technology and tools, and public space social space. Trends showed that LA research has consistently prioritized topics with societal significance while other prioritization of specific sub-fields of research appear to alter by year. For example, green infrastructure, community engagement, climate change, and technology and tools are the topics that have gained the most ground in the last 7 years. Topics like hydrological, social, and pedagogy-related research are also consistently highlighted, but only in specific years. Other topics such as form making and urban growth have decreased in numbers. In conclusion, community-based approaches involving water, green infrastructure, and ecosystem services to solve societal challenges such as climate change and public health are at the core of most of LA-based research, while the profession also continually seeks to embrace new technology, tools and metric-based evaluations to tackle contemporary circumstances.
COMMUNICATION AND VISUALIZATION
How High? Using Landscape Installations to Visualize Sea Level Rise

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Keywords: climate change, public art, visualization, public engagement

Sea-level rise has the potential to affect and displace up to 13.1 million people in the U.S. by 2100 if no adaptive measures are set in place (Hauer, Evans & Mishra, 2016). In order to respond and adapt to the changing climate, coastal cities need to be transformed. However, public engagement with the subject has been low, making climate adaptation planning more difficult due to lack of public support (Drews & van den Bergh, 2016). In order to support equitable resilience efforts, it is imperative to increase awareness of the problem across all sectors of the population. Landscape architects can increase public engagement with issues of climate change through multiple communication and visualization techniques. Current landscape architecture efforts in visualizing the effects of climate change have focused on the use of digital representations and virtual reality simulations (Dulic, Angel, & Sheppard, 2016; Sheppard, 2105). However, these visualizations may not be accessible across all sectors of society. The use of public art, and landscape installations in particular, can extend the reach of future visualizations beyond those who can access digital communications and may especially resonate with the public by being site-specific and experiential (Aragón, Buxton & Hamin, 2019). Additionally, these artworks can link environmental phenomena to the daily life of the public (Nassauer, 2012). This case study presents a temporary public landscape installation, FutureWATERS AGUASfuturas, which visualized future flooding due to sea level rise along the East Boston Greenway. Social science research methods were used to assess how art installations may contribute to public understanding of local issues of sea level rise, and whether they may contribute to the public’s embodied understanding of projected landscape-related impacts. Our study points to the potential for public art installations to increase salience and improve knowledge of projected flood levels, as well as their perceived value in calling attention and disseminating information about local issues of sea level rise. Our research presents the case for public landscapes as an accessible site for visualizing future risk scenarios, and as a setting for participatory practices involving local communities through the use of non-digital visualization techniques such as landscape installations. As such, our study suggest that public art can be an additional tool employed by landscape architects in increasing public participation and community design as part of efforts in equitable climate resilience.
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Images to Evoke Decision-making: A Project to Determine Compelling Representations for a Stakeholder-driven Research Project

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Keywords: GeoDesign, INFEWS, Planning, Scenarios

Contemporary landscape planning challenges require an increasingly diverse ensemble of voices, including regional stakeholders, physical scientists, social scientists, and technical experts, to provide insight into a landscape’s past trends, current uses, and desired future (Steinitz, 2012). To impactfully integrate these disparate parties, stakeholder-driven research must include clear lines of communication, share data transparently, and slowly develop trust. Sherry R. Arnstein notes the importance of meaningful, substantive stakeholder engagement in public planning processes with the image of a “ladder of citizen participation” (Arnstein, 2019). However, avoiding “tokenism” or “placation” in favor of “partnership,” “delegated control,” or even “citizen control” requires unique approaches to facilitate dialogue, evoke engagement, and continue stakeholder trust. With our research, we intend to determine a ranked set of compelling scenario representations using stakeholder input, proper timing for delivery, and a metric for successful graphics. The National Science Foundation awarded an Innovation at the Nexus of Food, Energy and Water Systems (INFEWs) grant to The University of Idaho’s Center for Resilient Communities to study Idaho’s agriculturally-relevant Magic Valley. Throughout this project, a variety of stakeholder outreach, engagement and retention strategies were used to gather and evaluate research findings. Of particular note are the means of visual communication and representation used to quickly and clearly align researcher and regional expert assumptions on the study area. These representation approaches include: researcher-generated geospatial maps, stakeholder-generated areas of impact traces, real-time co-created Geoplanner (ESRI) maps, system-wide infographics, hand-rendered scenario narrative vignette graphics, scenario impact graphics, and site-specific solution graphics. The methods of our project intend to utilize a stakeholder survey instrument to gauge effectiveness of each representation approach. To improve future stakeholder-driven geodesign projects, this presentation provides a ranking of graphic strategies based on the stakeholder survey instrument. Additionally, it provides examples and evaluates graphic representation strategies that can stimulate meaningful conversations, create common understandings, and translate research process and findings to a variety of audiences. Results of this study are intended to provide landscape architects with a framework for delivery of compelling representations to a stakeholder group, and a metric for their evaluation.
Walking and Drawing: Complementary Activities for Understanding the Environment and Landscape

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Keywords: Cognitive Learning, Design Skills, Drawing Skills, Visualization, Representation, Practice, Illustration

There are designers and authors who use walking to get inspired, to clear their mind, and to call on the muse. Stephen King, the novelist, is a well-known peripatetic who walks daily to engage ideas for his novels. If we agree with walking literature (Solnit, 2001, Careri, 2002, Nicholson, 2009, Gros, 2015) that the act of walking is effective for authors to enhance their perception of the environment and help their writing, then can we add the activity of drawing to walking in order to enhance drawing and creativity in design? Simple experiment. Students walk, observe, take pictures, and draw on a weekly basis. How does their drawing develop? What are they observing? Moving the body and stimulating the brain allow for more ideas to develop in the mind of a designer. The question in this exercise is: do the students become better drawers and designers because they consciously undertake walking and drawing together? Are they learning something from their drawing walks? Science tells us that walks activate the brain, the senses, and develops observational records of the world. Drawing is a skill that must be developed not only in technique but also in its development of the designer’s insights and environmental memories. The students will experience various settings of their environment during day, at night, and document their walks with photographs, sketches and words. The paper will also introduce ideas from auto-didactic learning, experiential learning, cognitive learning, learning for life, psychology and education. Walking has neuroscientific, psychological and anthropological literature (Lehrer, 2012, Ingold, 2016, Ramachandran, 2011) delineating how walking is good for sensorial stimulation, supporting meta ideas, and fulfilling biological triggers needed by body and brain. This paper explains the transfer of scientific information to application of learning activities related to drawing. The paper formulates an experimental approach to developing drawing and design skills along with experiential and spatial cognition. Assessment of the student work will be done by logging and documenting the works weekly. For now, a traditional measuring of effectiveness in drawing by comparing what was recorded in the initial attempts at drawing at the beginning of the experiment period with drawings at the end of the experiment period (Lin, 1993) will be applied. Formulating a new method for measuring and assessing the growth of drawing skills will also be explored as of now there is no current assessment used with measured standards.
DESIGN EDUCATION AND PEDAGOGY
A Foundation Studio Methodology for Designing Multispecies Commons

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Keywords: Introductory Design Studio Pedagogy, Landscape Media, Fieldwork, Assembly, Entanglement, Landform Manipulation

The purpose of this presentation is to describe a series of design and pedagogical methods introduced in a first-semester, graduate-level landscape architecture studio that critically engages landscape media, movement and time in place-making, and to share the outcomes and lessons learned from the past three years of studio iterations. The underlying framework expands Christophe Girot’s “four trace concepts” in landscape architecture and David Leatherbarrow’s claim that design is an “outgrowth” of landscape conditions. Through the lens of fieldwork, assembly, entanglement and landform that make up the four sequential and cumulative exercises culminating in a semester-long individual project, the studio asks students to traverse a forested terrain and interpret its spatial, biophysical and experiential phenomena, first as a set of parameters and processes and then as catalysts for creating a design language for multispecies interactions. A field-based investigation of a specific landscape medium such as ground materials and vegetation structures is paired with a key lexicon (e.g. regularity, layering, edge, contrast, rhythm) to help filter and ground students’ own landscape readings. The study of found conditions is further deconstructed into smaller spatial and material units that are prototypical in nature, and are reassembled into a continuous series of positions and configurations that can be assumed in human motion. This prototype turns ecological as students examine potential linkages between the systems of human and non-human movements and as they delineate additional spatial and temporal parameters that can support a meaningful interaction in a self-chosen site. Finally, the design concept which has evolved through the previous exercises is tested and materialized by manipulating the site’s landform and curating its transformation, disturbance and performance over time. The studio navigates the boundaries between the abstract and the precise, the site-specific and the site-less, the found and the constructed, and the conceptual and the technical, with an emphasis on a repeated synthesis and refinement of a design narrative and associated strategies over a several months. In this studio system of layered design methods, students experiment with focused landscape materials and ways of seeing, translating, and intervening each element in depth as a part of a broader, interconnected design and ecological process.
Assessing the Intersection of Cross-Cultural Design Studio Teaching and Research Based Design

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Keywords: Cross-cultural Design Studio Teaching, Research Based Design, international education

The intersection between cross-cultural design scholarship and research-based design suggests promising areas of interest for international design education (Hou 2010, Hewitt & Nassar 2019). This study utilizes these areas of scholarship, providing useful assessment criteria for interdisciplinary urban design studios in global cultural contexts. Two areas of assessment criteria most relevant to this paper address: 1) the quality and scope of participant learning, listening openness, common purpose, culture, and collaboration (Giroux 1997, Friere 2000); and 2) RBD project methodology addressing four areas: a) collaborative analysis, b) solutions based design principles and technological innovation, c) iterative cycles of testing and refinement, and d) reflection to enhance solution implementation (Reeves 2006). Their relevance to international design education is illustrated through case study of a semester-long urban design studio course addressing sea level rise between three groups of university students: 22 LA Masters and PhD students from Huazhong Agricultural University; 25 ARCH undergraduate students from Ain Shams University; and 13 LA undergraduate and Master’s students from Clemson University. All students completed field work in Charleston SC, worked separately and virtually over the course of the semester. During this time the students were observed and surveyed concerning cultural/learning aspects of the classes in terms of learning, listening openness, common purpose, culture, and collaboration. To evaluate the research-based design (RBC) aspects of the courses the study assessed quality and quantity of meaningful work throughout a semester in the four areas identified above. A list of the meaningful work included: shared regional and local research, planning for development, collaborative field work, site inventory and analysis, community interviews and analysis, conceptual development, solution development and technological innovation, iterative cycles of refinement, and reflection on solution implementation. Significant case study findings suggest: 1) that RBD processes in all four areas identified by Reeves mitigated underlying cultural miscommunication between student groups, resulting in more and higher quality meaningful student work, despite perceived and imposed participation limitations; and 2) that both the quality and scope of student learning increased with increases in collaborative ways of sharing knowledge, more flexible ways of thinking, studying and learning, and student perceptions that cross-cultural interaction stimulated creative thinking. While these findings are immediately relevant to interdisciplinary international education in landscape architecture, inferential observations during the semester suggest potential for improving educational processes in culturally diverse domestic studios.
Building the Links between Field Sketching and Design Thinking: Teaching Introductory Landscape Architecture Design

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Keywords: Landscape Architecture Foundation Design Studio, Morphology Approach, Field Sketching, Design thinking

Many educators and design professionals believe there are direct links between and among observing, sketching and design thinking. However, these links are abstract and too difficult for a beginner to grasp. It is one of the challenges on teaching Landscape Architecture foundation design studio, to build these links on a sophomore, who picks up a sketchbook and a drawing pen first time in his/her life. This essay reviews the methods have been used in teaching landscape architecture representation workshops and foundation design studio. A morphology approach is introduced to help students to recognize Landscape Architecture. While field sketching, students are asked to draw their attention to six Landscape Architecture morphological parts (Field, Space, Paths, Edges, Thresholds, Detail). Like a scavenger hunt, students start to train their eyes to seek/reveal the Landscape Architecture in their daily commute. Second, field sketching is not simply a representation, but also a process of collecting information. We first take apart what is seen (a three-dimensional space) disassemble into fragments (lines, dots, shapes), from which a sketch (a two-dimensional drawing) then be assembled onto a piece of paper. Different from Architecture sketch, which is strongly constrained by perspective principles, Landscape Architecture sketch has freedom/pleasure to collection information on others, such as, textures, tones, and qualities. Lastly, Design thinking is a reverse process of field sketching. Designers orchestrate ‘fragments’ in two-dimensional drawings (plans and sections) with a vivid imagination in three-dimensional space. And Landscape Architecture designing is a holistic integration of Field, Spaces, Paths, Edges and Thresholds...
Debating Theories: A New Method of Teaching History and Theory in Landscape Architecture

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Keywords: Landscape Pedagogy, Debate, History and Theory

The importance of theory and practice in landscape architecture is controversial. Some scholars insist that practice is the domain in design education while other educators determine that history and theory of landscape architecture have equal importance in establishing a comprehensive understanding of the profession, especially framing a stable foundation for beginners (Corner, 1990). Although landscape architecture educators proposed various pedagogy for studio and design learning (Powers, 2016), the teaching methods for a history and theory course have rarely changed during the past few decades. Despite discussion and group work, traditional lectures are still the primary teaching method adopted for a history and theory of landscape architecture course in most LAAB accredited programs. Teaching the landscape architecture students of today with antiquated methods causes negative feedback from students on course evaluations. Is there a way to change it? This study aims to propose a new method for teaching a history and theory course in landscape architecture. Instead of delivering traditional lectures, the instructor asked students to engage in a debate of theories. Before the debate, a series of selected readings were provided to the students. However, they would not know their arguments until the debate began, which forced them to think from both sides of the theories. The students were then divided into two groups with four students in each. The affirmative and negative teams were randomly assigned for each debate. The instructor served as a coordinator to facilitate the debate and to propose new arguments and points to encourage divergent thinking. In addition, the instructor also conducted participant observation during the class sessions to compare the students’ performance between lectures and debates. Four debates had been held during the semester. After each debate, the instructor conducted a 15 minute interview with each student to collect their thoughts of the class and this teaching method. The observation and interview results indicated a high preference of using debate to teach history and theory courses in landscape architecture. In addition, the students developed their own positions of landscape architecture design theory through debates. This had been verified in the studio design project of the same group of students, in which they applied the theories debated during their history and theory course. This method is expected to provide an alternative for landscape architecture pedagogy and weaken the “boring” stigma of a history and theory course.
Effectiveness of the “Sketching Plants” Practice Method for Enhancement of College Students’ Environmental Awareness and Affinity

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Keywords: drawing assessment; college student; environmental attitudes; environmental awareness; landscape education

Many types of research in the environmental and landscape education field indicate that young generations in an urban environment show a significant inability to perceive plants in their emergent surroundings. Due to seemingly few chances to experience natural environment within highly urbanized circumstances, Korean college students are losing empathy for the ‘green side of life.’ This study aimed to examine the ways in which the college students’ appreciation towards nature would be affected by a new type of education method, focusing on plant sketching practice. For this study, selected college students in Seoul were examined by being divided into control and treatment groups: students in the control group have taken a regular ‘walk-and-seeing natural landscape’ outdoor field trip and the students in the treatment group made a series of hand-drawn plant sketches during the field trip. Interviews and surveys were conducted to both groups after the trip. Collected materials were analyzed using inductive method to find patterns, categories, and themes, and were compared to find commonalities and differences. The result revealed that there was meaningful correlation between plant sketching practice and students’ change of environmental awareness. The keywords in the written answers changed from normative words into the ones reflecting internalized meanings. In conclusion, the students’ ‘plant ignorance’ can be relieved through education programs, especially with a hand-sketching method. Future research should be continued to examine the potential role of an outdoor plant sketch session as an interdisciplinary teaching, learning, and evaluation tool for environmental and landscape education across a variety of contexts.
Evaluating the Effects of Cluster-Based Landscape Architecture Studio Environments on Student Performance

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Keywords: Studio Pedagogy, Learning Environments, Peer Learning

This study seeks to explore the role of cluster-based studio learning environments in affecting student performance. Studies have demonstrated a critical relationship between the learning environment and student preferences and performance (e.g. Meeks 2013, Espey 2008, Perkins & Wieman 2005, Demirbas & Demirkan 2000). The studio environment is a unique physical and social setting that is germane to landscape architecture education. Contrary to the traditional lecture- and test-based classroom, studios encourage peer-to-peer interactions in both formal and informal activities as a key process toward student development and performance. Students are expected to learn from each other as part of the design process through pin-ups, desk critiques, and time spent together in the studio outside of scheduled class time. While invaluable to the students’ development, these interactions have potential to promote sharing of norms and information that are both positive and negative to students’ development. For over 40 years The Pennsylvania State University landscape architecture program has organized studio environments using a cluster model, or groupings of drafting desks, to foster peer interactions within a class. Faculty often discuss the importance of a high performing cluster in raising the overall quality of the class, yet compared to traditional lecture-based classrooms little research has been done to describe the results of this commonly applied strategy, whether there are differences among clusters, or what mitigating factors might affect the student performance. This study explores the results of the cluster model through two consecutive quantitative analyses of a recent first-year landscape architecture class. First, student performances from a linked design studio and skills course sequence that includes interim assignments, major design projects, and participation grades will be explored using ArcMap’s Cluster and Outlier Analysis tool to illustrate homo- or heterogeneity among clusters over a time period of one academic year. Second, cluster data will be statistically compared to sociodemographic data including age, gender, ethnicity, and hometown to distinguish between the effects of clustering and students’ characteristics. We expect our findings to demonstrate the importance of clusters in studio-based learning while suggesting strategies for instructors in adapting their learning environment throughout the semester to optimize student performance potential.
Finding and Enhancing PLACE in Placemaking within Small Historic Towns Where the State Highway is the Main Street: A Service-Learning Design Project Gauging Student Design Responses for a Sense of Place

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Keywords: Student Evaluation, Transportation Network, Placemaking, Service-Learning

It is my own belief that a sense of place is something that we ourselves create in the course of time. It is the result of habit or custom. – J.B. Jackson

Okanogan County in North Central Washington is a remote geographic area. Wild and rural over much of the terrain, it has a vast array of iconic landforms formed by a number of geological events such as Eocene volcanism and the Missoula Floods. Because of these events, various groups of people incrementally sought after this mineral-rich area for settlement including diverse populations of Native Americans, explorers, Euro-American settlers, and later, Latin-Americans. Small, historic cities and towns serve as hubs for people living, working, and recreating throughout the area. Economic challenges in these mostly low to moderate income communities have constrained local investment in infrastructure. Downtowns and the street networks remain neglected and in disrepair, and many settings lack a sense of identity and character that honors the rich history and diverse cultures of region. However, there are certain values and amenities in which local communities feel affinity. It is our intention that students realize these amenities and centralize their designs on the creation of a sense of place for the local residents, the land, and the history. In a Landscape Architecture studio at the University of Idaho, students will explore opportunities to enhance and create vibrant downtowns for 13 communities. Proposals are intended to include a research-based inquiry considering the ‘cultural urban landscape,’ streetscape improvements for main streets, and the design of downtown public spaces such as: town squares, pedestrian promenades, plazas, parklets and pocket parks, public art spaces, and other types of enhancements. These urban morphology analyses, iconographies, typologies, and frameworks are meant to provide the communities of Okanogan County with a means to create readily-available improvement strategies. Iterations of these proposals will also provide metrics for student learning throughout the process. In this paper, we will explore the following research question: How can students competently design for a ‘sense of place’ within a service-learning project? The methods are a formalized evaluation of student learning with spatially explicit metrics. Iterations of student designs will be incrementally evaluated with student-driven studio-specific design metrics. Results of these evaluations are intended to answer the research question concerning design for a sense of place. The results will also provide revisions of studio course layout, assignments, and guidance for similar service-learning studios Landscape Architecture.
Introduction/Purpose: This presentation outlines the pedagogical methodology and outcomes of Habitat for Hard Places, a landscape architecture studio currently in its fourth iteration that explores new approaches to habitat creation for aquatic life in Cleveland’s Cuyahoga River. Background/Context: Studies indicate that we are in the midst of a mass, Sixth Extinction of global biota driven by anthropogenic forces. Ohio is a contributor to and a victim of this trend: it has led the United States in the production of industrial toxic air pollution and remains one of the nation’s largest polluters. This and related environmental degradation have caused 333 species of animals in Ohio to be considered at-risk. A disproportionate share of at-risk species exist in Ohio’s waterways. The Cuyahoga offers a template for understanding the broader post-industrialized condition of the waterways of the Great Lakes Region (GLR). While regulations have led to modest improvements in water quality, the denatured river still provides limited habitat opportunities. Methods: Habitat for Hard Places asks students to innovate habitat solutions for fish and native vegetation along the Cuyahoga’s urban corridor. This work begins with a detailed assessment of the lifecycles of local fish populations and their specific habitat preferences (e.g., fast or slow water; rocky or muddy riverbeds; vegetated or non-vegetated spawning areas). With this ecological research, students develop habitat modules that aggregate to create systems of varying complexity to accommodate struggling fish populations. 3D prints of these modules are used to create rubber molds from which multiple concrete casts are produced to test the many potential configurations of fish module systems. Outcomes: The work of this studio has resulted in the submission of fish modules for patents (under review), a traveling exhibit at the Cleveland Urban Design Center (CUDC) in 2020, and a grant from the Ohio Environmental Education Fund. Importance: In the spring and summer of 2019 the United States proposed new rules to radically weaken both the Endangered Species Act and the Clean Water Act. This, combined with the powerful assertion of climate change forces and waning domestic manufacturing, marks a critical juncture in the trajectory of the GLR’s post-industrial waterways. This work firmly locates landscape architects at the nexus of a pressing generational landscape issue that too-often excludes designers. Moreover, Habitat for Hard Places sheds light on landscape conditions—particularly aquatic habitat—that, like the most fickle environmental problems, are hard to see and even harder to understand.
Introducing Landscape Design: Framing Projects through Collective and Scalar Site Analysis

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Keywords: Collective site analysis, scale, representation, introducing landscape architecture, project framing

