

# Adapting to Expanding and Contracting Cities

Book of Abstracts

The 6<sup>th</sup> Fábos Conference on  
Landscape and Greenway Planning

March 29-30, 2019  
University of Massachusetts, Amherst



**Editors:** Julius Gy. Fábos, Jack Ahern, Benjamin Breger,  
Theodore S. Eisenman, Sándor Jombach, László Kollányi,  
Mark Lindhult, Robert L. Ryan and István Valánszki



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University of Massachusetts, Amherst  
Department of Landscape Architecture and Regional Planning

Szent István University  
Faculty of Landscape Architecture and Urbanism

**This publication should be cited as follows:**

Julius Gy. Fábos, Jack Ahern, Benjamin Breger, Theodore S. Eisenman, Sándor Jombach, László Kollányi, Mark Lindhult, Robert L. Ryan, István Valánszki (Eds.) 2019: *Adapting to Expanding and Contracting Cities, Book of Abstracts, 6th Fabos Conference on Landscape and Greenway Planning, March 28-30, 2019, Amherst, MA.*

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**Published by:**

Department of Landscape Architecture and Regional Planning  
University of Massachusetts, Amherst

**Printed by:** Amherst Copy and Designworks

**This publication is available on the conference web site:**

<https://scholarworks.umass.edu/fabos/>

**Sponsors of the conference:**

Fábos Fund in Landscape Architecture & Regional Planning  
Department of Landscape Architecture and Regional Planning,  
University of Massachusetts, Amherst  
Department of Landscape Planning and Regional Development  
Szent István University, Budapest

**ISBN: 978-1-945764-08-0**

**Editing and page print:** Benjamin Breger

**Cover design:** Benjamin Breger

**Cover Photo:** Rose Kennedy Greenway Conservancy

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# Plenaries

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**Nancy Rottle**

Friday, 9:30 am - 10:15am

Room 163

**Albert Fekete**

Friday lunch, 12:00pm - 1:50pm

Marriot Center, 11th floor

**Luis Ribeiro**

Friday dinner, 6:30pm - 8:00pm

Marriot Center, 11th floor

**Joan Nassauer**

Saturday, 9:00am - 9:45am

Room 163

## Greenways for Expanding Cities and Regions: Open Space Planning in Metropolitan Seattle

Nancy D. Rottle

*University of Washington Department of Landscape Architecture;  
UW Green Futures Lab*

Seattle and its surrounding region have experienced a steady expansion since the 1980s, with the city's population growth currently the fastest in the country. While the state's Growth Management Act has helped to funnel much of that increase within defined boundaries, urban expansion is still significant, eating away fertile farmlands, clearing urban and rural forests, and covering soil with new impervious surfaces. With the rapid influx of population, both need for open space and contestation of its preservation and provision are continually intensified.

Efforts to promote and secure connected, ecologically healthy greenways, trails and open spaces have been ongoing throughout the last half-century. Notably, the Mountains to Sound Greenway (MTSG, Greenway) began in the early 1990s to envision and enact a multi-objective corridor following Interstate 90 from Seattle's shorelines eastward to Central Washington. The Greenway non-profit has since moved well over a hundred-thousand acres from private to public ownership, restored significant forest and riparian habitat, supported the continuation of "working" forestry and farm landscapes, and coordinated many miles of connected trails from urban to rural to wild, in a "landscape-based" greenway (Rottle 2006). Now almost thirty years old, the organization continues as an operational organization to unite multiple stakeholders around the MTSG goals of conserving and enhancing the landscape of the broad corridor, to ensure "a long-term balance between people and nature." (MTSG 2018).

Experiencing the success of the MTSG, the loss of rural landscapes and the remaining opportunities to secure their futures for public benefit, the University of Washington Green Futures Lab (GFL) modeled the Regional Open Space Strategy for Central Puget Sound (ROSS) on the

Greenway's coalition approach to conserving connected landscapes, but with a broader reach across four populous and growing counties bordering Puget Sound. Supported by two local foundations, the ROSS convened and led a diverse group of public and NGO stakeholders to develop a Strategy to conserve and enhance the region's open spaces that "significantly contribute to the ecological, economic, social, health, recreational and aesthetic vitality of the Central Puget Sound region." (GFL 2018) Over a six-year period, project staff led several watershed-based planning processes within the four counties; produced a series of white papers detailing the benefits and services of open space in addressing the identified regional challenges of biodiversity, climate change, equity, economy and health; collaborated with the Trust for Public Land in developing a public GIS-based interactive tool to assess the ecosystem services provided by existing regional landscapes; and delivered studied recommendations for a long-term Strategy to advance and enact a "dynamic regional vision." (ROSS 2016). Winning a 2016 ASLA Honor-Award, the Strategy has since begun to be realized through a Conservation Plan developed by the Puget Sound Regional Council and in a newly-formed advocacy non-profit, the Emerald Alliance.

However, the rapidity of growth, infusion of high-paying jobs and sharp gap of incomes in the region has fueled high-priced housing and resulting issues including a rise in people experiencing homelessness, increased pressure on the suburbs, and questions over the use of land for green space rather than provision of housing within the urban context. Concurrently, the value of contact with nature for health and well-being, and the increased need for integrating green space in the dense city – for both people, and wildlife such as salmon and orcas who depend upon healthy watersheds and hospitable migration corridors – is being recognized and promoted. Efforts to integrate and equitably provide multi-functional urban green spaces are therefore ongoing in Seattle and its surrounding cities, especially though the connection of ecologically designed buildings, parks and streets that offer habitat and contact with Nature, support safe pedestrian and bicycle movement and address stormwater exigencies. This approach may be our best

opportunity for new urban greenways within the economic and spatial restrictions of the expanding/intensified city. The coalition model, exemplified by the MTSG and the ROSS, is a proven approach to planning for connected, functional landscapes, and is especially needed in rapidly growing metropolitan regions – but perhaps even more able to achieve significant gains within slowly-developing cities and regions, before growth pressures preclude possibilities for integrating greenway and open space infrastructure into the urban context.

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**Nancy Rottle, PLA, FASLA**, is a Professor at the University of Washington where she has served on the Landscape Architecture faculty since 2001 and is the founding director of the UW Green Futures Research and Design Lab. A licensed landscape architect, over her 30+ years of professional experience Nancy has designed and led numerous projects, winning local and national awards including ASLA Honor Awards for *Open Space Seattle 2100* and the *Central Puget Sound Regional Open Space Strategy*.

## Heading towards greenways of the future: embracing place's nature and culture

Luis Ribeiro

*Lisbon University; TOPIARIS Design Office*

The current significance of greenways will reflect strongly in their future implementation in landscapes and communities. Old and recent concepts of “paradise” to “greenway” have highly influenced current and future landscape design and planning, always adding innovative layers of ecological and social functions, and aesthetics.

Early gardens provided wellbeing for private owners. Since the late 18th century, landscape architecture has highlighted the social role of parks and park systems: new paradises in congested cities for “everyone”. The greenway movement, throughout the 20th century, took these issues a step ahead. Current greenway design is endowed with an ecological ethic, as well as a respect for culture character diversity. Today, the growing significance of greenways crosses landscapes all over the countries. Three current Portuguese park examples are presented, illustrating innovative directions for the future: The expansion of the awarded Tagus Linear Park, Park of Barrocal ; Loures River Front.

These examples aim to demonstrate how real, sustainable practices are sources of inspiration and innovation for future greenway design in adapting to expanding and contracting cities. The pleasurable ambiances created in the ancient Persian paradise gardens through the use of exotic components are now replaced by thoroughly functioning natural and cultural ecosystems areas which became the “special” factor for design. Greenways of the future must provide for the good of our common landscapes.

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**Luis Ribeiro** graduated in Landscape Architecture from Lisbon University and developed his Ph. D. at UMASS-Amherst under the guidance of Julius Fábos. For the last 30 years he has been teaching, researching and practicing landscape architecture both at Lisbon University and TOPIARIS Design Office. Founding partner of TOPIARIS (1988), based in Lisbon, he has coordinated large scale projects in different geographical contexts. He is an expert in historical garden restoration and has coordinated many relevant projects.

## Vistas, views, prospects. Research and Design

Albert Fekete

*Szent István University, Faculty of Landscape Architecture and Urbanism, Department of Garden Art and Garden Techniques*

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The renewal of historic gardens, landscapes and sites has become more common in Eastern and Central European region. The Department of Garden Art and Garden Techniques of the Szent István University, Faculty of Landscape Architecture and Urban Design has been dealing with this since 1963, with landscape renewal on landscape, garden and settlement scale, based on scientific research. The more than 50-year experience has already proved the advantages of such “design by research” approach in the garden and landscape renewal processes, with Landscape Architecture being a discipline which has developed from a very practical basis in park and garden design. (Brink, 2017)

The purpose of this paper is to show the most significant conclusions of our historic garden research related to the castle and manor house gardens from Carpathian Basin, focusing on the importance of visual connections and links designed initially on sites.

Using case studies, the paper intends to explore how good landscape design in historic environments is achieved. We highlight that there is not one correct answer or approach per site, but there are ways of thinking and working. The historical value can not be simplified or understood as 'old'. the heritage being represented by the all-time valuable garden features and elements, independent from their formation in time. Besides the historical authenticity of the actual use, the new functions, the ecological claims, the social needs and the sustainability are the most important aspects which must be integrated in the heritage protection and reclamation process.

**Albert Fekete** is a landscape architect, head of Department of Garden Art, Dean of the Faculty of Landscape Architecture and Urbanism Budapest, Szent István University. He is a researcher, teacher, guest professor and active landscape designer, with international design experience, having his own office (Lépték Terv) since 2000 in Budapest, Hungary and since 2007 the AB PLAN in Romania. He has worked in Germany, Holland and Spain and has had more than 50 realized landscape and open space design projects.

## **Transdisciplinary landscape research: Ground for creativity**

Joan Nassauer

*University of Michigan, School for Environment and Sustainability*

Drawing on recent work in the legacy city of Detroit, MI, USA, this paper will discuss how the urgent challenges of climate change, aged infrastructure and a shrinking population suggest intersecting focal issues for transdisciplinary research. These challenges open the way for new forms of green infrastructure that can be invented and tested using a design-in-science approach. The setting of a legacy city suggests a design conception of the urban fabric as a dynamic, heterogeneous matrix of social and environmental functions, and contributing to their sustainable evolution for human well-being requires transdisciplinary evidence-based research.

**Joan Nassauer, FCELA, FASLA, is** Professor of Landscape Architecture in the School for Environment and Sustainability at the University of Michigan. She was named Distinguished Practitioner of Landscape Ecology in the US (1998), and Distinguished Scholar by the International Association of Landscape Ecology (2007). The author of more than 100 refereed papers, books and book chapters, she has experimented with ecological design of human-dominated landscapes to build knowledge about their cultural sustainability. Her teaching and research have employed science to address metropolitan and agricultural landscapes – ranging from continental scale implications of agricultural practices to neighborhood scale implications of green stormwater infrastructure. In her work advocating for research as integral to landscape architecture practice, she has served as Co-Editor-in-Chief of Landscape and Urban Planning since 2014, leading it to become the world's top-ranked refereed journal in urban studies and planning.



# Session 1A

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## *Coastal Adaptation*

Friday, 10:45am - 12:00  
Room 163

## **SAGE Short Course: A Pedagogical Model for Intensive Learning About Green Infrastructure Resilience Strategies for Coastal Sea Level Rise**

Jane Buxton

*University of Massachusetts, Amherst, Department of Landscape Architecture and Regional Planning*

Understanding and planning for complex problems like climate change-related sea level rise require deep knowledge and collaboration within and across multiple disciplines. However, disciplinary silos can be a barrier to interdisciplinary research, education, and problem solving for both students and professionals. Even in fields where interdisciplinary, team-based collaboration is common, such as engineering and science, it may typically involve a division of labor which may limit integration across disciplines (Borego & Newswander, 2010).

The SAGE Short Course was created to pilot an intensive, project-based, interdisciplinary pedagogical model to teach sustainable, adaptive and resilient coastal green infrastructure strategies to graduate and PhD students. This presentation describes the Course content, learning outcomes, and participant feedback. The Course combined classroom instruction, team project-based learning, and field experiential learning at coastal projects in the Boston area.

The project-based learning process provided a set of problems that created opportunities for participants to work together to integrate technical knowledge; create and present solutions to coastal flooding in real world settings; and have a more active role in their learning processes as compared to more passive learning models (Helle, et. al. 2006). Practical skills and knowledge were introduced in experiential learning which provided opportunities for wholistic integration of thinking, perceiving, acting and communication (Kolb & Kolb, 2006). Interdisciplinary learning supported the grounding of student work within the individual disciplines; the integration of disciplinary insights for knowledge building and problem solving; communication across

disciplines; and experience working in a collaborative setting (Borego & Newswander, 2010).

The efficacy of the SAGE Short Course learning model will be analyzed to assess for insights into collaborative efforts across the spectrum of interdisciplinary green infrastructure planning. The Short Course was sponsored by NSF project Sustainable Adaptive Gradients in the Coastal Environment (SAGE): Reconceptualizing the Role of Infrastructure in Resilience Award Number: ICER-1338767.

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**Jane A. Buxton** has a doctoral degree in Regional Planning from the University of Massachusetts, Amherst and a master's degree in landscape architecture from the University of Michigan. She has worked in open space and park planning, regional planning, landscape design and education. Her interests include climate adaptation planning, green infrastructure, environmental psychology, and design and practices that support livable, equitable and environmentally sustainable communities.

## Rising Seas: Adaptable Planning Strategies for Coastal Urban Greenways - Case Studies in the US and China

Hongbing Tang<sup>1</sup> and Jeanne Lukenda<sup>2</sup>

<sup>1</sup>*University of Massachusetts, Amherst, Department of Landscape Architecture and Regional Planning*

<sup>2</sup>*Weston & Sampson, Inc.*

This paper discusses adaptable planning and design strategies for coastal urban greenways to deal with rising seas due to global warming

and climate change. It advocates taking steps to protect the coastal landscapes, increase adaptation, and mitigate disastrous outcomes associated with sea level rise from a global perspective. Greenway planners must consider the costs and risks of accommodating the rising seas, retreating from them, or trying to defend the greenways with protective measures.

The City of Boston and the City of Shenzhen in China have been selected as our case studies. Boston, a paradigm of U.S. resilient coastal cities, is well-placed to deal with the challenge, with experts and resources accessible and at hand. With increased understanding of the successes and failures of existing natural and man-made protection, accommodation, and retreat measures; increased acknowledgement of current sea level rise impacts; and a vision for the opportunities that may come from proactive reduction of vulnerabilities, the City of Boston is taking charge of its future. The City of Shenzhen, on the contrary, does not have the knowledge and resources, and is far from getting ready to react to the threats of sea level rise and other climate-induced changes at the scale being forecasted by scientists. An important portion of its newly built greenways was severely damaged by Super Typhoon Mangkhut recently. Coastal resilience solutions are much needed for Shenzhen and other parts of Pearl River Delta greenway networks along the South China Sea.

This paper attempts to raise public awareness and perception on this emergent topic. It concludes with recommendations of adaptable planning strategies for coastal resilience by establishing planning and design guidelines, utilizing greenways as resilient infrastructure, restoring damaged ecosystems as natural coastal defenses, and advocating multi-functional greenways and land use with public involvement.

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**Hongbing Tang**, ASLA, RLA, LEED AP, lecturer at University of Massachusetts Amherst and adjunct faculty at the Boston Architectural College, holds MLA and MRP degrees from University of Massachusetts and B. Arch. from Tsinghua University, China. With over 20 years of multidisciplinary practice in the US and China, Hongbing brings a unique cross-cultural perspective, interdisciplinary approach and leadership in her practice and teaching.

## **On the Coastline: The genesis of green infrastructure towards a future sustainable landscape for the city of Maputo, Mozambique**

Ana Beja Da Costa and Luis Paulo Ribeiro

*LEAF, Instituto Superior de Agronomia, Universidade de Lisboa*

Cities in Africa, where the most remarkable forthcoming developments in the overall pattern of urbanization are expected, and quite notably in Sub-Saharan cities such as Maputo, experience accelerating population increases that stress urban infrastructures beyond capacity, and increase pressure on existent valuable ecosystems. In the city's coastal plains, the recently constructed Maputo ring road and Katembe bridge are drawing urban development towards the last stretch of vacant land of the Municipality, compromising the flood plains and mangrove ecosystems.

This paper aims to refine the planning discourse by systematizing urban strategies associated to green infrastructure functions, having mangrove wetlands as central element. This is achieved by mapping urban tissue and current land uses in relation to mangrove ecological land suitability classes, in order to give concrete spatial solutions for each urban condition. The definition of different types of green infrastructures based on mangrove ecology are outlined, to be implemented within the current land occupation context and that can support future scenarios of SLR.

The research explores green infrastructure planning applied to Maputo as a strategy to accommodate current and future urban development challenges, not only as urban biophysical networks that can create socio-ecological networks that improve urban resilience through a stewardship of urban ecosystems, but also as an ecosystem-based approach for adaptation to climate change.

**Ana Beja Da Costa** holds a degree in Landscape Architecture from ISA, Portugal and received a post-graduate Master in Human Settlements degree from KU Leuven, Belgium. She participated in research projects on landscape design and ecology applied to human settlements, being one of her main

research concerns the applicability of knowledge and practices developed in an European setting in these countries specific contexts. In parallel, she has worked as Landscape Architect in Portugal, the Netherlands and in Belgium. Currently she holds a PhD research grant from Fundação para a Ciência e a Tecnologia (Portugal).

## **Visualizing Climate Change-induced Futures: Temporary Art Installations on Boston's Greenways**

Carolina Aragón

*University of Massachusetts, Amherst, Department of Landscape Architecture and Regional Planning*

As places that can link environmental phenomena to people's daily life (Nassauer, 2012), landscapes can provide a powerful medium and setting by which to engage the public in climate change. In particular, landscapes may offer opportunities to localize climate change information (Sheppard, 2015), overcoming the dominant perception of climate change as an event that will happen in the distant future in remote places (Leiserowitz, 2015). Furthermore, landscapes can serve as the setting for public art projects which can provide access to visualizations of climate change-induced futures to general audiences (Aragón, Buxton, Hamin, 2018, manuscript). Engaging the public through the arts may help to overcome many of the barriers associated with climate change communication by providing the public with personal experiences with the subject through visualizations, narratives, analogies and metaphors (Roosen, Klöckner, & Swim, 2017).

This paper will discuss the role of public art in greenways as a medium by which to provide alternative ways to communicate and engage the public with local climate change issues. Two case studies of temporary art installations designed by the author (High Tide exhibited on the Rose Kennedy Greenway, and FutureWATERS/AGUASfuturas exhibited on the East Boston Greenway), will illustrate how art can be used to visualize future climate changed-induced scenarios, such as flooding due to sea-level rise. Art installations can perform as an in-situ form of representation that calls attention to the subject in potentially appealing and non-threatening fashion. The case studies

highlight the role of the aesthetic, visual, and bodily experience of art in the landscape, as an alternative entry point for understanding local effects of climate change.

The findings of this study demonstrate the potential for greenways and public landscapes to serve as settings by which to engage the public with issues of climate change and resilience through the arts. Greenways and public landscapes can contribute to public education on local issues of climate change by making information accessible to a diverse public in ways that can complement or serve as an entry point to scientific and governmental reports. Public art about climate change in greenways may contribute to the necessary cultural and political support required for climate adaptation planning.

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**Carolina Aragón** is an Assistant Professor in the Landscape Architecture and Regional Planning Department at the University of Massachusetts Amherst. Her research and creative work focus on public art as a medium to experiment with innovative materials, transform urban landscapes, and engage communities. Her most recent artworks include *High Tide*, exhibited at the RFK Greenway in Boston, MA, and the upcoming installation, “FutureWATERS/AGUAS futuras” to be exhibited on the East Boston Greenway. These art installations help visualize future flooding due to projected sea level rise.



# Session 1B

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## *Biodiversity*

Friday, 10:45am - 12:00  
Room 162

## Why Did the Turtle Cross the Street? An examination of herpetofauna habitat road fragmentation

Carlos J. L. Balsas

*University at Albany, Department of Geography and Planning*

Roads and urban development cause severe herpetofauna habitat fragmentation. The objective of this study is to analyze the road ecology problem of herpetofauna habitat fragmentation. It is argued that most wetland systems have high biodiversity conservation value and that their herpetofauna habitat fragmentation requires the implementation of adequate road crossing mitigation strategies. The research methods comprised mostly literature reviews on road ecology, habitat road fragmentation and mitigation, and roadway redesign measures. The key finding discovered was the urgent need for more continuous habitats, uniform underground crossings, and the elimination of reptile and amphibian road crossing deaths in (sub)urban settings. The study identifies the following five management recommendations: (1) Updating the existing knowledge on herpetofauna populations; (2) Engaging community constituents with road ecology and biodiversity activities; (3) Implementing various habitat mitigation measures; (4) Monitoring herpetofauna crossings in areas of need and maintaining the integrity of the protective measures; and (5) Disseminating research results through the creation of brochures, press-releases, newspaper, scientific articles, and presentations at conferences.

**Carlos Balsas** is the author of *Walkable Cities: Revitalization, Vibrancy and Sustainable Consumption across the Atlantic Ocean* (2019). Major interests include: Comp. Urban Revitalization, Sustainable Transportation Planning, and Planning Pedagogy.

## Creating a Regional Pollinator Corridor

Evan Abramson

*Franklin Regional Council of Governments*

Recognizing the essential ecological function of pollination, the critical role of pollinators in our food system, as well as the worldwide phenomenon of pollinator decline which is taking place locally, the Franklin

Regional Council of Governments (FRCOG), the regional planning agency for Franklin County, Massachusetts, proposes to create a regional plan for pollinator habitat implementation across Franklin County, an area of 725 square miles comprised of 26 towns, with a population of nearly 72,000 residents. A rural, hilly region rich in farmland and natural resources, Franklin County forms part of the upper Connecticut River Valley, is 77% under forest cover, 8% in agriculture, and 6% developed. Our plan will take into consideration the foraging and nesting requirements of native pollinators as well as prevailing threats; current and projected future land use patterns in our county; areas of ecological and biological significance; and opportunities for connection to neighboring regions.

The Franklin County Pollinator Corridor will be accomplished in two phases. First, a research, environmental analysis, and community outreach process which will inform the creation of the county-wide plan. Second, an implementation phase wherein FRCOG staff and partners from fields as diverse as conservation biology, education, farmscaping, and landscape design, will work directly with regional stakeholders, including municipal governments; DPWs; volunteer-led agricultural and conservation commissions; schools; land trusts; farmers, gardeners, and landowners; and state agencies such as MassWildlife and the Massachusetts Department of Transportation (MassDOT); to design and implement pollinator habitat across our county and beyond.

Technical assistance will also be offered to stakeholders, and may include: educational outreach tailored specifically for farmers, gardeners, land owners, landscaping professionals, and highway foremen; creating a school curriculum based on pollinator gardens at schools; and developing a toolkit of DIY pollinator garden designs, pollinator-supporting landscape management strategies, and plant species recommendations for local habitats and landscape scenarios. Recommended plants will be primarily comprised of those that support the foraging and nesting requirements of native specialist bees and native Lepidoptera. A precedent for this project can be found in the Great Barrington Pollinator Action Plan, co-written by Evan Abramson and available for download at: <https://www.townofgb.org/agricultural-commission/files/great-barrington-pollinator-action-plan-2018>

**Evan Abramson** worked internationally as a photographer and filmmaker for over a decade, before redirecting his career toward regional landscape planning as a solution to our global ecological challenges. His environmental documentaries have earned a number of film festival awards, and influenced policymakers across the globe. His photographs have been published in *The Atlantic*, *The New York Times* and *The Washington Post*, among other publications. As a community organizer for Food & Water Watch, he helped pass a statewide moratorium on fracking waste in Connecticut in 2014. He is presently a Land Use & Natural Resources Planner at the Franklin Regional Council of Governments. Prior to working there, he apprenticed at a biodynamic dairy, meat and vegetable farm.

## **Study on Greenway Plant Landscape Based on Bird Habitat Construction - A Case Study of Wenyu River - North Canal Greenway in Beijing**

Mengyuan Zhang, Yilun Li, Shuxin Fan, Peiyao Hao, and Li Dong

*College of Landscape Architecture, Beijing Forestry University*

In recent years, rapid urbanization is leading to a sharp decrease of bird diversity in city. The plant landscape in the greenway plays an important role in habitat conservation. This paper aims to explore the effects of plant landscape planning for the bird habitat conservation in urban greenway, and to study the design methods of greenway plant landscapes based on bird habitats conservation. Wenyu River - North Canal, a river located in the east of Beijing with uninterrupted green spaces along the coast, has the potential to become the migration channel for migratory birds. Dongjiao Wetland Park is an important node.

At the macro level, the program investigated the vegetation pattern of Wenyu River-North Canal by using GIS technology and analyzed the distribution and ecological connectivity of different bird habitat types in the greenway. The results show that along the Wenyu River-North Canal, the distribution of habitats for some bird groups is uneven and some habitat types are poorly connected.

At the micro level, a field study was conducted in Dongjiao Wetland

Park in combination with actual projects, in which the forest form distribution and plant species composition were analyzed and the bird biotope was mapped. The results show that in the Dongjiao Wetland Park, the plant community is dominated by arbor-herb type; evergreen plants, shrubs and food plants are lacking; grasslands habitats and wetlands habitats were small and the area disturbed by human is large. According to the analysis results, aiming at bird habitat conservation, a vegetation landscape optimization plan of Wenyu River-North Canal Greenway and a plant landscape reconstruction design of the Northern Park of Dongjiao Wetland Park were proposed, including protecting important habitat patches, optimizing plant community structure and selecting plant species.

**Zhang Mengyuan** is a master's candidate at Beijing Forestry University, where she studies ornamental plants and horticulture for a postgraduate degree, and is mainly engaged in landscape plant application and landscape ecology research. From 2013 to 2017, she studied at Beijing Forestry University and majored in landscape gardening for her undergraduate degree.

## The Role of Mining Ponds in the Hungarian Greenway Network

Ildikó Módosné Bugyi, Nóra Hubayné Horváth and Dalma Varga

*Szent István University, Department of Landscape Protection and Reclamation*

The aim of our research is to present the current state of mining ponds, wetlands (created by mining activity in Hungary) and to give support to the mining ponds' nature protection importance and their role in green infrastructure.

This research topic is very important, partly because of the lack of data related to mining ponds, but also because wetlands and their connecting blue and green infrastructure are playing a more important role today in reducing the effects of climate change.

A GIS analysis was made using data from the national mining register, the CORINE Land Cover and Agricultural Parcel Identification

System base map, non-motorized vehicular route data, and maps of the national nature protection areas.

As a first step of the GIS analysis, we selected those wetlands in Hungary that were created by mining activity. With the help of density-analysis, we visualized the national distribution of mining ponds. As a second step, we compared these identified mining ponds with the protected natural areas of Hungary, and then we analyzed their exploration with greenways. We investigated the connection between size, raw material type, age, and the potential for tourism, religious pilgrimages, horseback riding and bicycling, as well as nature protection.

Mining activities represent a paradox among environmentally-destructive land use activities. In most cases, the extraction of raw materials below the water-bearing level causes huge damage to the landscape. As a result of this, natural resources have been lost and continue to be destroyed. At the same time, these constructed mining ponds represent significant landscape value and recreational potential. Their natural value is demonstrated by the results of our research, which found that 21.85% of mining ponds are part of some nature protection designation (National Parks, Protected Landscape Areas, National Nature Reserve areas, Natura 2000 Areas and the National Ecological Network). According to our GIS analysis, 34% of mining ponds are incorporated into greenways in Hungary.

In the case of proper usage and landscape rehabilitation, mining ponds – due to their nature protection values and beneficial landscape features – are mostly suitable or can be made suitable for being destination areas and stopping points of greenways.

**Ildikó Módosné Bugyi** is a certified landscape architect. Since 1991, she has been a tutor in the Department of Landscape Protection and Reclamation. Her speciality is the reclamation of ruined areas related to mining activities and the landscaping of existing and abandoned mines. Her professional portfolio is also enhanced by settlement plans, regional plans, nature conservation plans, and environmental impact assessments. Thanks to several decades of design and research work, she has acquired a couple of design and expertise rights. Her education subjects: nature conservation (BSc), landscape protection (BSc, MSc), landscape reclamation (BSc, MSc), thesis preparation (BSc), diploma planning (MSc). Besides these, she has been a mentor of thesis and diploma works, and several award-winning TDK studies.



# Session 1C

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## *Greenways and Equity*

Friday, 10:45am - 12:00  
Room 165

## **Sustainable Green Infrastructure Planning in Greece: Proposal for an Urban Greenway Network in the Greater Athens Metro Area**

Alexander Kantartzis<sup>1</sup> and Spiro Pollalis<sup>2</sup>

*<sup>1</sup>Department of Agricultural Technology, School of Agricultural Technology, University of Ioannina*

*<sup>2</sup>Department of Architecture, Graduate School of Design, Harvard University*

Athens, the capital of Greece, epitomizes the opportunities and constraints of modern urbanization, sustainable mobility, green infrastructure, greenway planning, and the associated quality of contemporary Greek civic life. Though the country's economy has been suffering tremendously for the past consecutive eight years with harsh austerity measures holding back any developmental commotion, signs of recovery and appropriate funding are lately emerging.

Physically, Athens has overcome its natural containing barriers, the Pikilo and Hemmitos Mountains on east and west borders, the southern waterfront expanding over to the Thriasio and Mesogeia Fields and the island of Aegina respectively. Culturally, contemporary Athens is thriving, living up to her own historical heritage and legacy. Socially, the latest abrupt surge of immigrant and refugees influx has altered both demographical ratios and civic life in the congested downtown and CBD of the city as well as the dispersed residential neighborhoods within a chaotic urban fabric. Economically, foreign and local investors have shown a keen interest in large scale projects (e.g. the former Hellinikon International Airport) but national debts to both the International Monetary Fund (IMF) and the European Central Bank (ECB) have led to governmental hesitation and procrastination of any developmental plans, halting in turn the investors' much anticipated and crucial momentum. Lastly, clashing stakeholders' interests within the broader green infrastructure and targeted greenway planning process, provide the fertile basis for a wide spectrum of alternative development scenarios.

One of the most discussed and highest-profile projects in Greece today is Hellinikon, an ambitious plan for converting the former Athens airport into an enormous park. The site of Hellinikon lies 8 km southwest of the center of Athens being approximately 1,500 acres and boasting a 3.5 km waterfront, including a marina. Exploiting the Hellinikon site as the main organizing impetus, this paper presents a proposal for an Urban Greenway Network in the Greater Athens Metropolitan Area (GAMA) as a response to prudent city planning, attempting to address the vision, the strategic issues, the governmental and private synergies, the planning criteria, the physical design and standards of greenway planning required for its implementation at the city scale and beyond. At the background, ecological, social, and economic issues weave the sustainability concerns and processes of green infrastructure planning.

**Alexander Kantartzis** is a Professor of Landscape Architecture at the University of Ioannina at Arta, Greece. He has over 70 assignments (Greece and USA) in the fields of Landscape Architecture, Architecture, Regional Planning, City Planning, and Urban Design. He has taught and design critiqued since 1986 at TEI of Epirus, Hellenic Open University, University of Patras at Agrinio, Aegean University, University of Thessaly in Greece, and at LARP University of Massachusetts and GSD Harvard University, USA. Has published 33 scientific papers, participated in 6 Research Programs concerning Land Use, Land Reclamation, Landscape Planning, Landscape & Historic Heritage Planning and Design and has been promoting Greenways as a new land use tool in Greece since 2004.

## **Analyzing the Spatial Equity of the Benefits of Nature Based Solutions**

Daniele La Rosa and Viviana Pappalardo

*University of Catania*

There is a rising demand to enhance the provision of ecosystem services in cities, especially when looking at the issue of risk of urban flood associated with climate changes and urbanization processes. Among the set of Nature-Based Solutions available for urban planners,

Sustainable Urban Drainage Systems (SUDS) are effective systems to reduce the negative effects of urban water run-offs and to increase the overall provision of ES in cities.

However, SUDS can impact differently in the urban fabric and generate positive effects only on particular portions of cities. Such inequalities could be even more pronounced when SUDS are implemented in private areas such as green roofs or private green spaces. Planning of SUDS should try to consider not only the number of potential beneficiaries, but also their location in the city, as water sensitive approaches to urban planning must deal with distributive, procedural, and contextual dimensions of equity.

In this paper, we present different spatially explicit planning scenarios of SUDS location for a high-density urban basin in Southern Italy. Particularly, we evaluated the relation between the quantitative performance of SUDS in terms of reduction of risk from water run-off and the number and spatial location of beneficiaries (residents). Results suggest that planning choices for SUDS generate different benefits on the overall water run-off that might not necessarily match the possible beneficiaries (intended here as residents of different social groups). Trade-offs among their overall performance and the number and location of people living close by the areas are highlighted. Such trade-offs call for additional research to find more sound and consolidated ways to define and assess the benefits of SUDS when spatial inequalities issues can be generated.

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**Dr. Daniele La Rosa** holds a PhD in Urban and Regional Planning and is an Assistant Professor (with National Habilitation and tenure track) in Urban and Environmental Planning at the Department Civil Engineering and Architecture of the University of Catania (Italy). He teaches spatial planning and urban design in Building Engineering MSc courses at the Department Civil Engineering and Architecture of the University of Catania. His research topics include sustainable planning, Ecosystem Services, GIS applications for urban and landscape planning, environmental indicators, Environmental Strategic Assessment, Land Use science and landscape studies.

## **Greenways for Climate Adaptation: Avoiding the ‘Green Paradox’ while Improving Urban Resiliency**

Jacobien Kuiper and Elisabeth Hamin Infield

*University of Massachusetts, Amherst, Department of Landscape Architecture and Regional Planning*

Greenway planning and design is an important approach to climate adaptation in urban areas. In this paper we bring together literature on green gentrification, climate adaptation, and equity in an early exploration of equity issues specific to urban greenways for climate adaptation (‘adaptation-greenways’). Similar to environmental risks and green space access, impacts of climate change are distributed unevenly across urban space. Climate-vulnerable communities are often minority- and lower-income neighborhoods. Greenways can redress existing inequities (‘pre-equity issues’) by providing green space access and climate adaptation benefits in vulnerable communities. Recent projects demonstrate that greenways, while redressing existing inequities, can introduce new inequities (‘post-equity issues’) at the same time. This is the ‘green paradox’, where poor initial site conditions underlying existing inequities in minority- and lower-income neighborhoods can give rise to intense price and development pressure when these areas are revitalized by urban greening. As a consequence, greenways may lead to ‘green gentrification’ when urban greening creates increased property values and risk of exclusion and displacement. While less explored to date, urban greenways for climate adaptation may yield similar outcomes when improved resilience brings increases in property value, the benefit of which does not accrue to existing residents. The very neighborhoods that need resiliency investment to redress past environmental harms and prevent increased vulnerability are the same ones whose residents may be concerned about being priced out as improvements increase the market value of the newly-safer properties. Green-gentrification literature provides preliminary suggestions of practical steps that can be taken to address the ‘green paradox’. We assess whether the same strategies are likely to apply when greenways are planned for climate adaptation. This is worth investigating, because

adaptation-greenways may require differences in the needs of design. We conclude with a summary of considerations for future adaptation-greenway planning and design.

**Elisabeth Hamin Infield** researches and teaches municipal approaches to climate change, as well as resilient infrastructure. Her most recent co-edited book is *Planning for Climate Change: Sustainable Design for Resilient Cities*, co-edited with Robert Ryan and Yaser Abunnasr.

## **Greening without Gentrification? The Necessity of Transformative and Adaptive Governance for Sustainable Community-Oriented Implementation**

Dorottya Bekesi<sup>1</sup> and David Ralston<sup>2</sup>

<sup>1</sup>*Szent István University, Faculty of Landscape Architecture and Urbanism*

<sup>2</sup>*Merritt College Institute for Sustainable Policy Studies*

As we face an impending climate crisis requiring swift government action, large-scale urban greening infrastructure projects that can provide climate mitigations and adaption are increasingly targeted for funding. This is especially true in California with the State's landmark cap and trade program allocating tens of billion USD annually for climate protection projects. At the same time, governments are also recognizing the call for addressing environmental justice, which also make claims for green infrastructure investments. Acquiring "green" infrastructure capital funds is actually the easy part. The hard part is (1) mobilizing local (often municipal) support for implementation coordination and post-implementation maintenance and operation and (2), addressing the very real specter of greening projects paving the way for gentrification - which is significant for projects in disadvantaged urbanized communities suffering historic decline. Accordingly, many grassroots community organization and long-time residents look suspiciously on green investments pushed from "above" that seem disconnected from conditions of lived reality. Activist landscape architects such as the late Karl Linn - the "Father

of American Participatory Architecture” clearly recognized that even well-intentioned efforts to support and “beautify” disinvested at-risk communities through greening can indirectly catalyze gentrification. The bigger the investment and “buy-in” from governments can mean more impetus for new developments and with them, a new cultural landscape. These are the critical implementation and governance issues that the two recently-funded projects: San Leandro Creek (SLC) Greenway and the Brookfield School Freeway Buffer face in Deep East Oakland - an urbanized industrial pocket within the booming San Francisco Bay Area. The Air District, working as part of a collaborative community planning and design effort, responded to the calls for “greening without gentrification” as well as pleas for addressing environmental health. Against data showing the existent community vulnerabilities, this presentation highlights the on-going struggle to work within the standard implementation process to create a participatory process that incorporates community ownership, local culture and green job opportunities. The strategies presented attempt to show how green infrastructure projects can actually strengthen place-connections, community health and resiliency for the direct benefit of existing residents while also addressing the larger context of climate mitigation and adaptation. The 6-mile long SLC Greenway is one of the State of California awarded projects which will be constructed over the next 3 years. The Brookfield School Freeway Buffer Project is funded by the Bay Area Air District as part of the State Transformative Climate Communities planning partnership.

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**David Ralston, PhD, MCP** : David is a senior policy advisor working in the Planning and Climate Protection Division of the Bay Area Air District. In addition, he is also a research fellow and adjunct faculty at the Merritt College Institute for Sustainable Policy Studies/Action. He and his colleagues have been leading a participatory landscape architecture design process for a community-greenway project in Oakland, CA. **Dorottya Bekesi, BSc**: Postgraduate landscape architecture student. Her interest is in future cities, blue and green infrastructure-, brownfield and internal spare area development questions in accordance with the climatic, social and economic challenges of our time. Dorottya worked on the San Leandro Greenway project as a research associate in 2017.



# Session 1D

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## *Greenway Movement*

Friday, 10:45am - 12:00  
Room 174

## Urban Greenways: A Systematic Review

Olivia Horte and Theodore Eisenman

*University of Massachusetts, Amherst, Department of Landscape Architecture and Regional Planning*

Greenways are a prominent topic in landscape planning research and practice. In 1990, *Greenways for America* inspired greenway planning in the United States (Little 1990), and three Special Issues of *Landscape and Urban Planning* subsequently advanced international scholarship on greenways (Fabos and Ahern 1995; Fabos and Ryan 2004, 2006). In practice, linear green corridors are now prominent expressions of landscape planning in urban areas, which assumes added significance as three-quarters of people will be living in cities by the end of this century (Angel 2012).

But to the best of our knowledge, there has been no systematic literature review on greenways. To address this gap, we undertook a systematic assessment of peer-reviewed literature on “urban greenways.” We searched for this term in Web of Science (n=23), ScienceDirect (n=77), and the Avery Index to Architectural Periodicals (n=6), yielding 96 total articles after eliminating for overlap between databases. Drawing upon scholarly precedents in systematic literature reviews (e.g., Bentsen, Lindholst, and Konijnendijk 2010; Luederitz et al. 2015), we then assessed the articles based on 12 review categories including research focus, geographic extent, methodology, location of study, and journal discipline.

This presentation will deliver preliminary results of the research. By depicting the contours of greenway scholarship and potentially uncovering gaps, we hope to illuminate opportunities to advance research on this topic. These findings should be helpful not only to urban planners and landscape architects, but also to researchers and practitioners across a variety of disciplines who are interested in urban greenways.

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**Olivia Horte** is a senior Sustainable Community Development major with a concentration in Landscape Studies at the University of Massachusetts Amherst. She is also a member of the Commonwealth Honors College which asks graduating seniors to write a thesis within their field of interest. After completing an internship with The Rose Kennedy Greenway Conservancy during the summer of 2018, she was inspired to research greenways after seeing the effort of the non-profit to maintain the park sustainably and the subsequent joy and appreciation of patrons in the heart of downtown Boston. Her main interests include urban parks and greenways and their roles in benefiting both environmental and social aspects of urban environments.

## **Contradicting knowledge map of greenways: a comparative analysis based on English and Chinese literature**

Nannan Zhao<sup>1</sup> and Zheng Liu<sup>2</sup>

<sup>1</sup>*South China University of Technology, Department of Architecture*

<sup>2</sup>*KU Leuven, Department of Architecture*

Greenway is a flexible concept with diverse forms in different contexts. Recently in China, greenways have achieved rapid growth and become national policy. The widely implemented greenways also led to the first

national document on greenway planning and design, Guidance of Greenway Planning and Design, which was issued by the Ministry of Housing and Urban-rural development. However, there have been two distinct perceptions of greenways in existing Chinese literature. On the one hand, some researchers argue that greenways show strategic values in providing social integration and economic growth. On the other hand, many local scholars and officials criticize that there are excessive artificial constructions and the greenways fail to provide necessary ecological benefits. In order to develop a general understanding of the conflicting greenway perceptions in different contexts (i.e. English and Chinese), this article will collect data from WOS and CNKI databases and then illustrate it as two knowledge maps using VOSviewer. The analysis shows that ecological conservation, resident perception, and greenway planning have been the core issues in greenway literature, which now have rich meanings and features. In contrast with greenway research in English, greenway research in China is still at the beginning stage and focuses primary on greenway function. However, unlike international greenway research, green transportation, and urban recreation are now influential greenway functions in Chinese greenway discourse. Although the enhancement of the transportation function and urban location are responses to the increasing need for non-motorized transport and open spaces, the discourse also reflects the problems of excessive urban development and the lack of ecological concerns in urban China.

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**Nannan Zhao** is a doctorate student at South China University of Technology, Guangzhou. Her main research interests are urban greenways, urban regeneration, and urban design.

## **Are Greenways No Longer Green?: Understanding Greenway Planning Goals in Ohio Cities**

Amy Lynch

*Ohio University, Department of Geography*

The characteristics of a community's greenways depend upon its goals, which are typically some combination of conservation, economic development, recreation, active transportation, and, most recently,

community health. But, as Erickson (2004) notes, “While the three-legged stool of recreation, [active] transportation and conservation has supported greenway efforts across the continent, it is rare that each leg is equally weighted” (p. 219). Recreation components are attributes of most types of greenways, but are the double-edged sword of greenway planning, from an ecological perspective. Public support is necessary to create a greenway system large and connected enough to support species movement, for example. But if the public use components are too wide, disruptive, or trafficked, they can undermine the ecological benefits of the greenway. Recent evidence highlights Erickson’s concern about unequal weighting. In the United States, greenways are often discussed in combination with trails. Greenway and trail conference presentations from the past year (2017:2018) include all of the aforementioned goals: recreation, economic development, health, and transportation: and go a step further to consider equity and how cities might better connect low-income areas and communities of color to the networks. The fewest presentations focused on conservation. Just two (at the 2017 and 2018 California Trails and Greenways Conferences) addressed habitat connectivity.

A review of English language literature suggests that large-scale urban greenway planning theory and practice are moving away from ecological greenways and toward recreation and active transportation features. While these are important goals, movement away from the ecological characteristics and aims of greenway planning could result in missed opportunities, particularly with regard to urban habitat connectivity. This study presents a literature review for context and then examines the goals of greenway planning in Ohio’s three largest cities to test the theory and understand if - and how - this shift has manifested.

**Amy J. Lynch** is an assistant professor in the Department of Geography at Ohio University. Her research examines the ecological outcomes of land use and environmental planning with an emphasis on green infrastructure quality and connectivity.

# Comparative Analysis of Urban Greenway Construction in Asia from the Perspective of Urban Expansion: The Greenways in Guangzhou, Hong Kong, Singapore and Nagoya, Japan as Examples

Liang Li and Yingxu Yao

*Beijing Forestry University, School of Landscape Architecture*

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Under the background of the rapid development of Asian cities and the increasing demand for the land, the amount of new greenway construction is gradually increasing, and the location of the construction is gradually transferred from the outer edge of the city to the inner part of the city. Due to the population density and urban development patterns of European and American countries being quite different from those of Asia, it will be more beneficial to the development of Asian cities to seek the experience of other Asian cities in the construction of greenways. Taking the greenway construction of four typical cities in Asia as case studies, this paper discusses how to construct greenways in compact cities with high population density and limited land. By combing through the literature on the historical context of greenway construction, construction policy development, as well as the summary of network construction, this paper compares and analyzes the construction methods of compact urban greenways in Asian cities. This comparative study indicates that in compact Asian cities with greenways in the construction process, the emphasis on ecology has been reduced and more emphasis has been placed on greenway connectivity, convenience and other multiple functions.

In compact cities, it will be more economical and effective to systematically develop greenways through the integration of existing small and micro plots. This paper seeks the construction mode of compact urban greenways and it will be conducive to the restoration of cities in China and Asia and the upgrading of urban ecosystems.

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**Yingxu Yao** is a Master of Landscape Architecture student in the the School of Landscape Architecture, Beijing Forestry University, Grade 2.

# Session 2A

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## *Green Infrastructure Planning*

Friday, 10:45am - 12:00  
Room 163

## Implication of urban occupation patterns in the natural infiltration

Ana Paula A. C. C. Seraphim, Maria do Carmo L. Bezerra and Aline N. Oliveira

*Urban Environmental Management Group of University of Brasília*

The article aims to contribute to the study of urban form and hydrological impacts, especially with regard to a recharge of the aquifers. The focus on the natural water infiltration and recharge of aquifers is due to the similarities between the characteristics of the physical environment that are conducive to aquifer recharge and urbanization, which leads to urban occupation of recharge areas. To address the proposed objective, the study developed a methodological framework that relates elements of the urban form, intervening factors of urban infiltration and water sensitive urban design guidelines. To accomplish this, recent literature was reviewed in urban drainage, water-sensitive urbanism and urban morphology, seeking to organize and identify the links between them. The intervening factors of natural infiltration found in the literature were: (i) Sealing of the soil; (ii) soil compaction; and (iii) reduction of tree cover. The urban morphological elements related to these factors were: (i) streets; (ii) public spaces; and (iii) lots. The analysis characteristics of each of these morphological elements were identified from the revised intervening factors and urban design guidelines. The use of the framework for the analysis of the Lago Paranoá Basin in the DF – Distrito Federal, Brazil, demonstrated the validity of the identified analysis criteria for the study of the urban form hydrological impact. In addition, it confirmed the premise of the study that more details about the urban occupation form are needed, besides the percentage of impervious surfaces, for the evaluation and planning of water sensitive cities.

**Maria do Carmo** has a PhD in Urban Environmental Structures (FAU/USP) and a Postdoc by AAP, Cornell University. She is a Professor at the FAU/UnB, where she is leader of the Research Group on Urban Environmental Management and Coordinator of the Urban Planning area.

## The Green Belt of Auroville

Boglárka Nagy and Zita Szabo

*Szent István University*

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The South-Indian city of Auroville was founded in 1968 with the ambitious plan to become an utopist city for 50,000 habitants. The once heavily eroded land was transformed to a lush green area thanks to the past decades of landscape restoration work. The city aimed to create a new type of human habitat where the residents live in harmony and close relation with nature. As part of its master plan, a 2.5 km wide Green Belt was envisioned around the city zone that would contain organic farms and restored forest that would provide timber and refill underground water resources. The Green Belt was not only home to various projects of education and nature conservation but also an ecological system that already proved to locally reduce the severe effects of climate change.