Landscape architects enter the profession with an aptitude for spatial analysis across a multiplicity of scales and must often work in teams to fully execute design ideas. This paper reflects on our experience teaching a six-week studio intensive intended for adult students with little to no design background, promoting an approach that introduces landscape design through collective and scalar site analysis. This approach combines a collaborative, in situ site observation exercise followed by a set of investigative drawings individually tailored to student interests. In addition to familiarizing students with the urban riverfront site, the two-week exercise served to frame the design goals and objectives to be explored through a subsequent formal design project. This approach provides a viable alternative to the common practice of assigning a single site and defined program in introductory design studios — the students’ individual project briefs emerged from the collective field research and the multiscale drawing assignment. Ultimately, the two-part site analysis assignment successfully produced a wide array of landscape projects, including: typical bounded parks, unexpected site improvements (e.g. a commercial parking lot), and systems-scale reimaginings. For the collaborative site analysis, students were assigned one of eight half-mile sites along the Charles River. Within the eight groups, each student was responsible for observing and documenting the site through one of five lenses of investigation (vegetation and ecology, circulation and flows, ground and materiality, microclimate and temporal effects, or social engagement and use). Students worked together across sites and analytical layers to produce a shared atlas of the riverfront, a primary geospatial reference that functioned as a logical precursor to individual site selection. The following exercise, completed independently, tasked students with producing five drawings at five nested extents. Informed by Eames’s Powers of Ten and the inherently wide scalar range of landscape architectural work, this assignment in representation demanded that students become adept with design thinking across multiple scales, using manual drafting and modeling techniques to capture the salient spatial characteristics of their selected site and its multivalent contexts. The sequence of this exercise is also informed by Girot’s four “trace concepts” in understanding a site — landing, grounding, finding, and founding — and encourages students to leverage their individual experiences and collective interpretations of place to inform the unfolding of a project. In this process, students learn to investigate place through multiple scales and modes of inquiry, which is central to the discipline and especially important in an introductory landscape architecture studio.
Landscapes of the Western Imagination: Reordering Rurality

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Keywords: regionalism; site analysis; rurality; phenomenology; field recording

This paper explores alternative methods of site analysis and site assessment particular to the large-scale landscapes of the North American west. The authors argue that traditional site analysis techniques based on the collection and mapping of quantitative data are limited by their privileging of the plan view, frequently in the form of aerial photographs, and are ineffective at communicating the specific identity and potential of vast regions. Through the development of an innovative series of immersive field study experiences we address the question, how can one frame regionalism in a manner consistent with the unique phenomenological qualities of place which define rurality? Western lands have been defined by an ambiguous mythology of rural culture and conflicting notions of ownership and occupation. How individuals use and recognize these immense public lands varies greatly; they are formally recognized geographic entities created by public agencies, such as Crown Land in Canada and the Bureau of Land Management in the US, yet are boundless spaces in one’s imagination. Our study expands upon the historical, critical visual studies and descriptive approaches established in the work of Geddes and Litton, and merges them with the aesthetic and artistic structures proposed by Klee, Oppenheim, and later Dee, to develop a methodology which condenses the scale of the landscape to an understandable context at the beginning of the design process. Our framework for investigation emerges from a construct of ‘line’ and ‘point.’ A line is understood as the literal and figurative journey between two points, the passage from ‘here’ to ‘there.’ A second level of intervention is the ‘short pause’, or place of contemplation. Lastly, a more immersive response is made through the ‘long pause.’ In essence, it becomes a way in which to understand space by speed of travel through a landscape. Within a referent system of ‘sites’ and ‘actions’ students explore this realm of ambiguity and place the viewer in an explicit geography using a combination of drawing, filmmaking, modeling, assemblage, artifact collection and interpretive field recordings (Oppenheim). They explore how the intersection of land, memory, meaning and spirit of place can inform design decisions at a regional landscape scale. The goal is to communicate a disposition for the western landscape, its past and current uses, and its future.
Making as Methodology for Integrating the Poetic and Technical

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Keywords: Making, Design Pedagogy, Poetic and Technical

As landscape architecture faculty we tend to separate the poetic (aesthetic or creative), and the technical (practical or mechanical) in our classes as a way of helping students understand the range of activities needed to succeed in landscape architecture; this is also reflected in accredited programs’ curricula. An unfortunate result of contrasting the poetic and the technical is that students separate the processes, knowledge, skills, and abilities associated with landscape architecture as discrete components of the practice of creating landscapes. In addition, students also begin to quickly categorize their own strengths and weaknesses, and identify themselves as designers or engineers. According to Niall Kirkwood’s arguments in “The Art of Landscape Detail: Fundamentals, Practices and Case Studies”, the history of separating “aesthetic or creative concerns from the areas of work concerned with technology, that term used to describe the practical and the useful…” resulted in a “landscape discipline [that] was broken into two distinct categories. The first category was associated with the creative act of design and the study of design aesthetics. The second was concerned with the forming and implementation of design ideas” (page 9). This presentation proposes using “making” as a method for emphasizing and engaging the complexity and coexistence of the poetic and technical within the design process. Making models and drawings has always been used as an educational technique in teaching students to create three-dimensional landscapes. However, engaging students in making as a design methodology has the potential to eliminate imaginary and arbitrary boundaries between the poetic or creative processes and technical or practical concerns associated with building landscapes. The presentation includes exercises that I am implementing in the classroom focused on “making” of landform to prevent the continued bifurcation of the fine and mechanical arts. The exercises are interactive and iterative to help students figure out how both the poetic and technical can be “on” simultaneously, mutually supporting one another. While Kirkwood contends that “the mechanical arts and fine arts can be clearly unified through the subject of landscape details, where pragmatic concerns of construction and making are linked with the aesthetic concerns of ideas and thinking” (page 9); it is demonstrated in this presentation that the sculpting of landforms and the mechanical aspects of grading are the perfect place to explore unifying these aspects once again.
Productive Landscapes Past & Future: Renewable Energy Technologies in Design Pedagogy

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Keywords: productive landscapes, renewable energy technologies, pedagogy

Climate change mitigation calls for the rapid implementation of renewable energy in order to halt rising temperatures associated with the use of fossil fuels (IPCC, 2014). Current research on the intersection of landscape architecture and renewable energy production has largely focused on mitigating the visual impact of large-scale installations (Apostol, et. al, 2016), understanding the social barriers that may arise from the potential disruption to the way of life in certain communities (Pasqualetti, 2011), and site planning to maximize the efficiency of these technologies (Stremke & van den Dobbelsteen, 2012). Implicit in this research is the view of technology as an “other” to be mitigated, concealed, accepted, or maximized for its utilitarian purposes. Largely missing from the conversation is inquiry on the aesthetic and humanistic qualities of integrating renewable energy technologies in the design of parks and public spaces. This paper seeks to bridge that gap by first presenting a historical overview of productive landscapes as examples of the integration of infrastructure and technology (Vickery, 2019). We will then present two case studies for integrating renewable energy in landscapes as part of design pedagogy. The case studies will feature student work from the graduate landscape architecture studio, FutureParks, and the architecture course Architecture Now: A History of Sustainable Architecture, both taught at the University of Massachusetts Amherst. Findings from the case studies point to several challenges, such as integrating technology from the non-expert approach; the difficulties involved in incorporating innovation while providing opportunities for engaging with the design basics of landscape architecture, over-coming the entrenched belief in the separation of landscape and utility, as well as opportunities for continued engagement with other disciplines. A call for transdisciplinary pedagogical approaches— which transcend the boundaries of knowledge to bridge the inclusion of research, technology, and aesthetics— is made as a model to expand the role of landscape architects and designers in contributing to the social acceptance of renewable energy landscapes.
Professional Development for MLA: Future of Work Modules

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Keywords: Future of Work, Career Education, Lifelong Learning, Human Capital

Abstract: This presentation details the development of new learning modules on the “Future of Work” in the context of the professional development class for second year master of Landscape Architecture students at the University of Cincinnati. This class is the second of three one credit hour classes required in the program. The current textbook The Professional Practice of Landscape Architecture: A Complete Guide to Starting and Running Your Own Firm by Walter Rogers (2011) does not address the topic, and I believe it is a topic of interest to students. An overview of topics within the broad subject of the “Future of Work” include the following: • Impact of automation and artificial intelligence on the jobs of individuals and the profession of landscape architecture • Lifelong learning and retraining • Changes to the structures of firms • Labor market changes in the near term and long term • Potential new occupations for landscape architects • Potential new areas of professional practice in landscape architecture • Changes to closely related professions (architecture, civil engineering, transportation planning, urban design, and city and regional planning) and their impacts on the profession of landscape architecture. • Some practical hints for the young professional and next steps. This author entered academia after 33 years as a practicing registered landscape architect (RLA) and certified planner (AICP) to take a faculty position in the division of Experiential Learning and Career Education (ELCE). The position requires teaching, advising, and placement services for undergraduate and graduate students of Urban Planning and Community Planning programs, and recently expanded to include a new MLA program.
Rediscovery of Design Approaches in Regional Design Education

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Keywords: Regional Design, Creative Act, Design Studio, Environmental Planning

Regional design was an important component in landscape architecture from the early days of the field. Olmsted developed complex green systems, addressing the public health in growing cites at the high of industrialization. The environmental impacts of late industrialization were a driving force behind Ian McHarg’s development of a comprehensive environmental planning methodology, when designers became planners. Frederick Steiner integrated a community engagement process into the environmental planning methodology, very much aligned with democratic design approaches on a site and neighborhood scale. Apparently, the role of the individual creative designer has lost importance compared with the role of process-oriented planner. However, there are traces of a countermovement to be found: The landscape urbanism discussion of the past decade discovered the diagram tool as an opportunity for creative expression, the UPenn Exhibition “Design with Nature Now” celebrates 25 trailblazing regional design projects. Now is the time to revisit the role of creative design in landscape architecture on a regional scale with a focus on design education. This paper will explore how the creative aspect of design can go beyond innovative graphics, leading to more innovative solutions. Design is the creative act that imagines a positive future. Through the iterative design process, the landscape architect (or a design team) transforms an abstract idea of a good future into a physical shape, a concrete solution for a specific place. We teach design students that the creative act produces initial shapes that may not be feasible at once, but that they expand the range of possibilities. This form based approach is still common practice on the site or urban design scale. Regional environmental planning, however, is a fact and number-driven process that compares existing environmental conditions with a desirable future and outlines actions how to achieve that future. Therefore, in planning, individual creativity is not the driving force – rational assessments of existing conditions and political constraints are more important instead. This paper argues for the value of the creative act on the regional scale and the importance of fostering that creative act in design education. The “reality” of physical and political constraints often hinders students to think outside the box. Examples of environmental planning studios will be used to illustrate the potential of the creative design approach on a regional scale, connecting inspired design with data assessment.
Sited: Inclusive Design Pedagogy

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Keywords: Diversity and Inclusion, Inclusive Pedagogy, Critical Pedagogy, Sitedness, Situated Knowledge, Student-Centered

Design education is ripe for a radical reimagining. The absence of the diverse perspectives and approaches needed to adequately address the pressing challenges of our constructed environment demands a continued critical interrogation of design education that aims at inclusion. This paper proposes that by applying the core concepts and methodologies of landscape architecture onto its own pedagogical practices we can generate a more genuinely inclusive design pedagogy. Exemplifying this approach, and drawing on the author’s own teaching experience, the paper argues that landscape architecture’s unique relationship to site and sitedness offers a rich epistemological lens for this radical reimagining. Drawing together intersectional critical analyses with landscape frameworks and methodologies, this paper proposes approaching students as sites, with attention to situation, position, and identity. Part I reviews the generative concept of site and sitedness within the core of landscape theory and discourse, through review of both historical and contemporary landscape theory. Part II exposes the parallel concepts of sitedness within feminist and critical race/class analyses and pedagogies, such as Donna Haraway’s concept of situated knowledges, and bell hooks’ and Paulo Freire’s critical pedagogies, in order to expand landscape’s notion of site. With this expanded conception, Part III articulates a frame of “student as site” in which these enriched landscape approaches to site are themselves applied to students, engaging them as generative of their own specific potentialities, in rejection of a tabula rasa approach. Part IV concludes by projecting the outlines of a student as site pedagogy, building on the author’s initial application of this framework to her teaching of Representation and Studio courses. By constructing an inclusive design pedagogy out of landscape’s foundational concepts and methods, we enrich our understanding of the student and in turn challenge and advance those disciplinary foundations. A deeper, mutually reinforcing, conception of both students and sites can promote a richer, more authentic, and diverse field of designers not only in landscape architecture but across multiple design disciplines. If successful, the student as site framework can serve as a provocation for further elaboration, and a model for the application of other landscape methodologies to the challenge of inclusive design pedagogy.
Study Abroad, and the Impact on Neighborhood Preference

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Keywords: Student Study Abroad, Neighborhood Preferences, Urban Design

Fittingly for the centennial meeting of CELA, this paper discusses an issue of legacy and resonance: the influence of urban-place experience on future residential and neighborhood preferences. The effect of studying abroad has been reported as highly influential for landscape architecture students, providing a lived experience of the vitality and richness of urban life, and demonstrating the qualities of centuries of city-building [1]. This previous work concludes with a question: “What would be the effect of educational experiences that provided cultural immersion outside the frame of a design degree? Do students from other fields who visit denser communities without a parallel or subsequent academic framing through a design studio, also experience changes in their residential preferences?” This current work brings us up-to-date and considers the effect of study abroad on neighborhood preferences among none-design undergraduates, many of whom will eventually enter a local housing market in need of a shift towards greater land-efficiency and density. Study abroad can have a deep influence on young travelers in terms of broadening their worldview and inculcating a greater awareness of global issues and cultures [2] [3] [4]. This paper contributes to the literature by considering whether overseas experiences affect students’ acceptance of denser, sustainable housing layouts. This study identified university programs that offer immersive experiences in denser residential environments, and for three years participating students took-part in on-line surveys to measure attitudes towards compact living before (pre-test) and after (post-test) study abroad, with a total of 460 completed. The study found that while students embarking on their first urban experience were significantly less inclined to favor compact neighborhoods when compared to their urban-experienced counterparts (i.e. had spent at least a week or more stationed in a major city at home or abroad), once the students returned from study abroad, this gap had closed to be no-longer significant. The results also suggested that female travelers were particularly influenced by their experiences abroad, especially with regards to the idea of living with access to regional transit and in high-density neighborhoods where it was convenient to use local public transit. The work suggests that study abroad can have a significant influence on the neighborhood mores of some participants. Where – as is the case here – graduates choose to remain in the university’s region and in significant numbers, alumni of study abroad programs could become more accepting of necessary suburban compaction, transit, and other qualities of denser urbanism.
Teaching Design Computation in the Paradigm of Cybernetic Environment

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Keywords: Design Computation, Cybernetics, Systems Theory, System Modeling

In the past few years, the environmental management discourse has seen an emerging paradigm of research and practice that revolves around cybernetic technologies and computational methods in regulating, controlling, and managing processes in the environment. Concepts such as smart cities, responsive landscapes, sensing networks, machine learning, artificial intelligence, and cyberphysical systems have taken on increasing popularity in the design professions. Given this broader context, this paper presents the first episode in a 2-year Design Computation Course series for the MLA students at the University of Virginia. This 15-week course consists of lectures and workshops distributed in four modules: 1) Drawing and Representation (3WK); 2) Model, System, and Cybernetics (5WK); 3) Cybernetic Environments (5WK); 4) Module IV: Design Workflow (2WK). The lectures explore the history and theory of design computation and contemporary discourses around cybernetic environment by exposing students to a set of ideas rooted in cybernetics, systems theory, posthumanism, and science, technology and society (STS). These ideas help students build reflexivity by deepening their understanding of subjectivity in the modeling process, limitation of systems thinking itself, and the social construction of cybernetic environment. The workshops cover mapping and representation techniques using tools such as ArcMap, AutoCAD, Rhino, and Adobe Suite. However, beyond these conventional topics taught in a traditional visualization/representation course, we also use Grasshopper to introduce the concept of system modeling and computational thinking. Students use Grasshopper to explore different modeling techniques and use system models to represent various environmental phenomena and processes. This course not only teaches students digital tools and techniques that are central to the profession but also prepare students with the history and theory of design computation that is equally important for the next generation of landscape architects who practice in the paradigm of cybernetic environment. In this course, students will 1) gain interactional expertise in scientific and engineering disciplines and be able to conduct constructive conversations and collaborate with scientists and engineers; 2) learn terminologies and concepts that are necessary to understand emerging scientific and engineering research in sensing networks, machine learning, and artificial intelligence; 3) be able to critically examine cybernetic environment projects and challenge the deterministic and linear way of thinking that dominates many of these environmental practices; and 4) develop alternative approaches, indeterministic strategies, and recursive processes to modeling, simulation, and responsive tools and techniques with landscape sensibility.
Temporary Gardens

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Keywords: Time, Space, Process, Design

The last few years have seen a surge in temporary gardens. The flexibility and new challenges involved in conceptualizing and building non-permanent landscapes, has made them a creative and stimulating testing ground for designers. A study of the phenomena of temporary gardens is relevant for several reasons. First, because it expands the literature on ‘temporary urbanism’. Secondly, because it makes a relevant contribution to the disciplines of garden design and landscape design. The practice of temporary gardens involves a different conception and embodiment of time in design of space – from ‘linear’ time and cyclical time to ‘the immediacy of here and now’. The emergence of ‘temporality’ as design enquiry has prompted designers to look at practices other than garden design. The reason for the garden to assume a temporary form, is to respond to recent changing societal needs. The first ephemeral gardens are the well-known pre and post second world war ‘victory’ gardens (early examples of temporary or ‘meanwhile’ community gardens). However, the research has reconstructed a more complex story. The first substantial experimentation in temporary gardens has been made by performance, conceptual, and environmental artists in the 1970s. In their hands, the garden acquired a political meaning; it was a tool of the ecologically-driven global mass movement that was questioning and subverting mankind’s disruptive relationship with the environment. For the artists, the combination of ephemerality and the garden was a design strategy to manipulate the time expressed in ecological and social processes. Since the 1980s, the ephemeral garden has been used as a form of public art to great advantage of the public and private sectors (Theokas, 2004). It has become an ‘exhibit’ showcased in the open-air museums of the ‘temporary garden festival’. The short lifespan, the small size and the status of exhibit, are conditions that have propelled designers to explore alternative expressions of time in space. The temporary garden is a ‘garden-installation’ – one where the spatial relationships between the actors and the artefacts are dynamic and subvert a linear or cyclical notion of time (Cauquelin, 2005); and a ‘conceptualistic garden’ (Richardson, 2008) – where temporality matches with generation and communication of rapidly changing ideas that inform evolving markets. The focus on ‘expression’ and ‘narrativity’ in design suggests that temporary gardens are an experimental ground of the broader discipline of landscape architecture, and are contributing to reaffirming it as a critical cultural practice. The temporary gardens that have increasingly colonized the urban public space are bottom-up and grassroots expressions of ‘insurgent public space’ (Hou, 2010), or public-private led activities that expand the notion of public art by embodying transient modifications of place, and community participation. From temporary parks to pop-up gardens, these spaces combine multiple activities happening at the same time, organizing the changing and chaotic dynamics of nature, culture and the actors of such setting. This exercise of making time into space means essentially to amalgam a number...
of times -- individual, communal, biological as ‘mapping and overlay of the different rythmns and systems’ (Akiko, 2013). In conclusion, the attribute of temporality in gardens does not simply affect the duration of the physical space of the garden, but it revolutionizes the whole concept and process of designing time into space. As such, the investigation of the practice of temporary gardens holds the premise of making a relevant contribution to both the practice and theory of design.
Using Critical Regionalism to Critique and Learn from Contemporary Built Works

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Keywords: Critical Regionalism, Design Aesthetics, Creativity, Design Education

Design exemplars are studied as shortcuts to the understanding of a concept, design parameter or technical issue. They offer the additional benefit of direct experience that can transform our understanding and appreciation for various landscape styles and "isms." This paper addresses the search for successful examples of critical regionalism that help the understanding and utilization of its concepts. Examples that trigger associations with other successful projects and expand a thoughtful examination of the tenets of critical regionalism. Studying elements of critical regionalism in built works involves looking for meaningful regional elements used in creative ways, rigorous imaginative transformations of those elements, utilization of contemporary thinking and technology, finding unique design features that provoke critical thinking, and the creation of “bounded domains and tactile presences” that address the experiential aesthetic concerns of landscape architects. The items listed below will be explained along with instructive examples from various countries spanning over 50 years. 1. Rigor: a very salient concept for evaluating critical regionalism designs as it involves the application of demanding standards. 2. An assessment of rigor as applied to the perceptions by a designer of a landscape or region that uncovers regional inspirations for the subsequent design process. 3. Constant reinvention: an element of rigor that requires the designer to exhibit the tremendous courage, effort, and perseverance required to abandon a relatively fail-safe design style for a fresh reconceptualized one. 4. How the designer has adapted to each site, region, and program across a body of work. 5. Rigorous selection and organization of regional materials: a test of the integrity and cohesiveness of the design that directly impacts the emotional and intellectual connections to the users. 6. Appropriateness within the site context: applies to all aspects of a creative regionalist design. 7. Appropriate use, in a given program, of environmental psychology, cultural rules, and environmental imperatives. 8. How a designer negotiates the appropriate line between creativity and eccentricity or overly mannered design. 9. The insight and integrity of the regional inspiration that has been used to adapt a personal style to a given area. The author has used research into critical regionalism as a guiding ideology for both practice and education for the past 25 years. The research is informed by continuing and extensive literature reviews, interviews with dozens of regionalist practitioners throughout The United States, criticism and documentation of regionalist built projects in 11 countries.
Using Poetry to Inform Landscape: A Case Study of the Mississippi Children's Museum in Jackson, Mississippi

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Keywords: accreditation, landscape architecture education, standards