The original master plan was designed by Roger Anger, a French architect. While most of the development within Auroville is based on this original plan, visiting researchers and experts warn that present social and spatial reality shows a very different scene. The nationally and internationally praised city faces serious threats. The growing real estate business, hotel developments, encroachment of lands and a planned highway in the Green Belt of Auroville are endangering the restored ecosystem. Presently there are less than 3,000 Aurovilians, people of 50 countries, who are committed to live in Auroville and work for “the city the earth needs”. In the same time due to the above mentioned dynamics already more than 25,000 people live within the planned area of Auroville, (over)using its ecological services.

The paper will describe the past and present development of Auroville with focus on the Green Belt. Based on the writers’ personal experience and knowledge, collected during her years of living and working in Auroville, it will also attempt to describe the future scenarios. The role and significance of the Green Belt will be addressed through assessing its performance on the UN Sustainable Development Goals.

**Boglárka Nagy**, after graduating with a Master of Agricultural Sciences, was working in Hungary as an environmental educator for the Ministry of Education. She moved to Auroville in 2005, where she was engaged in various educational and environmental projects as an honorary volunteer of the Indian Government. She returned to Hungary in 2017, after a call from the Auroville Hungary Association, to support the foundation and establishment of an Auroville-type Hungarian intentional community experiment. This community presently has 34 members and 4 hectare of lands. She is a second year PhD student conducting a research on the Intentional Communities, and their contributions to the Sustainable Development Goals.

## **An Alternative Futures Approach to Green Infrastructure Planning for an Increasing Population**

Daniel Cronan<sup>1</sup>, Andrew Kliskey<sup>1</sup>, Jamie Trammell<sup>2</sup>, Chad Lorentzen<sup>1</sup>, David Griffith<sup>1</sup> and Paula Williams<sup>1</sup>

<sup>1</sup>*University of Idaho, Center for Resilient Communities*

<sup>2</sup>*Southern Oregon University, Center for Resilient Communities*

In 2017, the U.S. Census Bureau announced Idaho to be the fastest growing state by population in the country. As these trends continue, this growth can have various impacts on socio-ecological systems such as increased development, pressure exerted on agricultural production, and increased effects of urban stream syndrome. Various scenarios, driven by stakeholders, can help effectively guide the designs of our green infrastructure networks. This project evokes stakeholder-defined key issues addressed within a National Science Foundation (NSF) funded project in Idaho's Magic Valley. Innovations at the Nexus of Food, Energy, and Water Systems (INFEWS) is an interdisciplinary research initiative seeking to address issues concerning drought, water demand, water quality, and food security by using a stakeholder-driven alternative futures framework (Steinitz 2012).

Researchers within the project seek to operationalize stakeholder-driven assumptions for various scenarios utilizing the planning and suitability of effective Best Management Practices (BMPs) for the Magic Valley in Idaho. The project will utilize an alternative futures methodology to interpret and represent rural and urban green

infrastructure interventions at various locations within the watershed. This approach has the potential to operate at various scales and, through this project, we seek to construct the narrative at both the landscape and the site scale.

The results aim to provide policy makers, planners, developers, and landscape architects about siting various BMP types through a framework for planning and design. These outputs will also depict modeled landscape change via various scenario solutions. The stakeholder group will substantiate plausible solutions and scenarios for the Valley, which will guide the green infrastructure network. Once validated, we will focus on the siting of three different structural BMP networks to address water quality, water quantity, soil health, and inclusion of public green space.

**Daniel Cronan** is currently an Assistant Professor of Landscape Architecture at the University of Idaho in Moscow where he teaches GIS tools for Land Planning Analysis, Grading and Stormwater Management, and a Graduate Landscape Architecture and Planning Studio. His research interests focus on Alternative Futures Landscape Analysis to drive policy and sustainable implementation. As Senior Research Personnel at the Center for Resilient Communities, Daniel is currently working on an NSF-Funded Alternative Futures project within Magic Valley, Idaho to model landscape change under stakeholder-based assumptions about the future.

## **Challenges of Metropolitan Scale Green Infrastructure Planning: the Sydney Green Grid**

Catherine B. Evans

*Faculty of the Built Environment, UNSW*

In 2017, the Government Architect of New South Wales launched a draft policy known as Greener Places (Government Architect NSW 2017a). The new policy is underpinned by the Sydney Green Grid (SGG), an initiative pitched as transformative in its power to promote sustainable development, improve connectivity and enhance green infrastructure (GI) networks across the metropolitan region and the

state (Government Architect NSW 2017b). How successful will the SGG be in delivering “greener places” for urban areas across the state?

This paper exams the claims of the transformative power of the SGG with a focus on two related objectives. First, because the SGG is predicated on principles of GI, a brief literature review highlights the potential challenges of GI as a planning strategy. Secondly, the paper explores how the SGG relates (if at all) to precedents for metropolitan green space planning precedents in Sydney—what in fact will the SGG transform? The paper extends previous research on metropolitan scale green space planning in Sydney by bringing the SGG into focus and introducing a critical perspective derived from the GI literature. The findings reveal that in Sydney the coherence of landscape concepts and principles underpinning the metropolitan planning strategies is difficult to sustain.

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**Catherine Evans** is a Senior Lecturer in Landscape Architecture at UNSW in Sydney. She is currently working on a PhD on politics and planning of post-industrial landscapes in metropolitan Sydney. She was director of the Landscape Architecture Program at UNSW from 2015-2018.

# Session 2B

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## *Biodiversity*

Saturday, 2:00pm - 3:15pm  
Room 162

## Hotspot Cities Project

Richard Weller and Zuzanna Drozd

*University of Pennsylvania, Department of Landscape Architecture*

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This presentation will introduce ongoing research at the University of Pennsylvania. The Hotspot Cities Project examines how urban growth over the next decade will likely destroy habitat critical to the survival of vulnerable species in the world's most biologically diverse and threatened regions - the biodiversity hotspots - and how design and planning can be used to mitigate this imminent catastrophe. The UN Convention on Biological Diversity's Aichi Targets aim to avert mass extinctions by urging countries - as well as subnational governments including cities - to protect intact habitats where they exist and to restore habitat function where it has collapsed in representative and connected zones that prioritize biodiversity preservation. As city footprints continue to grow, urban greenways act as habitat reserves, corridors that facilitate the movement of wildlife between increasingly fragmented habitat, and as rich edges that can shape city growth toward more sustainable urban forms.

The project is an extension of Professor Weller's *The Atlas for the End of the World - Atlas for the Beginning of the Anthropocene*. [1] The Atlas includes essays, artworks and over 800 original maps which show how the 142 nations that preside over the world's 36 biological hotspots are tracking with regard to meeting 2020 targets for protecting biodiversity. The Atlas projects the growth rates of 422 hotspot cities to 2030, superimposing the ranges of endangered species and remnant habitat, the Atlas shows that 93 percent of these cities are on collision courses with the world's most valuable biodiversity and have done very little planning to avoid it.

The Hotspot Cities Project zooms in on 33 of the fastest growing of these cities. Our study of these cities has been multifold. We started by mapping the potential conflict zone between growth and biodiversity by superimposing 2030 urban growth forecasts from the Seto Lab [2] onto remnant vegetation data from 2012 (GLCF 2017) [3] as a series

of maps that show the likely “bloodlines” at the peri-urban “seams” where urban edge meets remnant habitat. We have identified the extent to which 33 focal cities conducted baseline biodiversity assessments, long term planning, and experimental design interventions aimed at stemming this loss. We have also begun a literature and case study review of academic, policy, and design-based interventions aimed at redirecting/reshaping urban growth towards spatial arrangements and forms that coexist with rather than conflict with biodiversity. In June 2019, the Hotspot Cities Project will hold a symposium that will bring together one municipal official/planner and one conservationist/ecologist from subset of 15 of the 33 hotspot cities for dialogue about their current challenges.

[1] Weller, RJ, Claire Hoch and Chieh Huang, “Atlas for the End of the World: <http://atlas-for-the-end-of-the-world.com> (accessed August 10, 2017).

[2] Karen C. Seto, Burak Generalp, & Lucy R. Hutyra, “Global Forecasts of Urban Expansion to 2030 and Direct Impacts on Biodiversity and Carbon Pools,” *Proceedings of the National Academy of Science of the United States* 109, no. 40 (2012): 16083-16088.

[3] We use remnant habitat as a proxy for ecosystems that have the capacity to support endangered species; we found that this approach identifies potential urbanization-habitat conflict zones more narrowly than the conflict zones between predicted urban growth and the ranges of non-marine animals included in the IUCN’s Red List in the categories of Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT), and Least Concern (LC) (IUCN 2017).

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**Zuzanna Drozd** is the Coordinator of the Hotspot Cities Project at UPenn, which is looking at biodiversity planning efforts by 33 of the fastest growing cities in the global biodiversity hotspots. These cities are expected to have significant conflict between urban growth and critically important remnant habitat that harbors vulnerable species. Zuzanna is also in the process of getting her Master of Landscape Architecture from University of Pennsylvania. She has a Bachelor’s degree in Product Design/Mechanical Engineering from Stanford University and ran an educational garden for 5 years before pursuing graduate school.

## **Productive Waterscapes in the west-south of Europe. Use circular economy theory to drive the change from a linear to a circular paradigm of water and greenways.**

Guido Granello<sup>1</sup> and Monica Manfredi<sup>2</sup>

<sup>1</sup>*Univestidad de Alcala de Henares, Departameto de arquitectura*

<sup>2</sup>*Politecnico di Milano, Dipartimento di Architettura e Studi Urbani*

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Re-thinking, re-design, re-use are the keywords of the ecological economy that seek to link social, economic and environmental aspects together. These fundamental principles can be observed in the theories proposed by the Ellen MacArthur Foundation and are the basis of the new discipline called Circular Economy. Recent studies seem to advise that the transition to sustainability (Foro Springtif 2015) is stopped by political, cultural, economic, and infrastructural reasons. This article shows and discusses through presenting different case studies, the situation of the circular economy applied to peri-urban greenways and waterfronts. Presenting obstacles and opportunities, the researchers want to give some advice and trace a method capable of shifting from a linear economy to a circular economy in urbanism and land management.

The focus on the historical link between cities and water, shows that the linear economy is in a continuous relationship of love and hate, thanks to the force of the water and the engineering knowledge of the human beings: a strong relationship when water was used for the industrial revolution, of distance and fear when the water was wide and polluted. In the last decade, this relationship seems to be skipped. Thanks to climate change, flood events appear to occur with increasing frequency and intensity, but municipalities allow industry and logistical compounds to settle near the rivers, affecting the aquifer.

The paradigm shift to a circular economy should include a democratic society where citizens are promoting different lifestyles and push the decision-makers to develop new strategy and policy. This new vision is well applied in different contexts but doesn't seem to be able to face and influence the protection of the last ecological corridors present

in peri-urban areas, the reclaiming of derelict and polluted industrial areas, and the development of a virtuous approach to new industrial and logistical settlements.

The conclusion of the paper collects positive case studies, using them to show some methods and strategies able to drive the change through a new balance between ecological restoration and economic development. Re-thinking, re-design, re-use are keywords of the ecological economy that seek to link social, economic and environmental aspect together.

**Monica Manfredi**, Architect and Landscape Designer, Adjunct Professor since 2000 and PhD at Politecnico di Milano, has dealt with Water Landscapes inventing Hydro-Landscapes and has designed the public spaces of historic center of Intra in Verbania. She has collaborated with Umberto Riva on interior design, museum installations, exhibitions, public spaces and landscape design. She writes and does research on issues of architecture, environment and landscape.

### **“City in the park”, Greenway network concept of high-density cities. Adaptation of Singapore Park Connector Network in Chinese cities**

Guifang Wang<sup>1</sup>, Huawei Li<sup>1,2</sup>, Yang Yang<sup>1</sup>, Sándor Jombach<sup>1</sup> and Guohang Tian<sup>2</sup>

<sup>1</sup>*Szent István University, Faculty of Landscape Architecture and Urbanism, Department of Landscape Planning and Regional Development*

<sup>2</sup>*Henan Agricultural University, College of Forestry, Department of Landscape Architecture*

The high density of cities has become the characteristic trend of growth in today's Chinese cities. Taking some cities as an example, the population density of the core areas in Beijing is 20,700 person/km<sup>2</sup>, Shanghai is 25,600 person/km<sup>2</sup> and Zhengzhou is 10,362 person/km<sup>2</sup>. In 2018, the Chinese government proposed the concept “City in the park”. It means that the urban space will be primarily utilized to create a more complete green space system.

As connectors of the urban green space, these elements as greenways will become an important structure for connecting various types of green spaces such as parks, nature reserves, waters, forests and other green spaces. This paper takes the Park Connector Network (PCN) as an example, to analyze Singapore's experience and to cope with the dramatic increase in population and urbanization. The research goal is to provide reference for the construction of Chinese garden cities and the construction of high-density urban green space systems.

Problems in high-density urban systems:

- a). Lack of land for creating green space in densely populated cities;
- b). The multi-functionality of land use has low efficiency and there are many underutilized areas;
- c). Insufficient connectivity of existing green space;
- d). Green space around the community does not meet the daily needs of residents;
- e). The green space management system is not completely developed.

This paper mainly studies the background of the green network in Singapore: the planning content, the greenway design techniques and indicators. In addition, the Network (PCN) also sets an example to develop a drainage buffer and linear reserved areas of roadways, to increase the accessibility, connectivity and biodiversity of different green open spaces. The PCN example provides law enforcement through the establishment of specialized institution to solve inter-departmental cooperation problem. Based on the analysis of the Singapore Park Connector Network (PCN), we propose the following suggestions for the planning and implementation of high-density urban green space system in China:

- a) Make full use of low-efficiency land, especially linear space;
- b) Collect public information to meet the needs of residents;
- c) Pay attention to the ecological benefits of greenways and protect diverse habitats;
- d) Improve ecological design and focus on habitat creation;
- e) Establish a complete green space management system and a related department.

**Guifang Wang** is a PhD student in Landscape Architecture at Szent István University, Department of Landscape Planning and Regional Development. Her bachelor degree is Agriculture in Henan University of Science and Technology, and her master degree is landscape architecture in Henan Agricultural University, China. Her research topic is Multi-scale construction and optimization of ecological network in urban and rural ecosystems. The general goal is to maintain a high degree of landscape connectivity to reduce fragmentation and to balance the contradiction between urban construction and ecological environment protection. The research focuses on urban and rural ecosystem and provides references for planning.

## **Repercussions in the landscape of Colombian Amazonas (Caquetá and Putumayo Region) caused by deforestation during the internal armed conflict; a Review**

Fernando Arturo Mendez Garzón and István Valánszki

*Szent István University, Faculty of Landscape Architecture and Urbanism, Department of Landscape Planning and Regional Development*

Colombia has lived in the last sixty years trapped between the claws of an internal conflict with special characteristics, which have brought serious consequences for its development and a very high cost in human lives. However, these consequences are not limited only to economic and social fields, they have also brought several effects on the environment, as well as strong changes in the landscape, especially in the country boundaries and more neglected zones of the Amazonas region.

The Amazon rainforest, the largest in the world in terms of size and biodiversity, is recognized as a source of ecological services for both local and worldwide communities. Ten percent of its territory belongs to Colombia, covering approximately 35% of the country's total area. Despite global efforts, it continues to be vulnerable to deforestation pressures which change the land use and consequently the landscape. In the Amazonian departments of Caquetá and Putumayo, human activities, such as logging and illicit crops are the main causes of deforestation, which are increasing the department's vulnerability to climate change and natural hazards. This is especially true in the

foothills between the Amazonas and Andes region, which function as a greenway (transition zone) linking these two important ecosystems, one of the most biodiverse regions in the world.

This paper seeks to collect data from several sources to give an integral and general approach based on mixed methods of the effects of several drivers, including the internal armed conflict, on the forest cover and the landscape in the last 16 years. The methodology used in the review paper was comparing and crossing data of the conflict, deforestation and illicit crops from both, private and public sources, including the United Nations Office on Drugs and Crime (UNODC), The Monitoring Project of the Andean Amazon (MAAP), the “Peace and Reconciliation Foundation”, “Dejusticia Study Centre” and The Alexander von Humboldt Institute. In addition, remote sensing and GFW data were used to generate indicators of degradation in the land use and land cover.

Nowadays, after the agreement with the “FARC” guerrilla in 2016, the discussion focuses on the threats that post-conflict could have on the development potentials of affected areas. The government focuses now to decrease the number of illicit crops and increase the reforestation efforts. This will help recover the original landscape, such that the end of the armed conflict brings opportunities to repair the environmental damage and rethink the development of the country.

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**Fernando Arturo Mendez Garzón** is an Industrial Designer, graduated from the National University of Colombia and Buenos Aires University (Argentina). He holds a Master in Garden and Landscape Architectural Design at Szent Istvan University (Budapest-Hungary). Currently, he is a student of the Ph.D. program at the Doctoral School of Landscape Architecture and Landscape Ecology at Szent Istvan University in the Department of Landscape Planning and Regional Development. Eight years of professional experience as a High School and University professor in Bogota, Colombia. Work experience includes advertising and packaging companies as well as in architectural offices; designing outdoor furniture, signaling, and open spaces. In the last years, he has focused on the research of development and restoration of National Natural Parks in Colombia and Hungary.

# Session 2C

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## *Greenways and Equity*

Saturday, 2:00pm - 3:15pm  
Room 165

## Baltimore Greenway Trails Network

Avery Harmon

*Rails-to-Trails Conservancy, Baltimore, Maryland*

The Baltimore Greenway Trails Network (BGTN) is a concept to develop an urban trail network linking the neighborhoods, amenities, and outdoor resources that define Baltimore's landscape. The project will close four gaps separating the city's existing 25-miles of trail infrastructure to create a 35-mile loop including an Olmsted designed median, underutilized railroad line, utility corridor, and other landscapes. Underlying the trail's physical composition are the racial paradigms that have shaped Baltimore's infrastructure through Redlining, Urban Renewal, gentrification, and other policies and trends that define urban development. Despite these challenges, the BGTN embodies the potential of greenways to effectively respond to a broad spectrum of local issues and interests through participatory planning and green infrastructure.

The project team has emphasized the necessity for extensive community outreach and these efforts have been supported by an American Planning Association Plan4Health grant awarded to build a constituency of trail advocates in marginalized communities through pop-up demonstrations, charrettes, and other meaningful participatory planning. Beyond gathering feedback to help steer the project's design and implementation, this has enabled RTC staff to build trust and transparency with local residents that have deep-rooted concerns about cultural shifts, displacement, and whether or not a trail would benefit existing residents. In addition, the project also received a local philanthropic grant to facilitate the development of 30% design plans for three trail gaps. Two of the sections are still in the preliminary planning stages and one was recently awarded a state Transportation Alternatives Program grant to complete 100% design plans in order to eventually pursue construction funding.

On a national scale, the BGTN, as part of RTC's TrailNation portfolio, exemplifies the diversity of RTC's work across the country to build

model trail network projects. The TrailNation projects range from rural, multi-state projects over thousands of miles, the largest is in the San Francisco Bay area at 2,700+ miles, to the 35-mile BGTN. It's critical for each project to suit the interest of the communities we're working in, so each trail takes on its own purpose and design. In regard to Baltimore, the Trail Network highlights how communities with limited resources can utilize trail infrastructure to promote quality of life, serve as a vehicle for community improvements, and break down the geographic barriers that limit our cities.

**Avery Harmon** is from Waterbury, Connecticut and now lives in Baltimore after attending Loyola University. During his senior year, Avery was introduced to Baltimore activism which inspired him to explore the role of public policy in shaping African-American neighborhoods. After graduating, Avery became a Teaching Fellow at Baltimore Collegiate School for Boys and then served as an AmeriCorps VISTA with the University of Maryland, Baltimore's Community Engagement Center. Avery currently works on the Baltimore Greenway Trails Network - 35-mile trail concept. This work is important to Avery because it allows him to pursue his goal of improving neighborhoods through the built environment while contributing to a city that he deeply appreciates.

## Planning for Diverse Engagement

Natalia Sanchez

*Cornell University, Department of Landscape Architecture*

With the majority of Americans living in urban areas, never has our urban parks landscape played a more central role in the emotional nurture and physical development of youth, the promotion of health and outdoor recreational opportunities, and the engagement of new and diverse audiences. Bolstering one of the largest urban park systems in the world, it makes sense for urban National Parks to act as a representation of why an urban setting and its green spaces need to be relevant to the changing demographics of the United States. Progressive and flexible measures must be put into place to create significant and long-lasting connections with diverse populations, community members and the future generation of park stewards and advocates. To foster engagement with new and diverse audiences, urban National Parks must first, identify new community partnerships, from

schools and universities to cultural organizations and outdoor clubs, that allow them to leverage monetary, programmatic and volunteer resources with similar missions to those of urban parks. Second, seek to attend and participate in community events where audiences not aware of urban parks, resources and engagement opportunities can begin building a sense of trust in the face of potential barriers such as fear of the outdoors, transportation or language barriers. And third, develop content-specific curriculum that is most relevant and would have the most impact on specific age-group, racial, ethnic or cultural backgrounds, from Spanish-language presentations, and history talks relevant to diverse groups, to professional and career development for young adults.

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**Natalia Sanchez** is a graduate student in the Master of Regional Planning program at Cornell University. Natalia has had the opportunity to intern with the City of Chicago's Historic Preservation Division, the National Trust for Historic Preservation in Washington, DC, the National Park Service's Urban Agenda Initiative in Jacksonville, FL; as well as with the National Trust of Trinidad & Tobago looking at the potential of the Woodford Square Heritage District as a model for sustainable urban development in Trinidad & Tobago. Natalia works as a park ranger at De Soto National Memorial, a unit of the National Park Service, and focuses on engaging new and diverse audiences with their National Parks and other public lands.

## **Revitalizing Urban Waterway's Community Greenspace: Streams of Environmental Justice**

Richard Smardon<sup>1</sup>, Sharon Moran<sup>2</sup>, and April Karen Baptiste<sup>3</sup>

<sup>1,2</sup>*SUNY College of Environmental Science and Forestry, Department of Environmental Studies*

<sup>3</sup>*Colgate University Environmental Studies, Africana and Latin American Studies*

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While there are many reports of physical demonstration projects that attempt to restore segments and functions of urban waterways, there is no consensus about what to do and how to do it from a social or environmental justice perspective. We have discovered this during the three years of working on the Onondaga Creek Revitalization

Plan in Syracuse, New York, and others have found this to be a major challenge as well. There are also equity issues in terms of who has historically been forced to live in high-risk flood plain or polluted water areas, with marginalized communities being the ones who shoulder the greatest burdens. This paper explores approaches to urban creek and river revitalization, drawing from international case studies from Europe and North America plus the authors' experience with the Onondaga Creek Revitalization Plan in Syracuse, NY. Given the different waterway objectives for both restoration and /or revitalization, there is a need for a collaborative social process, with attention to social equity, in developing such projects and plans. The authors' new book 'Revitalizing Urban Waterway Communities: Streams of Environmental Justice' (Smardon et al. 2018) presents ways of addressing multiple jurisdictions and diverse sets of stakeholders. European and US case studies present challenging environmental justice issues, and so principles and methods for addressing them are needed (Moran 2007, 2010, Perreault et al. 2012, Platt 2006). Drawing on the concepts of collaborative learning models and coproduction of knowledge, the authors developed a process for community input for urban community waterway revitalization.

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**Richard Smardon** has his Masters in Landscape Architecture from the University of Massachusetts, Amherst and his PhD in Environmental Planning from the University of California, Berkeley. He is a SUNY Distinguished Service Professor Emeritus at SUNY/ESF.