Landscape narratives are defined as “the interplay and mutual relationship that develops between landscape and narrative (Potteiger and Purinton, 1998). Telling stories with the landscape is not new, as evidenced at Stourhead, England, an estate laid out in the 1700s and based upon Virgil’s epic poem Aeneid (Bergdoll, 2000). This form of explicit storytelling references the Aeneid poem by featuring direct quotes in the landscape and also symbolically representing the hero’s journey in a pathway around the estate’s lake. Using a story to influence landscape concept and elements was recently explored in the design of a children’s museum in Jackson, Mississippi. After a series of exploratory meetings between the client (the museum) and project landscape architects, a poet was employed to develop a fantasy concept in narrative form. While all of the elements within the poem were not incorporated into the resulting landscape plan the poem served to paint a fantastical picture of a child’s imagination. Inspired by this poem, the resulting landscape was called the ‘Literacy Garden’ and the educational goal was to let children explore and experience a variety of activities. These experiences would then become the basis for creating and sharing their own story with other children. Landscape architecture students at Mississippi State University were invited for periodic visits during the project design development and implementation phases to see the project evolve from concept to form. Teaching the development of conceptual ideas and guiding how these translate into resulting forms is challenging for the landscape instructor. Using poetry to serve as a prompt for ideas can result in a rich source of design imagery.
GEO-SPATIAL AND DIGITAL ANALYTICS
Artificial Intelligence Systems for Automated Site Analytics and Design Performance Evaluation

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Keywords: Artificial intelligence, post-occupancy evaluation, camera vision, site analytics, human behavior

Post occupancy evaluation is time consuming and captures an incomplete picture of site use over time. Few firms invest in assessment of their built works and designers too often miss valuable lessons that could be learned from seeing how sites are used, maintained, and impacted by (or placing impacts on) local context. Existing digital systems are capable of tracking human movement through spaces using networked camera feeds, but they lack the granularity of human behavior capable through in-person assessment. Digital systems are unable to capture observed mood, interaction, and socialization of site occupants though some aspects can be inferred from tracking and timestamp data (how long people stay in congruent groups, paired motion through space, etc.) Meanwhile, in-person evaluation does not offer a complete analysis of a site across all hours of the day and is missing granular environmental and historical data to determine influences on human behavior. Firms have begun using automated camera vision tracking to develop generalized design guidelines based on real-world measurements within specific site boundaries. While these investigations contribute to design discourse and ideation, they often miss site-specific and nuanced aspects of human behavior, and can leave out surrounding contextual, cultural, environmental, or event-based impacts on uses of the built environment. Additionally, few studies address public issues of concern regarding privacy, and information access, or data storage and ownership. This project demonstrates the early stages of an artificial intelligence (AI) based camera vision system, capable of tracking individuals through designed space, capable of being run on consumer-grade hardware. Current AI models often fail to account for deeper metadata beyond raw identification and lack a consistent and unified workflow process. This system differs from those currently under development as it uses multiple cameras at different angles, distances, and fields of view, to offer more complete site coverage without typical occlusion, lighting, or perspective distortion issues. In addition to location, occupant’s directionality of focus is recorded along with individual attributes such as whether they are wearing a backpack, carrying a bag, clothing color, and similar data outside the realm of privacy concerns. Tracking and metadata can then be analyzed through both automated and manual methods (for validation purposes) to determine underlying patterns of use, impacts of spatial and programmatic elements within the built environment, and influences of environmental conditions on site behavior.
Computationally Assessing Existing and Proposed Ground-Nesting Bee Habitat Resiliency

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Keywords: Pollinators, Resiliency, Planting Design, Climate Change

Based on a literature review of urban pollinator habitat assessment and planting designs for pollinator habitat and climate resilience, this paper presents a new computational planting design tool for assessing urban pollinator habitat quality and resiliency. Worldwide, pollinator populations are crashing. This decline, in large part, is due to habitat and plant diversity losses due to: land development, homogenous residential and commercial planting design, landscape management practices, and climate change. While emerging planting design and site management efforts support pollinators, these interventions often only focus on foraging opportunities and replicate past plant communities, which are not always adaptable to changing climatic or weather conditions (Maschinski & Haskins, 2012). Design computing and geospatial analyses can facilitate a better understanding of existing habitat quality and the impacts proposed planting schemes have on pollinators, assisting landscape architects to efficiently design healthy, connected, and resilient landscapes in the face of climate change. We adapted the Xerces Society’s agrarian and rural landscapes pollinator habitat assessment guides (Hatfield, Jepsen, Jordan, Code, & Carpenter, 2017) with existing urban pollinator research findings (Davis et al., 2017) to create an urban habitat assessment protocol. This protocol identifies the following four critical habitat assessment categories: foraging, nesting, water, and landscape management. Planting design resiliency is evaluated using the measures of plasticity, ecological resilience, and structural diversity (Hunter, 2011), with a specific emphasis on bloom phenology, biodiversity, and plant responses to extreme weather events. The research team used R Shiny, an open-source interactive web app development R package, PostgreSQL, and PostGIS databases. Plant characteristics are derived from the USDA plant database. Initial observations demonstrate that there are significant gaps in the USDA plant database, which highlights the need for a more thorough and uniform documentation of plant climate resiliency characteristics. Future research should explore the use of citizen science and other input mechanisms to augment the database and expand to include factors such as plant structural diversity and nesting habitat. Various tests also demonstrate that the tool is not limited by geographic location or scale. Additionally, the use of the tool does not require extensive training. However, the results show that despite gaps in the plant database, the prototype holds significant potential in allowing designers to rapidly iterate planting design assessments across a multitude of resiliency factors, producing a visual record of biodiversity and resiliency deficiencies.
Land-use Pattern Change in Connecticut Coastal Area Under the Pressure of Climate Change and Human Activities

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Keywords: land-use pattern, coastal, climate change, flood hazard, resilience, urban morphology, Geospatial analysis

According to the United Nations, presently about 40% of the world’s population lives within 100 kilometers of the coast, with hundreds of millions living in low-lying coastal areas that are less than 10 meters above sea level. Natural and human communities located in coastal areas are increasingly threatened by climate change and its impacts like sea level rise, extreme storm events, flooding, and coastal erosion. This research focuses on coastal towns in the state of Connecticut, which are part of ongoing work developed by the Connecticut Institute for Resilience & Climate Adaptation (CIRCA) and UConn’s Community Research & Design Collaborative (CRDC). The purpose of this research is to understand spatial and temporal coastal land-use pattern changes, it aims to reveal the relationship between urban patterns and vulnerability, and seeks to provide a basis for future land use and policymaking. Changes in coastal land-use patterns can be seen as an outcome of dynamic interactions between natural process and human activities over time. Therefore, this research also seeks to identify the major drivers of land use changes and how these relate to growth patterns and natural hazards. This research uses LiDAR imagery and geo-referenced historic maps to analyze low-lying areas and develops a time series of land-use change. It seeks to demonstrate how urban morphology responds to vulnerability, spreading and retreating in accordance to social and environmental drivers. The maps resulting from the time series are combined with digital elevation model (DEM), to highlight the relationship between landform and flood vulnerability. Preliminary findings indicate that major drivers of coastal land-use change are related to the urban subdivision, transportation, commercial and industrial activities, and climate change. Initial urban areas were established in hazard-free locations, which ensured a buffer capable of reducing storm force and absorbing floodwater. Over time population growth and economic pressure have led to rapid development and pushed cities to spread to high-risk areas. The observations indicate where increased vulnerability has led to repetitive flooding and long-term impacts pushing town to retreat, altering land-use patterns to accommodate for open space. Reserving the resilient zones and keeping the balance of urban development and natural capability can be a sustainable way for land use planning. The findings from this research can aid in planning and decision-making. It has the potential to inform plans that simultaneously consider historic urban morphology changes and risk projections.
HISTORY, THEORY AND CULTURE
A Cross-Epoch Ecological Experiment of Pleistocene Park, Siberia

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Keywords: Arctic experiment, Pleistocene Park, Soviet ecology, Soviet modernization, climate, biosphere

Scientific practices have played a central role in the construction and imagination of the Arctic. In particular, field practices and in situ experiments conducted in this region have actively shaped its landscape as a way of knowing and altering “nature.” This presentation delineates the cultural and intellectual narratives of Pleistocene Park, a long-term ecological experiment established in 1989 in northeast Siberia. The park experiment aims to 1) resurrect a Pleistocene epoch ecosystem that disappeared 11,700 years ago, and 2) slow the impacts of present-day climate change on thawing tundra, both by introducing a long-gone grass-steppe ecosystem and by testing the ecological role of grazing megafauna in the modification of climates. A close reading of the park scientists S.A. Zimov and V.I. Chuprynin’s early writings suggests that the park’s epoch-crossing mission and ecosystem management are a product of a broader Soviet legacy at the nexus of Arctic modernization and conservation. Furthermore, the park’s promotion of non-climatic factors (e.g. grasses and herbivores) to ultimately influence the climate follows a distinct Russian scientific and philosophical tradition – V.I. Vernadsky’s biosphere and noösphere – that elevates the living matter as a geological force capable of changing the course of the planet’s climatic future. The construction of a modern Arctic biosphere and the subsequent rejection of a moss-dominated tundra reflect an important segment of Russian ecology that is intrinsic to understanding its vast Arctic territory as well as the park’s design and management strategies. While the scientific grounding and methods of its experiment have been debated by ecologists, the park transcends strict science and engages with the real and contingent aspects of plants and animals, place and time, driven by a singular philosophical attempt to situate humankind in the evolution of biologically driven ecosystem changes. Far more than tackling the immediate symptoms of global warming, the park constitutes an entirely new model for multispecies interrelation and a rationale for tundra restructuring to materialize ecological mutuality, and provides an important non-European case study for Arctic landscape management that expands the notion of a climate beyond climatology into myriad living things.
Affordance Value of 2D Play Elements

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Keywords: 2D play; 3D play; playgrounds; affordable construction; child development; public health; affordance; environmental psychology; landscape architecture; affordance-based design; accessibility

The affordance value of play spaces is a well-researched topic within the literature surrounding environmental psychology, childhood developmental psychology, and public health (Jongeneel, 2015; Sporrel and Withagen, 2017; Prieske et al 2015). This paper aims to channel the practices from these disciplines into an argument pertaining to landscape architecture, environmental design, and the constructability and implementation of affordable play spaces. Within the Canadian context, parent groups are often responsible for the fundraising, planning, designing, and constructing of playgrounds for public schools. This paper will argue there are gaps within the existing research in which elements of a playscape are evaluated based on a current criteria for play affordance that does not adequately account for cross-scalar 2D play opportunities, and thus does not provide a reasonable precedent for pursuing economically affordable and accessible alternatives to traditional 3D playground design pursuits going forward. Landscape architecture offers scale as a means to evaluate the affordance value of play elements as designs elicit reactions to a particular environment (Dee, 2001). This generally refers to factors such as comfort, security, reassurance, orientation, friendliness, accessibility, and the ability to relate to the surroundings – all of which affect the perception of environmental affordances. The variety of affordances offered by an environment are discovered as an individual changes over time, whether in maturity, physical ability, confidence, or perceptive capacity (Heft, 1989). These discoveries are the manifestation of relational properties between the physical characteristics of the environment and action capabilities of the user (Gibson, 1979; Heft, 1988). Traditionally, playground design is comprised of a collection of 3D structures such as slides or swings that offer play opportunities and require certain abilities of the user. If we consider playgrounds through the lens of affordances, we recognize that playgrounds do not consist of pieces of equipment, but as a collection of things to sit on, climb on, jump across, etc. If we extend the concept of environmental affordances to 2D elements within a play environment, it follows that games made up of painted lines or patterns can prove to offer comparable affordance value with greater accessibility and implementation capacity compared to expensive, prescriptive 3D elements. We argue in this paper that 2D installations can offer imaginative, self directed play opportunities that are an economically viable alternative to traditional 3D play structures, and remain appropriately positioned within the context of affordance evaluation.
**Cinematography in the Landscape: Transitional Zones in Themed Environments**

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**Keywords:** Thematic design, cinematography, transition zones

While landscape architects are adept at thinking about transitions between indoor and outdoor environments and blurring the threshold between the two, less attention has been paid to the liminal space between landscapes and how built landscapes interact with each other (George, 2009; Waite, 1998). In ecological settings, the transitional zones between types of landscapes—known as ecotones—are both vibrant and vital to the health of the surrounding landscapes (Holland, 2012). Similarly, transition zones in constructed environments can be critical spaces and key to the success of adjacent landscapes. Thematic design—the multidisciplinary practice of creating themed environments—is a language that evolved from the visual grammar of animation and film (Gottwald and Turner-Rahman, 2019; Lonsway, 2009). In cinematography, transitions between scenes establish continuity and narrative flow; cuts, wipes, and dissolves are common techniques that lead viewers through disparate settings with minimal disruption (or, conversely for dramatic effect, intentional dislocation). These same techniques are employed in thematic design, moving visitors between narrative elements of a themed space, and between different themes (Hench and Van Pelt, 2003). Such principles—based in film grammar, practiced in the built environment—provide landscape architects with a visual language to better interpret, understand, and design transitional zones in constructed landscapes. This presentation examines transitional spaces of themed environments to demonstrate the applicability of these design principles for enhancing placemaking within landscapes. These environments are worthy of serious examination as themed transitional zones serve to mediate multiple levels of content complexity and identity-laden forms across all the senses; these are seamless negotiations at once visual, tactile, auditory, and olfactory (Lukas, 2013). The scenography leveraged by thematic transitional zones has wider application for landscape architects and other placemakers concerned with crafting environments which are simultaneously congruous as experiences yet diverse in presentation.
For Whites Only: A Timely Commentary about Latino Culture and Landscape Architecture

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Keywords: Latino Landscapes, Latino Design, Latino Studies, ASLA, Diversity, Social Justice

Between the 1920s and 1940s, there were signs spread across Texas that blatantly discriminated against Mexicans in public places that read “We serve Whites only. NO Spanish or Mexicans.” Is this expression of repression and racism still silently extant in our universities, professional organizations, and professional practice that is successfully keeping Latinos from entering the landscape architectural fold? As the Latino population of the United States grows, there are more Latinos who inhabit our landscapes and public spaces and we should be seeking their participation. This paper studies the lack of participation and engagement of Latinos in Landscape Architecture using literature from history, science, culture, geography, sociogenic theories, language, and landscape to bring light to this debate. Increasing the representation of Latinos in landscape architecture begins at the founding of ASLA in 1899. It originated with eleven members whose landscape values represented several dominant colonizing cultures in America – England, France, Italy, and the Netherlands. The cultural background of ASLA and CELA exhibit European values and landscape perspectives that developed in Medieval Europe, the Renaissance, and the English and French style which aligns with historical, political, and sociological ideals they manifested. The Spanish, Portuguese, and Mexican also had governments who influenced land development in the United States but were not represented at the founding of ASLA. This exclusion of Latino culture and influences ignores the contemporary evolution of diverse design needs in America. One hundred plus years later, how is ASLA and CELA recognizing they neglected Spanish and Portuguese influences at its founding? Is this omission creating a racially motivated attitude like the ‘Whites only’ of the early 20th century or are Latinos disinterested in ASLA and their work? The environment is everyone’s problem, including Latinos. But why are Latinos and ASLA not locked arm and arm against the terrors being committed to our environment? This paper takes a historical approach in researching this subject. It navigates the history of Latinos in America, in order to objectively see where ASLA and CELA can better embrace Latinos into professional careers in design and in higher education. It looks at Latino relationships through existing research on design, sovereignty, land aesthetics, and their definition of nature. The mission is to conceptualize a system where Latinos can exist within the larger cultural space to contribute their knowledge about landscape and design.

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Keywords: roadside planting, highway landscape, women

In the January 1929 issue of Better Homes and Gardens, an article titled “Building Beauty into Highways” described roadside beautification through planting and urged readers and their garden clubs to plant trees, shrubs, and flowers along highways leading from the town. Found in a women’s magazine that caters to homemakers with advice on housekeeping and tending private gardens, this article—seemingly out of place in a home and garden magazine—offers a hint to the involvement of women in the civic sphere in the 1920s and 30s. In the two decades following the rise of automobile travel and prior to World War II, how did women participate in highway beautification and roadside planting efforts? What, where, and how did they plant? This paper examines female involvement in highway beautification in the 1920s and 30s through civic associations such as garden clubs and women’s clubs, as well as individual female landscape designers who authored roadside planting guidelines, to suggest that women were highly active in shaping the expanding landscape of highways, and that the act of planting served as a vehicle for female participation and representation in the public sphere. To do so, this paper begins with a discussion of the visual environment of the highway in the early twentieth century and the gendered nature of the built environment, followed by an analysis of the 1929 article and its accompanying illustrations. By placing the article within the context of roadside planting efforts in the 1920s and 30s, in which both garden clubs and landscape design professionals were heavily involved, it is evident that the discourse of highway beautification in a women’s magazine is not an outlier. The act of planting in the age of motor travel brings women to spaces outside the domestic sphere, connecting to broader themes: home, borderlands, and beauty.
Park-making in 21st century China: from Hybrid to Ecological Modernization

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Keywords: Ecological Modernization, 21st century China park-making, history, theory-building

This research reveals ways that purpose-built parks and city-making in China’s 21st century evolved from post-Mao hybrid modernization (Padua 2006) to “ecological” modernization. It examines the history and politics of public parks in modern China and posits innovation in the making of purpose-built parks in post-Mao secondary cities shifted since the mid-1990’s to 2002 period of hybrid modernization. It brings to light the transformation from the hybrid modern “growth first” Deng Xiaoping period to ecological modernization and President Hu Jintao’s “people-first” approach. In this theoretical context, ecological modernization draws from social theory as a reflexive phenomenon that is manifested in transformations in the government apparatus to overcome that nation’s environmental crisis (Mol 1992; Giddens 1998; Harvey 1996). China’s top-down governance and central government’s acknowledgement of irreparable environmental impairment created by decades of unregulated growth enabled that nation’s modal shift to ecological modernization triggered by Hu’s “green” revolution circa 2007. This study acknowledges that China’s primary cities, Beijing, Shanghai and Guangzhou (formerly known as Canton), have their own heritage of public parks as places for foreign consumption during China’s colonial period of humiliation; hence, China’s secondary cities were crucibles for innovation in the post-Mao era (Padua 2006). It contributes to filling the knowledge gap on 21st century landscape history, theory and praxis in China, especially ways their top-down political context fostered innovation in park-making. It explores China’s 21st century ecological modernization through the lens of “greening”, purpose-built park design and city-making in four secondary cities. It brings to light the history of China’s 20th and 21st century “reform” and “revolutionary” praxis, and emphasizes the emergence of China’s “green” revolution. It suggests that some of the completed works by landscape architects in China’s 21st century first decade, especially the 2008 Beijing Olympics and 2010 World Expo in Shanghai were not unlike the post-1994 period in China’s art world when creative artifacts were made for international consumption. By the second decade of China’s 21st century, trends represented in outdoor designed environments and city-making reveal a shift to ecological modernization, particularly China’s “sponge city” – a term that made its way to the international design and planning lexicon. With China as a living laboratory and vessel for 21st century ecological modernization, this research includes speculations on future trends in the discipline of landscape architecture, particularly in light of the “green” aesthetic, President Xi’s concept of “Beautiful China” and concerns for global environmental stewardship.
Rooting Time in Place

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Keywords: Decolonization, Design, Environmentalism, Memory, Monument, Place, Time

Manuel Castells and Ricardo Bofill agree that the new architectural monuments are likely to be “communication exchangers,” which they define as moments of transfer between networks of transit.(1) These transportation hubs, which focus on speed of movement and are often built within interior infrastructural networks, necessarily negate the slowness and fixity of the landscape and nullify landscape’s ability to act as a site of collective memory. The drive to accumulate wealth in an increasingly capitalist society has, furthermore, led to the exploitation and reconfiguration of land which, in turn, has dispossessed and dispersed populations across the globe.(2) Yi-Fu Tuan, following J.B. Jackson, pointed out that the “modern [individual] is so mobile that [one] has not the time to establish roots; [their] experience and appreciation of place is superficial.”(3) This panel presentation will argue that a growing disconnection from place contributes to our patterns of consumption and waste, which are having drastic negative impacts on the environment. This presentation will show the work of an advanced Master’s level studio in which students were asked to recover landscape architecture as an effectual means of engaging collective memory.(4) Their design work sought to give form to the antithesis of monuments to motion, aspiring instead to root time in place. The goal was to connect a transitory population to the land. Critically, the site of this design studio was on the unceded, traditional, and ancestral territories of the ʷməθkʷəy̓əm, sḵwx̱wú7mesh, and sel̓íl̓witulh people. Any efforts to establish new connections to place, therefore, also had to contend with preexisting ancestral connections, requiring an acknowledgment of a plurality of affective memory experiences. This presentation will establish that connections to place and locating oneself in time through ancestral relationships have been severed for settlers by parallel forces of colonialism that have also effaced the ongoing traditional uses and aesthetic expressions of the landscape for indigenous peoples. Exemplary student work will show that the discipline of landscape architecture is uniquely positioned to reconnect people to place and, in so doing, curb our environmental destruction.
Teaching Landscape History in the Age of the Anthropocene

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Keywords: The Anthropocene, Landscape History, Global Climate Change, Landscape curriculum

Almost a quarter century ago, the late Robert Riley penned the article, “What history should we teach and why?” The idiosyncratic, polemical piece raised critical questions regarding the scope, context and format of how to effectively teach the history of landscape architecture. Respondents to Riley revealed their own pedagogical and disciplinary leanings on a range of issues, including where landscape history should reside within a curriculum. Specifically, should history be taught within the context of a studio or be its own, stand-alone course? Debating where to situate the teaching of landscape history seems almost quaint now, given the undeniable and imminent consequences of global climate change. The environmental impact of the traditional practice of architecture and landscape architecture is stark. One recent study estimates that “the building sector is responsible for 40% of global energy consumption and 30% of anthropogenic greenhouse gas (GHG) emissions” (De Wolf, Pomponi and Moncaster, 2017.) What role, if any, can learning about the past play in framing possible solutions to our dire situation? Is the traditional method of teaching landscape history even capable of addressing these new, unprecedented challenges? Currently, it is in the studio where innovative design solutions responsive to the threats of global climate change seem to be taking place. The traditional history course runs the risk of becoming irrelevant. Taking seriously the impact of global climate change requires future-oriented thinking yet landscape history turns its gaze toward the past. Landscape history has traditionally highlighted and even celebrated “grand works” (Eurocentric, elite, patriarchal and/or colonial), valorizing the great designers and their patrons. Course content will need to radically change and accreditation criteria will need to follow suit. This presentation will explore these questions, offering tentative suggestions for how the history course might change, and calling for critical self-scrutiny on the part of the discipline.
The American Experiment: Through the Lens of South Carolina’s Cultural Landscape

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Keywords: Cultural Landscapes, American Experiment, Humanities