## Boom and Decline: When Greenways Link Low and High SES Neighborhoods

M. Margaret Bryant

*Department of Landscape Architecture, Center for the Urban Environment, SUNY College of Environmental Science and Forestry*

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Social and economic inequalities in American cities mean that “booming cities” all have neighborhoods that are not thriving, and “declining cities” are likely to have some areas that are booming. Disadvantaged urban neighborhoods with high numbers of people living in poverty exist in all cities, but they are more pervasive in declining cities. Greenways, linear features in the urban landscape, cut across neighborhoods with varying levels of socioeconomic status (SES), depending on their design and place-specific characteristics. Where greenways link wealth to poverty, interesting concerns, issues, and opportunities arise. This paper reviews existing research on phenomena associated with this particular aspect of urban greenways: connections that greenways make between boom and decline, between wealth and poverty, between advantaged and disadvantaged neighborhoods. Factors specific to greenway planning in low SES neighborhoods are identified, and a greenway planning framework for addressing inequalities is proposed. Examples of specific greenway projects where high SES to low SES linkages occur and have been documented are provided.

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**Dr. M. Margaret Bryant** began her career as a student of Dr. Fabos in the early 1990s and was introduced to greenways at that time. Dr. Bryant is the Director of the ESF Center for the Urban Environment (CUE) and an Associate Professor in the Department of Landscape Architecture at SUNY ESF. With thirty years of experience in private sector and academic practice, Dr. Bryant’s expertise encompasses physical landscape and environmental planning, natural resources planning, ecologically sensitive urban and site-scale design, urban green space planning, and neighborhood/environmental determinants of health.

## Session 2D

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### *Greenways and Waterways*

Saturday, 2:00pm - 3:15pm  
Room 174

## **Sensitive Study of the City/Nature Relationship Associated to the Montevideo Waterfront**

Ana Vallarino Katzenstein

*University of the Republic Udelar (Uruguay); Architecture, Design and Urbanism School FADU*

Montevideo is located on the banks of the River Plate. The coastline makes evident the evolution of ideas and meanings associated with the city/nature relations. Given its accessibility, its extension, and its intensive use, the waterfront is a paradigmatic public space of the Uruguayan capital. For this reason, for its heritage value and its status as city/nature frontier it was the object of some projects and work tool for others. It allowed the development of a theory for the study of the landscape. In turn, this theory also enabled the development of other projects that generated thematic, theoretical and methodological contributions. Building one more turn in the spiral of knowledge, we now propose gathering these contributions to enrich the sensitive study of urban open spaces.

It is essential to address the complexity of reality, with a multi, inter and transdisciplinary approach that contributes to landscape design and planning in pursuit of an integrated coastal management. It is enriching in this regard to link humanities and social sciences, art and natural sciences. In this regard, it is also fundamental to articulate the scientific culture with local traditional knowledge and with the work of decision makers. On the other hand, involving the population strengthens the identity and contributes to shape a collective conscience. Finally, for this reason, the integrated practice of university functions is as strategic as the articulated use of cartography, collaborative work and ICTs.

**Ana Vallarino Katzenstein** is the Executive Director of the Instituto de diseño, Facultad de Arquitectura, Diseño y Urbanismo (fadu) Udelar, Universidad de la Republica, Uruguay. She has written articles and books on Landscape Design and is a professor in Landscape Design; She has been a visiting professor and given presentations in Uruguay, Argentina, Brazil, Italy, Germany, France, Morocco, Colombia, Spain. Independent professional activities include: projects, consultancies and advice on landscape architecture.

## Interlinking People and Nature through a Technologized Urban Greenway

Dorottya Bekesi

*Szent István University, Faculty of Landscape Architecture and Urbanism*

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The project area is located along the Danube River in Budapest, and as a peninsula, has a significant role in the city on an ecological level. In my research, I present the project from the industrial revolution up to the present day. In my concluding remarks, various design ideas for implementation on the peninsula and in its neighborhood were demonstrated.

The abandoned Népsziget with its industrial site holds a lot of potential for cultural and environmental development. When it comes to city planning in Budapest, the main issue is the decrease of greenfield territories in the suburban areas, while the city area has many different sizes of brownfield sites which have a potential for restoration. The other important aspect of the area is its connection with the Danube River, that needs to be taken into account because of the newly emerging effort to create resilient riverbanks in cities.

I identified two strategies for the development of Népsziget. On a municipal level the connection of public transport, land use, green space character, and its core functions were improved. As a large-scale transportation development, a 5 km long greenway connection was created with the EuroVELO 6 bicycle route which runs along the riverside within the identified brownfield project area. The greenway, accessible for pedestrians and cyclists, has both cultural and educational functions and is digitally connected (through a private network) with the redesigned museum park that replaces the mentioned brownfield site in my plans.

A special feature of the program is infrastructure running on renewable energy and providing information about the priority design area and the relationship between the city and water. It also personalizes the space by linking the user's electronic device to the new development area.

The Nepsziget urban greenway project took shape through the shared vision of the cooperation of designers such as engineers (landscape design, civil, water construction, electrical), architects, scientists, and artists. It also includes many innovative constructions – solar panels, smart information columns, stormwater management, energy generating pavement, digital info post – that promote the ecological and sustainable functioning of the area.

The concept creates a thematic route for active and passive recreation, including a park with cultural and technological innovations. The main positive aspect is the transformation of old, unused, and devastated areas and the provision of new functions.

**Dorottya Bekesi** is a postgraduate landscape architecture student. Her interest is in the future global effects on cities, blue and green infrastructure development, brownfield and internal spare area development questions in accordance with the climatic, social and economic challenges of our time. Her research into the New National Excellence Program was published in 2017: “Redevelopment opportunities of the Nepsziget brownfield site” which is the underline of her current master thesis. She also worked on the San Leandro Greenway project as a research associate at the Merritt College Institute for Sustainable Policy Studies (CA) in 2017.

## **Waterways to Urban Greenways: A case study in Shangjie, Zhengzhou, Henan, China**

Li Zhang, Xiaohua Liu, Yuwu Xiang, Xiaoxia Lei, Yanliang Kuang, Junjie Li, Suyun Li, Qianying Lu, Yan Guo, Jianzhou, Xi Long, Shiyu Zhongzhu, Yihong Chen, Fengli Cao, Zhenying Shan, Jinxiu He and Yiyu Wang

*Shenzhen Techand Ecology and Environmental Co. Ltd*

This case study introduces how we used a water sensitive approach to plan a storm water and sponge city project, which expanded into a holistic green infrastructure project. The project is in the Shangjie district in city of Zhengzhou, Henan China. The whole site is 61.16 km<sup>2</sup> including several waterways. The city is expanding into areas that were previously agricultural. Developers and city both desire to improve the ecological value of the city to boost the economic growth of the Shangjie district.

The main goal for the client is to transform the existing industrial city into a more resilient and livable ecological region. Our approach is to holistically solve the region's increasing demand for flood control and storm water management, and to improve ecological and recreational values along these riparian corridors. We propose additional waterways and water bodies to act as green infrastructure, then link the greenways to existing or proposed parks to form a comprehensive greenway network.

Our multidisciplinary team conducted detailed investigations and collaborated extensively. The team consists of hydraulic engineers, civil engineers, environmental planners, landscape planners, urban planners, economic planners, and others. We used a variety of technologies, including GIS, Infoworks, remote sensing technology, MIKE model, and lab tests.

**Li Zhang** is Chief Planner of Shenzhen Techand Ecology & Environment Co. LTD. She has practiced both in the US and China in landscape design and planning. She has directed multi-disciplinary teams on numerous planning and design projects including sponge city, ecological planning, river restoration, and watershed planning, often pursuing nature-based solutions. Master of Landscape Architecture, UMASS, Amherst. Master of Architecture, Zhejiang Univ. California Licensed Landscape Architect, Leed AP

## Palermo, Italy: The Coast Road

Monica Manfredi

*Politecnico di Milano, Department of Architecture and Urban Studies*

This paper proposes a re-reading of the work of Roberto Collovà dedicated to Palermo and its coastline. It interprets, in a perspective paper, the arguments contained in his research as suggestions for the construction of landscape research to condition, through their appearance, a new way to see and interpret places and their potential.

Rereading his studies, his drawings and his observations suggests the construction of a method of recognition of the existence of a landscape, in this case of a greenway and its potential, within an existing urban fabric. The historical center, the fragments of urban spaces, and

the fragments of green that can be read as hidden parks, gardens, and third landscapes: a sequence of places described, recognized and reconnected in a single story proposing a new urban geography.

The previously unrecognizable resources are recomposed in a design that brings out invisible opportunities that are proposed to draw the character of the city of Palermo in the coming decades. Along the coast line is the story of a possible linear park as a new structure of urban infrastructure and the development of a new urban ecology that is confronted with the themes of pollution and the deterioration accumulated over time in the history of the city.

The fate of cities is entrusted to urban planning, a discipline that decides the fate of cities, but perhaps by thinking differently about existing spaces, we can find a new potential city. Cities are also full of spaces that are clippings, remnants of activities, empty spaces in the city. Forcing the definition of park as something not necessarily only green, but as a system of green urban spaces linked together, allows urban spaces to connect and hold together different parts of the city. This is possible through the recognition of a new form that must be recognized and named for it to exist. The way of conceiving this urban greenway suggests ways and perspectives of reading the existing city aimed at constructing linear urban spaces that can renew its meaning and future prospects.

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**Monica Manfredi**, Architect and Landscape Designer, Adjunct Professor since 2000 and Phd at Politecnico di Milano, has dealt with Water Landscapes and has designed the public spaces of historic center of Intra in Verbania. She has collaborated with Umberto Riva on interior design, museum installations, exhibitions, public spaces and landscape design. She writes and does research on issues of architecture, environment and landscape.

## **Session 3A**

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### *Green Infrastructure Planning*

Friday, 3:45pm - 5:00pm  
Room 163

## **'Brown' is the new green: Post-industrial sites as potential in the development of the green infrastructure on the riverfront of Budapest, Hungary**

Anna Adorjan, Anna Pecze and Kinga M. Szilagyi

*Szent István University Faculty of Landscape Architecture and Urbanism*

In Budapest, Hungary and all around Europe in the capital cities, the sight of degraded, industrial landscapes in urban areas became usual during the last decades, due to the unexpected growth of cities. In the last 30 years, many sites have gained new functions and have been reused for different purposes, but still, huge areas remained unused and presumably polluted. According to my hypothesis the unutilized areas – especially in the riverside area - could potentially become the part of a new green infrastructure element, which could make the green infrastructure system of Budapest more complete, usable and ecologically valuable.

For this paper we will analyse the existing research data, maps, concepts and plans for the Budapest riverside area from the past years, and among these especially the actual and planning state of the post-industrial brownfield areas. The research goal is to find out if these documents and plans adequately support the indicated goals and professional proposals of the concepts.

Thereafter, the paper presents international examples and best practices, which may shape the green infrastructure development in Budapest in the future.

In the second part, we will analyze and compare a post-industrial renewal residential area which is important for green infrastructure development, and the regulatory plan and design competition of an unused brownfield of Budapest, both in the riverside area and with lots of similarities, with the aim of developing a typology of different approaches, goals, and design means that have been applied, and distilling a set of guidelines for the design of future projects. This

means not only comparing potentials and limitations of the site and of the future program but also investigating the different long-term strategies, for instance, a choice for a master plan.

One of the conclusions from the analysis of the Hungarian capital and the international examples is that an integrated approach of the development documents and regulatory plans is needed to ensure the long-term development of the green-infrastructure of Budapest. From the second part, the case studies show the realization of the plans, and help to conclude the successful and failed acts on the riverside for the future real estate developments, and exact actions which would be able to promote the development of the riverside in the hope that future real estate development will deliver the new green infrastructure element of Budapest to adapt the city for the 21th century.

**Anna Adorjan** is a teacher assistant in the Department of Urban planning and Design, at Ybl Miklós Faculty of Architecture, Szent István University, where she has been since 2014. From 2014 to 2017 she was doctoral student at the Szent István University Doctoral School of Landscape Architecture and Landscape Ecology, she is now PhD candidate. The focus of her research is the reuse of post-industrial sites, green infrastructure planning and the urban green system. In her work as a teacher assistant, and in her research she tries to use her design experience from the years she spent as a professional urban planner and landscape designer

## **Selling nature: aligning green infrastructure principles with the funding of urban landscapes**

Ian Mell

*University of Manchester, School of Environment, Education & Development*

As the allocation of funding for urban greening continues to diminish planners, landscape professionals and environmental advocates are increasingly turning to the ‘valuing of nature’ as a mechanism to address these shortfalls. Whilst consensus exists that urban nature holds a critical role in promoting ecological sustainability and liveability, there is a less established understanding of how we translate these ideas into funding. Such variation in landscape valuation practices leading to significant disparity between how cities support their natural

environment. In turn this has led to a growing reflection on how we can valorise the environment to ensure it is attributed with the same value as other built infrastructure. By increasing the proportion, diversity and functionality of urban areas it is possible to examine how city governments, developers, and the environment sector have utilised green infrastructure to generate institutional and financial buy-in for investment in nature-based interventions. Through an assessment of the implementation, management and funding of green infrastructure, with specific reference to London, this paper discusses the nuances of valuing nature to identify barriers and successes to investment in urban nature. It goes on to reflect on who, how and where resources are being delivered, enhanced or downgraded and asks how the nuances of value can be used to shift the understanding of stakeholders towards a more nature-based mind-set for development.

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**Ian Mell** is an Associate Professor in Environmental and Landscape Planning at the University of Manchester. He is a leading expert in Green Infrastructure policy and practice and has worked extensively across the world evaluating the added-value of GI investment

## **Challenges and answers of urban development focusing green infrastructure in European Metropolises**

Krisztina Filepné Kovács, Paloma Gonzalez De Linares, Vera Iváncsics, Klaudia Máté, Sándor Jombach and István Valánszki

*Szent István University, Faculty of Landscape Architecture and Urbanism, Department of Landscape Planning and Regional Development*

Urban sprawl is a general problem of developed countries and several European strategies highlight the importance of controlled development, compact settlements structure, and protection of ecologic values. We analyzed European metropolis regions focusing on challenges of preservation of green infrastructure and controlling urban sprawl. Vienna has protected the green spaces in and around the city for a century already. In case of Munich, the “compact-urban-green” leitmotif was implemented. Rennes created a green

belt around the city, protecting agricultural land and privileges high densification and the agglomeration is planned in a polycentric model. In our comparison analysis, we would like to draw the consequences for metropolitan region of Budapest for which the state adopted an act for shaping the frames of spatial development. The Urban Atlas elaborated by the European Environmental Agency helps us to compare the land development between 2006 and 2012 in the surveyed metropolis regions.

**Krisztina Filepné Kovács** is an associate professor at Szent István University, Department of Landscape planning and Regional development. She received her doctoral degree in 2014 with thesis: *Land use aspects of rural competitiveness*. Main teaching subjects: Landscape planning, Spatial planning, Regional development. Main research topics: landscape function analysis, rural development, spatial planning systems of European countries. She participated in preparation and execution of several Hungarian and international projects.

## **Identifying and classifying, quantifying and visualising Green Infrastructure via urban transects in Rome, Italy and Sydney, Australia**

Simon Kilbane<sup>1</sup> and Daniele La Rosa<sup>2</sup>

<sup>1</sup>*University of Technology, Sydney*

<sup>2</sup>*University of Catania, Department of Civil Engineering and Architecture*

Green Infrastructure is increasingly recognised as an approach to deliver a wide-ranging set of ecosystem services in cities and as a way to operationalize concepts of urban resilience through the better delivery of urban planning, water sensitive urban design and a broad diversity of open space types. This paper argues that the first step in the delivery of effective Green Infrastructure planning and hence ecosystem services is the identification, visualisation and calculus of the full spectrum of existing open space types within urban contexts. To test this idea two case study cities – Rome and Sydney – were selected for their differing geographical origins and planning history. In each city an analysis of the urban fabric through a novel

transect mapping process revealed a range of Green Infrastructure types including a diversity of open space, public parks and plazas, streetscapes, greenways and terrain vague. This began by analysing and comparing identified land-uses with existing planning rules, strategies and mechanisms within each city. Through this process we found that for each city significant differences were evident between the formally recognised urban open space and a range of potential additional Green Infrastructure candidates were identified. We then considered the potential recognition and activation of these spaces as critical pieces of overlooked Green Infrastructure into the metrics of a sustainable future city. Comparing these two cities against each other also confirmed the richness of Green Infrastructure types globally across both expanding and contracting cities and highlights differences in data precision, land policy, governance, nomenclature and urban conditions. This research posits that in the absence of the holistic and multi-faceted understanding, metrification and the visualisation of the diversity and distribution of green infrastructure in all its forms then progress towards implementation of robust and resilient cities and their urban ecosystem services will be limited.

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**Simon's** interests lie in the potential for mediation at the interface between Landscape Architecture and Ecology and specifically the role of design to connect ecological patterns and processes with humanity. Previously employed as a Landscape Architect and Urban Designer, Simon worked in the UK, France, New Zealand and Australia before completing his doctorate under Richard Weller (Landscape Architecture, University of Pennsylvania) and Richard Hobbs (Landscape Ecology, University of Western Australia). From 2014, he established the Landscape Architecture program at the University of Technology Sydney as its inaugural chair and in 2018 was awarded the Australian Institute of Landscape Architects 'National Award of Excellence for Research, Policy and Communication', the highest award of this type in Australia.

# Session 3B

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## *Urban Vegetation*

Friday, 3:45pm - 5:00pm  
Room 162

## Urban Microscales: The role of spontaneous urban vegetation and site-responsive art interventions

Frank Slegers

*University of Massachusetts, Amherst, Department of Landscape Architecture and Regional Planning*

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The discussion of non-indigenous, spontaneous plant vegetation in urban environments has been a polarizing discussion. Most recently, a group of urban ecologists and researchers have questioned “state of the art” activities eliminating non-domestic and exotic plant species from extreme urban landscapes such as brownfields or places with extreme climatic conditions. (Del Tredici, 2014; Lachmund, 2013; Rohwer and Marris, 2016). Del Tredici (2014) captures typical urban infrastructure such as chainlink fences, vacant lots, stone walls, pavement cracks and describes their prevailing colonization with plants, their ecological and aesthetic benefits. These publications suggest a re-evaluation of urban vegetation.

A simultaneous discussion is guiding innovative and reactive measures to transform or explore challenged or neglected urban sites or cities (Hou, 2010). Tactical urbanism and guerilla urbanism are questioning prevalent, long-term planning strategies as they are typically institutionalized, top-down approaches that are expensive and showing results only after significant time. Some projects that fall into the category of tactical urbanism are site-responsive art interventions in transitional urban areas (Kellner et al. 2005). Noteworthy is the project HAFENSAFARI, that was executed from 2003 to 2009 in the port of Hamburg (GER) as a series of guided tours along site-specific installations to change perception of place. Typical for the installations was that they were mostly small-scale and low-budget interventions that emphasized underestimated or undiscovered structures or vegetation.

This paper will focus specifically on small urban sites and will synthesize two different fields of research and creative work: urban vegetation ecology and site-responsive art. The paper applies a mixed method of literature review and case-study research and targets:

- Benefits, challenges and opportunities of spontaneous vegetation in urban landscapes
- Spatial distribution of spontaneous vegetation on small vacant lots and brownfields
- Examples of cultural uses of small vacant lots with spontaneous urban vegetation
- Tactical urbanism as a tool of urban revitalization
- Benefits, challenges and opportunities of residual spaces in urban environments
- Site responsive art interventions in urban contexts
- Examples of small-scale site interventions as public art

It is hoped that this findings can question prevailing practice of maintaining urban landscapes, and that the qualities and potentials of small urban sites can be redefined and direct further activities.

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**Frank Slegers** is a registered Landscape Architect and Associate Professor of Landscape Architecture at the University of Massachusetts Amherst in the Department of Landscape Architecture and Regional Planning. His work centers on strategies to rebuild urban environments by exploring ecology, community, art, and aesthetics. Slegers teaches urban design studios and competition laboratories that integrate environmental research with urban form and tactical interventions to engage community interaction. Slegers' creative work explores site responsive art to transform the perception of urban places. Frank Slegers is one of the directors of the UMass Design Center in Springfield and holds degrees from Hannover, Germany and UMass Amherst.

## The role of individual trees in the protection of urban image

László Z. Nádasy, Gábor Sándor and Zsuzsanna Illyés

*Department of Landscape Protection and Reclamation, Szent István University, Budapest, Hungary*

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The protection of urban image and cityscape has become the target of professional attention in Hungary since the introduction of Urban Image Handbooks and urban image regulations. Trees are a major part of local image in Hungary. Using GIS methods we established that built-in areas are usually surrounded by sparsely wooded areas and groves, which are taller than the vast majority of buildings. Therefore, trees play a dominant role in shaping urban character. Effects of trees on urban living conditions, liveability and the ecosystem services they provide have been intensively researched in recent years. However, the role of individual trees in determining local image has been out of the focus of research. Although trees located on public property have been inventoried in past decades, information about their aesthetic properties and image value is scarce. In addition, there is an almost complete lack of knowledge regarding trees standing on private land, even though a large proportion of these is also visible from public areas, therefore having an impact on urban image. Tree protection regulations also fail to adequately address the topic. Identifying the individual trees with the most profound effect on the visual image of an urban area is a difficult task – not only due to of the lack of information, but also because there are no established methods for determining the aesthetic and image value of urban trees.

At the Szent István University, Department of Landscape Protection and Reclamation, we attempted to develop a methodology to evaluate the importance of individual trees from the standpoint of urban image and streetscape, with District XXII of Budapest as the study area. Using a three-step method based on the analysis of aerial photographs and fieldwork, we identified the top 1% of all individual trees with the most dominant impact on the surrounding urban landscape – 706 out of an estimated 70.000. We inventoried and analysed several aspects of these trees and their environment (e.g. soil, condition,

health). The results show that there is no direct connection between the urban image value of trees and their ecological, dendrological or nature conservation importance. Our research suggests that trees with the most profound impact on the cityscape are different from those with the highest ecological value. This makes it clear that efficient protection of urban image requires a new approach towards tree evaluation as well.

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**László Z. Nádasy** is Landscape Architect and assistant lecturer at the Department of Landscape Protection and Reclamation. He participates in the education of domestic and international programmes and courses in nature conservation, habitat mapping, landscape protection, dendrology and study of ornamental plants. His research topic is the assessment of individual urban trees based on their landscape value.

## **Characterizing Historical Urban Canopy Cover Change in a Post-industrial City**

Marc Healy

*Clark University, Graduate School of Geography*

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Urban forests are typically studied through the lens of their current benefits, socioeconomic factors, and management policies - often overlooking the historical factors that have led to current conditions. Urban tree distribution, structure, health, and associated benefits reflect past state and city-level planting initiatives and programs. This historical legacy has played out within post-industrial cities in Massachusetts, resulting in low canopy cover and ecosystem services compared to wealthier neighboring towns and cities. This study investigates the trends in tree cover and distribution in the city of Chelsea, the first city in the Massachusetts Department of Conservation and Recreation's Greening the Gateway Cities tree planting program. Chelsea, a former shipbuilding and manufacturing hub, is an example of how canopy coverage and human drivers interact within a post-industrial city. Canopy cover maps for 1952 and 2014 will be evaluated in the context of the relevant political and planning initiatives at the time. This historical perspective will allow for enhanced understanding of the current distribution of the urban forest and canopy coverage.

It will also provide context for the recent tree planting taking place in Chelsea through the Greening the Gateway Cities Program. This state sponsored program concentrates planting in environmental justice neighborhoods that have lower tree canopy, older housing stock, higher wind speeds, and a larger renter population. The Greening the Gateway Cities Program plans to increase the urban tree canopy by 5-10% primarily to reduce heating and cooling costs, but trees have many other associated benefits such as reduction in stormwater runoff, better air quality, and an increase in property values. This program can

**Marc Healy** is a PhD student at Clark University's Graduate School of Geography. He currently researches effects of urban forests in Massachusetts through a state funded tree planting program called Greening the Gateway Cities. Marc graduated from the University of Utah in 2014 with a BA in Geography, having interned at Wasatch Front Regional Council (MPO).