This paper brings to light the American Experiment through a broad historic, interpretative and analytical reading of South Carolina’s cultural landscape. The American Experiment is imbedded with the utopian notion that is linked to Thomas Jefferson’s 1776 Declaration of Independence when the colonies defied Britain. It is a vast topic and this paper intends to reveal this experiment through a reading of South Carolina’s cultural landscapes over time. It is based on preliminary research where South Carolina’s cultural landscape is analyzed in terms of environmental history, in addition to the normative accepted studies, typologies and classifications of the cultural landscape: designed, vernacular, historic site, and ethnographic (Melnick 2008). It draws from Tafuri’s (1979) notion of utopia, as well as review of the literature on South Carolina’s cultural landscapes, archival review of creative artifacts, field research and informal interviews. It touches on South Carolina’s colonial period and ways politics influenced the historic settlement patterns, designed landscapes as well as South Carolina’s agrarian landscape as its own type of experiment. It also touches on the impact of the slave heritage and the Gullah community in South Carolina’s Lowcountry, the state’s geographic area defined by the coast including the Sea Islands. It highlights ways the colonial concept of the experiment in South Carolina’s agrarian and “working” landscapes represented the spirit of entrepreneurship and innovation that informed contemporary attitudes about the landscape as largely a productive artifact, with some pockets of significant designed landscapes. Where Upton (1984) has carefully articulated the 18th century cultural landscapes of “white” and “black” landscapes in Virginia, this research seeks to cast a broader history of South Carolina’s cultural landscapes since the Age of Exploration. While this research does not ignore the contributions of the slave heritage to the development of South Carolina’s cultural landscapes, it intends to reveal the long span of time, broader capitalist, industrial and agricultural complex that have influenced contemporary South Carolina’s cultural landscape and are reflective of the American Experiment as an ongoing evolution. In part, it speculates on late 20th and 21st century cultural landscapes in South Carolina that are unique or part of larger trends representing the American Experiment. It contributes to closing the knowledge gap on re-framing the narrative for South Carolina’s cultural landscape as a major southern and “utopian” actor in the evolution of the American Experiment.
The Cultural and Political Ecology of West Lake: Ecosystem Services of an Iconic Cultural Landscape in Eastern China

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Keywords: Cultural and political ecology; West Lake; Hangzhou City; Ecosystem services

The West Lake in Hangzhou, China is a UNESCO Cultural World Heritage Site and beyond for its role in inspiring Chinese art and poetry over more than 1,200 years. But this iconic body of water has relied on human action throughout its history to provide periodic maintenance essential for its continued function. Moreover, West Lake has long played an important role in the economy of human settlement, contributing to the emergence and rise of Hangzhou City as a political and economic center. In this paper we examine the creation and development of West Lake from the perspective of cultural and political ecology, theoretical positions developed in American anthropology and geography that consider human cultural behavior, respectively, as reactions to environmental conditions and as decisions to create ecosystems more favorable to meeting human needs. The paper begins by examining five historical periods, focusing on the development of human settlement and land use with respect to the creation, modification, and maintenance of the lake. We then explore the ecosystem services provided by West Lake in different periods, including the various resources available from lacustrine ecosystems, flood regulation and cultural and religious services. In addition, we document important political actions made at different governance levels for maintaining the Lake. Our results indicate that West Lake has provided ecosystem services of various types and quality to Hangzhou at different historical times and has been greatly affected by human needs and social change as well. In general, cultural services such as recreation and tourism gradually replaced provisional (e.g., food and freshwater) and regulating services (e.g., flood regulation) and became the most important ecosystem service type. This important shift was made possible by creation of a landscape by famous artists and authors over the centuries, whose design provided both practical and inspirational resources. Furthermore, both national and regional policies posed significant direct or indirect disturbances on the regional landscape, further influencing the ecosystem services of West Lake. Landscape design has played a central role in all the ecosystem services, from creating West Lake in the first place, to maintaining a productive lacustrine ecosystem, to generating a physical setting that inspired creative minds, and finally to developing an iconic cultural site of global importance. The perspectives of cultural and political ecology on West Lake revealed the deep logic of long-term change of a cultural landscape and provide important implications for sustaining its future ecosystem service provision.
LANDSCAPE ARCHITECTURE FOR HEALTH
Finding Common Ground for an Interdisciplinary Approach to Green Infrastructure

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Keywords: green infrastructure, physical activity, interdisciplinary, urban green space

One of the benefits of green infrastructure as a concept is its application to a broad range of benefits (Mell 2009). Green infrastructure that supports physical activity combines public infrastructure such as parks, sidewalks, trails, bikeways, and street trees with one or more of the following: water management areas, wildlife habitat areas, urban agriculture, utility rights of way, riparian corridors, and vacant lands. Multiple and concurrent uses in shared space lack a holistic approach to planning (Lovell and Taylor 2013; Young and McPherson 2013). Differences in disciplinary perspectives and agency silos may limit the potential for a more interdisciplinary framework (Botchwey and Trowbridge 2011) in the planning, design, and maintenance of such areas in support of physical activity (Coutts and Hahn 2015). This paper examines the opportunities and limitations to an interdisciplinary approach to green infrastructure. Methods consist of: 1) evaluation of the operational definitions of green infrastructure from disciplinary perspectives, and 2) semi-structured interviews (n=44) with design professionals, agency personnel, and developers participating in the regulatory process at the project and municipal scale in four US cities known for green infrastructure initiatives (Austin, TX; Denver, CO; Louisville, KY; and Portland, OR). Emergent patterns from analysis are then compared among cities. Findings suggest a high awareness level of green infrastructure among respondents, yet descriptions and definitions of green infrastructure are multiple and varied depending upon disciplinary interests and responsibilities. Different municipal agencies prioritize particular aspects of green infrastructure over others. Interviewee responses reflect the distinction between agencies that manage land and those who do not with respect to green infrastructure planning and implementation. Respondents make a positive association between green infrastructure and physical activity as contributing to safe places where people can recreate. This research highlights the need to develop common terms and an interdisciplinary framework toward a more holistic approach to green infrastructure that supports physical activity.
INLAND FROM THE COAST: Improving Adaptative Capacity Through Participatory Design

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Keywords: Participatory design, multi-disciplinary, community design, climate change, resiliency, adaptive capacity, health and wellbeing,

Participatory community design holds great potential to help increase adaptive capacities in communities experiencing climate change and increased vulnerability. However, this tool is often overlooked in favor of top-down approaches when revising floodplain management policies. A community-based framework that integrates environmental risk, community well-being and design best practices at the regional and local scale is needed to increase community resiliency. This project takes a multi-scalar and multi-disciplinary approach to community design. The framework brings researchers, local officials, government agencies, design professionals, and community members together to address complex problems. Local communities affected by severe flooding in Louisiana’s capital region participated in a series of workshops held by researchers and designers to identify community priorities and issues. Computational modeling of future environmental conditions were developed to project the likely impact of changes to communities in this coupled inland-coastal region. The resulting community input and environmental modeling along with health and well-being research, professional design and policy skillsets were linked to develop community design strategies at the site, neighborhood, and regional scale. Through the participatory process, researchers forged strong and ongoing relationships with and between local designers and community stakeholders that are now taking steps to implement the plans that emerged. The framework shows that engaging design professionals, policy makers, and residents to apply future projections of ecological conditions and community well-being priorities in local and regional development decisions can vastly increase adaptive capacity and resiliency in communities even as climate change brings greater risk. This presentation draws from research funded by the Gulf Research Program of the National Academies of Sciences, Engineering, and Medicine and the Robert Wood Johnson Foundation (#200008299).
Landscape Evaluation of Health Retirement Resorts

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Keywords: Landscape Evaluation, Retirement Resorts, Elderly

Background: China has entered an aging society. In 2017, 17 percent of China’s population was aged 60 or over, which will be expected to become 35 percent by 2050 (1). Given this rapid increasing aging population, the retirement village or resort appears increasingly marketization places where people retire for rest, recreation, and relaxation (2). Compared to permanent residents, many retirees, so-called snowbirds, choose to temporarily move to the warm and pleasant areas to avoid severe weather. Like Florida, US, Hainan province is one of the appealing places for retirees who wish to spend their winter times to avoid severe weather and smog in northern areas in China. Despite the increasing interest in the retirement resort, there is lack of studies to use objective criteria in evaluating such retirement resorts in terms of health, service, biodiversity, transportation, and environment. Aim: The purpose of this study is to construct a landscape evaluation index system to understand the performance of health retirement resorts in terms of health, service, biodiversity, transportation, and environment by using mixed-methods design (i.e., combines quantitative and qualitative evaluation indicators). Methods: The ecological environment, health performance, and landscape function were used as the evaluation criteria, a wide range of indicators such as biodiversity, air quality, water quality, food quality, noise index, service facilities, management level, landscape accessibility, and color aesthetics. The analytic hierarchy process (AHP) [3] was used to determine the weight of each indicator layer, and the distance index method [4] was adopted to construct the evaluation model. Result: This study intends to use four health retirement resorts as examples to evaluate. Through a field investigation and calculation, we established a variable matrix of evaluation indicators and performed perfume principal component (PC) analysis. The result indicated the variations in the evaluation results of various indicators by people of different gender, age and health characteristics. Such different groups reported different demand for health resort environment. However, they consistently reported that there were lack of places in the selected retirement resorts, including private landscape space, enjoyable facilities, safe road conditions, and the design needs of disabled people. Discussions: The findings from this study suggest the potential design optimization for future development of the retirement resort. The results of this study will also provide methods and references for health retirement resorts and guide the design to be scientific, reasonable, operability, and practical.
Preliminary Exploration on the Relationship Between Urban Park and Public Health

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Keywords: Park, Public Health, Body Health, Psychological Health, Spiritual Health, Chinese Characteristics

China's high-speed urbanization process not only brings environmental problems at the material level, but the heavy burden of life pressure also increases the people's spiritual burden, which makes the city's public health face severe challenges. The study puts the proposition of public health on the three levels of physical health, psychological health and spiritual health, and attempts to demonstrate the urban park by analyzing the health needs of different levels and their corresponding connotations and backgrounds. The environment is not only the spatial basis of health activities, but also an important guarantee for human mental health and an important carrier for the pursuit of healthy spirit. The impact of urban parks on public's physical health is mainly reflected in aerobic exercise. Urban park is the main venue for aerobic exercise, and the aerobic capacity represents the overall health of the public. Urban parks provide a place for people to relieve stress and meet the social functions of people to develop good mental health. Flowing water, poetry and painting, and the landscape of various plants have a certain psychological and visual sense. The wide garden road, the comfortable landscape, the changes of the four seasons, and the comprehensive experience of the sound of the wind and water can all achieve the purpose of psychological relaxation. Urban park design practices based on public spiritual health vary from country to country. The spiritual pursuit of the ancient Chinese imperial gardens is “one pond surrounded by three mountains”, which is a kind of garden pattern in China, and it has been inherited and developed in the future royal gardens and some private gardens. “Shan-shui City” is summed up from the construction and development of human settlements in China for thousands of years. It is the carrier of Chinese Shan-shui culture, the idea that Chinese traditional culture gave birth to, and the urban form formed in the practice of urban construction in China. In today’s urban park design, we must incorporate the spiritual totem into the design. Integrate garden design with the spiritual pursuit, spiritual purpose and mental state of the Chinese, and integrate it into our design. The study combines the landscape design strategy of Beijing Olympic Forest Park to explain our thinking and exploration of the public behavior patterns with Chinese characteristics, and how to carry out the spatial planning and design that is suitable for it.
Spatial Distribution of Green Space Predicts Mortality at the Census Tract Level

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Keywords: Greenspace morphology; Healthy Cities; Healing landscapes; Longevity

Little knowledge is known of how and to what extent the spatial arrangement of green space related to mortality risk. This led to the difficulties to apply research conclusions into landscape and city planning practice, which works on spatial maps at the population level. We aim to investigate the protective green space distribution in cities against mortality. In this cross-sectional study, we calculated landscape metrics to measure the greenness, fragmentation, connectedness, aggregation, and shape of green space, with and without considering green areas less than 900 square feet, using GIS and spatial pattern analysis program. These metrics were selected as they reflect a general spatial distribution of green space. We analyzed all-cause and cause-specific mortality (heart disease, chronic lower respiratory diseases, and neoplasms) of 2006 per census tract in Philadelphia city, Pennsylvania, US. We fitted negative binomial regression and principal component analysis to assess associations between landscape spatial metrics and mortality, with control for geographic, demographic, and socioeconomic factors. Census tracts with a higher percentage, more connected, aggregated, less fragmented distributed green spaces, and more complex shaped green areas showed a lower mortality risk. The relationship between landscape metrics component and all-cause mortality vary according to age and education. The relationship is stronger for older adults and the lower educated group. The spatial distribution of green space in cities significantly influences mortality risk. Greenness alone may not be sufficient in capturing green space for health purposes, and health-promoting programs via environmental planning should consider the distribution of green space.
The Impact of Micro-restorative Interaction with Natural Green Elements on Attention Restorations

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Keywords: attention restoration, micro-restorative experience, mental fatigue, Sustained attention, natural green elements

The purpose of this study was to explore the potential impact of micro-interactions with natural green elements on attention restoration, as a component of health and well-being. Today, 55% of the world’s population lives in urban areas, a proportion that is expected to increase to 68% by 2050. This population needs accommodations. One way of responding to this demand is high-density developments (Angel & Blei, 2016). Densification usually means no front or back yards and limited access to a natural environment (Beer et al. 2003; Swanwick et al. 2003, Wang et al., 2019). Living in these new dense cities brings a new lifestyle with it. Bureau of Labor Statistics’ study on average hours per day spent in primary activities for the urban population suggests that most time is spent at home, at work, and commuting between these two locations. Access to natural environments, such as public open spaces and parks, provides people with numerous health benefits (Baycan-Levent Tüzin & Peter, 2009) such as better perceived general health, reduced stress levels, and reduced depression (Kaplan, 2001). Recent research has also determined that green landscapes have the capacity to promote cognitive functioning and help people to recover from attentional fatigue (Keniger, Gaston, Irvine, & Fuller, 2013). Population growth, densification, and the new lifestyle of urban residents have limited the citizens’ interactions with green environments. So it is important to maximize the benefits that citizens can receive during their limited interaction with natural elements. Attention Restoration Theory (ART) (Kaplan & Kaplan, 1989) indicates that sustained attention is one of the critical factors for successful cognitive functioning. This experimental study tests the potential for natural green element micro-interactions to increase the level of sustained attention. This study compared the results from a Sustained Attention to Response Task (SART) for 35 residents of a high-rise residential building. Participants were randomly assigned to experience one of two versions of a building’s threshold modeled in a 3D virtual reality environment. One model included natural green elements, and the other did not. Participants completed the SART twice. Once before experiencing the threshold, as the baseline of their sustained attention, and once after. The results indicate that those who interacted with natural green elements in the building threshold for 50 seconds obtained demonstrably higher SART score and expressed less cognitive errors. This research outcome supports the potential positive effect of micro-interaction with natural green elements on health and well-being.
‘Therapeutic Landscapes’ in Psychiatric Hospital Design: The Landscape Design of Dromokaitio Mental Institution in Athens, Greece, Based on Pre- and Post-occupancy Research Findings

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Keywords: therapeutic gardens, psychiatric hospitals, mental health, wellbeing, evidence-based design

Over the years, there has been an interesting and growing body of research investigating the relationship between the physical environments and its effects on human health and well-being (Ulrich et al., 2008; Kaplan, 1995; Cooper Marcus and Barnes, 1999; Ward Thompson; 2011). These studies gradually led to the establishment of therapeutic gardens as a design component to improve health and well-being for people suffering from a variety of illnesses (Ulrich, 2002; Cooper Marcus and Sachs, 2014). However, health discussions of ‘therapeutic landscapes’ tend to focus on physical health benefits rather than mental health benefits. Today, there is an increasing recognition of the role of nature in mental facilities, which has gained prominence as research to holistic health approaches exhibits an ongoing research interest (Söderback et al., 2004; Bird, 2007; Hatrig, 2008; Mason and Holt, 2012; Erbino et al., 2015; Wood et al., 2013; Wood et al., 2015; Sidenius et al., 2015; Erbino et al.2016; Cipriani et al, 2017). This study explores how natural environment and activities that take place in it are beneficial to human health and well-being for people suffering mental illness. It attempts to bridge the gap between research and design by examining the evidence-based design (EBD) and post-occupancy research of ‘therapeutic landscapes’ in psychiatric hospitals. A detailed search of published peer-reviewed literature on the subject in the past 30 years and subsequent analysis of the results which are grouped thematically, compared and contrasted with respect to methodology and findings. Results show that pre- and post-occupancy research findings on psychiatric hospital ‘therapeutic landscapes’ are sparse and landscape design recommendations vary. This research focuses on literature evaluating the landscape design characteristics of existing therapeutic gardens for people enduring mental health difficulties. These findings are analyzed and evaluated in order to form a design guideline for landscape implementation in mental institutions. Finally, Dromokaitio Psychiatric Clinic of Attica, the first state infrastructure for psychiatric illnesses in Greece that dates back to 1887 with a capacity of 400 patients on a plot of 321 acres, will be used as a case study to implement these landscape design guidelines based on the research findings as well on site analysis (identification, limitations and potentials of the area) and the evaluation of user needs (patients, staff, relatives).
LANDSCAPE PERFORMANCE
Erosion Control or Food Crop? Opposing Goals and Management Strategies for Perennial Wheat

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Keywords: roadside landscape management, public perception, DOT, perennial wheat

The design, planting, and management of highway roadsides presents many challenges to landscape architects and DOT professionals also faced with management of conflicting goals and values of the public. Even partners in roadside projects can have opposing goals and management strategies - as seen in this study with perennial wheat. The planting and management techniques for erosion control conflict with those for food crop production – but must this be the case? Frequently opposing goals include: establishment of fast erosion control and land stabilization and use of native versus exotic plant material, definition and provision of a publicly desirable landscape aesthetic, management of a safe zone and clear right-of-way, provision (or prevention) of view corridors for businesses and billboard owners, and preservation of tree cover and other important functioning ecosystems. Landscape architecture can offer design solutions that combine and accomplish many of the goals above. This paper presents results after two plus years of a pilot study of perennial wheat (Kernza) at Interstate 85, exit 6, near LaGrange, Georgia and the Kia Motors Manufacturing plant. This study is a joint project with funding and support provided by The Ray Anderson Foundation, The Georgia Department of Transportation, The Land Institute, and the College of Environment and Design at the University of Georgia. As the Land Institute nears the point of release of perennial wheat (Kernza) seed for planting around the globe, questions remain as to the adaptability of perennial wheat to warmer climates. The extensive root system and perennial character of Kernza appears to be a low maintenance and soil stabilizing roadside plant, even into USDA zones 8 and 9. The second year study results of this 30’ x 30’ test plot, located in USDA zone 8b, are positive with nearly 95% seed germination, successful vernalization and seed production during the first and second growing seasons, and spreading via rhizomes in year two. Interesting questions for further research remain as year three and later data is collected. Will perennial wheat become aggressive and invasive? What is the value to local ecosystems? Will DOT’s become amenable to wheat and other crop harvest on public roadsides? Can planting and management techniques for perennial wheat grown as a food crop change to be even more environmentally friendly? Will the public become more accepting of tall grass and forb laden roadsides and their according ecosystem services rather than the current desire for a turf-like roadside aesthetic?
Exploring Cooling Range: Optimizing Green Space Design to Mitigate Heat

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Keywords: Green space, Community design, Air temperature, Urban heat island

To respond to negative effects of rapid urbanization and climate change, many cities in the US have developed their resilience plans. Among these programs, urban heat islands (UHI) effect reduction strategies using green spaces (GSs) are commonly documented. However, the existing plans have not been well applicable to cool down UHI at a fine scale due to the lack of detailed design guidelines with green spaces. This study aimed to 1) assess cooling ranges of small green spaces (SGs) over their edges to surrounding areas and 2) identify threshold of spatial cooling distance with SGs. The study site was located in a single-family housing area in College Station, Texas. The study was conducted on five SGs and a reference site adjacent of a paved road exposed to solar radiation. Air temperature was collected at the height of 1.5m from the ground from each measuring point. The temperature data were measured three times a day (10h, 13h, 16h) for six days (from November 2016 to April 2017). A T-type thermocouple sensing unit and compatible loggers recorded air temperature data every second. Cooling distance measure was set according to each SG’s radius; 1) ‘Mid’ indicating the middle of a SG; 2) ‘Edge’ indicating the edge of a SG; 3) ‘1.25R’ representing 1.25 times of the radius apart from the Mid; and 4) ‘1.5R’ representing 1.5 times of the radius apart from the Mid. The findings showed that SGs’ cooling effects surpassed its edges. The mean value of cooling degree from the Mid to the Edge was 2.15°C (7.85%), while the mean value of 1.25R and 1.5R was 1.91°C (6.98%). Moreover, in spring, SGs’ cooling degrees exceeded 2.14°C at the 1.5R (8.32%). In summer, SGs’ cooling effects decreased largely but kept the cooling at the 1.5R showing 1.06°C (3.66%). Our findings will help designers, planners, researchers and local government officials by providing an optimal and economical green space design guide to mitigate UHI in communities. In addition, the findings of this study will help to develop more advanced methods to collect microclimate data focusing on air temperature linked to spatial information which can evaluate the heat reducing impacts of SGs.
Ten Eyck Landscape Architects Campus Transformation Project: A Multi-functional Landscape for the University of Texas at El Paso

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Keywords: Landscape Performance, Restorative landscapes, Attention Restoration Theory, Ecosystem Services, Planting Design

This presentation explores the multifunctional aspects of the Ten Eyck Landscape Architects (TELA) Campus Transformation Project for the University of Texas at El Paso (UTEP). In 2012, TELA led a multidisciplinary team through design and construction of the 11.5-acre Campus Transformation Project (CTP) The project was intended to create a new campus heart for celebrations and recreation that would be pedestrian friendly, mitigate stormwater events, provide a universally accessible and a socially-engaging campus, while re-establishing natural systems and celebrating the University’s desert environment. TELA added restorative landscapes to the CTP design. The CTP became the first project certified under the Sustainable SITESv2 Initiative in 2016. Environmental psychologists, Stephen and Rachel Kaplan, developed attention restoration theory or ART. According to the Kaplans, time spent in nature is the antidote for a depleted mental and emotional condition that they call directed attention fatigue and restorative landscapes restore the cognitive and emotional state. In addition to having a high natural content, the ART stipulates that three other qualities be present if restoration is to occur: being away, extent and compatibility. ART has now been validated by multiple research studies (Laumann, Gärling and Stormark, 2001; Hartig et al., 2003; Park et al., 2010). This case study was developed with the designer, with input from others who worked on the project. It used case study methodology including literature review, personal interview, project descriptions by the designer and visual landscape analysis. The project’s functions include flood control, universal accessibility, pollution mitigation, micro-climatic modification, increased biodiversity, and an intentionally designed restorative landscape containing all the elements stipulated by ART. The findings are qualitative for restorative landscape and quantitative for the flood control. The project delivers a wide range of ecological, social and cultural ecosystem services, with minimum water inputs and is a new model for public open space in an arid environment.
The Ecosystem Service Value of Old and Venerated Trees in the Summer Palace

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**Keywords:** old and venerated trees, The ecosystem Service, historical value, cultural heritage conservation

The ecosystem service value of old and venerated trees in the Summer Palace (Beijing, China) is an important part of the heritage of this imperial classical garden and includes economic value, natural ecological landscape value, and social value. The Summer Palace has abundant ancient tree resources. There are 1,601 ancient trees. Among them, 97 first-class trees are over 300 years old and 1,504 second-class trees are over 100 years old. This paper describes a method to calculate the ecosystem service value and concludes with a statement of economic value for these ancient trees. The method to determine ecosystem service value has four criteria which establish a formula for quantifying this value. First, the value of these trees is their economic value as determined by market forces of them as a commodity. Second, and according to the growth status of ancient trees, the value coefficient of their growth potential reflects their ecological and landscape value. Thirdly, the social value of these trees - including historical value, cultural value and spiritual value - is determined according to the historical records: couplets and plaques in buildings and courtyards in the Summer Palace, ancient documents and historical events, and similar archival and textual resources. For example, Emperor Qianlong, as the chief designer of Summer Palace, went there 147 times in his lifetime and wrote more than 1,500 poems about the garden - with as many as 20 kinds of plants repeatedly described in his poems and essays. Finally, as a Chinese national first-class heritage site and a UNESCO World Heritage garden, the cost of landscape management and conservation of ancient trees in the Summer Palace is calculated according to the maintenance standard of such an important park. Using the formula derived from these four criteria, the total value of ecosystem services of the ancient trees in the Summer Palace is estimated at $127.65 million. This is only a part of the total value of ecosystem services in the Summer Palace which has been calculated in my research. The Summer Palace is incomplete if the ancient buildings are left without old and precious trees. While gardens can be rebuilt, it is difficult to find ancient trees with hundreds of years of growth and cultural longevity to create a landscape for subsequent generations. This research provides a method to communicate their value.
The p[AR]k: An Engagement Between Technology and Landscape Performance

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Keywords: augmented reality sandbox, landscape performance, digital communication, computational modeling, parametric modeling

Project stakeholders can be further engaged with a project by using a tangible medium with technology to generate augmented and measurable outcomes. This study tests the adaptation of the Augmented Reality (AR) sandbox to include performance measurements such as tree benefits, stormwater management, and accessibility in the scope of pocket parks. Tethering malleable media with advance computational modeling can result in a more comprehensive project outcome by revealing the intangible performance of design with graphic information. Augmented reality sandboxes are becoming a more common tool for landscape architecture classes and other studies to understand heightfields of topography as the user manipulates a form of sand media in an enclosed container. Although this is extremely beneficial for the user to understand these fundamentals, the technology of the Xbox Kinect to generate these colored heightfields in the landscape can be utilized to measure other landform conditions of slope, aspect, and drainage along with performance of tree benefits, runoff volume, and circulation. Providing visualizations and a means to demonstrate these properties can give the user more ownership and agency behind their decisions and transformations to landforms. The feedback collected from the Xbox Kinect will generate a point cloud of the sandscape that the sensors are projecting down on. From this point cloud, the computational software of 3D Rhino and Grasshopper can begin to analyze and generate graphic information based on various parameters. The initial analysis of the point cloud will be to create various colored projections to communicate slope conditions, landform aspect, and drainage. In addition to the use of sand as an instrument of the design process, colored circle cutouts are used to symbolize tree locations which are registered with the Xbox Kinect to assign tree values. Depressions in the landforms can be read as collection ponds for runoff or serve as a retention pond to measure on-site stormwater volume. Similar to the properties of the colored cutouts, colored fabric is used to indicate circulation routes which can be computed as different types of material, form, and width. Turning malleable medium into augmented representation under the control of the user gives ownership to decision making for a project beyond the designer’s scope to include a larger audience and engagement. This information will help determine the performance of the proposed project by measuring tree benefits, runoff volume, and circulation using calculation standards of the respective topics.
LANDSCAPE PLANNING & ECOLOGY
7J Meadows: An Arid Ecological Master Plan

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Keywords: arid ecology, rural development, community engagement, ecological preservation

The 7J Ranch, recently acquired by The Nature Conservancy (TNC), requires strategic and sensitive master planning to ensure the preservation of a diverse wildlife ecology while introducing additional program opportunities that include eco-tourism, research laboratories, artist residence, sustainable infrastructure, and public outreach. Through community engagement with TNC, university programs, and local stakeholders an ecological master plan was developed to incorporate environmental protection and public advocacy within the rural town of Beatty, Nevada. The study site is at the headwaters of the Amargosa River; which supports a rich and lush ecology of flora and fauna within the overall arid environment between the hot dry Mojave Desert and cold dry Great Basin ecoregions. Springs and aquifers sustain this healthy ecology with year-round surface and subsurface drainage for fish, amphibians, mammals, and birds. Due to this sensitive ecology revolving around its precious water resource a strategic plan was developed to protect these rare resources from being over-used or contaminated by inappropriate land use practices. Research themes were introduced by TNC to help better understand the site’s complex composition of environmental and historical components to aid in the master plan development. The University of Nevada Las Vegas (UNLV) expanded these themes to include geology, hydrology, ecology, and wildlife for the environmental systems while also elaborating on the historical context of Beatty, early settlement by Native Americans, and ranch grazing policies. UNLV students used the research analysis of these themes to create interpretive signage and mapping that will be staged throughout the project site for educational and advocacy purposes for visitors, local residents, and stakeholders. The analysis from this phase of the project framed the programmatic development of the site’s master plan to preserve sensitive microhabitats and cultural artifacts. Other components were added to the master plan program from community design charrettes that include renewable energy, agriculture, recreation, and trail networks. From the master plan phase, focus areas were selected through the assistance of TNC and other stakeholders to develop concept renditions that integrated the ecological and programmatic components of the site using perspectives, section drawings, diagrams, and other graphic representations. The research analysis, master plan, and conceptual renditions will be used by TNC to promote the project site to community members and sponsors for preservation, implementation, and future development of the 7J Ranch site. Select graphics will also be used as marketing material in brochures and other dissemination for fundraising.
Approaches to Environmental Planning in Post-Suburban New Jersey

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Keywords: home rule, environmental planning, post-suburban

This presentation examines the planner’s and designer’s exploration of the post-suburban cultural and political context in search for better solutions for the built environment. The focus lies on a New Jersey paradox: In comparison with other states, New Jersey introduced successful environmental protections at a relatively early stage but was late to the game of securing public parklands/open space. The expansion of the New York and Philadelphia metropolitan areas made neighboring New Jersey the first state to be completely ‘built out’ as a result of urban sprawl. Within the planning and design community in New Jersey, there is a sense that regional environmental planning is needed, even though the political situation in this home-rule-state makes it extremely difficult. The term ‘post-suburban’ is borrowed from the urban planning discourse, where it is used to indicate the need to revitalize older suburbs. In North New Jersey, these revitalization challenges are most prevalent in residential areas that evolved post-World War II, as well as in aging office parks and malls. With shifting suburban conditions, user expectations of open space characteristics and park amenities are changing. Further, the remaining green spaces are gaining a more important role to provide relevant resiliency and sustainability functions for these suburbanized areas. Outlining these functions and designing appropriate physical features is the task of environmental planning and landscape architecture today. However, a new approach must go beyond that: The comparison with Germany’s Ruhr Region will show that revitalizing and expanding an open space system has a positive impact on regional development at large. Which of these successful strategies
Remaking Urban Natures: Culture, Ecology, and Politics of Cultivating Plants and Habitats in Yards and Neighborhoods

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Keywords: Biophilia; Plant blindness; Extinction of experience; Landscape change; Urban landscape ecology; Human-plant interactions; Plant-conscious culture; Yards and neighborhoods; Cultivation practices; Biodiverse landscape

What lessons can remaking urban natures provide to landscape architects? I examine how the process of cultivating plants in the United States has grown more complex as the attitudes, values, and beliefs of society have shifted towards biophilia. I am especially interested with how urbanites have increasingly blended alternative cultivation practices to create more biodiverse landscapes in private spaces of yards and in the public spaces of neighborhoods as well as having helped diversify the meaning of urban nature through their everyday practices. The conventional aesthetic of immaculate lawns, shade trees, and bold flowers has given way to a more complex, multifunctional, multicultural mosaic of diverse plant species and landscapes, which I define as different types of urban natures. Their remaking efforts help to create a plant-conscious culture that addresses the disconnection between people and plants. The disconnection goes by different names in the literature like “extinction of experience” (Pyle 1978; Soga & Gaston 2016) and “plant blindness” (Wandersee & Schussler 1999, 2001; Balding and Williams 2016). Yet, a key gap exists in the literature that takes a critical look at this cross-scale cultural phenomenon as a remaking of the definition of urban nature to one emphasizing the pluralistic visions of urban natures. To address this key gap, I will draw on my extensive experience to propose a framework that will help landscape architects to better “read” the complex cultural, ecological, and political meanings of urban landscapes as the remaking of urban natures. This framework draws on cutting-edge academic research and professional practice to develop a series of lessons to help advance understanding about these new urban natures and to explain why they are emerging more frequently in American yards and neighborhoods. My presentation will delve into some of the early work that has emerged from this study. First, I will flesh out the distinctive characteristics of the plant-conscious culture who remake urban natures. In addition, I will explore how they more consciously use species, space, visibility, material, and practices to advocate for why biodiverse landscapes matter to resisting the extinction of experience and to reducing plant blindness. Different examples will be discussed such as community gardens, habitat restorations, and edible landscapes. Second, I will review three lessons about remaking urban natures that are important for landscape architects to remember because yards and neighborhoods are a “hothouse” for emerging ideas to redefine the understanding of human-plant relations.
The Effect of Imperviousness on Surface Runoff Under Varying Climate Conditions

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Keywords: urban flooding, imperviousness connectivity, effective impervious area, climate variability, climate impact

The amount of impervious surface is a typical land use measure which indirectly quantifies the impacts of urbanization on local flooding and health of streams. It serves as an integrative and practical indicator for land use planner and water resource managers to diagnose expansion of developed areas. While the total impervious area (TIA) has been one of the most useful and applicable indicators to quantify urbanization impacts, directly connected impervious area (DCIA) is another emerging measure which represents hydraulic connectivity between impervious surface and stream network. DCIA is a subset of TIA, where surface runoff directly drains into stream outlets through closed pipe systems. It has not yet been established which measure, TIA versus DCIA, is a better predictor of development impact on urban hydrology. The major purpose of this study is to empirically examine how TIA and DCIA affect surface runoff under varying climate conditions. Highly urbanized watersheds in three metropolitan statistical areas (MSAs) in Texas, including Greater Houston, Greater San Antonio, and Greater Austin, were monitored on a monthly basis from 2010 to 2017 as a case study. Multiple ordinal regression models were developed to identify the relationship between imperviousness variables of land use as independent variables and the probability of runoff yields as a dependent variable. We hypothesized that TIA or DCIA would outperform one another to increase runoff yields. In addition, contributions of TIA and DCIA were expected to change by precipitation depth. The results of ordinal regression models show the positive association of TIA and DCIA with the cumulative logit of both runoff depths and peak flows. While DCIA was a more powerful predictor than TIA in runoff depth models, the gap between TIA and DCIA contributions decreased in peak flow models. Similarly, the marginal effect analysis revealed that the impact of DCIA on the high-risk runoff depth was far greater than that of TIA, and this gap became minimal for high-risk peak flows. Moreover, the effects of TIA and DCIA fluctuated by storm size; the mean marginal effects of both TIA and DCIA increased until a certain threshold and then decreased with increasing rainfall depths. This threshold varied by MSA. The study demonstrates the need for regulating DCIA rather than TIA to effectively control both runoff volume and peak flow in urban watersheds.
Urban Regeneration and Ecological Restoration: Practice, and All Is Coming

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Keywords: Ecological Wisdom, Full-period Working System, Modern Urban Planning Theory, Government Reorganization, Practice Coherence, Knowledge Consilience

A series of ecological and environmental issues emerged with rapid urbanization, which caused the evolution on traditional urban planning theory, and ecological priority orientated planning theory such as ecological wisdom practice gradually became mainstream recently. How to balance the contradiction between natural protection and development still exists in current process of urban planning and construction. In western countries, rapid industrialization and urbanization led to a series of urban diseases, and pioneers of modern urban planning theory appeared and there had been a long transformation process. Theory of ecological wisdom was also existed in Chinese philosophy when we built a capital city in ancient time. The master plan extends the perspective to the surrounding natural mountains and water, which helps to form an overall understanding and consideration. Designers nowadays need to learn. This kind of integral design thought is very common in ancient China, is one kind of thought that human and the nature can interact and communicate, is a kind of Chinese style thought. This tradition is ecological wisdom. Under the guidance of the concept of ecological civilization construction, the whole planning industry is facing great changes and transformation. The relevant ministries of China have begun to adjust and reform. Government reorganization in China is for building greater practice coherence and provide potential for greater knowledge consilience. From the perspective of practice, a new and more coordinated practical system is established, and a more reasonable knowledge reorganization and integration is realized on the basis of full investigation and reasonable utilization of ecological resources. Summarized from the past 10 years’ experience in the planning and design practice, the role of coordination and organization of the project team is particularly important. Based on the transversal and vertical dimension of transboundary practice experience, a full-period working system of multiple dimensions transboundary should be established for the implementation. The multi-dimensional system is a network composed of a horizontal multi-discipline system and a vertical multi-stage system. Taking 2 examples to explanation how the system works to provide the reference for urban planning practitioners in China, the case study including Beijing Olympic Park Landscape Planning and Design and 2019 Beijing International Horticultural Exposition Planning. Chinese President Xi’s speech at the opening ceremony of the 2019 Horticulture Expo pointed out the direction and opportunities for the future work of urban planning industry. The core concept of the current ecological practice is industrial cooperation, overall design and win-win cooperation. It is also an important method for urban regeneration and ecological restoration.
PEOPLE-ENVIRONMENT RELATIONSHIPS
A Design to Increase the Spatial Affinity of an Urban Plaza Prestige Project

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Keywords: spatial affinity, urban plaza prestige project, ecological aesthetics, practice wisdom, China

Large percent of urban plaza prestige projects all around China share similar problems of the mere ardent about out-of-scale grandness, lack of natural feeling and spatial affinity. Such common phenomenon no doubt reflects designers’ compromise to their clients’ preference of prestige projects with only (and monotonous) focus on large and magnificent impression. Little (if any) attention has been paid to ecological aesthetics, spatial practicability and affinity, which are favored by the actual users of these plazas. While fewer prestige projects occur lately in Beijing, Shanghai and other mega cities for the sake of avoiding negative effect in propagandas rather than any changes of taste and preference of the municipal governments, the clichés in the design of prestige project urban plaza are still popular in many second and third-tier cities in China. Local government officials prefer to build urban plazas as prestige projects in order to create magnificent atmosphere with the purposes of impressing people in and around it. Therefore, the space in these plazas shows a grand yet without spatial affinity feelings. On the other hand, the expectations of actual plaza users would be more focused on spatial affinity, including the interactivity (referring to the actual function of the space) and ecological aesthetics (referring to ecologically based aesthetic values) (Wei and Wang 2014). Hence, how to effectively combine these two expectations regarding to different spatial feelings in a single project is vital for a successful design of an urban plaza prestige project. Urban plaza prestige project design represents a practice in socio-ecological systems where people’s interests are diverse (Xiang 2016). In order to have a design that can be implemented, designers should acquire phronesis, that is, the practical wisdom with focus on communicative rationality (Flysbjerg 2004). This is critical for designers being able to explore the possibilities of integrating the multiple interests by expressing different spatial feelings at large and small scales. They can try to create symmetry, grandeur overall layout to fulfill government officials desire while designing creative, practical small spaces with ecological aesthetics and spatial affinity for users of the large plaza area. The author’s design proposal of the Cultural Plaza of Jiutai Cultural and Sports Center in Jiutai, Jilin, China has applied this strategy and gained acceptance of the local government, becoming the winning proposal among several alternatives. The projects started construction in 2017 and is nearly completed now.
Assessing the Relationship Between Parkland Characteristics and Human Wellbeing: An Analysis of Resident Mortality and Parkland Characteristics in Large US cities

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Keywords: Macroscopic scale, Landscape performance, Mortality, Human wellbeing, Environmental justice

The amount of public access to a park was identified as one of the three most important characteristics of an effective park system. Prior research has shown that even if such access is provided, minorities tend to frequent parks much less than majority populations (Mowatt, 2009). As social justice issues related to the uneven distribution of public resources, like forests, parks, and open spaces, have raised attention of researchers and planners in recent decades, the exploration of the theoretical linkages in environmental justice research have become more rampant. However, there has been little attention given to the physical aspects of cities and how landscape performance can be linked to human wellbeing. This and related types of investigations are direly needed to provide evidence linking the quantitative differences in natural resource distribution across different socioeconomic conditions. This paper asks, how does parkland quantity and quality affect life expectancy? It assesses area of parkland, accessibility of parkland, and governmental spending on parkland in large US cities and their association on life expectancy. Estimates on life expectancy of residents are obtained by the U.S. Small-Area Life Expectancy Estimates Project (USALEEP) from National Center for Health Statistics in 2018. These data were modeled with existing census track data while parkland characteristics are gathered from the Center for City Park Excellence (funded by the Trust for Public Land), a non-governmental organization raising funds for protecting and restoring natural spaces and collaborating with communities to design and plan new community service amenities and open spaces. City scaled parkland data and life expectancy estimates are analyzed to reveal statistical relationships among variables. Further, cities with similar characteristics, like population composition, median income, health care condition, and climate characteristics are compared to isolate the impacts of parklands. Findings suggest that increases in both quantity and quality of parklands are highly associated with increased human wellbeing. By connecting the characteristics of public open spaces with human wellbeing, this paper provides evidence of impact of the distribution of public open spaces on human wellbeing. Research on environmental justice and advocacy of fair distribution among different ethnic groups gains more evidence for future policy, planning and urban design.
Confronting the Divide - Nature versus Power Lines

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Keywords: infrastructure, power, transmission, electric, grid, new jersey, urban, suburban, nature, narrative

The above ground infrastructural grid reflects an image of New Jersey’s relationship with nature. Telling a story of urban and suburban expansion; these railways, roadways, and electric lines dissect physical space while connecting cultural centers. They symbolically mark the line between civilizations and their cultivated values as opposed to a more ‘natural’ state of being: an existence where there are no transportation corridors to carry people from far reaching places into cities and back, no power lines to bring an increased standard of life to homes and public streets, no drive to fuel a growing economy, and no need for standardized mechanical time. In particular, the growing web of electrical stations, transmission lines, and utility poles in New Jersey are held to be antithetical to nature. Creating a placeless zone of man-made infrastructure, they are ever-present yet constantly ignored while simultaneously representing the progress of urban development in what is now the most densely populated state in America. Today, concerns over a growing separation from nature spark debates about what our relationship to nature is and how we can conserve it. Preserved at the margins of our developments, tracts of forested wilderness represent one view of and desired interaction with nature, as it would have existed most similarly to a world with limited anthropogenic influence. The Garden State’s agricultural lands, or second nature, represent a highly productive relationship between humankind and the land that has existed for many centuries. Parks, gardens, boulevard plantings, and green systems represent humanity’s artistic touch combined with nature, and are found in abundance today. Then we have the idea of ‘new wilderness,’ or nature that has sprung out of anthropogenic ruins and urban decay. While searching for a response to the questions of ‘what is nature’ and ‘what is our relationship with it’, I have chosen to explore the idea that nature is a narrative told by cultural groups as well as individuals. These narratives reflect the social orders and belief systems of the narrator(s) and govern the way we view and decide what constitutes good or bad interaction with nature. Through looking at how ideas of nature have historically reflected social values, I am questioning the man versus nature divide through the proposal of a system of bike and pedestrian greenways that utilize the electric grid as the focal scenic viewing point.
Dried Up: Developing a New Planting Aesthetic for the Increasingly Arid West

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Keywords: Planting Design, Arid Landscapes, Planting Aesthetics

As climate disruption occurs, the Rocky Mountain West is predicted to become more arid due to the anticipated decline in precipitation, and increase in evapotranspiration resulting from rising temperatures. Simultaneously the desire to grow economically through land development increases the number of people moving to the area thus requiring more water. As this demand for water to support land development is increasing, the amount of available water for irrigation is decreasing. At some point in time the landscape of the Front Range of the Rocky Mountains will begin to look very different. This presentation discusses the implications of the opposing forces of climate disruption and land development vis a vis water availability and consumption on the future aesthetic(s) of the landscapes in Front Range communities. This paper begins by examining historic influences effecting planting design in this region. The lack of water needed for farming, mining, and settlement in the Rocky Mountain West was clear early on. In 1860’s Colorado adopted a set of laws regarding land ownership and water use known as the Colorado Doctrine. With expansion westward, people migrating east from areas of greater precipitation brought with them plants and planting aesthetic(s) of their homeland to this much drier environment. The aesthetics imported from one’s place of origin express more than just color, texture, or seasonality; they carried with them personal and community values. Images of dry, dystopian landscapes are used as warnings of impending water shortages. The arid, desolate landscape imagery in the movie Mad Max: Fury Road, is meant as a cautionary tale of drought and hardship unless global warming is addressed. This paper focuses on using the tools of landscape architects to generate a new planting aesthetic suggesting a preferred alternative to these dystopian images. The reduction of available water for landscape resulting from the changing climate and pressures of land development in Colorado, creates the conditions to explore alternative planting aesthetics that incorporate communities’ values and identity, and envisions an environment that contributes to our future well-being.
Fine-scale Visual Landscape Assessment: A Before/After Approach to Evaluate the Impacts of Vacant Lot Reuse Programs