## **The impact of tree planting program governance structure on tree survivorship and vigor: A case study using the Massachusetts Greening the Gateway Cities program.**

Nicholas A. Geron, John Rogan, Deborah Martin and Marc Healy

*Clark University, Graduate School of Geography*

Trees in urban neighborhoods benefit residents by reducing building energy costs, providing cleaner air, decreasing surface runoff, and improving quality of life. However, tree canopy cover is not evenly distributed across neighborhoods in many mid-sized American cities which leads to higher air and surface temperatures, and increased energy bills for residents who are the most economically vulnerable. The state of Massachusetts (USA) created the Greening the Gateway Cities (GGC) program to increase tree canopy cover by 10% in post-industrial, midsized cities with lower educational attainment and lower income than state averages. The study posed two questions: what is the governance structure of the GGC program? How successful is the program using annual survivorship and vigor of the trees? This research examines the GGC program as a case study for a governance structure that fosters connections between the city, community and residents

can create the social and environmental infrastructure to support increased tree canopy in urban neighborhoods. Data was collected in four gateway cities in Massachusetts: Chicopee, Fall River, Holyoke and Chelsea. 49 residents who received trees as part of the program were interviewed as well as two DCR foresters, three city planners, one head of the city's community maintenance (Department of Public Works), and two paid staff and three volunteers of community partners. These interviews informed the creation of a governance framework for the GGC program. Tree survivorship, annual mortality and vigor of 3459 trees were used to measure the initial success of the planting program and to forecast potential benefits to residents. Results show how the GGC planting program can produce increased sense of ownership between cities, communities and individuals in the planting zones. The governance model, with an emphasis on stewardship, showed high rates of annual survivorship (~96.5%), low annual mortality rates (~3.5%) and average vigor rating of 1.5 (1 being healthy, 5 being dead).

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**Nick Geron** is a Ph.D. student in the Graduate School of Geography at Clark University with a focus on urban forestry. Urban forests face many challenges from increasing development and population growth to a changing climate. Nick is interested in the success of tree planting programs like the Greening the Gateway Cities Program in MA to ensure healthy urban forests in the future. He studies the survivorship of juvenile trees, the potential benefits from tree planting and the informal and formal governance structures surrounding the urban forest.



# Session 3C

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## *Spatial Analysis*

Friday, 3:45pm - 5:00pm  
Room 165

## Mapping and Assessment of the Urban Heat Island in Zhengzhou City

Huawei Li<sup>1,2</sup>, Guifang Wang<sup>1</sup>, Guohang Tian<sup>2</sup> and Sándor Jombach<sup>1</sup>

*<sup>1</sup>Szent István University, Faculty of Landscape Architecture and Urbanism, Department of Landscape Planning and Regional Development*

*<sup>2</sup>Henan Agricultural University, College of Forestry, Department of Landscape Architecture*

The rapid urbanization of Chinese cities has brought significant effects to the urban environment and ecological network. The changes in urban forms and land cover pattern have made a great impact on urban climate. A series of environmental problems have arisen from urban heat island and endanger the sustainability of urban development. Therefore it is requested to assess and predict the urban heat island changes in order to support management of diverse functions in the city.

We chose Zhengzhou city as a research area. It is the capital city of Henan Province in Central China, characterized by a warm climate and four distinctive seasons, with a dry spring (March–May), and a hot and rainy summer (June–September). Based on the Landsat TM and ETM+ images from 2000 to 2017, we applied GIS technology for the analysis of Land Surface Temperature (LST) and prepared further assessment. Using LST data of the past 17 years, we analyzed the changes of urban heat island and its relationship to land use change and other factors, in order to make suggestions to planning.

Two algorithms were selected to compare and obtain reliable LST data in this research. The first one uses the split-window method for the retrieval of land surface temperature. The second uses the comparative analysis method to reveal the temperature changes of five different classes for the past 17 years. Finally we examined the relationship between land surface temperature (LST) and the pattern of impervious surface and green space in metropolitan areas.

The results show that from 2000 to 2017, the heat island effect of Zhengzhou city changes with the direction of urban development. With the growth of built up land and a decrease of green space LST has increased. The type of heat island is transferred from the low temperature zone to the medium temperature zone or to the high temperature zone. The surface temperature rise was caused by the increase of built-up land. Additionally, the LST variation is not only associated with the dominant land cover types but is also affected by the land cover transformation pattern and dynamics. Vegetation and water surfaces have a good cooling effect. This finding implies that development of green spaces is the most efficient way to reduce heat island effect when Zhengzhou city implements urban and landscape plans.

**Huawei Li** is a Phd student at Szent István University, Department of Landscape Planning and Regional Development, Hungary. He holds a bachelors in urban planning, and master in landscape architecture. He is also a Phd student at Henan Agricultural University, Department of Landscape Architecture, China. His research focuses specifically on dynamic changes and effects between green space and urban heat island in the development of urban regions, and also its relation to city structure. The general aim is to develop a GIS based green infrastructure management system for regions of dynamically developing cities like Zhengzhou.

## **Greenway exploration in the satellite jungle – Discovery of urban and rural green network with satellite image analysis in Hungary**

Sándor Jombach, Huawei Li, Guifang Wang, István Valánszki and Krisztina Filepné Kovács

*Szent István University, Hungary, Faculty of Landscape Architecture and Urbanism, Department of Landscape Planning and Regional Development*

Over the last few decades of growing data production in the field of remote sensing and GIS, we have experienced a rapid development of methods and tools in green network analysis. A series of journal articles, methodological and technical guidelines describe how to map green system based on aerial photography and satellite imagery. Many

studies stress that green networks have a climatic conditioning role and outstanding ecological significance in landscapes. Environmental agreements and sustainability aspects emphasize the need for mapping and managing green infrastructure in urban and rural landscapes. The usual question is: What are the elements of green infrastructure in a study area? In the last few months, we have prepared a series of satellite images and aerial photo analyses and have processed freely available spatial data on green spaces, land use, climatic hot spots, and have searched for ecological and recreational potential of landscapes in Hungary, in order to explore greenway suitability. In this paper, we make a report about our research, discovering greenway potential of urban and rural landscapes.

**Dr. Sandor Jombach** is a landscape architect from Hungary, assistant professor of Szent István University, Faculty of Landscape Architecture, Department of Landscape Planning and Regional Development. He has lectured since 2006 in the fields of GIS, Remote Sensing, Landscape Management and Assessment at the University and preparing studies and research projects on Green Space Intensity of cities. His additional specialty is Landscape modelling, Visualization, Landscape Assessment, Character Assessment, Capability and Suitability Assessments. He is coordinating research projects on Visibility Assessment, Green Space Analysis and Urban Heat Island.

## **Study on Greenway Network Planning Based on Big Data Social Behavior and Urban Potential Space Framework**

Xixi Chen

*Beijing Forestry University*

Chinese greenway construction will enter a new period of development. The existing research and practice has been focusing on the construction of regional greenways. Considering the urban traffic congestion and the worsening issue of the air pollution problem, urban bicycle greenways should be high-ranked in the future greenway construction in China. The selection of urban greenway is influenced by complicated factors, such as the existing urban land use layout, the network structure and the usage demand. At present, China greenway route selection is mainly based on suitability analysis of the value and

potential of urban land use, but rarely related to the daily use demand of citizens. In particular, there is a lack of consideration of the two key factors: the conversion potential of urban land and the usage demand of urban residents. Under the new big data environment, this paper uses big data to explore a greenway network planning model, which consists of GIS spatial analysis (evaluation of potential space of urban greenway) and social behavior analysis of big data (evaluation of use demand of urban residents).

From the perspective of urban greenway potential space evaluation, including: 1) high frequency use space, evaluated through urban public space vitality and urban green space landscape vitality. 2) Unutilized space that can be transformed, namely river channels, railways and protective greenbelts. From the perspective of social behavior analysis of big data, including: 1) usage demand analysis of existing park and built greenway based on big data of Web review, analyzing daily activities and usage demand by verb statistics, and mood index by semantic analysis. 2) bicycle usage demand analysis of greenway node space and linear space by shared bicycle OD data and trajectory data.

Linear space and point space can be drawn from the above analysis. The analysis of linear space is used to establish the cost grid of greenway suitability, while the analysis of point space is used to establish an evaluation index system and select greenway nodes. Minimum cost path algorithm is used to generate the preliminary scheme of greenway selection by connecting nodes and cost grid in ArcGIS. Finally, combined with big data analysis of greenway usage demand, the structure and function of the greenway planning is optimized to form an overall urban greenway network system. Under the background of new technology development, a controllable and quantitative data model of urban greenway selection is explored.

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**Xixi Chen** is a master student in School of Landscape Architecture, Beijing Forestry University. Her research focuses on Landscape Architecture infrastructure (Beijing 100083), having published a study on Urban Bicycle Greenway Planning Based on Big Data Analysis of Shared Bicycle on IFLA World Congress 2018.

## Greenness Indicator for Spatial and Settlement Planning Based on NDVI and LAI Indicators

Laszlo Kollányi, Klaudia Máté, Viola Prohaszka, Edina Fóris and Ágnes Sallay

*Szent István University, Department of Landscape Planning and Regional Development*

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In the international practice of green infrastructure research, many indicators have been developed to measure the social functions, naturalness, the role of the urban climate, interconnection, networking, multifunctionality, and ecosystem services. In 2007, an indicator of biological activity value (BA) was introduced into the Hungarian town planning practice and legislation, which shows the intensity of green areas in areas to be built and is the basis for counting land use changes of settlements. However, the actual biomass, which can be measured by remote sensing devices, has not yet been considered in determining the indicator values. The main purpose of this research was to develop an easy-to-use, easily adaptable indicator for spatial and settlement planning, which has good correlation with the green coverage of different land uses and with biomass; and which may be also suitable for monitoring the ecological value of land use changes.

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**Laszlo Kollányi** is a landscape architect and landscape planner. He has taught for more than twenty years on landscape planning and GIS in the Landscape Planning Department of Szent Istvan University. Main research fields: modelling landscape with GIS, landscape planning, green infrastructure planning, historical preservation in the landscape, landscape aesthetics.

# Session 3D

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## *Greenway Perception*

Friday, 3:45pm - 5:00pm  
Room 174

## Trail Users in the Cincinnati Metropolitan Region: Purposes, Patterns, and Preferences

Na Chen<sup>1</sup>, Greg Lindsey<sup>2</sup>, Wade Johnston<sup>3</sup>, Kelley Adcock<sup>4</sup> and Esther West<sup>5</sup>

<sup>1</sup>*College of Design, Architecture, Art, and Planning, University of Cincinnati*

<sup>2</sup>*Humphrey School of Public Affairs, University of Minnesota*

<sup>3</sup>*Tri-State Trails, Green Umbrella*

<sup>4</sup>*Interact for Health*

<sup>5</sup>*Research Analyst*

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The benefits of using multi-use trails have been recognized from different perspectives, such as improving public health, expanding active transportation options, and enhancing environmental quality. Trail managers in Greater Cincinnati have developed a 212-mile trail network, with plans to expand and connect the system. Given regional priorities for trail development, trail managers and advocates need to understand more about trail users and how they use the network. In response, two nonprofit organizations in this region, Tri-State Trails and Interact for Health, along with the assistance from researchers at the University of Minnesota, launched Greater Cincinnati's first comprehensive trail measurement program including both trail traffic monitoring and an intercept survey of trail users. Monitoring results show the network is heavily used: in 2017, monitoring results on 137 miles of the network showed users traveled an estimated 11 million miles on those segments annually (Lindsey et al. 2019).

This paper describes results of the survey which was designed with questions covering trip characteristics, perceptions of the trails, socio-demographics, and locational information. Between August 2017 and October 2017, 31 trail staff and volunteers administered the survey at 20 locations. 734 responses were obtained. Three methods are used to analyze the survey: descriptive summary, statistical association analysis, and geographical mapping. The descriptive results show 89% of respondents are recreational users while only 8.8% are utilitarian users.

These utilitarian users cluster in areas close to Cincinnati downtown and along a centrally located, long trail that connects several communities. Most recreational users are female, white, between 35 and 64 years old, well-educated, and with relatively high incomes. These users primarily bicycled and walked on trails, drove less than 25 minutes to trail, and traveled less than 5 miles. In contrast, most utilitarian users are male, with income of less than \$59,999, walked or biked to trail, and traveled no more than 2 miles on trails. Recreational and utilitarian users' preferences are consistent with positive attitudes towards trail use and environment. Some differences between recreational and utilitarian users are statistically supported using the statistical association analysis. Geographically, the neighborhood context of trail users with different socio-demographics is displayed to illustrate clustering phenomenon among trail users by race and income.

The differences between recreational and utilitarian users imply the importance of developing policies to satisfy various needs of trail users. This analysis provides a valuable framework for local governments to evaluate, manage, and improve the multi-use trail network.

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**Dr. Na Chen** is an assistant professor in School of Planning at University of Cincinnati. She received her B.A degree in Public Policy from Sun Yat-Sen University, Guangzhou, China, in 2008, the M.A. degrees in Community Planning and Public Administration from Auburn University, AL, in 2011, and Ph.D. degree in City and Regional Planning from The Ohio State University, OH, in 2016. After she received her Ph.D. degree, she worked as a Postdoctoral Scholar in Department of Technology Management at University of California, Santa Cruz, CA. Her research interests include travel behavior analysis, accessibility, transportation equity, transportation and land-use planning, and spatial data analysis.

## Recognizing Greenway Network for Quantifying Students Experience on Campus-Based Universities: Assessing the Campus Outdoor Spaces at San Diego State University

Mohammed Gabr<sup>1</sup>, Hisham Elkadi<sup>2</sup>, and Claudia Trillo<sup>3</sup>

<sup>1</sup>*Department of Architectural Engineering and Environmental Design, Arab Academy for Science & Technology, Alexandria, Egypt*

<sup>2,3</sup>*School of Built Environment, University of Salford*

This paper evaluates the potential of creating a green infrastructure – more specifically, an urban greenway – and its contribution to the students' campus experience, with emphasis on the outdoor university activities. To achieve best value for money – particularly in the current financial climate, with severe budget cuts constraining universities – justifying investments on campus outdoor spaces such as greenways, relies on a clear demonstration of their link to the overall success of the campus. Attempts to quantify the benefits from investments on such spaces are challenged by the scarcity of studies on the relationship between students' experience and design (and related cost) of different types of campus landscape settings. This paper fills this gap by offering a thorough examination of a variety of extant campus developments and by measuring the performance of some selected open spaces against a 'price-tag' mechanism. The case study of the San Diego State University has been chosen as core case study and supplemented by 16 sub-cases across California State. The assessment has been conducted through three steps. First, a site inventory of the physical characteristics and landscape features has been conducted, focusing on 7 typologies of campus outdoor spaces (COS). Second, four main use patterns (Individual-customized, Group-social, Programmed-scheduled, and Active experiences) have been assessed by calculating the intensity of use (function of the frequency and duration of use) for each of them. The data collected was based on syntax observation methods with photos and maps of COS as prompts. Third, a Campus-Experience-Score (C-E-C) has been calculated and normalized to the size and population of the university, matching it against the actual development costs of each COS setting. The C-E-C allows measuring the link between types and features of COS and related students' experience. Findings were discussed and verified through six in-depth

interviews with local and international academics and developers/practitioners. This paper offers valuable benchmark to designers and planners seeking to maximize the value for money of investments on COS such as greenways.

**Mohammed Gabr** is a Lecturer Assistant at the Department of Architectural Engineering & Environmental Design (AEED), Arab Academy for Science & Technology (AAST), Alexandria, Egypt. He is an Architect analyst focusing on campus masterplanning, design developments and associated activity-based costing/investment models. During his PhD, he was awarded a 12 months secondment and then a faculty adjunct as a Marie Curie researcher at the City Planning Department, College of Professional Studies and Fine Arts, SDSU. As part of a Knowledge Transfer Partnership - co-supervised by the MAPSLED Research Programme, M.Gabr data collection and analysis methods are continuously evolving to help achieve maximum impact, reach, and longevity.

## **Impact of the engendered Fo'raa square on the city expansion; square efficiency and attraction**

Anne Gharaibeh and Jasmine Lefdawi

*Department of City Planning and Design, College of Architecture and Design, Jordan University of Science and Technology*

Irbid City Municipality foresaw a potential for reviving its center by creating an opportunity to preserve a heritage building and to serve the location by engendering Fo'raa Square at its front. The plan was put to action in 2008, when the place was transformed from a bus station to a square to adapt to this change. It created an opportunity to absorb activities and attract the expanding city center to its direction.

The purpose of this paper is to study the square daily use and its efficiency in attracting business and pedestrians from the city center and its impact on the city expansion. This research documents change through collecting information from municipality archives; and successive interviews with the local senior residents, downtown stakeholders, and decision makers. Questionnaires consist of participation profile, social activities, and the meaning of the square

for its users. Observations document patterns of static and dynamic uses in the square in accordance to surrounding land uses. Integration of space is also documented using space syntax analysis software.

The results show that, although the intention was to create a vista for pedestrians and a trigger for businesses, it acts against its intervention goals and objectives by failing to drive the city pedestrians and business towards the square. Instead, most of the square visitors are those wanting to ride on the busses at its periphery or wanting to take a short cut to reach their destinations. Very limited numbers of users occupy the space for leisure purposes or to meet others in the daytime.

Its edge-type of location and the lack of active land uses are marginalizing its role as a square to the extent that it becomes a negative space at night. It is not considered a destination for shoppers or workers in the downtown. After 10 years of its establishment, it is still unknown to the majority of people shopping downtown.

**Dr. Anne Gharaibeh** is an Associate Professor of landscape architecture and land use change. She is currently Chair of the Department of City Planning and Design and the Vice Dean for College of Architecture and Design. Won Shoman Prize for research in 2016

## **Evaluating Open Space in urban fabric on basis of different landscape aspects, Case Study: Circuit House Park, Mymensingh, Bangladesh**

Farzana Sharmin and Mansura Perveen

*University of Nürtingen-Geislingen, Germany*

Urban open spaces are integral parts of city life to provide better quality of life. Rapid development processes initiate expansion of the city but lead to declining green open spaces. Mymensingh, a city of Bangladesh, is on verge of expansion, which raises question about sustaining its riverfront, green open spaces and historical relics. Because of the close proximity with the capital, Dhaka, it will possibly become a high density city in future, while it is expanding

to the other side of the river Brahmaputra. Mymensingh Circuit House Park, which is a riverfront park, is taken as a case study to structure the research and central focus, as a vast green space with a historical playground. The following study examines the quality of urban open space, integration with adjacent neighborhood and user's perception. Different methodological approaches were used for data collection and analysis, including informal interview, attitudinal questionnaire, observation through photographic evidence and spatial configurational analysis using 'Space Syntax'. The study considers the relevant type of usages and future structure plan of expansion of Mymensingh city. The study shows how to develop the relationship between open spaces and city dwellers and schematic design proposal of an ecological corridor as touristic walking trail connecting open spaces and historical places, with future growing urban settlement. The possible correlation between green and blue infrastructure could ensure the better life quality of the city and sustain its green core and historical identity.

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**Farzana Sharmin** is currently a masters student in Landscape Architecture. She is studying in University of Applied Sciences Nürtingen-Geislingen (HfWU) in Germany. She has completed her Bachelor in Architecture from Bangladesh University of Engineering & Technology (BUET) in 2014. After graduation, she was working as a practicing architect in Bangladesh. Her profound interest in Landscape Architecture and Sustainable Urban Development leads her to pursue masters in Landscape Architecture.



# Session 4B

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## *Greenway Case Studies*

Saturday, 9:45am - 10:30pm  
Room 165

## East Coast Greenway 2050: Harford County

David N. Myers

*University of Maryland*

This paper documents both the process and product of a university studio project that explores the role of the East Coast Greenway (ECG) in the overall 2050 Harford County biking and greenway system plans. Harford County, MD occupies an important geographic area in which the ECG is aligned in the Mid-Atlantic region. The presentation also documents initiatives in the more urbanized counties of the State of Maryland and the District of Columbia. Numerous initiatives that characterize urban jurisdictions are reviewed for their relevance to a more a rural environment, but also a county that is experiencing population growth. The specific objectives of this studio project were to 1) research and document the inventory, programming information, and composite analysis, 2) to inform and create envisioning design and planning products that could be used by the ECG supporters, and 3) to assist in the overall initiatives of the ECG and trail and bike planning in Harford County. The ABC method, utilizing a GIS / ecological design approach, was adopted to document the abiotic, biotic and cultural inventory of the county. The general envisioning approach was to allow each student to develop their own concept ideation process as to produce a variety of scenarios. The proposed ECG plans and designs offer an opportunity to explore the possible roles of the ECG, ECG challenges, and ECG's role in embracing Harford County's social, economic, and environmental diversity.

**David N. Myers, Ph.D., PLA, ASLA** is an Associate Professor in the Department of Plant Science and Landscape Architecture. He served as Director of University of Maryland Landscape Architecture and MLA Program Chair from 2012 to 2017. His teaching focuses on green infrastructure, GIS and greenway design and planning, landscape ethics and watershed planning. He has an interdisciplinary background with education and experience in landscape architecture, plant science, and biogeography with and has received funding from Chesapeake Bay Trust, NPS, National Capitol Park and Planning Commission: Montgomery County and Prince George's County, and the Maryland Department of Environment.

## The 606 at Three: Trends in Use of Chicago's Elevated Rail-Trail

Greg Lindsey<sup>1</sup>, Yunlei Qi<sup>2</sup>, Paul Gobster<sup>3</sup> and Sonya Sachdeva<sup>4</sup>

<sup>1,2</sup>*University of Minnesota, Minneapolis, MN*

<sup>3,4</sup>*USDA Forest Service, Evanston, IL*

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The 606, Chicago's 2.7 mile, \$95 million trail, is the only elevated, multiuse trail in the US. Opened to use in June 2015 after more than 15 years in planning and development, The 606 was designed to provide residents of nearby neighborhoods having major open space deficits with a safe, attractive place for recreation, fitness, commuting, and other purposes. Above all, The 606 was designed to be used, incorporating features to address concerns of local residents and facilitate walking, jogging, bicycling, and other activities. To better understand its use, we studied trends and patterns in trail traffic during the first three full years of operation (2016-2018). Based on analyses of counts taken with infrared sensors at two locations along the trail, our data show that while The 606 is heavily used, total use declined in both 2017 and 2018. Cumulative trail traffic volume on the western, less affluent end of the trail declined 16.1% from 1.2 million in 2016 to just over 1 million in 2018. Cumulative volume on the eastern, more affluent end of the trail declined 11.9% from nearly 1.4 million in 2016 to just over 1.2 million in 2018. Despite these declines, patterns of use have remained consistent, with much higher use in summer and "shoulder" seasons than in winter, higher use on weekends than weekdays, and different hourly patterns on weekends than weekdays. A statistical model shows that approximately 78% of the variation in daily use is associated with variation in weather and day-of-week. We hypothesize that the declines in use could be associated with differences in weather patterns over the years, congestion on the trail during peak periods of use, a novelty effect that has worn off over time, or changes user perceptions and preferences, perhaps associated with the resource. Research strategies to test these hypotheses are outlined.

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**Greg Lindsey** is a Professor of Environmental and Transportation Planning at the University of Minnesota.

## Neabsco Creek Boardwalk: Beyond Just Connecting Communities

Jim Klein

*Lardner/Klein Landscape Architects, PC*

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The Neabsco Creek Boardwalk is envisioned as a beautiful crown jewel along the Potomac Heritage National Scenic Trail (PHNST) - the only place in Prince William where you can walk on water.

Prince William County's new 3,200-foot long boardwalk across Neabsco Creek, a tributary of the Potomac River in Woodbridge, Virginia forms an important link along the Potomac Heritage National Scenic Trail (PHNST), the 700-mile trail network along the Potomac River from the Chesapeake Bay to the Allegheny Plateau. When open in early 2019, the boardwalk will serve as a regional destination for environmental education, birding, hiking, and access to natural areas. Located between the historic Rippon Lodge on the north and the 217-acre wetland preserve known as Metz Wetlands to the south, the boardwalk will provide new opportunities to experience the County's natural and cultural heritage up close.