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Keywords: Urban vacancy, vacant lot reuse programs, visual landscape assessment, cues to care, blotting

Urban vacancy has been a pressing issue in many US cities over the past few decades. While high vacancy in most cases contributes to negative outcomes such as social segregation, lack of visual quality and safety, as well as decreased property value, vacant land greening initiatives are a potential urban asset that can alleviate many of these negative outcomes and improve neighborhood conditions. We have examined the impacts of one such initiative, the Large Lot Program in Chicago that transfers vacant lots to neighborhood residents in high vacancy areas by allowing them to purchase 1-2 city-owned vacant lots on their block for $1 each. The purpose of this study is to examine the impacts of this program through evaluating fine-scale landscape change over time. To perform visual landscape assessment, we developed a condition-care index based on visual assessment of both aerial and street level imagery. This index measures different aspects of land/tree cover and condition/care for lots purchased in two areas of the city, East Garfield Park and Greater Englewood, one year before and after purchase (N= 424 lots). Our 7-item index showed acceptable reliability with Cronbach’s alpha of 0.753 before lot purchase, and 0.698 after purchase. Our findings show 8% increase in lots with gardens one year after implementation of the program. We also found 16% reduction in lots with mature trees, however it was accompanied by a similar increase in the proportion of mature trees rated in “good condition.” Some of the lots studied, exhibited signs of appropriation and stewardship before purchase, known as “blotting.” Our analysis revealed that transfer of ownership through the Large Lot Program increases both the extent and types of changes made whether or not blotting had occurred, reflected in the condition-care index scores. At an applied level, our work presents an approach that informs planners about the type and degree of changes being made to lots, to evaluate progress along various environmental conditions for urban greening. Additionally, this work adds a temporal dimension to the literature on urban vacancy and greening, which has tended to examine social or ecological patterns at a single point in time. This interdisciplinary work extends methods of visual landscape quality assessment by adapting recent approaches from allied fields of sociology and urban ecology and applying them in a novel context to understand how landscape condition and care are visually expressed by the greening of vacant lots.
Gender Segregation on Chinatown Urban Square

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Keywords: Segregation, gender, urban square, Chinatown, community gathering space

Urban segregation research has drawn an increasing interest starting from the last century. However, most of the previous research has been focusing on the following perspectives: the index of segregation (Duncan and Duncan, 1955), the impact of segregation (Massey and Denton, 1993), the measurement methods of spatial segregation (Morrill, 1991; Wang, 1998; Reardon and O’Sullivan, 2004), and new forms of segregation (Van Kempen and Şule Özüekren, 1998; Caldeira, 2012). This article argues that several research gaps have existed in the current urban segregation studies. First, while racial segregation is intensively studied, gender segregation is still insufficiently understood. Secondly, most of research measure segregation based on the only spatial territoriality, which is problematic. Thirdly, the reasons behind segregation and how the segregation study implies future policy change is under-challenged. Vanghan and Arbaci suggested that segregation is a multi-dimensional process which requires a multi-disciplinary approach (2011). This research used a multi-disciplinary research framework and methods to understand the gender segregation on a 1.3-acre urban park. With two years of ethnography, severe gender segregation is found on the Portsmouth Square in San Francisco Chinatown. Previous research found out the main reason behind segregation is that men and women have different preferences in open spaces, while also holding different concepts of optimum public spaces experiences (Mozingo, 1989). This research reaffirms this idea, and further suggest that gender segregation on urban space usage also result from a combination of several other forces, including time availability, the impact of physical space design, and gender role ideology. Behavior mapping, participant observation, ArcGIS, and in-depth interviews are primary methods in this research. This study fills the gap of segregation studies in general, and also implies lessons for urban designers and planners what types of space design will perpetuate or reduce segregation.
Landscapes of Resettlement: Exploring Migrant Relationships to Space in Berlin, Germany

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Keywords: landscape, architecture, war, migrant, immigrant, berlin, germany, turkish, vietnamese, river spree, anecdotes, housing, homelessness, job security, kreuzberg, world war 2, integration, assimilation, guest workers, access

Water is amorphous, replenishing, destructive, and transient. Rivers have brought people together by providing access yet have also been used to divide people. The River Spree is one example that divided East and West Berlin alongside the Berlin Wall during the Cold War. Berlin’s neighborhoods consequently grew apart as they diverged politically, economically, and culturally, establishing subcultural niches. The city of Berlin in Germany accommodates distinct communities that carry comparable experiences of warfare, resettlement, and integration, stories that are told through the landscapes along its rivers. This paper explores whether a relationship exists between immigrants and the landscapes that they have resettled to and are active within, relative to the River Spree of Berlin, and how best to integrate these relationships into a learning experience. Furthermore, the research methods include: travel to onsite visits, visually documenting the river analogously and photographically, and exploring archives of historical, cultural, and present events and anecdotes.

Industrial sites have historically dominated the River Spree,[1] for much of Berlin’s physical landscape was shaped during the Industrial Age.[2] This was a major component behind the invitation of guest workers from countries including Turkey and Vietnam to help rebuild and economically revitalize Germany. It was common to find many migrants settled in subpar residences that were heavily damaged by the war, as it was often what they could manage to or were often allowed to afford. While this led to the development of culturally rich communities, cramped housing environments, gentrification, and limitations in educational and professional resources resulted in significant reports of job insecurity, homelessness, and gang activity in migrant-prevalent neighborhoods such as Kreuzberg. Ultimately, this paper seeks to better understand Berlin’s migrant experiences, and how architecture and landscape affect their relationship with space. The basic hypothesis is that the struggle and resilience of the people are indelibly represented in the physical and psychological landscapes along the River Spree that a considerable population of migrants reside near. After the conducted research, it is apparent that immigrants generally experience difficulty finding community, integrating, and accessing equitable resources and spaces. There also exists a significant presence of immigrants along the River Spree of Berlin. Nonetheless, there are also many migrants whom seek to transform their own experiences to create opportunities to support other migrants and provide cultural, personal development, and educational resources to all residents. Ultimately, we find that the land also adapts with the people.
Patterns of Labor as Landscape: Bos Park and Lower Klamath National Wildlife Refuge

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Keywords: Management, Maintenance, Water, Infrastructure, Ecology, Labor, Socioecological, History, Mapping, Materialism, Feedback

The purpose of this study is to reveal and spatialize the way large-scale landscapes are created and altered over time by patterns of human action through two case studies. Two seemingly geographically and typologically distant sites are connected with a new examination of the role of maintenance and management patterns. Site visits to Bos Park in Amsterdam and to the Lower Klamath National Wildlife Refuge straddling Oregon and California in the summer of 2019 give evidence for their composition as complex systems of feedback cycles between maintenance personnel, water, earth, plants, wildlife, and the public. Through this project I aim to map and visualize these systems to show how they are materialized in the landscape, particularly through machines, movement, and material exchanges at a body scale. From detailing the spatial implications of the current patterns I project backwards in time to show how this system has changed, both gradually and suddenly, and how the landscape has changed with it. Both sites benefitted from depression-era labor crews, and both hosted forced racialized labor camps during WWII (Bos Park held three Nazi labor camps within it and Klamath held two Japanese Internment Centers in close proximity.) How did these different bodies, tools, and processes both shape and experience the landscape? How can we show responsibility for this history through current practices? With methodology including counter-mapping, measured drawings at multiple scales, historical photographs, and narrative storytelling this project will make a case for designers to participate creatively in the orchestration of management and maintenance patterns over time, instead of focusing only on the one-time construction or installation as the completed “design”. This requires an expansion of how we define maintenance and construction in relation to landscapes. Finally, I will attempt to project these systems forward into the future, to show where creative alterations in patterns of maintenance and movement across the landscape could change its spatial form, perception, and socioecological function. As the mindset of control over the environment and the landscape continues to fail us the question becomes: how can we give up control but not give up responsibility? By seeing landscape in the ever-present and shifting patterns of our physical engagement with it, I hope to find new avenues for design at wider spatial and temporal scales.
Spatial Analysis of Cultural Behavior Differences in an Urban Plaza

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Keywords: Cultural differences; Urban plaza; Behavior mapping; Spatial Analysis; Culturally inclusive design;

People create urban spaces, and in turn, urban spaces impact people’s feeling regarding the city. City spaces are landscape embedded with culture; however, cultural behaviors and how space-design could support minority cultures are still under-comprehension. By studying Portsmouth Square in San Francisco Chinatown, the article argues that cultural behavior differences are displayed in four different realms. These include geographical territoriality, activity typologies, space preference, and the way people interact with each other. It further argues it is not those symbolic architectural ornaments that support Chinese immigrants’ daily lives, but the placemaking curated by informal seats, tree shades, and cultural activities. The article acknowledged that one urban park usage does not represent one ethnic community in general. Hence, in creating culturally sensitive and culturally inclusive urban spaces, landscape architects, planners, and urban designers are strongly urged to do research and investigations to understand the needs from ethnic minorities who are active users of the place. Moved beyond the traditional methods of observation, the study also utilized quantitative spatial analysis to further-elaborate the qualitative data collected from conventional behavior mapping method.
The Effect of Neighborhood Parks on Reported Crime Rates in the Greater San Antonio Area, Texas

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Keywords: crime prevention, environment and crime, access to nature, biophilia

An increasing body of research points to the benefits of exposure to nature and natural elements (e.g., Beatley, 2016; Sternberg, 2010, Miller et al, 2009). This study explores how the presence of outdoor parks in the greater San Antonio, Texas, area, affects rates of reported crime. The study comprises three components. Part one is a macro-level study comparing six neighborhoods with and without parks at three income levels (low, medium, high). Crime rates per 1000 people reported through Lexis-Nexis for the period from 2014 to 2018 are compared for each neighborhood. Types of reported crime include violent and property crimes. Across all three income brackets, crime rates decrease in the neighborhood that has a park. ANOVA tests suggest that the most significant difference in crime rates is observed in the lower income neighborhoods with and without a park. Part two is a meso-level examination of the lower income neighborhood. Twenty neighborhoods with an annual average income of less than $35,000 are compared, ten with and ten without parks. Evidence indicates that the presence of a park lowers the rate of reported crime, but not to a significant degree. Part three is a micro-level examination of the results of part two that focuses just on the neighborhoods with a park. The two neighborhoods that have the highest rates of reported crime are analyzed for physical and qualitative characteristics, as are the two neighborhoods with the lowest crime rates. Regardless of demographic factors, the parks in neighborhoods that have the lowest crime rates have the following in common: the park appeals to a multi-generational audience; it can be used at multiple times of the day and year; it is well maintained and has a variety of amenities; it has access for people of all abilities; there is a good balance of natural elements and man-made amenities. The parks that have higher crime rates share these traits: parks are not well maintained, with portions of the park in total disrepair; the park has a narrow audience and would only be used for specific events; there are few amenities that allow the park to be used in all weather conditions; amenities do not encourage social interaction; and landscape quality and maintenance is poor.
The Great American Squirrel Trail: An Epic and Wild Proposal for Large-scale Landscape Restoration through Vision, Belief & Shared Action

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Keywords: Forest Restoration, New Power, Large-scale Landscapes, Social Movements

Ecologists and activists have long called for wildlife corridors to combat habitat fragmentation. Yet, if so critical to biodiversity and ecosystem support, where are they? Why have we been unable to implement wildlife corridors on any sort of meaningful scale? My research focuses on addressing this question and in doing so, develops a proposal using a “New Power” model. This approach leverages popular and local governmental engagement in aiming to achieve a reforestation corridor through the Eastern Deciduous Forest Biome in the United States. “The Great American Squirrel Trail” proposal is an Atlantic to Mississippi reforestation and wildlife corridor that also intends to revitalize economically challenged counties in the Ohio River Valley and Appalachian Mountains. Using England’s National Forest (Allison, 1996), in part, as a model, the proposed wildlife corridor intends to incentivize a shift in land use to foster the growth of new tourism and forest-related industries, in order to improve the prospects of local economies while also achieving ecological goals. Therefore, the proposed path for the corridor was determined through GIS analysis and cross-country ground-truthing to identify county-wide connectivity that satisfied criteria that included economic stagnation, limited employment opportunities, declining industries and environmental degradation. With a broad corridor chosen, the project shifts to focus on new methods of expressing a vision, gathering broad support and empowering advocates. “New Power,” as expressed by Jeremy Heimans and Henry Timms (2019), refers to new media connectivity as a driver of social movements, brand-building and customer engagement. While this approach has been articulated by the authors primarily as a marketing tool, they have demonstrated effectively through case studies that these approaches may be used to fuel political, activist and philanthropic efforts. Within this proposal, these same techniques are used to guide a vision, solicit support and build shared belief in a landscape restoration project at a regional scale. The final proposal references several best-in-class ecological restoration case studies coupled with new reforestation design techniques to create a vision of a developing Appalachian landscape. Moreover, it reveals that regional-scale restoration projects are not only possible, but that through New Power engagement methods, Landscape Architecture can initiate epic and positive environmental impacts.
The Potential of Learning Landscapes at Public High Schools: Applying the Findings of a Generation of Studies on the Benefits of Contact with Nature to Facilitate Academic Enhancement, Fitness and Well-being

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Keywords: Ecoliteracy, schools, biophilic design, outdoor education, learning environments

Studies have shown that contact with nature contributes to the health and well-being of individuals. The benefits of this extensive body of knowledge can be applied to the design of outdoor spaces at public high schools. Traditional public high schools, also known as brick-and-mortar schools, are located in rural, suburban and urban settings. While the physical structure of schools can be divided into three forms: building, parking, and athletic fields, the buildings are also representative of various architectural genres. As a result, the outdoor environments of these schools reflect the schools’ architectural time frame, community growth or decline, economic stability and cultural background. The design challenge for landscape architecture is to develop a committed learning landscape design philosophy derived from the layered knowledge base of previous research that establishes contact with nature to be beneficial for human health with studies indicating correlation between the physicality of school campus spatial design and student outcomes. This essay attempts to demonstrate an overarching philosophy, gleaned from previous studies, that can shape a learning landscape design stratagem for secondary education environments. Landscape architecture is particularly well suited to address the essentials of learning landscape development at public high schools for its ability to be adaptable in a multidisciplinary environment. Landscape architecture intervention can be a catalyst to activate public school campus sites to address academic enhancement, fitness and student well-being through greater contact with nature.
Tracking the Gaze: The Relationship Between Natural Green Elements and How We See the Environment

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Keywords: gaze tracking, attention restoration, micro-restorative experience, natural green elements

The purpose of this study is to explore the potential impact of micro-interactions with natural green elements and how an individual's attention is directed within space. Access to natural environments, such as public open spaces and parks, provides people with numerous health benefits (Baycan-Levent Tüzin & Peter, 2009) such as better perceived general health, reduced stress levels, and reduced depression (Kaplan, 2001). Recent research has also determined that natural green elements have the capacity to promote cognitive functioning and sustained attention (Keniger, Gaston, Irvine, & Fuller, 2013). Research on restorative environments has explored the possible correlation of the existence of natural green elements in an indoor space with a higher sustained attention level. However, how the presence of green elements changes the pattern of spatial attention has not been thoroughly explored. This exploratory study examines how an individual's attention is directed in indoor environments depending upon the presence or absence of natural green elements. This study compares the results of heat-maps generated for ?? participants via VR goggles. These maps evaluate the scene based upon the direction and duration of an individual's gaze. Participants were randomly assigned to experience, for fifty seconds, two versions of a building's threshold modeled in a 3D virtual reality environment. One version included natural green elements and the other did not. The order of experiencing the two versions was also random to compensate for the carry-over effect. The results indicate that the pattern of attention changes with the presence of natural green elements. With green elements, the participants' gaze was drawn to captured over %50??% of the participants' attention. Also, the features that received a higher level of attention in the absence of natural green elements received a considerably lower degree of attention when the natural green elements were introduced. This research suggests that the green elements have the potential to draw more attention toward them, and they do not deviate attention to other elements in space. Moreover, it begins to shed light on how green elements impact an individual's improvement in cognitive functioning and sustained attention.
When the Past is Present: Indeterminacy and Ephemerality of Soft Infrastructures in Lake Titicaca

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Keywords: reed urbanism, floating city, ephemeral ecologies, vernacular architecture, aqueous landscapes

Uros, in Lake Titicaca, Peru, is a civilization that predates the Incas. However, their not-so-secret secret to such longevity seems to arise out of their unique relationship with a single organism: totora reeds. Taking this material as the point of departure, this research examines existing phenomena and relationships in a perennial wet gradient between the aqueous and the buoyant. When “dry land” is as fluid as the water that sustains it, preserving a simple set of guidelines allows for a critical examination when the only constant is ‘grass.’ Documented through on-site drawing and sketching, stereographic photography, and mapping, this research indexes historical/vernacular manifestations of reed/water urbanism. Landscape and its geographies are an inherently hybrid medium, and research insights question how notions of preservation and regionalism could inform design thinking. Moreover, floating cities often suggest temporal and fluid manifestations of urbanism. Yet, conditioned by people and a variety of competing, and sometimes complementary, externalities, what agency might the field of landscape architecture claim in the physical constructions—in this case woven—of ephemeral vernacular cities? At the same time, intersections and overlaps between amphibious architecture, hydrological landscapes, and natural ecologies, tempered by adaptive practices, integrate multiple spatial scales at which these soft infrastructures operate. These dynamics make Uros—and the practices of its people—fertile territory for examination. Ultimately, this research seeks to elucidate on questions of mobility, fluidity and indeterminacy. Operating outside traditional understandings for a city and its “urban fabric,” vernacular constructions—like Uros—often resist fixed, normative frameworks or spatial conditions in relationship to human habitation. Little literature has been dedicated to this water city beyond superficial and picturesque treatments aimed at Western tourists. However, growing environmental pressures and economic forces are precipitating a slow exodus from these settlements into adjacent urban centers. Thus, even in a few decades, the soft infrastructures used for the buoyant nature of this city will be slowly abandoned and eroded. Their ability to inform landscape epistemologies will be lost. So, this research is perhaps, not only timely, but also paradoxically seeking to record that which resists permanence and solidity.
RESEARCH AND METHODS
A Systematic Review of Alternative Protocols for Evaluating Non-Spatial Dimensions of Urban Parks

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Keywords: non-spatial dimensions of parks, protocols, park quality; park use; park benefit

With rapid urbanization, parks are important assets for quality of life in urban settings. They provide opportunities for outdoor physical activity and therapeutic benefits. A growing number of park assessment studies are shifting their focus from spatial assessments, such as the availability, proximity, and accessibility, to non-spatial assessments, such as park quality, park use, and park benefits. Consequently, arguments for developing methods of measuring these non-spatial dimensions of urban parks have emerged in the literature. The purpose of this study is to analyze and synthesize the different approaches used for assessing non-spatial dimensions of urban parks and draw implications for future urban landscape planning, design, and research.
Collecting data in the field can be a challenging endeavor due to the time, financial, and personnel resources required. When conceiving a data collection project, careful thought should be given to data analysis. If the goal is to conduct spatial statistical analysis in ArcGIS, then the best course may be to collect data directly into an ArcGIS product. Paper-based methods of data collection may be cheaper initially since expensive hardware and extensive training on the hardware/software are not required; however, the data are entered manually into ArcGIS eventually which introduces potential error into the data set (Cox, Loebach, & Little, 2018). Collecting data directly into ArcGIS saves time in data entry and reduces the chance for error. ESRI, the developer of ArcGIS programs, offers ArcPad and a host of mobile apps to collect field data. ArcPad requires a Windows platform, and ESRI plans to retire the program in 2020 (ESRI, n.d.b). To replace ArcPad, ESRI developed mobile apps, such as Collector, Survey123, and QuickCapture, supported by Android and iOS platforms (ESRI, n.d.a). The advantage to switching to apps to collect data is the cost of hardware. Personal smartphones could be used, so no purchase of hardware may be required. If tablets are preferred, then Android and iOS tablets are cheaper than Windows tablets. The paper will focus on comparing 4 mobile platform devices for collecting field data. The main considerations for hardware selection were cost, screen size, weight, use of a stylus, and battery life. Visibility in direct sunlight is an important consideration; however, a consistent level of information was not found concerning visibility. Therefore, visibility was considered in the testing of the hardware, but not the selection. Rugged tablets offer protection from damage when used outdoors; however, they tend to be double the cost and half the screen size of regular tablets. Since, cost-effective cases offer protection from the elements and damage from dropping, rugged tablets were eliminated. Some of the apps allow for handwriting analysis to enter data; therefore, devices had to sync easily to a stylus. The 4 devices selected were the Samsung tablet s4, iPad, Samsung Note 9, and the iPhone XR. During a behavior mapping exercise, students tested the devices and completed an evaluation form assessing screen size, weight, ease of handwriting recognition, battery life, and visibility in direct sunlight. Results are pending final analysis.
RESEARCH BY DESIGN
Curbing Sediment

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Keywords: Infrastructure, Hydrology, Sustainability, Urban Design, Sediment, First Flush Toxins, Design Standards