The project was initiated by Prince William County's Woodbridge District Board of Supervisor and the District's PHNST committee and supported by the Prince William County Department of Parks and Recreation, National Park Service, Northern Virginia Regional Park Authority and local trail and birding groups.

L/KLA's design for the boardwalk threads the needle between tidal and non-tidal wetlands while crossing the highly braided channel of Neabsco Creek. Landing areas at each end of the boardwalk are designed to orient visitors to the unique plant and animal habitats associated with the daily and yearly ebb and flow of Neabsco Creek. Herons and egrets browse the aquatic vegetation for food; muskrats and beavers tend to their lodges and dams. Snakes and turtles sunbathe.

Requiring the expertise of numerous professionals, L/KLA designed

the project with the help of a multi-disciplined team that included civil, structural and geotechnical engineering and natural and cultural resource experts. L/KLA's collaborative design approach helped establish a highly resilient design addressing the complex issues associated with flooding, storm surge, and related environmental permitting.

More than just permitting, the design team balanced the need to minimize environmental impacts with encouraging visitors to get up close and personal with Neabsco Creek. The Neabsco boardwalk runs along distinct ecological niches found throughout Neabsco Creek while dropping periodically in elevation to immerse visitors in the wetland environment. A key design approach is the utilization of top down construction, where each segment of the boardwalk is built from the previously constructed segment. This approach has minimal impact on sensitive wetland environments.

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**Jim Klein** has thirty-eight years of experience in the planning, design and management of public landscapes including greenways, trails, complete streets, parks, historic places and neighborhoods. Jim has worked on plans and designs for regional trails like the Anacostia Riverwalk Trail, Capital Crescent and Metropolitan Branch Trails, as well as the Neabsco Creek Boardwalk Crossing in Woodbridge, part of the Potomac Heritage National Historic Trail. He has performed feasibility studies, facility plans, design services, interpretive and programmatic development, as well as operational and management strategies for many types of trails, bicycle and pedestrian safety projects along with walking trails for access to natural areas and historic sites.



# Session 5A

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## *Landscape Character*

Saturday, 11:00am - 12:15pm  
Room 174

## **Land use change and city character change: the provision of Amman green corridor**

Anne Gharaibeh and Esra'a Al-Zu'bi

*Jordan University of Science and Technology, College of Architecture and Design, Department of City Planning and Design*

The city of Amman had been known throughout history as the city of waters, referring to the abundance of water flowing in its known stream, which is one of the most important reasons of the emergence of the expanding city of Amman (formerly known as Philadelphia). But this image which is transmitted by historians and orientalists has faded away as a result of the rapid process of urbanization caused by demographic mutations, migration and transportation over the last century. This caused pressure on natural resources which led to change and damage to the ecological and morphological character of the city of Amman. In the seventies of the last century, while the stream began to pollute and dry-up, the trees were removed and the stream was covered and converted into one of the most important streets in the downtown (Quraysh street).

This study aims to assess the current and past situation of the green corridor of Amman, through studying the city morphology, ecology, sociology, demography, environment and land use changes. It is also aimed at exploring the provision for rehabilitating the legendary old stream which was considered a life symbol and a stability indicator, as a potential green corridor for the city. It will study the potential ecological perspective as an opportunity for stimulating a green heart infrastructure bringing back the lost city character.

The research will study the time laps to compare morphological, ecological, environmental and land use changes using urban growth maps. Interviews with stakeholders and questionnaires with users of the place will investigate the converted land uses through direct and indirect evidences. The explored changes as witnessed by the older generation and the futuristic ecological ideas of all generations will

also be based on stakeholder and user feedback.

It is expected that this research will map change, understand character transformation, predict green infrastructure amendment strategies, and explore the impact of the potential renovated ecological corridor on the city character.

**Dr. Anne Gharaibeh** is an Associate Professor of landscape architecture and land use change. She is currently Chair of the Department of City Planning and Design and the Vice Dean for College of Architecture and Design. Won Shoman Prize for research in 2016

## **Adapting Landscape Character Assessment for Supporting Greenways Planning for the Proposed Appalachian GEOPARK**

Charlie Yuill and Stefania Staniscia

*West Virginia University, Landscape Architecture Program*

A three county region of the Eastern Highlands of the State of West Virginia is (almost a million acres) proposed for establishing a Geopark for the Appalachian Mountain Region - one of two aspiring Geoparks in the USA. Geoparks are UNESCO United Nations supported areas that serve to link and interpret important geologic and cultural histories and how they are often critically joined determinants of regional settlement patterns. Currently, there are no Geoparks in the United States, though there are numerous worldwide, with the majority in Asia and Western Europe. The proposed Geopark region is internationally environmentally and culturally significant containing a major karst region with numerous extensive cave systems, as well as, the earliest coal mines and mining communities in the Appalachian Mountains. For example, the abandoned town and coal mine of Red Ash, which is in the region, is the location of the earliest commercial coal mine in the United States (circa 1870). Red Ash also represents a literal translation of Welsh coal mining practices into the Appalachian Mountains.

Efforts have been underway for over a decade documenting archaeological and historic / cultural remnants in the region; first

utilizing intensive fieldwork then various remote sensing methods, then airborne and terrestrial Lidar and most recently very high-resolution satellite data. The objective of this intensive data collection effort is to develop detailed archaeological feature and historic landscape characterizations of the region based on adaptation of European historic landscape character methods (HLC) to the rugged landscape of the Appalachian Mountains. This presentation / paper will discuss data collection methods and results as well as our efforts focused towards adapting Landscape Character Assessment (LCA) methods to a mountainous forested landscape with a wealth of Native American, as well as African American and European American settlement remains and ruins as well as perhaps the richest biodiversity in the conterminous United States.

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**Charlie Yuill** is an Associate Professor in the Landscape Architecture Program at West Virginia University and was founder of the Natural Resource Analysis Center - an interdisciplinary research laboratory that is housed within the Davis College of Agriculture at WVU. His research focuses primarily in linking large area landscape assessment methods with frameworks such as landscape character assessment, historic landscape character assessment and landscape archaeology. Much of his current work involves utilizing airborne and terrestrial lidar and other remote sensing technologies in this research. He has focused his work in the mountains of Appalachia for the last twenty-five years.

## **Assets of Water Mills in Hungary**

Zita Szabo and Ágnes Sallay

*Szent István University, Faculty of Landscape Architecture and Urbanism, Department of Landscape Planning and Regional Development*

Watercourses have been a great energy resource for thousands of years (Lewis 1997). Technical inventions have changed the role of water as an energy resource. The landscape preserved the former usage of watercourses as we can still find water mills.

In this research, we show the presence of water mills in Hungary. The main goal of the research is to show the possibilities to use water as an energy resource based on historical knowledge and the new technical

improvements. We show which landscape characteristics make a place suitable for water mills. However, it is important that water mills change the landscape. We also answer the question how these elements can fit into greenways. There are examples of new functions like residential buildings, exhibition halls or community spaces. This helps to start to use water energy in a sustainable way and to give new functions for the old watermills.

Firstly, we review the types of water mills and the technical improvement in Hungary (Kádár 2010). Secondly, we summarize the history of water mills in Hungary (Kádár 2010). The main part of our research is to map the water mills in the country. As a resource, we used TÉKA (Land Value CT) to find existing watermills. Water has been used as energy source for long time in Hungary. Both streams and rivers have been used, geographical conditions determine the possibilities. With new inventions, these old wind mills can be important elements in the landscape again.

In our research, we mapped the water mills in Hungary. Historically, water was used as an energy resource much more in this country. Streams, rivers could provide a great opportunity to use renewable energy instead of fossil fuels. Water can be used as an energy resource that is more efficient, with new technical improvements. These developments provide a great opportunity to reuse these historical elements again and incorporate them into greenways.

## **New results in surveying landscape character and urban green areas**

Zsuzsanna Illyés, Zsófia Földi and Dalma Varga

*Szent István University, Department of Landscape Protection and Reclamation*

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In the framework of the project “KEHOP-4.3.0-15-2016-00001”, we had the opportunity to research the particularities of urban spatial structure. The aim of the research was to define the influencing role and parameters of the urban space with regards to the landscape character. Within the research topic, we paid accentuated attention to

the role of green areas in the settlements. We attempted to characterize the types of the settlements' green space system as a supplement to the above-mentioned research and analyze in five settlements.

The results show that:

- there is significant dispersion in the field of urban space; we have delimited almost 60,000 built-in patches in the country's 93,000km<sup>2</sup> area, while there are 3,154 administrative areas;
- the size of the built-in patches allow a close approximated grouping into functional types;s
- following the Second World War, the newly built-up areas show similarities all over the country, disregarding the characteristics of the landscape;
- “central” settlements (1,474 units) are typically loosely-built, possess a high green area ratio and have a significant tree stock, and only about 6% of Hungary's territory is partly forested green space, while densely built-up areas occupy 5% of the settlement space;
- larger green areas are typically only the constituent part of cities, while in most settlements, the partially green space with stands are the characteristics of the green space system;
- the partially forested green areas of the settlements show significant differences; and can be classified into distinct types, with the character not only being influenced by the settlement's built-up structure, but also significantly by the natural spatial system in which the settlement was established, and the continued farming traditions as well as the new functions of the settlement;
- the green space of the settlement fringe areas is a principal factor in influencing the landscape character and affects the development possibilities of the green space system within the settlement.

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**Zsuzsanna Illyés** is an associate professor and the Head of the Department of Landscape Protection and Reclamation since 2013. Zsuzsanna does research in landscape history, landscape and settlement character, cultural anthropology and agricultural philosophy. She takes part in teaching Landscape protection, Landscape History, Regional and Local Planning. Her most recent publications are in landscape history and ecological networks, landscape history and sustainability, settlement structure and population, vegetation and land cover. Zsuzsanna Illyés currently works at the Agri-environmental Management Research Group, Szent István University.

# Session 5B

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## *Urban Vegetation*

Saturday, 11:00am - 12:15pm  
Room 162

## Street Trees and Safety Implications for Drivers, Walkers, and Bikers: A Systematic Review

Alicia Coleman, Theodore Eisenman, and Gregory Labombard

*University of Massachusetts, Amherst, Department of Landscape Architecture and Regional Planning*

Global cities are pursuing ambitious tree planting initiatives and canopy cover goals (Locke et al. 2017), which can yield substantial roadside tree plantings (Silvera Seamans 2013). Concurrently, the safety of all roadway users is now a prominent aspiration of urban planning, aptly called Complete Streets to include pedestrians, bicyclists, motorists, and transit users of all ages and abilities (Zehngebot and Peisner 2014). This convergence is potentially good news, as Complete Street advocates identify street trees as a safety buffer against moving traffic (ASLA 2018; Smart Growth America 2016). Yet, some traffic planning literature portrays conflicting findings, where roadside trees can be a risk to drivers (Hasan, Othman, and Ismail 2016), and also serve to calm traffic (Chen 2015). There has been little scholarship on the intermodal relationship between street trees and circulation safety, and we undertook a systematic literature review to address this research gap. Using keywords related to street trees and intermodal safety in 25 databases, journal article content was categorized to identify important traits and findings within and across modes of circulation. We will present preliminary results of this review, one of which being “disciplinary crosstalk” (Vogt 2018), and the need for interdisciplinary research on street trees and safety. We will also discuss how the recent synergy between urban tree plantings, attention to intermodal safety, and streetscape redevelopment is serving as a contemporary expression of greenway planning and design.

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**Alicia Coleman** is a Ph.D. student in Regional Planning at the University of Massachusetts Amherst. Prior to doctoral studies, Alicia completed two years of AmeriCorps service at a regional land trust in eastern Massachusetts, where she focused on conservation planning and prioritization, landowner outreach, and collaborative projects with local land trusts and the Metropolitan Area Planning Council. Alicia holds a Master of Environmental Studies from the University of Pennsylvania, a B.S. in Behavioral Science from Wilmington University, and a graduate certificate in Geographic Information Systems from the Pennsylvania State University.

## **Tree composition and structure in relation to urban park history and land-use in Hong Kong, China**

Allen Hao Zhang

*Technological and Higher Education Institute of Hong Kong*

Urban parks serve as the major ecologically functional urban green infrastructure in densely populated and concrete-dominated cities. Trees in urban parks play an important role in fully performing the function of urban parks. However, the dynamics of tree composition and diversity remain largely unknown. This study assessed the tree composition and diversity in 32 urban parks with different ages in the highly urbanized city, Hong Kong. In total, 2800 trees belonging to 181 species were surveyed in 319 plots across all parks. The tree species were highly dominated by 75.7% exotic species. Broadleaved tree species were more common than conifers and palms. Park history

has an impact on the species composition and diversity. The trends of a decrease in larger tree and an increase in smaller tree populations were found in newly established parks, especially for some large native tree species. The most common and dominant trees in urban parks have changed, with more ornamental trees planted in new parks. The species richness and diversity have also decreased in new parks due to frequent use of only a few species in urban parks. Great attention should be paid to the change of species composition and diversity to avoid the abuse of exotic species and homogenization in urban parks.

**Dr. Allen Zhang** has published more than 20 articles in the refereed journals, a large portion of these articles have been published in the top tier international refereed journals such as “Urban Forestry and Urban Greening” and “Landscape and Urban Planning.”

## **Monitoring the impact of planted trees on land surface and air temperatures in Massachusetts Gateway Cities**

John Rogan<sup>1</sup>, Benjamin Weil<sup>2</sup>, Deborah Martin<sup>3</sup> and Mathew Cahill<sup>4</sup>

<sup>1,3</sup>*Clark University, Graduate School of Geography*

<sup>2</sup>*University of Massachusetts, Amherst, Department of Environmental Conservation, Building and Construction Technology Program*

<sup>4</sup>*Massachusetts Department of Conservation and Recreation, Urban and Community Forestry Program*

Urban forests and greenways provide ecosystem services that benefit environmental and human health, and serve economic, community, and aesthetic value. Because of the benefits of urban forests as greenways, urban tree planting is a major urban sustainability and climate change mitigation initiative in many US cities that aims to provide more canopy cover to streets and buildings, and enhance ecosystem services including air temperature cooling through shading, and reduced ambient wind speeds through sheltering. Additionally, while the role of trees as green infrastructure has gained increasing support as a component of climate adaptation, this role has seldom been integrated into urban planning practice and empirical data about performance and realized benefits are in short supply.

This study draws attention to an exemplary case within the plethora of urban tree-planting/greenway programs nationwide: the Department of Conservation and Recreation Greening the Gateway Cities Program (GGC) in Massachusetts where upward of 8000 trees have been planted since 2014 in thirteen of the twenty-six “Gateway” cities. Massachusetts’ Gateway Cities are mid-sized regional economic centers that historically provided good (gateway) manufacturing jobs, but which today face a range of social and economic challenges in the post-industrial economy. The study employed novel micro-climate modelling methods drawing on in situ weather monitoring sensors, microclimate simulation modelling, and Landsat thermal satellite data to determine the effect of GGC tree planting on air and land surface temperatures across the urban landscape gradient in Chelsea, Fall River and Holyoke, Massachusetts.

The study applies the three-dimensional microclimate model, ENVI-met, based on a computational fluid dynamics approach, simulates surface-plant-air interactions in the urban environment. ENVI-met allows for the simulation of major atmospheric processes such as the wind field, air temperature, humidity, radiation and turbulences, taking physiological vegetation processes into account in a detailed manner. Using HOBO climate station data, the ENVI-met model was calibrated locally and run to simulate the impact of tree planting on microclimate using four different scenarios: (1) no new tree cover; (2) current GGC tree cover; (3) idealized GGC tree cover (trees in all available plantable space – especially yards); and (4) micro-climate conditions under future climate. Results show a significant two-degree Celsius difference between urban sites in all cities in control sites (without planted trees) versus matched sites with newly planted trees. The implication of this finding is that new urban tree cohorts, in sufficient density, can provide significant cooling benefits even in their earliest stage of establishment.

**John Rogan** is a geographer at Clark University who specializes in forest disturbance and environmental monitoring using remote sensing and GIS. His urban forestry research has been funded by the National Science Foundation and the Department of Conservation and Recreation in collaboration with colleague Deborah Martin (Clark Graduate School of Geography).

## **The role of vegetation in interpreting the city. A typomorphological analysis applied to the case of Lisbon (Portugal)**

Maria Matos Silva and Rui Justo

*Research Centre of Architecture, Urbanism, and Design, Lisbon School of Architecture, Universidade de Lisboa*

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The discipline of “History of Urbanism” taught in the Master of Landscape Architecture at the University of Lisbon, includes both a theoretical and a practical component. While the theoretical part focuses on the comprehension of the main moments of the city’s formation, the practical part focuses on the introduction to the study of urban morphology in its spatial, infrastructural and functional aspects.

Through the development of the exercise on a particular area in the city of Lisbon, students, organized in groups, are expected to focus on its morphological interpretation, decomposing it in different systems and elements, such as the urban layout, the built fabric, the street, the square, the block, the courtyard, the plot and the building, as well as on its functions and human activities. This process allows them to decode and organize by types the morphological complexity of each urban area making possible the comparison and relation between elements and systems. This method of typomorphological analysis is here assumed as an important reading tool of the city, simplifying what is naturally complex through a graphic classification process of the diverse elements that structure it. A method that is not only useful in the academic education but also as a tool in the (re)design process of the city.

In recent years, a stronger emphasis was given to the analysis of public space in each homogeneous area. Considering this intention, and assuming the practical classes as an ongoing laboratory, we seek to interpret the different ways urban greenery is perceived, implemented and maintained.

Through a distanced and integrated approach, re-interpreting the student's work, this article aims to explore questions such as the influence of green spaces as a formal or informal composition element of urban space. By reflecting upon the attributes of vegetation, this research may contribute not only to the development of the discipline of urban morphology applied to the city of Lisbon but also to the acknowledgement of urban greenery as a contributor to the creation of specific, unique and unrepeatable spaces within urban landscapes.

**Maria Matos Silva** is Assistant Professor of Landscape Architecture at Instituto Superior de Agronomia (ISA), University of Lisbon since September of 2018. She is a Research Associate of the Centro de investigação em Arquitectura, Urbanismo e Design (CIAUD) at the Faculty of Architecture, University of Lisbon. Other current positions include being a board member of the Portuguese Association of Historic Gardens. Maria graduated in Landscape Architecture from ISA in in 2007, being awarded the best graduate student in the final year. In 2010, she completed a Master Degree on Urban Design at Universitat de Barcelona, and in 2011 a PGDip in Urban and Regional Planning at the University of Lisbon.



# Session 5C

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## *Planning and Governance*

Saturday, 11:00am - 12:15pm  
Room 165

## **Cuyahoga Greenways: A Community-Driven, Data-Enriched Initiative to Implement a Regional Greenway Vision**

Michael R. Mears<sup>1</sup>, Oliver D. Kiley<sup>2</sup> and Neal J. Billetdeaux<sup>3</sup>

<sup>1,2</sup>*Cuyahoga County Planning Commission*

<sup>3</sup>*SmithGroup*

Cleveland and surrounding Cuyahoga County is undergoing a gradual transformation. A highly urbanized region in America's rust belt, it has experienced decades of declining population and sprawling development. Presently however, the region has shown signs of economic and social improvement as it recovers from years of stagnation and disinvestment. Accompanying this rebound is an increased awareness to the region's fluctuating socioeconomic conditions and residual challenges to improving mobility. Moreover, there is a desire to ensure that change is sustainable and leads to equitable outcomes for all segments of the community.

Greenways, most notably the county-wide Emerald Necklace, have long been a staple and signature asset of Cuyahoga County. However, the needs of the population are diversifying, particularly regarding mobility and how people access jobs, parks, cultural resources, public services, and commercial centers. Being such, non-motorized travel -- a rising trend for a broad spectrum of the populace -- has become a key component in the region's renewal as it grapples with constricted transit, geographic inequality, and an existing Greenway network whose benefits do not fully reach all sectors of the population.

Cuyahoga Greenways is a county-wide initiative to envision, plan, and implement over 800-miles of greenways and urban trails throughout the region. Unlike conventional approaches to building non-motorized facilities, like bike lanes, that may only serve a segment of the population, Cuyahoga Greenways seeks to build an interconnected, non-motorized transportation network that is safe and welcoming for people of all ages and all abilities. This initiative, which featured input from 29 regional agencies and 43 participating communities, developed a vision, framework plan, and implementation tools for making the

new greenway framework a reality.

The planning process was community-driven and data-enriched, empowering local leaders and stakeholders with the knowledge necessary to make informed decisions and craft a plan that benefits the community both economically and socially. A cornerstone of the process was a robust public engagement program with over 20 community-wide events. Leveraging both traditional and digital tools, a rigorous spatial analysis of over 300 corridor opportunities was completed. The resulting analysis, coupled with the community's involvement, allowed stakeholders to identify and prioritize actionable greenway proposals that provide the biggest return to the community while dispensing more equitable outcomes.

With the greenway framework plan in place, community leadership has shown a willingness to more effectively collaborate across jurisdictions, leveraging resources to implement projects. The Cuyahoga Greenways initiative exemplifies a regionally coordinated and evidence-based process to improve equity, mobility, and expand the benefits of greenways to all neighborhoods in Northeast Ohio.

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**Neal Billetdeaux** leads many of SmithGroup's motorized and non-motorized transportation enhancement projects, bringing expertise in non-motorized planning and integrating green infrastructure in urban environments Neal's background in ecology gives him a unique understanding of how environmental issues play an important role in today's planning projects. He currently sits on the Board of Directors for the Michigan Trails and Greenways Alliance and Legacy Land Conservancy. Neal earned both BS and MLA degrees from the University of Michigan.

As Senior Planner at the Cuyahoga County Planning Commission, **Michael Mears** is a team leader on community master plans and other regional planning initiatives. Michael's background in planning and landscape architecture give him a unique understanding about the intersection of equity, design, land use, mobility, and active transportation in contemporary planning projects. This diverse education allows him to seamlessly integrate County Planning's work into the varied disciplines, organizations, and stakeholders engaged in community development. Michael received a bachelor's degree in Landscape Architecture from the University of Massachusetts and a master's degree in Urban Planning and Design from Cleveland State University.

## **Greenways as Indigenous cultural pathways. Healing landscape and peoples one step at a time in the South West of Western Australia**

Simon J. Kilbane

*University of Technology, Sydney*

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The South West of Western Australia (SWWA) is widely known as one of the world's most biodiverse regions and a recognised biodiversity hotspot. However, since European colonisation approximately 200 years ago, this landscape has been cleared, fragmented and degraded at large and small scales, a problem magnified by being one of the planet's most vulnerable locations to climate change. This region also hosts one of the world's longest continuous cultures, the Nyungar people, who have lived in the SWWA for at least 38,000 years. However, following colonisation, Nyungar land management practices – that once connected the region's Traditional Owners with place, including firestick farming and seasonal movement – have been mostly lost with consequences not only for the biological makeup and diversity of the region but also for their culture.

Fortunately, a range of contemporary projects, policies and plans have emerged that endeavour to address both the region's environmental challenges – including ecological fragmentation and species extinction – as well as aiming to reconnect the Nyungar peoples and traditional landscape practices with place. These projects provide a holistic vision to the challenge of improving landscape health and central to this practice is the continued maintenance of walking linkages across the landscape, through vegetated corridors or pathways, sometimes referred to as 'songlines'. This research will introduce three SWWA project examples that at varying scales explore the intersection of Indigenous knowledge, culture and practice with green infrastructure planning across challenging, complex and contested urban and regional environments.

This range of Greenways promote the experience of traversing landscapes on foot as a critical step toward the simultaneous healing

of self, culture, community and landscape - embracing both ecological restoration as well as cultural and spiritual health. These emerging projects thereby propose an expanded and diverse spectrum of mutual benefits, offer greater buy-in from broad sectors of community and offer an additional tool toward implementation. While this research could appear specific to this part of the world, it offers contemporary examples for how to plan, design and visualise Greenways in order to deliver the widest diversity of benefits across landscapes in question; as well as a potential novel contribution to the Greenway typology, highlighting a new chapter in the ever-expanding and rich greenway (and green infrastructure) narrative.

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**Simon's** interests lie in the potential for mediation at the interface between Landscape Architecture and Ecology and specifically the role of design to connect ecological patterns and processes with humanity. Previously employed as a Landscape Architect and Urban Designer, Simon worked in the UK, France, New Zealand and Australia before completing his doctorate under Richard Weller (Landscape Architecture, University of Pennsylvania) and Richard Hobbs (Landscape Ecology, University of Western Australia). From 2014, he established the Landscape Architecture program at the University of Technology Sydney as its inaugural chair and in 2018 was awarded the Australian Institute of Landscape Architects 'National Award of Excellence for Research, Policy and Communication', the highest award of this type in Australia.

## The Williamsburg Mill River Greenway: An Illustrated Case Study Time-Line From Community Charrette to Public Plan for Design and Construction

Nicholas Dines<sup>1</sup> and Gaby Immerman<sup>2</sup>

<sup>1</sup>*University of Massachusetts, Amherst, Department of Landscape Architecture and Regional Planning*

<sup>2</sup>*Smith College, Landscape Studies Program*

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This paper will document and illustrate the planning and design timeline of the proposed 2.5 mile Williamsburg Mill River Greenway that is now in design/engineering development phases with a projected bidding document completion date of 2023.

This local Greenway segment is part of the larger Mill River Greenway Initiative that is composed of “...a group of local citizens who aim to protect the Mill River watershed, preserve its cultural artifacts, enhance its biological health and encourage recreational activity. Our goal is to design and create a greenway along the river.” [[millrivergreenway.org](http://millrivergreenway.org)]

The WMRG goals reflect the aims of the larger Mill River Greenway Initiative. In summary, the key local objectives are:

1. Provide a pedestrian shared use path to link Williamsburg and Haydenville Centers to encourage alternative transportation modes for local and regional users.
2. Create a linear Greenway Park that links to other river parks, rest areas, historical interpretive networks and trails (mills and cultural artifacts significant in the Town’s history), and to existing businesses along the proposed route.
3. Mitigate the Mill River scour that is eroding the bank supporting Route 9 along the curve at the Brassworks Mill Pond site.
4. Utilize the additional space allowed by the wall to accommodate a 10’ shared use path and improved road design within the currently constricted curve.
5. Restore native plant species along the river edge where space permits and install downstream river groins to encourage the restoration of aquatic life after construction and bank stabilization.

The project began with a charrette sponsored by the BSLA (Boston Society of Landscape Architects), and organized by Mark Lindhuldt, FASLA in 2012 with the aim of exploring local community design and planning initiatives. The first draft of the current WMRG plan was prepared during the two-day event and the sketches and existing conditions photos serve as the basis for the current plan.

The presentation will illustrate the design phases and will highlight the convergent contributions of the local WMRG Committee members, the Smith College Engineering Design Clinic, local design and engineering firms and will conclude with an appreciation of the multi-disciplinary contributions that are required of successful Greenway planning and design: Watershed and Landscape Planning, Landscape Architecture, Civil and Environmental Engineering, Ecological Conservation and Cultural History Studies.

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**Nicholas T. Dines, FASLA**, is a Professor Emeritus of landscape architecture and former director of the landscape architecture graduate program at the University of Massachusetts where for over 30 years, he has taught courses in site engineering, structures, design studio, design drawing, design theory, and professional practice. He is the co-editor of McGraw-Hill's Time-Saver Standards for Landscape Architecture; co-author of Time-Saver Standards for Landscape Construction Details CD, and its companion publication, Time-Saver Standards Concise Site Construction Details Manual; and author of, Landscape Perspective Drawing. He has over 32 years of professional experience, including a 10-year period of work on residential and recreational design projects in Greece.

# Understanding governance structures in shaping greenway implementation in city-regions: A case study in central Zhejiang Province, China

Jun Xian Chen, Sun Sheng Han and Siqing Chen

*The University of Melbourne, Faculty of Architecture*

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Greenway implementation in city-regions is a collective action involving a complex range of relations between regional and local agencies, between government departments at the same administrative level, and between adjacent jurisdictions. This paper explores how greenway implementation governance is structured, and why different governance structures result in different greenway implementation processes and outcomes in a city-region. We use a case study approach to a greenway project in central Zhejiang Province (CCCZ), where data are collected through field reconnaissance, in-depth interviews, and document analysis. Preliminary findings reveal that the central Zhejiang Greenway Project has experienced a development from ‘territorially-specialized governance’ to ‘cross-scale governance’. ‘Double-hatted’ agencies comprising government leaders and professional representatives from different agencies can create cross-scale institutional linkages both vertically (across levels of governments) and horizontally (across jurisdictions and departments), thus improving the efficiency in greenway implementation at a large scale.

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**Jun Xian Chen** is a PhD candidate in the University of Melbourne, supported by ‘Melbourne Graduate Research Scholarship’. Her PhD research project focuses on institutional complexities in regional greenway planning and implementation. She completed her master degree at Peking University, China. Her research findings appeared in prestigious peer-reviewed international journals including *Habitat International* and *Transport Policy*.

# Session 6A

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## *Ecosystem Services*

Saturday, 2:45pm - 4:00pm  
Room 174

## Urban Landscape Planning and the Contribution of Green Infrastructure in Promoting Ecosystem Services

Camila Gomes Sant' Anna and Maria Do Carmo Bezerra Lima

*University of Brasília*

Green infrastructure (GI) has been an object of different theoretical-practical approaches concerning its application as a tool to build a sustainable and resilient land use plan. The key would be to guarantee the cities' functions and services to work with nature. The challenge requests a clear association between conceptual terms and the design practices that have been developed in recent years, attending urban functions and protecting ecosystem services. The present work contributes to the debate, establishing the relationship between principles, urban scales, urban functions and configurable components of green infrastructure with the potential to guarantee the ecosystem service and to respond to the demands of the city's functioning. The research approach is related to the ecosystem service associated with the water cycle in cities. The method is based on the organization of conceptual review bases and some research results on green infrastructure, landscape architecture and urbanism, to build a framework of analysis that can be validated in an empirical study that will subsidize plans of urban spatial planning. As a result, we present the primitive analytical and methodological steps for the identification of aspects raised for the intervention of a plan of urban land occupation based on nature.

**Camila Gomes Sant' Anna** is a professor in the field of Landscape Architecture at the Faculty of Architecture and Urbanism at the Federal University of Goiás in Brazil. She has a research proposal for a PhD at the University of Brasília with Maria do Carmo de B. Lima

## Greenways as a Solution to Reduce the Fine Particle Pollution in Beijing, China

Fan Fu<sup>1</sup>, Caijun Zhao<sup>2</sup> and Luca Maria Francesco Fabris<sup>3</sup>

<sup>1</sup>*Beijing University of Civil Engineering and Architecture*

<sup>2</sup>*Huaqiao University, China*

<sup>3</sup>*Politecnico di Milano*

Since 2013, fine particulate matter has become the main air pollutant in Beijing and caused adverse effect on citizens' lives and health. Though the government has made plenty of efforts to reduce the pollutant, it is still high, at annual average concentration of 58  $\mu\text{g}/\text{m}^3$  in 2017 according to a government air quality report, which is nearly 6 times of the suggested standard by the World Health Organization. Researchers show green spaces can reduce fine particle pollution in cities by direct ways or indirect ways. The former includes dry deposition and isolation diffusion of fine particles, the latter includes mitigation of urban heat island effect so as to lower temperature, improving local air circulation which can accelerate diffusion, and reduction of building energy consumption so as to reduce the emission of fine particles.

Therefore, a well proposed urban green space system will help Beijing to reduce fine particle pollution. However, the problems of current urban green space system in Beijing are: 1) there are not enough green spaces in built areas, so the heat island effects are significant and cause secondary pollutants of fine particles; 2) different scaled green spaces are unbalanced located in Beijing, so that different scaled heat islands are unbalanced and the diffusion of fine particles is abated; 3) the existing greenways are not for reducing fine particle pollution, so they don't work well to obstruct the sources of fine particles or to help diffusion of fine particles.

In order to solve the problems above and to reduce fine particle pollution in Beijing, greenways need to be planned to improve the existing green space system. This research focuses on the issues of fine particle pollution and attempts to reduce the pollution by implementing greenways in existing green space system. Through investigation

on site, remote sensing image analysis and climate simulation, this research proposes an optimized greenway strategy for reducing fine particle pollution in Beijing.

**Dr. Fan Fu** is a professor of landscape architecture at Beijing University of Civil Engineering. His research areas include Chinese traditional architecture and garden, urban green space system, and ecological approaches in landscape architecture. He is one of the translators of *Land Use Planning (Chinese Version)* by Julius Gy. Fabos. He was invited to lecture on 1997 ASLA meeting, 1999 Landscape Architecture Conference by CHSLA, JILA and KILA, 2008 IFLA meeting, 2010 Asia Ethnic Plants Conference, 2010, 2013 and 2016 Fabos Greenway and Landscape Planning Conference, and IFLA 2016.

## **Rethinking urban nature: the rise and value of Nature-Based Solutions (NBS) in Europe**

Ian Mell<sup>1</sup> and Sarah Clement<sup>2</sup>

<sup>1</sup>*University of Manchester, School of Environment, Education & Development*

<sup>1</sup>*University of Liverpool, Department of Geography & Planning*

Nature-Based Solutions (NBS) have been proposed by the European Union as the most contemporary approach to delivering resilient cities in Europe. Through official guidance and funded projects, the Horizon 2020 programme, the EU has positioned nature at the centre of landscape and urban planning debates. However, there remains a scepticism regarding whether the support of NBS as an alternative to green infrastructure (GI) planning is meaningful and appropriate or damaging to existing practices. Furthermore, the framing of NBS does not, to date, extend the conceptual, practical or political parameters of ‘green space’ planning beyond terminological changes. Its most significant contribution to urban planning is the emphasis it places on urban ecology as a foundational principle of all development. To assess the added value of NBS in the planning and management of urban landscapes the paper reflects on the academic discussions surrounding the approach. This examines how NBS are being used to shape support for investment in urban nature but also argues that it potentially creates a schism between advocates of existing green space

terminology and approaches. It concludes by setting the parameters for further analysis of how NBS are being, and may be used, going forward to socio-economic and ecological agendas in the EU.

**Ian Mell** is an Associate Professor in Environmental and Landscape Planning at the University of Manchester. He is a leading expert in Green Infrastructure policy and practice and has worked extensively across the world evaluating the added-value of GI investment

## **Greenway Planning of Guangdong Province**

Zhuo Lu, Bing Wu, Xiaoguang Liu and Yuanxiang Wu

*Department of Landscape, School of Architecture, Harbin Institute of Technology;*

*Key Laboratory of Cold Region Urban and Rural Human Settlement Environment Science and Technology, Ministry of Industry and Information Technology, China*

Guangdong Province is located in the southernmost region of mainland China with a total area of 180,000 square kilometers. The GDP ranks first in China, and the economic aggregate accounts for 1/8 of China's total. As the economic development continues, the fragmentation of ecological land is becoming more dangerous. To solve this problem, the local government organized the master planning of environmental protection. The provincial greenway planning (also called ecological corridor) proposed in this paper is an essential part of it. The total length of planned greenways in Guangdong Province is 2,836 kilometers, and its primary function is biodiversity conservation. In the master planning of environmental protection, the planning of the ecological red line has already identified ecological patches. By constructing the provincial backbone greenway to connect ecological patches and form an ecological network, it can guarantee the ecological area of an economic priority development zone like Guangdong Province to provide sustainable ecosystem services. In this paper, the traditional Minimum Cumulative Resistance method (MCR) has been optimized based on graph theory, by using the betweenness of the edge (route or corridor) and selecting the least connected subgraph with the highest

betweenness of the potential greenway by irreplaceable conditions to determine the irreplaceable backbone route and key strategic points. Under the premise of ensuring connectivity, the goal of planning the least number of greenways, the smallest footprint, and the constant value of ecosystem service is achieved. In this method, the backbone structure of the eco-network that maintains ecological security is established, nodes are found which are important hub locations in the eco-network but poor ecological conditions, and greenway route redundancy problem generated by the MCR method was solved, land resources and funds are saved, the guidance and control functions of the provincial greenway system are realized. The plan has been reviewed by the local government and entered the implementation phase.

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**Zhuo Lu** is a master's degree candidate in Dept. Landscape Architecture, in the School of Architecture, HIT. She got her bachelor's degree in engineering from School of Landscape architecture specialty, Northeast Forestry University, 2015. Her primary research direction is landscape and ecological planning, She has participated in several research projects on ecological source selection and ecological corridor designation.

# Session 6B

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## *Cultural Landscapes*

Saturday, 2:45pm - 4:00pm  
Room 162

## The Cultural Landscape of As-Salt, Jordan: Keys to World Heritage Nomination

Dania Khlaifat

*University of Massachusetts, Amherst, Department of Landscape Architecture and Regional Planning*

As-Salt, a city in Jordan, has undergone heritage enhancement projects since the 1990s and is currently undergoing a heritage regeneration project in its downtown core, in preparation for potential World Heritage designation. Therefore, the State Party representing As-Salt submitted a report in 2015 to UNESCO for World Heritage Nomination. The report was entitled “Arab Eclecticism - Foundation and evolution of an Architectural School in the city of As-Salt (1860-1925)”. It mainly focused on the architectural image of the city. Unfortunately, the report was unsuccessful in proving the Outstanding Universal Value of As-Salt, a value used by UNESCO to determine the cultural or natural significance of sites and monuments. Hence, As-Salt’s nomination status was deferred.

And while the ongoing project of “Oqbah bin Nafe” in As-Salt’s downtown addresses touristic amenities and increasing public open space, a piecemeal approach of specific physical interventions is not the solution. In order for a resubmission to nomination, the State Party of As-Salt must not only present the architectural style of the city, but also present the urban fabric as a whole, the tolerance of Muslims and Christians living side-by-side, and what is unique about the city in comparison with cities of its like.

This paper aims to understand As-Salt’s history, to compare its physical characteristics with other Muslim cities at the local, and regional level; in order to establish what makes As-Salt significant. This thesis explores a different approach to presenting the nomination report of As-Salt. Accordingly, a collective of guidelines and measures will be studied following the historic preservation framework of different institutions such as UNESCO and ICOMOS to make informed decisions specific to As-Salt, in the form of design interventions, guidelines, recommendations, or policy-making.

**Dania Khlaifat** is a Fulbright scholar from Jordan and a master's degree student of Landscape Architecture at the University of Massachusetts, aiming to achieve a certificate in Cultural Landscapes. An Architect and LEED Green Associate. Three years of construction experience in a mega touristic resort in Aqaba, Jordan.

## **Imparting Olmsted's Legacy Abroad: An Exhibition Series in Beijing, China**

Yanhong Tang

*Ecoland Planning and Design*

In the first integrated-exhibition of its kind, our team of Chinese landscape architects and American scholars showcased the influence and impact of Frederick Law Olmsted's work on the American landscape through a three-month Exhibition, a Symposium and Reference Book launch at Beijing's National Museum of Chinese Gardens and Landscape Architecture. The Exhibition featured a meticulously curated collection of Olmsted's most significant works, organized into six distinct thematic sections spread over 6500 square-foot. In tandem with the Exhibition was a Symposium that assembled leading Chinese landscape architects, government officials and scholars, and a 230-page Chinese-English Resource Book "Designing America's Landscape - Olmsted and His Works" to serve future generations of designers and scholars. This integrated-exhibition afforded a broad audience - students, professionals, government officials, and the general public - a multi-faceted and comprehensive understanding of Olmsted's approach to design and how they can be consulted to inform the work of urban development in China. With a visitorship of 112,500, this groundbreaking exhibition aimed to germinate and advance the sustainable urban design movement in China.

The Olmsted exhibit in China was conceived, researched, and produced in partnership with the museum's curatorial staff with technical assistance from institutions in both the U.S. and China including the Frederick Law Olmsted National Historic site, the US National Park Service, and the Arnold Arboretum of Harvard University. A lavish collection of historic photographs and newly collected educational

materials illustrated Olmsted's professional contribution and how heightening qualities within natural landscapes can protect dense urban areas from flooding, create public spaces that provide a safe and healthy respite, and foster a legacy of preserved natural and cultural landscapes. Furthermore, the exhibit showcased Olmsted's vision and how the profession can improve the quality of life and create sustainable environments.

The Olmsted exhibit was held at the Museum of Chinese Gardens and Landscape Architecture, which receives approximately 450,000 visitors annually. This is the first and only national museum in the world that is primarily focused on landscape architecture. Since the exhibit concluded, portions of the exhibit, including scale models of Central Park and Boston's Emerald Necklace are now on permanent display in a prominent location at the entrance to the museum. The now-permanent inclusions ensure that Olmsted exhibit will continue to impact and influence contemporary Chinese landscape architecture.

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**Ms. Tang** is a co-founder and a principal of ECOLAND Planning and Design Inc., a multi-disciplinary planning and design firm with extensive, expertise in Beijing, China. The firm holds China's Class A license qualification for Regional planning, landscape architecture, and architecture. ECOLAND staff consists of approximately 260 professionals. Graduated from UMass LARP in 1989, she has 30 years of professional experience in landscape architecture and urban planning; Besides her focused services on urban planning, landscape architecture, she's also volunteered in some professional related work including: Lectured at the invitation of ZUBE Lecture Series, UMass, Amherst, MA, 2018. Spoke at the Fabos Conference on Landscape and Greenway both in 2013 and 2016. Lectured at the University of Sheffield, UK

## Lalbagh: An Incomplete Depiction of Mughal Garden in Bangladesh

Farzana Sharmin

*University of Nürtingen-Geislingen, Germany*

Lalbagh Fort Complex is one of the extravagant examples built by the Mughal Empire in Bangladesh, documented in UNESCO World Heritage tentative List. While there are several Mughal structures found in the Indian sub-continent, this incomplete fort is the only footprint of encamped Mughal garden style that remains in the capital of Bengal, Jahangirnagar (now Dhaka). The fort complex is a combination of three buildings (the mosque, the tomb of Bibi Pari and the Diwan-i-Aam), with two gateways and a portion of the partly damaged fortification wall articulating Charbagh style garden area. Charbagh is the concept of Persian garden adapted by Mughal. The following area is situated in densely populated neighborhood in old portion of Dhaka city. Rapid organic urban development along the following area is becoming a threat to the structure. Demand for the surrounding buffer zone, poor maintenance, uncontrolled users etc. are creating existential crises over these vulnerable structures. This study is aimed for analyzing the eccentricity and similarity with Charbagh/Mughal garden style and the challenges which it is facing. The research follows methodological approach of case study by analyzing secondary data collection, historical maps, literature review and observation. This paper highlights the strategic proposition for its protection as well as documentation on landscape aesthetics.

**Farzana Sharmin** is currently a masters student in Landscape Architecture. She is studying in University of Applied Sciences Nürtingen-Geislingen (HfWU) in Germany. She has completed her Bachelor in Architecture from Bangladesh University of Engineering & Technology (BUET) in 2014. After graduation, she was working as a practicing architect in Bangladesh. Her profound interest in Landscape Architecture and Sustainable Urban Development leads her to pursue masters in Landscape Architecture.

## **Building Connections to the Minute Man National Historic Park: Greenway Planning and Cultural Landscape Design**

Robert Ryan and Theodore Eisenman

*University of Massachusetts, Amherst, Department of Landscape Architecture and Regional Planning*

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The Minute Man National Historic Park (NHP) in Massachusetts commemorates the Battle of Lexington and Concord (1775) that began the American Revolution. The National Park created in 1959 seeks to interpret the battle and restore the agricultural landscapes of the revolutionary period. The Park is situated within the larger Freedom's Way National Heritage Area (FWNHA) that was designated in 2009 to preserve the extensive historic cultural resources of the region, including such gems as Thoreau's Walden Pond.

Unfortunately, the Minute Man NHP is divided into four units and bisected by a busy state highway that makes wayfinding challenging for visitors. Moreover, the National Trust for Historic Preservation listed the Minute Man NHP "as one of America's most endangered Places" (NTHP, 2003) due to the impacts of surrounding traffic, noise, and incompatible developments. There are several existing and proposed projects including the Battle Road Trail, Minute Man Bike Trail and Scenic Byway that have the potential to link the Park's resources, but key connections are missing to create a coherent network.

To address these challenges, this project, a partnership between the US National Park Service, FWNHA, and the University of Massachusetts, Amherst uses greenways as an organizing element to improve pedestrian and bike connections from the Park to the many nearby historic, cultural, and recreation resources, while providing visitors an alternative to touring the park by car. An undergraduate landscape architecture studio under the direction of the authors developed a greenway plan for the surrounding area with regional connections, as well as designed key sites and corridors along this greenway network that act as gateways and nodes for cultural and historical interpretation. This project exemplifies the challenges of historic and cultural

planning within a developed suburban setting where local and regional recreation demands put pressure on historic landscapes. In addition, the fact that several key sites are outside the jurisdiction of the National Park in municipal, non-profit, or private ownership exemplifies the need for collaborative planning efforts. Finally, the project shows the management issues that continue after designation of historic corridors.

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**Robert L. Ryan, FASLA** is professor and chair of the Department of Landscape Architecture and Regional Planning, University of Massachusetts, Amherst where he teaches courses on green infrastructure planning and environment and behavior research. His research explores the role of place attachment as a motivation for stewardship of urban green spaces. He is the co-author of the award-winning book, *With People in Mind: Design and Management of Everyday Nature* (Island Press, 1998), *Planning for Climate Change* (Routledge, 2018), as well as over thirty-five journal articles and book chapters.



# Session 6C

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## *Greenway Case Studies*

Saturday, 2:45pm - 4:00pm  
Room 165

## Perceptions of the “new urban greenways” in the Pearl River Delta, China

Zheng Liu

*KU Leuven, Department of Architecture*

The Pearl River Delta (PRD) greenways are the first regional greenway network in China, which has been seen as the pilot greenway project to the other provinces and cities. The PRD greenways also resulted in continuous debates on their forms and functions. Some researchers argue that the PRD greenways show great value in promoting economic development and urban-rural integration, while some criticize that the PRD greenways have accomplished little ecological benefits that were planned in the early stages. However, most of the debates exist among key actors or researchers, while public perception of greenways is overlooked. Public perception could not only function as evaluation of greenway development, it also provides detailed information about what are the primary greenway forms and functions from a general view. In this article, the public perception is reviewed from three perspectives, which are greenway users, common citizens, and professionals that are working in design or planning institutions. The perception data of greenway users (n=393) is collected through on-site questionnaires in two greenways in Guangzhou. The perception data of common citizens (n=279) and professional planners or architects (n=185) is collected through Internet questionnaires that were distributed in targeted chatting groups on WeChat. The result of investigation shows that, the respondents recognized greenways as bikeways (28.66%), street greenery (22.63%), sidewalks (20.91%) and parkways (14.01%), while few see greenways as green open spaces (3.66%). Although researchers have doubts about greenways' ecological benefits, the users and citizens commonly recognized greenways as important recreational spaces in urban life. Moreover, most professional architects and planners see greenways as strategic spatial elements and prefer to incorporating them in future projects.

**Dr. Zheng Liu** is a Ph.D researcher in KU Leuven, Belgium. In 2017, he finished his thesis “Urbanism in Transformation: The Planning and Implementation of the Pearl River Delta Greenways” and received a doctoral

degree from South China University of Technology, China. His research focuses on greenway planning and Health City. He has recently worked on the health effects of urban green space and housing condition on pregnancy outcomes.

## **Greenways in China from Two Competitions: A Design Strategy in Urban Landscape Design**

Jane Huang

*AECOM Beijing*

The concept of the greenway was introduced to China in the late 20th century and has developed rapidly in the past decade. From small scale experiments in parks and streets, to over thousand-kilometer regional greenway networks in Pearl River Delta area, greenways have been adopted and implied as a positive strategy by planners and governors to promote public infrastructure and integrated urban development. In the year 2016, The Greenway Planning and Design Guidelines was issued by the Ministry of Housing and Urban-Rural Development of the People's Republic of China. This recognized greenways officially as a physical spatial component in master planning.