Purpose: This presentation outlines the methodology and outcomes of Curbing Sediment, a research project, testing the alteration of curbs and aprons to collect sediment from roadways. Background: According to the USGS, stormwater runoff transports pollutants including sediment, nutrients from lawn fertilizers, bacteria, pesticides, metals, and petroleum by-products often discharging to waterways without treatment. Once in the water they affect aquatic ecosystems because they are nearly impossible to collect. Accumulation of sediment in catch basins requires maintenance and when clogged can cause localized flooding. Accumulation of sediment in bioswales is also problematic. Most notably, the accumulation of large sediments and trash reduces a bioswale’s ability to filter contaminants. In their technical memorandum “Operation and Maintenance of Green Infrastructure Receiving Runoff from Roads and Parking Lots,” the U.S. EPA explains how sediment accumulates on impervious surfaces and, when routed to bioretention areas, builds up at inlets, clogs soil, and smothers plants. Methods: To help mitigate these issues, concrete curbs and adjacent aprons can be altered to collect sediment in advance of entering a storm drain or bioswale. Altered curb faces can also aid in reducing the velocity of stormwater runoff, ultimately reducing strain placed on existing stormwater management infrastructure. The research team tested twenty alternatives to the standard concrete curb and apron. The interdisciplinary team included students and faculty from landscape architecture, civil engineering, and environmental science. Simulated storm events pumped sediment filled water over full scale milled foam models. During these eight minute tests water turbidity was monitored by sensors and samples to measure sediment inputs and outputs were taken every two minutes. A minimum of three storm events were run on each model. An iterative design process was used to leverage data from each round of testing. Findings: All designs collected sediment, three performed noticeably better. A provisional patent has been filed for all designs tested. Currently, the research team is meeting with representatives ODOT and Ohio State University(OSU) to build pilot projects on local roadways. Importance: This landscape architecture led project follows current discourse in the academy and practice. DLANDstudio secured patents for the Gowanus Canal Sponge Park and HOLDS System. Professor Jake Boswell, OSU, has a provisional patent for floating concrete. Professor Richard Hindle, Berkeley, has written extensively on the subject of patents. The designs rendered from Curbing Sediment can become a new design standard, as we continue to address water quality issues.
Design with Engineering With Nature

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Keywords: multifunctional infrastructure, engineering, collaboration, research by design, action research

Engineering With Nature (EWN) is an initiative within the US Army Corps of Engineers (USACE). It focuses on integrating engineering and natural processes for what the USACE categorizes as “water resources infrastructure”, looking to build bridges between engineering and ecology. Landscape architects have recently been similarly concerned with how infrastructure might be re-imagined to meet more diverse purposes, including engineering functions, ecological value, recreational opportunities, and aesthetic benefits (Spirn 1984, Mossop 2006, Orff 2016, Belanger 2017). This presentation concerns on-going collaboration between EWN and our team of landscape architects. This work has a number of overlapping purposes. The most immediate is to provide conceptual design guidance to local USACE districts on specific infrastructure projects. Our work is currently in its second year and has engaged seven different projects. For each, our team has conducted fieldwork, engaged district personnel in extensive conversations and workshops, produced research mappings, and developed novel design concepts addressing concerns ranging from coastal storm risk management and inland flooding to the utilization of excavated soil to construct new recreational and ecological features. These concepts both inform the local projects and are becoming part of a broader databank of novel infrastructure approaches that can be shared with districts around the country. A second purpose is to reposition EWN and landscape architectural approaches to infrastructure design relative to USACE design processes, which are tightly constrained by institutional barriers to innovation like single-purpose authorizations (which impede multifunctionality), strict cost-benefit requirements (which often fail to incorporate ecological and social externalities), and the need for reported evidence of performance from prior projects (which makes piloting new concepts difficult). Over time, demonstrating value through the individual infrastructure projects our work is addressing is facilitating earlier and more significant engagement between EWN, our team, and local districts. The most long-term purpose of the work is to build networks of shared knowledge and practice around innovative landscape infrastructure. In coming decades, the United States will face significant environmental challenges, including but not limited to climate change adaptation and mitigation. Meeting these challenges will require the design of infrastructure that is substantially different from the infrastructure we have today. In order to do that, landscape architects, engineers, and ecologists who are committed to the value of ecologically-integrated, landscape-based infrastructure will need to know one another and know how to work together. Engaging a broad base of personnel from local districts is helping to build those networks.
Research + Gathering: Site Analysis as Discovery

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**Keywords:** fieldwork, representation, design research, site analysis, experimentation, design speculation

Site analysis in professional and academic contexts often relies on mapping, found data, and GIS layer analysis, looking at transportation, grading, connections, demographics, ecology, history and so on. This method tends to divide topics, where we look at each layer in isolation, and generates a huge amount of data. Designers are often left overwhelmed and unable to determine how this research and analysis is relevance to their design project. A traditional process flattens and segregates research as apart from the design process, and becomes something to “check off” rather than being generative and integrated. This talk will describe novel site analytical processes and tools that expand how landscape architects can understand and document site. Each method emphasizes fieldwork and the body’s relationship to space, integrates data, GIS layers, and other quantitative mapping with qualitative and experiential data collection, and begin to speculate on design interventions. Drawing examples are from a series of design exercises in courses taught by the author as well as from personal and professional practice, and fall into the following methods: Measuring - Triangulation + Mapping - Sequential Sections - Measure and record material depths, transitions Gathering - Gather materials, textures and smells in containers - Construct an index of materials / conditions - Experimentation/landscape processes, data collection Photographing - Photo-Walk - Transects - Scene or photomontage - Time-lapse/compilation Work this way is done with intent, and through a critical and clearly articulated lens, asking a question or taking a stance on the site’s future, and gathering a curated set of information to support an argument. It becomes not only a way of site analysis, but a beginning point for design, as design speculations are developed simultaneously as information is gathered, and potential sites for intervention are identified. This is not to say that data analysis is not important; rather, this method expands upon our toolkit, deepens our understanding of site, becomes a filter for information and relevance, and is a jumping off point for the design process.
The Geologic Imagination in Landscape Architecture

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Keywords: geology, urban flooding, design research, creative research, imagination

This paper shares a design research methodology that links geologic history with the contemporary design of stormwater as an emerging functional-aesthetic for the Chicago region. The material, forms, and patterns of an urban site’s geologic history are not often a stormwater design variable, particularly in the age of the Anthropocene, noted for planetary-scale, surficial geologic disturbance. There is a lack of updated geologic soil data, fallen out of pace with the scale of urban and industrial operations in the form of excavation, flattening, and drainage, and many cities seeking innovative stormwater design are presently challenged by a “disappearing,” paved-over, ground plane. Drawing from literature on the role of subjectivity, interpretation, and imagination in site research, geologic soils in an urban setting thus become the subject of analytic creativity. In the process of searching for soils information, one must combine instruments of measurement with designerly imagination to relate sites to their geologic history. This design research approach guided an interdisciplinary team of landscape architects, Quaternary geologists, and engineers and their students who together operated as creative agents in partnership with Chicago-Calumet communities just south of the City limits. Across the region, the issue of urban flooding has presented both the urgency and the potential to imagine a much better hydrologic future for the region rooted in a reading of its landscape past. Students went on site immersion visits in the dune-swale, regional, coastal landscape [walks through geologic time], and conducted a spatial mapping exercise—of soil, surface, site, city, system, region—[creating slippage across scales of space and time]. In seeking rainwater designs for neighborhoods affected by flooding, the creative research process allowed students to invent new design interventions into the urban ground that exceed pure function. Their proposals generated a renewed sense of intrinsic beauty and awareness tied to the region’s hydro-geologic history, and reinserted the value of wetness and moisture related to topographic variation in an urban context. Through this project, communities faced with recurring flooding due to under capacity gray infrastructure are now seeking ways to root their solutions through landscape and the land itself. The project was recognized with a National ASLA Honor Award in the Student Collaboration category, and typifies a process of engaging the deep time of a site in the imagination of its future.
Unknown Futures: Landscape Strategy, Design Typologies and Design Speculation

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Keywords: design research, typology, landscape frameworks, multi-scalar, complex systems, landscape strategy, design speculation

This talk will analyze work examples from studio exercises taught by the author and ongoing practice that engage landscape architecture as strategy and unpack typological design responses to address a wide range of ecological, infrastructural, and urban conditions. Project examples are multi-scalar and interdisciplinary in nature, and develop speculative large-scale landscape proposals in the Bay Area, CA, Salton Sea, CA, Dixon, NM and Las Vegas, NV. Neither using design typologies or considering landscape architecture as strategy are new. James Corner, in "Not Unlike Life Itself," describes a strategy as a "highly organized plan (spatial, programmatic, or logistical) that is at the same time flexible and structurally capable of significant adaptation in response to changing circumstances." Typological studies are a catalog of design responses; they can be a kit-of-parts that can be combined; an index of formal strategies within a specific category or functional categorization; or prototypical designs for specific conditions. As designers, we often intuitively work in this way, generating typical design responses that can be adapted to more specific site considerations. We also engage landscape architecture as strategy, considering how a site fits into a larger context and modifying large-scale hydrological, infrastructural, and ecological systems. Working with a combination of typologies and strategy jumps scales to simultaneously design at both territory and detail, and supports design interventions that work systematically, embrace chance and unpredictably, and are adaptable and flexible. This design approach can be used to speculate on future scenarios and outcomes, showing how a territorial design strategy lands on, modifies, or reconfigures the landscape, and allows for quick and iterative tests using a set of typical site conditions, before diving into detailed site designs. The process generates design proposals, typological design responses, and conceptual frameworks that re-imagine the scope and realm of landscape architecture - projects tackle energy generation, cultural and arts programming, ecological remediation, economic generation, speculative development, air and water quality, landscape adaptation, and infrastructure. Each proposal serves as a case study to argue for the expanded role of landscape architecture in an age of uncertainty, and urgently presses us to develop design strategies that are more than “less bad” but intrinsically different, generative, and productive.
SERVICE LEARNING AND COMMUNITY ENGAGEMENT
Complete Street Participatory Design Toolkit

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Keywords: participatory design, complete streets, green infrastructure, community engagement

The Complete Street Participatory Design Toolkit is an open source toolkit for building engaging physical models for participatory design workshops on complete streets. It is meant to encourage community engagement in the design process with playful, intuitive modeling by hand using a library of modular, laser-cut pieces. The toolkit includes elements for physically modeling complete street strategies described in the Urban Street Design Guide (National Association of City Transportation Officials 2013). With the toolkit participants can model a typical transect of an urban street as a baseline scenario and then move, add, and realign sidewalks, parking, crosswalks, planters, bioswales, street trees, traffic lights, and signage to envision new scenarios for complete streets. The beta version of the toolkit includes a computer aided design (CAD) library for laser-cutting models and was deployed at a community meeting in Denham Springs, LA in March, 2019 by LSU Landscape Architecture students in the LA 7061 Advanced Topics Studio. The students helped community members to design scenarios for Denham Springs' main street using the toolkit. The release version of the toolkit will include instructions, tutorials, an expanded CAD library, a library of graphics, augmented reality (AR), and physical computing with Arduino. Physical computing components will include LED lighting for the streetscape models. We will use user experience surveys to assess the release version of the toolkit. The Complete Street Participatory Design Toolkit can be downloaded from GitHub or the Open Science Framework under the Creative Commons Zero free culture license.
Crossing Conventional Boundaries: Interdisciplinary Design Studio Experiment with a Service-Learning Agenda

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Keywords: Interdisciplinary Experiment, Urban Design, Service-Learning, Community Engagement, Pedagogy, Future Cities

Today, 55% of the world’s population lives in urban areas. This proportion is expected to increase to 68% by 2050 (UN, 2018). As urban growth continues and development pressures established neighborhoods, communities face a unique set of challenges that require creative, impactful, and multidisciplinary solutions to adapt to the rules of the cities of tomorrow. Today design and planning professionals have to work in harmony focusing on environmental, societal and economic issues in urban placemaking to address the concerns of the 21st-century city. Developments that shape the built environment also bring the question of how to prepare our students to better serve the urban communities of tomorrow. This presentation reviews and discusses an interdisciplinary experiment/project undertaken by the collaborative efforts of landscape architecture, architecture and public affairs faculty/students at an institution with no such precedent. The graduate studios with an urban design emphasis (Lang, 2005) and service-learning agenda (CC, 2003; Hardin et.al, 2006; Butin, 2010) collectively focused on the distressed Historic Marine Urban Village within North Side Neighborhood to explore the perils of traditional neighborhoods in one of the fastest-growing cities, Fort Worth, Texas. The North Side is found to be isolated from its context due to the physical, social and economic barriers and exemplified a test site, a traditional neighborhood, to explore the pressures of the 21st-century city (Pate, 1994). This collaborative experiment started with an interdisciplinary analysis followed by visions and master plans for the urban village. In addition to a series of community/stakeholder activities, the project was the platform for discourse for a symposium and was exhibited in two major community and professional venues. After completion through initial local AIA support, the project received research funding from its institution for further research and dissemination. In conclusion, this interdisciplinary project examined the problems of the 21st-century city neighborhood through the lenses of urban design and community partnership. Reflections from the three different disciplinary angles illustrate that participants developed critical thinking skills, sense of civic conscientiousness and commitment to the community valued by academy and practice in both professions (CCSL, 2010; XXXX, 2016) while illustrating the opportunities and constraints surrounding North Side Neighborhood within the context of their growing city. In an attempt to bridge theory and practice (XXXX, 2006; XXXX, 2012) and promote interdisciplinary dialog this experiment also produced additional lessons and identified various areas for improvement to build on which will be the subject of the presentation.
Designing a Legacy: Contributions of University Design Engagement toward Zion’s Iconic Western Image

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Keywords: Intermountain West, Gateway Communities Utah Community Engagement

This study evaluates the contribution of university design program engagement in mediating competing values through design. The iconic landscape surrounding Zion National Park has been long valued by indigenous inhabitants, early settlers, early landscape painters, whose work captured the iconic landscape, and more recently international visitors. With park visitation rapidly approaching 5 million annually (NPS, 2019), public land management agencies, regional planners, and local stakeholders seek alternatives for easing disparate visitor impacts on the park’s gateway communities, while enhancing regional economic vitality. Within the West, gateway communities—places adjacent to significant public lands—often reflect cultural divisions between long-term residents, whose livelihoods often depend on traditional agriculture and natural resource-extractive industries; new residents attracted by natural amenities; and tourists drawn internationally by the regional landscape’s compelling and iconic imagery (Howe et al., 2012). Imbued through their disparate individual and collective experiences, these groups often bring competing cultural, economic, and political values which manifest through disparate ideals for the natural and built environment (Travis et al., 2013). This study evaluates the contributory roles that university-based design engagement projects play in mediating among competing visions for the West held by different stakeholder groups in Southern Utah, through evaluation of select engagement projects in the region surrounding Zion National Park. The collective case study analysis (Yin, 2013) includes analysis of data derived from project related archival documents and design products, focused interviews with project informants, and reconnaissance of project sites. Through evaluation of engagement project formats; documentation of their analytical and experiential design processes; and examination of the relationships between the university, public land management agencies, community partners, and professional firms; we assess opportunities and constraints for design programs engaged in similar community engaged design practices. Due to the discipline’s collaborative design processes, landscape architecture’s suitability for facilitating collaboration is well recognized (Angotti et al., 2012). University design programs should contemplate potential projects as opportunities for showcasing the discipline’s capacity to address a broad range of contemporary problems and building legacies of regional impact. Within the
Intermountain West, gateway communities are opportune settings for design programs to offer meaningful design involvement for design problems in high profile settings—viewed by millions of park visitors each year. Through our evaluation, we find that if brought to the table, university landscape architecture programs are uniquely positioned to facilitate collaborative dialogue on the future of these compelling places.
Evaluating the Role of Integrated Landscape Planning in Transit-oriented Development Strategies for Reviving Dilapidated Urban Areas: A Case Study of Mullens, West Virginia, USA

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Keywords: Transit-Oriented Development, Coalfields Expressway, Community participation, Heritage tourism

Transit-Oriented Development (TOD) is a planning and design strategy designed to promote urban development for pedestrians and bicycles in a compact and mixed-use land use plan, with emphasis on work, housing, services and facilities (Dittmar et al., 2012). Developing transport infrastructure and TOD can bring positive changes to our communities by making neighborhoods more accessible and encouraging private investment (Knowles, 2012). The City of Mullens is a historic railroad and coal mining town settled in 1894. Mullens is in Southern West Virginia at the junction of state highways 10, 16, and 54 where Slab Fork Creek joins the Guyandotte River in Wyoming County. As of 2017, the population of Mullens was only 1,369, less than half of Mullens’ 1960 population (U.S. Census). The City of Mullens is working hard to recover from the loss of jobs, loss of population and the devastating flood of 2001. The Coalfields Expressway has been designed to connect Beckley southwest through West Virginia to Virginia in Buchanan County. The Coalfields Expressway can bring potential economic development impacts in southern West Virginia especially by increasing access to regional outdoor recreation resources including the Hatfield and McCoy trail system (Chmura Economics and Analytics, 2013). The Rural Policy Research Institute has identified transportation as one of the major elements of rural economic development policy (Dabson et al., 2011). The paper focuses on exploring the opportunities of the Coalfields Expressway and how these opportunities can be utilized to build capacity in the community by planning for recreation and heritage tourism development in the city of Mullens. This project was supported by funds from the WV Economic Development Authority FLEX E grant program in partnership with the Wyoming County EDA. Multiple transit modes like pedestrian, cycling, all-terrain vehicle, tourist trains, industrial trains, trucking, and personal vehicular modes were considered in the development strategies. These modes add to the complexity of the overall planning process. Through Geographic Information Systems (GIS) mapping inventory and analysis (Rebolo et al., 2009), opportunity identification for planning- corridors, districts, and possible intervention sites have been identified. After initial analysis, development goals and strategies were set through community participation workshops. The strategies focused on creating landscape structures tied to the river and topography, along with the cultural development of the town. Key issues to addressed include meeting the goals, objectives, and strategies of their comprehensive planning process and visualizing community transformation through those criteria.
From Vacant lot to Gateway Park in Druid Heights, Baltimore

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Keywords: Vacant lots, service learning, design implementation, urban green space, stormwater

Vacant lots negatively affect the health and safety of residents (South, Kondo, Cheney, & Branas, 2015). They often become sites for illegal dumping and are filled with trash, broken glass and remains of criminal activities. Overgrown vegetation also attracts illegal activities and unwelcome pests. However, with proper design and care, vacant lots can be assets for community residents as public green spaces. In Druid Heights, Baltimore, over 40 percent of properties are either vacant buildings (18.4%) or vacant lots (23.2%). There is an urgent need to revitalize the Druid Heights neighborhood through the development of vacant lots into sustainable and functional green spaces for the community. University of Maryland Landscape Architecture students worked with Druid Heights residents and the Druid Heights Community Development Cooperation to transform a vacant lot into the community’s Gateway Park. They worked with community residents, leaders and stakeholders to shape design ideas. After hosting a community meeting, the community members voted on two design concepts as possible park solutions for their Gateway Park. The winning designs envisioned a dynamic community space to accommodate the present and future needs of the Druid Heights community. They provided gathering spaces, as well as performance and relaxation areas for the residents. They also integrated water quality improvements by capturing stormwater runoff and treating the pollutant load. The student designs promoted the use of native plants and increased tree canopy cover to support urban wildlife habitat. The winning designs were further developed into construction documents for bidding and implementation. With the help of Maryland Department of Natural Resources, the new Gateway Park has been constructed in the spring of 2019.
SUSTAINABILITY
City-University Partnerships for Thermally-comfortable and Equitable Communities

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**Keywords**: Extreme Heat; Extreme Cold; Thermal Vulnerability; Urban Sustainability; Resilience to Extremes

Extreme thermal events are a growing urban challenge, which landscape architecture researchers and practitioners must navigate. City officials and designers have responded with a variety of policies to reduce extreme heat (Larsen, 2015; Stone, 2012). While at the other thermal extreme, cold is an existing challenge with research showing that cold-related mortality is greater to or equal that of extreme heat (Berko, Ingram, Saha, & Park, 2014). Yet, few cities have collaboratively addressed the problem of thermal vulnerability in a systematic way. Managing thermal extremes may likely require collaboration between residents, public officials, designers, and researchers. In fall 2017, researchers from two universities partnered with local governments in Tempe, AZ and Buffalo, NY. This city-university and city-city partnership resulted in a codesigned city-university action-research agenda. Work from this initial project then led to a pilot of four living lab activities in a subsequent summer in Tempe, AZ. During that summer, the team conducted a citywide heat and health survey to serve as a baseline for broad city policies around extreme heat for vulnerable individuals and communities. Complementing the survey, we deployed a neighborhood microclimate assessment for a select number of parks, playspaces, multiuse paths, and sidewalks in one Tempe neighborhood. This was followed with one participatory heat assessment event that had residents and public officials walk through that same infrastructure to document their thermal experiences. All the data from the summer activities were then synthesized to inform a climate action co-design workshop in the subsequent fall. The workshop had the goal of co-producing policy and design solutions with residents and city officials. The citywide survey serves to sample all Tempe neighborhoods views on heat and health, while the assessments are intended to test the effectiveness of a pilot neighborhood living labs-policy approach to inform climate policy and actions. For the session, we will discuss the results of this living labs approach with a focus on barriers, opportunities, and lessons to inform paths toward creating more thermally-comfortable and equitable communities. We will also discuss next steps for piloting this approach in Buffalo, NY.
Geology and Soil Considerations in Green Stormwater Infrastructure Design

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Keywords: stormwater management; green infrastructure; soil, geology, morphology, terrain

Green stormwater infrastructure design requires consideration of various biophysical factors including urban morphology and geology, area availability, soil and water contamination, local and regional climate, and vegetative cover. This research particularly looks at how geology, soil type, and other terrain characteristics can affect and inform green stormwater infrastructure design. While remarkable literature exists on general application of green stormwater infrastructure, very little information is available on the effects of specific land parameters on its design. In order to understand how geological differences could affect the design of green stormwater infrastructure, we studied built projects from different regions of the United States and the globe and prepared a comparative summary chart. We then formulated a conceptual framework of associations between geological conditions and employed green stormwater infrastructure practices. Our findings suggest that (1) soil type and soil depth are very important factors and therefore need to be carefully considered prior to the start of design process; (2) weather closely impacts soil behavior and seasonal changes that cause heat /cold fluctuations need to be taken into account when designing green stormwater infrastructure; (3) Tailored and targeted site-specific solutions are needed for successful green stormwater infrastructure design. As future uncertainty of the World’s climate escalates, many nations are in process of making decisions to anticipate the forthcoming change and appropriately modify and adapt their stormwater infrastructure. Research highlighting the “local and site specific” aspects of green stormwater infrastructure design would help decision makers during this adaptation process.
Modeling Landscape-Based Water Infrastructure as a Coupled Human and Natural System

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Keywords: Ecosystem services, landscape infrastructure, environmental stewardship, place attachment, community-owned utility model, coupled natural and human system

Attachment to the natural places leads to pro-environmental behaviors (Budruk et al., 2009; Gosling and Williams, 2010; Scannell & Gifford, 2010). Place attachment mediates the relationship between destination attractiveness and environmentally responsible behaviors (Cheng et al., 2013). Few have examined these relationships based on the perception of residents toward everyday settings (Halpenny, 2010). This study investigated the parameters for optimizing landscape infrastructure as self-sustaining providers of natural (NESs) and cultural ecosystem services (CESs). A community-owned water utility model was conceptualized as a coupled human and natural system (CHNS) with self-reinforcing feedback loops: place attachment leads to stewardship behaviors that help provide more NESs and CESs to result in more place attachment. Six prototypes were generated from three community workshops conducted with stakeholders from the Green Benefit Districts (GBD) in San Francisco. A total of 99 participants were sampled from the GBD to participate in a visual preference survey. The survey presented the six prototypes to assess participants’ place dependence (PD), place identity (PI), and place attachment (PA) toward the prototypes and their willingness to pay for (WTP) and maintain (WTM) these prototypes. PD, PI, and PA were measured by the extent to which the participants rely on each prototype for quality of life, identify with it as an extension of self, and are likely to visit it frequently as a destination. Path analyses showed that when water retention and water reuse were provided as NESs, PI significantly increased PD (β=.95, p<.001), PA (β=.42, p<.001) and WTP (β=.25, p<.01) while PD significantly enhanced PA (β=.55, p<.001), WTP (β=.66, p<.01), and WTM (β=.86, p<.001). When auditory and visual qualities, regional transportation, and water sound were provided as CESs, PI was positively related to PD (β=.97, p<.001), PA (β=.45, p<.001) while PD was positively correlated with PA (β=.47, p<.001), WTP (β=.94, p<.001), and WTM (β=.87, p<.001). The findings suggest that CESs are likely to contribute to a larger extent of an increase in people’s willingness to pay and maintain than NESs particularly when they enhance quality of life. PI alone did not result in people’s willingness to pay or maintain with enhancing quality of life for CESs. PI significantly increased willingness to pay without enhancing quality of life in the case of NESs. Future studies should include the perceived importance of NESs and CESs as a potential mediator (Gosling and Williams, 2010).
Thermal Delight: Impact of Landscape Design on Building Energy Performance Using Computer Simulation Tools

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Keywords: Landscape Design Strategies; Building Energy Performance; Solo Radiation Modeling; Energy Modeling

This study investigates the influence of landscape design strategies on building energy consumption in the age of climate change. The aim is to understand microclimate effects created by planting design in/on/around buildings in urban typologies for the purpose of developing spatial design guidelines for energy saving. The implementation will improve design prediction capabilities for urban energy models. The likelihood of extreme heat events is predicted to increase and be exacerbated by the heat storage capacity of the densely built environment of an urban area (urban heat island effect). Meanwhile, many residences in low-income neighborhoods may not have central air-conditioning systems (e.g., up to 50% of low-income homes in Polk County, Iowa) to face this harsh climate. In this regard, vegetation is thought to mitigate these effects by reducing reflected radiation, alleviating surface heat fluxes, and increasing evapotranspiration. Efforts to integrate these effects in combined building-microclimate energy models have only been attempted; however, no easy to use tools exist which integrates the landscape consideration with building energy consumption and interior thermal comfort. Therefore, the combination of living systems such as trees and green surfaces and spatial typologies is lacking when building energy performance is considered. This research is based on literature review and data assessment, collected from DIVA (Design Iterate Validate Adapt), a highly optimized daylighting and radiation plug-in for Rhinoceros. We used EPW (Energy Plus Weather) files, assigned materiality and energy simulation nodes within DIVA, and then developed design matrix that can be applied to four urban density scenarios in different climates and cities in the United States – Des Moines, IA; Phoenix, AZ; Miami, Fl – and in three seasons. False-color radiation maps were used to show the impact of radiation on urban surfaces for each density and season. Then, appropriate living plant systems and related 3D forms were added to the models. The scenarios illustrate a considerable reduction in radiation per area of exterior building surface and heat gain, thus reducing building energy consumption in summer. The project further developed landscape guidelines for the aforementioned spatial conditions. The urban modeling interface (UMI) demonstrates a method to predict the correlation between a landscape strategy and the anticipated reduction in building energy consumption for a chosen urban density. Considering different urban typologies, densities, and climates, the Thermal Delight study improves our understanding of the relationships between natural infrastructure, building energy efficiency, and urban microclimate.
A real estate trend is sweeping the nation which situates agriculture, in the form of working farms, gardens, and orchards, as a central focus of residential developments. These neighborhoods, which range from 2-acre urban infill projects to 5,000-acre subdivisions, have been dubbed “agrihoods” in popular literature. Agrihoods tap into a growing interest in local food, wellness, and a sense of community by using agriculture to connect residents with each other and their food. These developments, some of which date back to the 1980s but most of which have been developed in the past 10 years, have proven very popular and successful for residents, developers, and farmers alike, according to news reports and sales analyses. While agrihoods have been reported on in newspapers and at real estate conferences, there is little research on these communities that goes beyond being purely descriptive. The purpose of my project is to inventory and analyze agrihood developments around North America to understand where and why these neighborhoods are being developed and how they function. I relied on internet searches, social media, and word or mouth to discover 80 agrihood projects around North America which I’ve displayed on my website - www.agrihoodinfo.com. Results indicate that agrihoods vary widely in size, context, and amenities offered, which is potentially problematic in this early stage as developers and residents seek consistency in how these developments are marketed. I also plan to carry out an online survey of agrihood residents and semi-structured interviews with developers and farmers, at a subset of mature agrihoods, in order to provide analysis into how agrihoods function, why developers are incorporating agriculture into communities, the challenges and benefits for the agrihood farmer, and how residents engage with food production and consumption. The results of this project will help planners, landscape architects, developers, farmers, and interested residents understand how agrihoods function and the role these developments can play in re-localizing our food system.
URBAN DESIGN
Analyzing Urban Growth and Shrinkage Pre and Post Tsunami in Fukushima Prefecture, Japan

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Keywords: Depopulation, Tsunami, relocation, demographic composition, Fukushima

Depopulation, or shrinkage, is a severe problem in many urban areas globally, impacting development and having large-scale socio-economic effects on communities. Relatedly, massive population migrations which can occur due to relocation after natural disasters such as earthquakes and tsunami can significantly change the demographic composition of regions and cities. Large scale demographic shifts due to natural disasters in regional already experiencing depopulation can either help protect cities from the problems associated with depopulation (or reverse the condition) or further amplify the condition. The 2011 Great Tsunami in Japan resulted in a combined total of confirmed deaths and missing persons of more than 24,578 (15,893 deaths, 2,533 missing, and 6,152 injured). Post-tsunami recovery efforts resulted in widespread population relocation of high risk communities into lower risk areas. Using the Fukushima Prefecture in Japan, a region characterized by several depopulating cities both pre and post tsunami, as the study area, this research examines how the population relocation efforts have either exacerbated or assisted in lessening the effects of urban shrinkage after the devastating earthquake and tsunami of 2011. It is important to note that the Fukushima Prefecture is shaped by not only tsunami damage and post tsunami relocation efforts, but also by post-nuclear-meltdown evacuation and relocation. To examine this, t-tests are used to evaluate significant changes in total population, youth population rate, labor force rate, elder population rate, and unemployment rate. Based on these findings, we then develop a ranking system to identify the municipalities in Fukushima are which have continued, began, or reversed trends toward urban decline, comparing pre and post tsunami spatial conditions. The results show that 30 municipalities (4 cities, 15 towns and 11 villages) have seen population and economic growth since 2011, and 12 municipalities (4 cities, 7 towns and 1 village) are underdoing trends toward decline within the Fukushima Prefecture. To asset in interpretation, we also characterize each city according to their demographic composition and GDP, finding that most cities have increased their GDP, decreased unemployment rates, and decreased in average age of residents. Growing cities tend to have less aged populations and more labor force than shrinking cities. We also find that large cities are more likely to be shrink while large towns and villages are more likely increase in growth. However, many now populating cities
which were depopulating prior to the tsunami, are doing so largely due to significant increases in elderly populations with minimal young persons, indicating a short term increase in population that will inevitably decline in the next decade or so in many cities. By determining the implications of such relocation efforts, the government can better develop targeted strategies that good for the prosperity and development of the Prefecture.
Can Pedestrian Wayfinding Signage Improve Walkability? A Case Study in Springfield, Massachusetts

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Keywords: Pedestrian Wayfinding, Walkability

Purpose: This research focused on understanding if the pedestrian wayfinding signage can improve walkability of the streets. With face-to-face interviews in downtown Springfield, the research engaged residents, workers, and visitors with visions to understand how the signage has made a difference to their travel behavior.

Background: Located to the east of the Connecticut River, downtown Springfield is the urban core of western Massachusetts, and once was a notable center of growth until its rapidly declined after war. Recent interest in revitalizing this area has brought attention back to downtown Springfield. In 2015, a Pedestrian Wayfinding project was initiated in downtown Springfield by the City of Springfield and the Massachusetts Department of Public Health. The project was aiming at encouraging people to walk more, to help create a vivid streetscape.

Methods: A face-to-face interview was done among pedestrians before (n=110) and after (n=90) the installation of 54 wayfinding signage in downtown Springfield. The signs showed both walking time (within 10 mins) and distance (within ½ mile) to the nearby points of interest. Major questions including: Do they think the signs are a good addition to the city? Have they noticed the signs? If yes, has the awareness encouraged them to walk more? What would encourage them to walk more? Flaws: The participants were randomly selected from the pedestrians. However, for a more accurate analysis and comparison, the Pre- and Post-interview should have been done from same participants, so that a clearer view of what changes have the signs made to detailed individuals can be seen.

Findings and Importance: 78% of participants (n=70) think the signs are a good addition to the city, even though only 7% among all have noticed the signs. The top 3 factors that would encourage people to walk more: Feeling safe; More places to walk to (coffee shop, more restaurant options, shopping...); More activities to join (art festival, live entertainment...). These findings convey two general ideas: To some extent, the signs do help encourage walking, once they can be easily noticed. The design, information provided, and the placement of signs should be carefully conducted and decided. Second, other efforts should be made together with the signage from cities, districts, and individuals, such as creating a safety community, a welcoming open space, and local business are more encouraged. With efforts from all perspectives, can the walkability be promoted and people’s awareness of walking be encouraged.
Conflicting Drone Pilot, Public Space User Attitudes, and the Design of Park-like Settings

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Keywords: Urban Design, Public Space, Drone Navigation, Unmanned Aerial Vehicles

The popularity and use of unmanned aerial vehicles (UAVs or “drones”), has dramatically increased in public space over the last decade (Molina 2018). As of December 2016, more than 616,000 drones were registered with the US Federal Aviation Administration, with likely many more drones in use than are officially registered (FAA 2016). It is expected that subsequent conflicts in public space use will increase as commercial drone numbers approach 7 million by 2035 (Beasley, 2016). While there is considerable research on unmanned aerial vehicle (UAV) applications and navigation (Koh 2012, Nemeth 2010, Tripicchio 2015) and an emerging body of work in landscape architecture (Kullmann 2017, Park 2016, Hewitt & Nassar 2019), there is no research addressing increasing conflicts between drone pilot and public space visitors, drone navigation in public space, and their effect on the design of public space. The paper presents findings from research funded by a multiyear NSF grant to better understand these phenomena, through examination of: 1) drone pilot behavior and perception of UAV navigation in public space; and 2) behavior and user perception of UAVs by public space visitors at the Sarah Duke Botanical Garden. Findings are derived from two sets of surveys and landscape assessments. Survey 1 findings were derived from a) garden visitor survey analysis; and b) visual analysis of the garden’s landscape. Survey 1 was administered to 144 self-selected garden visitors over two consecutive days. During this time garden visitor behavior and locations were observed throughout the garden. Survey 2 findings are derived from: a) survey analysis of drone pilot conference attendee responses from the North Carolina Drone Conference in 2018. Survey 2 was administered to 83 self-selected conference attendees over two consecutive days. Comparative survey responses most pertinent to the development of design guidelines to reduce potential conflicts between these two groups address: 1) landscape use preference; 2) landscape feature preference; 3) attitudes about garden comfort, safety and privacy; 4) awareness of drones and their use in public space; and 5) attitudes about the use of drones in public space.

Preliminary findings indicate significant potential areas of conflict between the two user groups based on their perceptions of the importance of similar landscape features for navigation and garden activities, and their conflicting competing values related to landscape use and public privacy.
Environmental Justice and Park Quality in an Intermountain West Gateway Community: Assessing the Spatial Autocorrelation

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Keywords: Landscape Design, Urban Planning, Spatial Analysis and Assessment, Spatial Regression, Socioeconomic Factor, Minority, Parks and Recreation

Context: Research on environmental justice issues, particularly unequal park distribution and quality, has found that communities’ minority density and socioeconomic status (SES) are often correlated with disparate park qualities. However, most studies of spatial relationships between park quality and socioeconomic factors employ simple statistical analyses, which do not account for potential spatial autocorrelations and their effects on validity. Objectives: This study determines whether the distribution of park quality is spatially auto-correlated and assesses the associations among multiple indicators of environmental justice and both separate park features and overall park quality. Methods: This study evaluates spatial relationships between park quality and multiple environmental justice indicators in Cache County, Utah following the spatial regression process conducted in R programming language. Both overall park quality and separate feature qualities were audited by the PARK (Parks, Activity, and Recreation among Kids) tool. Environmental justice indicators included minority density, poverty, unemployment, low-education, renter rate, and yard size. Results: Results illustrate a spatial autocorrelation existing in park quality distribution, detecting the dependence of the variable for quantitative research. They also show significant correlations between park quality and environmental justice indicators. Conclusions: The study’s spatial regression model is a model for analyzing the spatial data and avoids the autocorrelation which is overlooked by the normal statistical approaches. Also, variances of park quality can be accounted for by different environmental justice indicators, such as minority, poverty, and yard size. This disclosure of disparate public resource quality treatment among different groups of individuals could inspire the policy-makers and city planners to correct the disparity.
Exploring the Role of Greening and Placemaking in Vacant Lots Transformation in Hartford, Connecticut

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Keywords: Vacant lots, Greening, Sustainable urban design, Placemaking, Environmental Equity

Between 1950 and 2000 many post-industrial cities have experienced decentralization along with the loss of population, businesses, and industries. Such trends always left the core urban land vacant and blight, which are treated as negative space, causing an increase in crime and property value reduction. In this context, Hartford, Connecticut, due to deindustrialization and the wave of immigration, is also facing urban vacancy and blight issues that poor immigrants lived in core neighborhoods, while upper-class residents moved to suburban towns. The call to rethink vacant lot management has resulted in the municipality to start dealing with the blight and vacancy issues firstly within the Promise Zone in northern Hartford, which is one of 22 federal designated zones consisted of three high poverty neighborhoods. Transforming negative vacant lots to green and open space has been examined as an efficient strategy to reduce neighborhood crime rate, improve perceived attractiveness, promote ecological services and biodiversity conservation in many studies. The goal of this project is twofold: 1) to analyze and categorize city-owned vacant lots in North Hartford Promise Zone and 2) to envision sustainable urban design strategies for transforming vacant lots. The design research process was organized on different scales from district-scale, neighborhood-scale to site-scale. The study firstly analyzed the spatial distribution of city-owned vacant lots and assessed the social-ecological resources within the Promise Zone. According to that, vacant lots were categorized as four types by land use: row house, street corners, commercial/industrial, and main street, and the project site selected is a brownfield lot on the neighborhood main street and traffic hub. The site design embraces economic, social and environmental aspects of sustainability by improving human well-being, highlighting cultural identity, and mitigating social inequity. In terms of site design strategies, four strategies are deployed in this project: 1) green stormwater infrastructure 2) brownfield phytoremediation 3) tactical street design 4) eco-revelatory landscape. The study highlights the design research process by involving the communication among landscape architecture students and faculty, the university outreach department, local experts, decision-makers, community NPOs, and the residents. By doing so, this study provides policymakers, planners, government partners and NPOs with new knowledge, insights, and methods of transforming vacant/blight lots from negative space into community assets in post-industrial cities, especially in low-income neighborhoods.
Resilient Balance: A Project to Determine Suitable Locations and Desirable Forms for Infill Development in Agricultural Communities

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Keywords: Agricultural Land Conversion; Urban Growth; Land Use Conflict

Population growth, climate change, and increased urbanization pose complex resource conflicts in the interconnected food, energy, and water systems that will support an additional 3 billion people globally by 2050 (Nelleman et al, 2009). Global commodity markets and international politics figure prominently in local land allocation, particularly in regions with extensive commercial agriculture sectors that are intimately tied to global exports. In these areas, immense land, energy, and water resources are consumed locally to produce products that largely move outside the region. This local-resource-to-global-good exchange poses unique resource constraints on urban areas that support established commercial agricultural industries. As a result, planners must balance agricultural land preservation with urban growth, and these decisions can have far-reaching cultural, economic, hydrological, ecological, and social impacts. The task is challenging, as land allocation, driven by economic factors and perceived consumer preference, has often favored the conversion of agricultural land to alternative land-uses (Hulse & Ribe 2000, Carr, 2007; Guo, 2012). However, the general implications of agricultural land conversion on regions and watersheds are well-known and significant, so alternative development patterns like infill must be considered, despite significant cultural and economic challenges (Lewis, 2015). For the purposes of this paper, we will refer to this balance of development and agricultural land preservation as “resilient balance.” The purpose of this paper is to determine suitable locations for urban infill, as well as desired forms, to achieve said balance. The methods of this paper intend to provide a transferable approach for determining suitable locations for infill development under the resilient balance framework, as well as site-scale design applications of these principles. This paper utilizes assumptions from a broader National Science Foundation INFEWs grant studying alternative futures for Idaho’s Magic Valley. Throughout the stakeholder-driven research project’s life-cycle stakeholders identified agricultural land conversion as a critical uncertainty and desired compact development alternatives. This mixed-method paper utilizes the findings from the aforementioned stakeholder-driven research project to predict areas of future development in a selected scenario as well as descriptive case studies to provide guiding infill development principles, site selection criteria, and site design recommendations. The results of this study will contribute to the body of knowledge in creating livable, compact cities and provide broadly-applicable guidance for small urban centers that face conflicts stemming from competing rural and urban needs and desires.
The Value is Measured with ‘Green’: Urban Design Lessons from Downtown Dallas

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Keywords: Value, Urban Landscape, Urban Design, Parks, Downtown Dallas, Climate Change, Economic Value

21st-century cities are challenged with population growth, rapid urbanization, climate change, ecological and environmental degradation issues reminding the value of nature, land, and open and green space within cities. (XXXX, 2019). While the cities like London, one of the most vegetated cities in the world, aspires to reach a goal of becoming 50% green space by 2050 (Beale, 2019) North American cities like New York taking concrete steps towards carbon neutrality by adopting policies for green roofs through Green New Deal (Hirsh, 2019). Cities like Dallas, the 5th best economically performing large city in the US (Jackson et.al., 2019) are looking for ways to adapt to this new century as ‘green’ rapidly becoming a scarce but much-valued commodity in urban landscapes. Indeed, the City of Dallas is ranked dismal 52nd out of 100 in the US for the park availability/access for its residences (Trust for Public Land, 2019). As data have shown downtown Dallas has also been short of urban parks by any comparable measures with other major US cities. The city offers only 5.6% of the downtown land area as parks whereas this proportion reaches 33% for downtown Chicago and 14.6% for downtown Atlanta (Hargreaves Assoc., 2013). Yet the story for downtown Dallas doesn’t end here either. The city has been incrementally investing towards a green future with the adoption and implementation of A Renaissance Plan for its park system since the early 2000s (Carter & Burgess, Inc., 2002 & 2004). This long-range development plan as well as 2013 updates founded upon a vision for Dallas to have one of the premier park and recreation systems in the United States. Dallas commits to increase its downtown parks from 53 to 87 acres with multiple future priority parks (Hargreaves Assoc., 2013) and it is about to achieve this benchmark in the coming years. This research reviews and critically evaluates downtown Dallas’s nearly 20 years of investments in urban landscapes to discuss the value that the green brings to Big D within the context of urban design. This presentation also focuses on the adaptation, implementation, and execution of the plans, the process and the timeline of completion for all six parks while highlighting their economic impacts. Using downtown Dallas experience as an example, this presentation also critically assesses the value of such urban landscape interventions’ for downtown in the age of rapid urbanization, climate change, and ecological and environmental degradation.
Towards a More Porous City

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Keywords: porous, material research

We need our cities to be more porous than they are. As we have gained more thermal control over our interior spaces, so have we “conditioned” our urban landscapes to effectively keep moisture out. In contemporary practice we create seamless transitions between building and street, providing smooth surfaces to facilitate movement, maximize flexibility, and reduce liability. These controlled hardscapes also require the careful calibration of slopes and surfaces to meet codes and discourage puddling, efforts that push water out when truly we need to let it in. When we do make room for water in the city, it is often as a “feature”, an expressive element or strategy with performative and aesthetic goals. The Benthemplein in Rotterdam(1) is a recent example of this. With its stainless-steel gutters moving water from nearby parking lots to a central basin, the Benthemplein artfully celebrates the collection of rainwater. The project functions best when dry and when wet: hosting active uses on a sunny day, collecting rainwater on a stormy one. Being in Rotterdam, the Benthemplein also highlights the challenges modern materials face in damp environments. The smoothness of the plaza’s surfaces quickly becomes problematized and even potentially hazardous when the concrete steps and pavements become slippery and damp. This dampness calls into question the idea of conceptualizing water as a discrete body. The Benthemplein project is designed to direct water through channels and pools, assuming an either wet or dry condition. With our cities becoming wetter, this binary understanding no longer serves us well, if it ever did. Dilip da Cunha and Anuradha Mathur have questioned this same binary extensively in their work(2), calling for an understanding of water as ubiquitous wetness: “There is no such thing as dry land. Wetness is everywhere to some degree.”(3) To make our cities more porous requires a re-examining of materials, looking to new technologies and old. It requires a re-conceiving of urban ground to make room for moisture. We need to rethink the conditioning of our hardscapes and move swiftly from the wet / dry binary towards a more porous gradient of wetness where dampness has a place.
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