Recent research and professional interest in planning for sustainable and resilient cities are indicating more emphasis on multi-functional public open space systems. In this paper, two urban design competitions in the same city, Fuzhou, in south China, are discussed and compared, regarding the important role greenways provide to broader urban ecosystem services and promotion of human well-being.

According to the masterplan of Fuzhou City (2011-2020), future development will be towards the south and east, mainly in Nantai Island and Changle Oceanfront New Town. The Fuzhou Nantai Island Peripheral Road Design Competition was held in 2013. The initial idea was to explore the possibility of creating a greenway along the riverfront to serve for international marathons and bicycle races. The design responds to the new city masterplan, whilst creating five distinctive zones around the 60km peripheral road, each with strong cultural and natural identities. The process of identifying the greenway is an integrated multidisciplinary collaboration for building a strong

transportation and landscape infrastructure network throughout the island.

In 2018, the Fuzhou Changle Oceanfront Boulevard Design Competition was held to integrate land use, transportation service, ecological buffers and urban parks. The greenway in this project is not only the strategy for linking all the resources, but a unique landscape itself, to provide multi-functional and diverse experience. The two competitions highlight the value and evolution of greenways in China, in the rapid expanding urban development, to link natural, cultural and functional urban components, to integrate and transform a city into a friendlier and healthier place for everyone.

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**Jane Huang** received her MLA from UMass-Amherst, USA, MArch from Tsinghua University, China, and is now the Planning and Design Director for AECOM Beijing.

## **A study on Community Greenways of Haizhu in Guangzhou from the perspective of Everyday Urbanism**

Wenxiu Chi<sup>1</sup> and Guangsi Lin<sup>1, 2, 3</sup>

<sup>1</sup>*South China University of Technology, Department of Landscape Architecture*

<sup>2</sup>*State Key Laboratory of Subtropical Building Science*

<sup>3</sup>*Guangzhou Municipal Key Laboratory of Landscape Architecture*

The greenway has become more and more popular all around the world and greenway construction in China is represented by Guangdong Province. As a type of greenway in Guangzhou, the community greenway refers to greenways that connect community parks, pocket parks and green spaces, mainly serving nearby communities. However, whether the community greenways match the daily urban life of the citizens has not been given enough attention within a few years after the completion.

We aim to analyze whether the top-down strategy matches the daily life of residents, from the perspective of everyday urbanism. We studied

the case of Changgang Community Greenway in Haizhu District, the downtown area of Guangzhou from the top-down view and the bottom-up view according to Post Occupancy Evaluation (POE). Methods that we used include literature research, site observation, questionnaire and structured interview. The result shows that, from the top-down view, the aim of community greenways itself is to serve the residents. While from the bottom-up view, lots of survey participants are not so satisfied when talking about the specific content.

**Wenxiu Chi** is a first-year master student at South China University of Technology, majoring in Landscape architecture. Her mentor is Prof. Lin Guangsi. Wenxiu Chi graduated from Shanghai JiaoTong University, and she has always been interested in academic research. She participated the practice research program (PRP) when she was a sophomore, studying the heavy mental enrichment of plants and received one of the best ratings. She wants to continue academic career in the future and be a scholar in landscape architecture.



# Session 7A

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## *Ecosystem Services*

Saturday, 4:15pm - 5:30pm  
Room 174

## Evaluation of the Value of Regulating and Supporting Services Provided by Green Infrastructure in Wuhan

Wei Zhang

*Huazhong Agricultural University, China*

Urban green infrastructure provides multiple regulating and supporting services for the city. This research focuses on the services provided by green infrastructure in Wuhan, China. Located in the central part of China, Wuhan is a large city with more than ten million people. Based on multiple remote sensing images and other related studies, this research evaluated and monetarized the economic value of 7 regulating and supporting services (runoff mitigation, water purification, carbon sequestration and oxygen releasing, air purification, noise reduction, climate regulation and biodiversity conservation) in 3 different districts of the city (the central area, the peripheral area and the suburb area) from 1987 to 2015 by using multiple evaluation methods. Finally, this research summarizes the pattern of regulating and supporting services provided by green infrastructure.

Several results can be obtained through the analysis: (1) The total value of green infrastructure regulating and supporting services in Wuhan in 2015 is 45.079 billion Chinese yuan (6.4962 billion US dollars), which is equivalent to 4.1% of Wuhan's GDP in 2015. (2) From the perspective of supply and demand, the regulating and supporting services of green infrastructure, such as air purification, carbon sequestration and oxygen release, are far from meeting the current demands of the city. (3) The service value provided by urban water area is significantly higher than that of the vegetation area. Also, the service value provided by multi-layer greening is much higher than that of single-layer greening. (4) The decline in the ecosystem service efficiency of the green infrastructure in Wuhan has slowed down from 1987 to 2015.

**Wei Zhang** is a lecturer at Huazhong Agricultural University, Department of Landscape Architecture

## **Cultural ecosystem services and local identity – A ppGIS case study from Budapest Metropolitan Region**

István Valánszki, Sándor Jombach, Krisztina Filep-Kovács, Asmaa Abualhagag Ahmed, Fernando Mendez and Gabriella Balha

*Szent István University, Faculty of Landscape Architecture and Urbanism, Department of Landscape Planning and Regional Development*

Several studies and international conventions highlight the importance of public participation in the process of strategy building. In spite of all these initiatives, public participation methods are not common tools in the practice (especially in Central-Eastern-Europe). In the frames of our research, we applied the ppGIS (Public Participation GIS) method, a special, mostly new tool in Hungary, in order to bridge the gap between the scientific world and local citizens. The method combines community based mapping with GIS techniques. It aims to foster the integration of the public into the process of evaluation, planning, and decision making using GIS technology. Our former research project justified the significance of this method, especially in mapping cultural ecosystem services, since these cases are the most important to local knowledge.

We applied the ppGIS method in micro-region of Vác, situated in Budapest Metropolitan Region. Five cultural ecosystem services were chosen based on former scientific literatures (these are the most commonly used cultural ecosystem services, since these describe the social-cultural background of a place, region): aesthetic value, recreational value, spiritual value, cultural and historic value, and educational value. The survey was carried out between 2017 and 2018 collecting 184 maps. The data was digitized and processed using GIS. The objectives were to define the level of local identity in this peri-urban region, and to analyze the relationship between the frequently used, visited areas and the location of the most important cultural landscape elements for the locals. We had the following research questions:

- Which landscape elements, settlements, regions are marked

mostly with local significance? What are the causes for regional disparities?

- Do the commuting or travel routes influence the significance of landscape values for the society?
- Is there any correlation between hiking trails, cycling routes and the location of marked landscape elements?

Our results show that most of the regionally known values are in the administrative and historic center of the micro-region, but some settlement-groups may have their own local identity, as the level of appreciation differs when we analyze the separate watersheds within the micro-region. It turned out that there is a correlation between bike routes and cultural ecosystem services in the region. The hiking routes are crossing the area where the most values were marked by locals outside of town centers or villages. In spite of high road density and the huge number of commuting residents, the most important daily routes did not always influence priorities locally.

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**István Valánszki, Ph.D.**, is a landscape architect and assistant professor at Szent István University, Faculty of Landscape Architecture and Urbanism, Department of Landscape Planning and Regional Development. His researches mainly focus on ppGIS (public participation mapping), cultural ecosystem services and landscape evaluation. István also has international research and work experiences (e.g. University of Massachusetts, USA; Leibniz-Centre for Agricultural Landscape Research, Germany; The James Hutton Institute, Scotland; Norwegian University of Life Sciences, Norway; Vienna University of Technology, Austria). In addition to national awards, in 2017 he received the 2017 “Outstanding 3rd Cycle” doctoral student Award of the ECLAS (European Council of Landscape Architecture Schools).

## Calculating Cultural Ecosystem Services as Part of Greenspace Management

Jocelyn Gavitt and Richard Smardon

*Departments of Environmental Studies & Landscape Architecture,  
SUNY College of Environmental Science and Forestry*

Lake related greenspace provides many benefits to residents and visitors, which are often under-valued. The Millennium Ecosystem Assessment

Project (2005) proposed the valuation of ecosystem services, defined as regulatory, provisional, ecosystem support and cultural services provided for us by nature, free of charge. The challenge here is: How can we use cultural ecosystem services derived from scenic landscapes for greenspace management and assessment?

Cultural ecosystem services received international recognition as part of the Millennium Ecosystem Assessment Project (2005). Also, as part of ecosystems services, are regulatory, provisional and ecosystem support. For this paper we are particularly concerned with cultural services, which include recreation, science and education, spiritual/historic as well as aesthetic functions. De Groot et al (2002) and Farber et al (2006) offer a progression of description of cultural Ecosystem services. De Groot et al (2002) describes Information functions as including; aesthetic information, recreation, cultural artistic information and spiritual/historic information. Farber et al (2005) for cultural services include; aesthetic, recreation, science/education, and spiritual/historic functions.

This paper presents ecosystem cultural services related to water based scenic landscape resources and then applies it to an Upstate New York lake landscape. A very careful accounting of greenspace ecosystem services is presented as they are applied to lakeshore residents, village residents and town/watershed residents and lake greenspace users utilizing user benefit calculations to yield over 10.6 million dollars of benefits per year (Smardon 2018).

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**Jocelyn Gavitt** specializes in community engagement, planning and design. She has extensive experience in master planning, site design and recreational planning. She is a registered landscape architect with a bachelor's degree in Landscape Architecture from Cornell University and a master's with a concentration in community planning from SUNY College of Environmental Science and Forestry. Jocelyn is also a faculty member at SUNY ESF where she teaches design studios and planning courses in the Department of Landscape Architecture. She was inducted into the American Society of Landscape Architects in 1996.



## Session 7B

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### *Greenways of Ancient China*

Saturday, 4:15pm - 5:30pm

Room 162

## The Study on Greenway Planning in Ancient China Impacted by the Literati Philosophy: Huizhou West Lake as an Example

Shiran Liang

*Shen Zhen University, China*

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This paper contends that the expansion of the ancient city Huizhou benefited from the greenways which were designed and constructed between the 11th to 15th centuries A.D. across the Huizhou West Lake, which was recognized as the world's cultural heritage. It illustrates that the transportation function not only linked the city with the nature of the western areas, but also promoted the infiltration and integration of the two. They eventually made the ancient Huizhou city an ideal model for Shan-Shui city in ancient China. This paper also analyzes and summarizes the literati philosophy thoughts embedded in the greenway planning: 1) Deep and simple forms with multiple features, which were based on the macro-regional pattern that combined levees into multilevel landscape, delivering a variety of meanings and profound impacts on this ancient city; 2) Brief design with more functions, characteristic of minimizing workload to solve complex structures, like planning and developing green ways when combining levees, not only controlling and stabilizing the water level, but also giving consideration to fisheries; promoting the development of the western mountain areas, and shaping the eastern coastline of waters; 3) Building with poetic and picturesque images of calligraphy, which showed conceived concepts in Chinese culture with design of traffic engineering facilities. Its deep artistry was unique for modern landscape design but with profound life connotation and spiritual ideas, which became the assistant carriers of national spirit. Historically, as well as currently, these ideas for designs still continue to exert impressive influence.

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**Liang** is both a practitioner and a researcher in landscape architecture. He received his doctorate from Beijing forestry University in 2012. His tutor, Professor Zhaozhen Meng, is not only an Academic of the Academy of engineering of China, but also a recognized authority of Chinese landscape research. Liang used to be the design director of BLY, which was one of the most famous landscape design institutions in his country, and he has won

the 2nd place in The Engineering Reconnaissance Design Awards of China 2017, which was the most authoritative award in the field of architecture and Landscape. Recently, Liang has been the supervisor for Graduate Programs at Shenzhen University.

## **Cultural Values of The Historical Roads in West Beijing, China**

Fan Fu<sup>1</sup>, Tao Jin<sup>2</sup> and Chunqing Li<sup>3</sup>

<sup>1,3</sup>*Beijing University of Civil Engineering And Architecture*

<sup>2</sup>*Yuyuantan Park Administration, Beijing*

The Historical Roads in West Beijing are the historical roads which connected Old Beijing City to the West Mountain and cities west to Beijing. The West Mountain is the buffer of Beijing, blocking the invasion from west, and the hub between Beijing and west provinces, whose products and resources were delivered to Beijing. Moreover, the West Mountain has plenty of cultural entities, such as royal gardens, temples and historical villages. Therefore, the Historical Roads in West Beijing pass through villages, temples, fortresses and post houses along ridges and valleys, and had different category of roads for trade, military and religion functions. In current years, Beijing planned to develop the West Mountain-Yongding River Cultural Linear Areas, which is one of the three Cultural Linear Areas constituting a main part of Beijing's Historical City characteristics. The Historical Roads in West Beijing will play an important role in the development. However, the values of the Historical Roads haven't been paid enough attention. Thus, a comprehensive cultural evaluation should be done. Based on the evaluation, cultural/historical greenways can be implemented along the suitable Historical Roads. This research focuses on the cultural values of the Historical Roads in West Beijing, and discusses the aesthetic, historic, scientific, social and spiritual values of the Historical Roads. As a result, a plan for cultural/historical greenways will be proposed to preserve the Historical Roads, promote tourism and keep historical memory.

**Dr. Fan Fu** is a professor of landscape architecture at Beijing University of Civil Engineering and Architecture.

## **An Exploration of China's Greenway Planning Based on the Culture of China's Ancient Road: Taking the Royal Waterway of Qing Dynasty in the Northwest Suburbs of Beijing as an Example**

Jingyu Wang, Xiaofei Xue and Chunguang Zhou

*Beijing Forestry University, College of Landscape Architecture*

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The exploration on greenway and its concept originated in Europe and the United States in the nineteenth century. In view of geographical differences, the development and planning of greenway in China should adapt to the local context. Set the Silk Road(114BC-127AD) as an example, which represents the Ancient Road in China. The formation and development of the Silk Road and other roads such as post road, official road, business road and waterway in other past dynasties are Chinese Ancient Road System, inheriting the thought of “Harmony of Nature and Human Beings” which is the foundation of Chinese traditional culture. The Ancient Road has played a tremendous role in regional development of China, cultural communication, beauty-appreciation, and the progress of ecological civilization of Chinese nation. The Ancient Road, which contains massive amounts of cultural heritages, is the treasure of China's modern Greenway, which meets both ecological needs and the inheritance of history and culture. Beijing, the city which has more than 3,000-years of history, has been the capital of China for more than 800 years. However, rapid urbanization and city sprawl has seriously damaged the ecological environment and historical and cultural heritages.

This paper will take the Royal Waterway in the northwestern suburbs in Beijing as an example, which was formed during the Qianlong Emperor period in Qing Dynasty, to explore how to build a modern greenway with Chinese characteristics by taking “water” as a carrier, and also taking the historical context of both the waterway and the surroundings into account. On one hand, it improves ecological environment of this area by restoring the original historical waterway system; on the other hand, through protecting and showing historical cultural heritages, it can improve the contents of citizens' recreation.

At the same time, the paper expects that this model can provide reference for similar greenway development in China.

**Xiaofei Xue** is associate professor of the School of Landscape Architecture, Beijing Forestry University where he teaches courses on History of Ancient Chinese Garden and Introduction of Landscape Architecture. His research interests are History of Landscape Architecture and Theory of modernist landscape architecture. He serves on the guest editor of the professional journal, China Landscape Architecture. Xiaofei holds a PhD in Landscape Architecture, Master in Landscape Architecture and Bachelor in Landscape Architecture from Beijing Forestry University.

**Jingyu Wang**, who was born in 1991 in Hebei Province China, is a graduate student in the School of Landscape Architecture, Beijing Forestry University. Her research focuses on history and theory of landscape architecture.

## **Interaction between City and Water: The Experience of Water System Planning in the Ancient Chinese City, Jinan for The Modern Urban Greenway Construction**

Peng Zhao and Xiaofei Xue

*Beijing Forestry University, College of Landscape Architecture*

Greenway, as a linear green open space, is of great significance to optimize the urban ecological environment, maintain urban safety and health, protect urban cultural heritage, and construct urban public open space. The water system has always been an important foundation for the construction of urban greenways. In recent years, the disorderly urban growth has caused frequent flooding, deterioration of ecological environment, breakdown of historical context and insufficient public open space. Nowadays, the traditional urban gray infrastructure and land planning have been unable to meet the development needs of cities.

Jinan City is surrounded by mountains and river and the altitude is higher in the south of city than the north of city. It is easy to cause street floods and waterlogging in low-lying areas. At the same time, historical context and urban spatial form has been gradually destroyed.

This paper will consider the urban planning and water system planning of ancient Jinan City as an example, focusing on the dynamic relationship between urban flood prevention and the of urban public open space in ancient Jinan City. This paper summarizes the historical experience of urban water system planning, flood prevention, and the construction of urban public open space in the historical and cultural corridor in ancient Jinan City: (1) the water system is comprised of lake, river, city moat and spring water. (2) utilizing flood control strategies such as drainage, storage, distribution, diversion and infiltration. (3) constructing urban open space with a combination of types of water space. (4) linking historical and cultural heritage with the water system. This paper explores the experience of ancient Jinan City for the construction of today's urban greenway.

**Zhao Peng**, born in Qingdao of China, is a graduate student in the school of Landscape Architecture, Beijing Forestry University. His research focuses on the history and theory of landscape architecture.

# Session 7C

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## *Greenway Case Studies*

Saturday, 4:15pm - 5:30pm  
Room 165

## Park System Links

Wolfram Hoefler

*Rutgers University, Department of Landscape Architecture*

Buffalo's first park system master plan by Olmsted featured a variety of parks, knit together by a system of greenways. This approach served as foundation for the development of a Park System Master Plan for Bergen County New Jersey. Although it was established in 1946, for over seventy years the Bergen County Parks system had no comprehensive Master Plan that instituted goals and objectives for county parklands in a region that is experiencing substantial growth.

The presentation will focus on greenways as core components of an interconnected park system and will provide an overview of the community engagement and planning process.

The community outreach process revealed a wide range of reasons for park visits, and so the overall master plan vision "From the Marshes to the Mountains" celebrates the geographic diversity of the county. The master plan developed emphasis categories for individual parks that support the diversity of amenities accessible by all residents. The overall concept addresses the increasing demands on public open space due to population growth and demographic diversity, which place significant pressures on the existing parks.

Key elements of the master plan include anchor parks, emphasis categories, and multi modal connections. Anchor parks provide amenities to a regional audience and function as the backbone of the park network. The introduction of multi-modal connections encourages bike and pedestrian access with combined concepts of adaptive re-use of rail lines and bike lanes on appropriate roadways, increasing the functionality of the overall system. The presentation will also highlight the proposal for a Hackensack River Greenway that evolved from the master planning process. The new linear park would combine existing parklands with future acquisitions and new partnerships.

**Dr. Wolfram Hoefler** is Associate Professor and Chair of the Department of Landscape Architecture at Rutgers, The State University of New Jersey. He holds a doctoral degree from Technische Universität München 2000 and is a licensed landscape architect in the state of North-Rhine Westphalia, Germany. His research and teaching focus is the cultural interpretation of brownfields as potential elements of the public realm. Further he is interested in the role of urban plazas, neighborhood parks, or community gardens as places where people of diverse backgrounds can meet, interact, and possibly learn about each other. Dr. Hoefler also serves as Co-Director of the Rutgers Center for Urban Environmental Sustainability (CUES).

## **Greenways as a new potential for shrinking cities. The case of Milan (Italy)**

Luca Maria Francesco Fabris<sup>1</sup>, Gerardo Semperebon<sup>2</sup> and Fan Fu<sup>3</sup>

<sup>1</sup>*Politecnico di Milano, Italy*

<sup>2</sup>*Politecnico di Milano, Italy and Shanghai Jiao Tong University, China*

<sup>3</sup>*Beijing University of Civil Engineering and Architecture, China*

The paper aims to illustrate the transformation of Milan, focusing on its relationship with (urban) greenways. At the beginning of XXI century Milan was deeply converted into a mere service industry centre. The change modified also its territory. Brownfields took place of industries and logistic compounds, places without a use dotting its urban fabric. In the 1970s, visionary architects, planners, and landscape architects started to design a series of parks surrounding the town, creating a green crown fading its outskirts. North Park and South Park together with Boscoincittà (Wood-in-town) created a continuous green curtain setting the basis for a circular greenway. In the 1990s some studies, including the PhD thesis 'Post-industrial Green' by one of the authors and the academic research 'Metro-Bosco' by Stefano Boeri, demonstrated how Milan, while becoming a shrinking town passing from 2 million to 1.6 million inhabitants, could be transformed in a town where districts could be connected through green corridors. These theories, even if they had good dissemination and were widely published, actually didn't become real as Milanese Administration imposed an anachronistic policy based on the developing of new neighbourhoods, trying to 'sprawl' a city that

actually was decreasing. This proposal however bore a series of radiant green corridors starting in the centre of Milan (Raggi Verdi -Green Rays, a project by LAND, 2005). In the second decade of the new Millennium, it was clear that Milan had to accept to decrease, enabling at the same time a way to foster the quality of life for its citizens. In the last five years, the new Administration's policy encouraged the abandoned areas requalification (actions 'Re-shaping Milan' 2015, and 'Re-shaping Milan', 2018-ongoing, developed with the Politecnico di Milano), and asked Italian Railways (Trenitalia) to 'give back' to the town six unused railways-yards encrusted in the city territory. This request, endorsed also by the common people - asking more and more green spaces and slow mobility in the town-, became real with the visionary plan "Fiume Verde" by Studio Boeri Architetti (Green River, 2016). This proposal designed a net of inner green corridors able to increase deeply the city green surface. In 2018, the first international competition to transform two railway-yards has been launched. One will be a linear park, the other will host the widest Milanese public park). The first concrete milestones for a green-way transformation of Milan.

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**Luca Maria Francesco Fabris**, (1966) journalist and architect, obtained a PhD in Architectural and Environmental Technology, a Master in Urban Planning and Environment, and is associate professor in Architectural Technology at Politecnico di Milano, where teaches at the AUIC School's MS in Architecture and Landscape Architecture. He's writing for the review *The Plan*, and is Editorial Director of the magazine 'YouBuild', Scientific Director of 'Environscapes' book series published by Maggioli Editore. Visiting professor at European, American and Asian Universities, he focuses on researches related to contemporary built environment, sustainability and landscape. Editor, scientific referee and reviewer of various university publications, he has written several books and essays about the above-mentioned subjects and contributes to specialized reviews. More on [www.environscape.eu](http://www.environscape.eu)

## Greenway Planning in the 11th district of Budapest

Ágnes Sallay, Zita Szabó and László Kollányi

*Szent István University, Department for Landscape Planning and Regional Development*

District 11 is one of the most dynamically developing parts of Budapest as its population reached 150,000 people in 2018. The widest variety of land use is present in its 30 km<sup>2</sup> of area, including apartment buildings from the early 20th century on the banks of Danube, villas on the Gellért Hill, panel buildings in the outskirts, industrial areas, family houses, and semi-natural areas. In addition to the developments affecting residential areas (Kasza, 2007), numerous investments have been started in the last few years that will have an effect on the entire capital: the tallest building in the city is under construction at the Kopaszi-gát (Kopaszi-Dam) and a so-called 'super hospital' is planned in the district near Budaörs ([www.ujbuda.hu](http://www.ujbuda.hu)).

The local government of the district has plans to create a greenway (Fabos, 2004), to satisfy the locals' need for recreation by joining the remaining semi-natural areas. Landscape architecture Master's students from Szent István University are involved in the planning process. Our job was to select the route for it and to create development recommendations for hubs along the way. The planned greenway will be accessible to pedestrians as well as by bicycle (Bicycle roads, rules). It will lead from Kamaraerdő in the north (in the neighbouring District 12) to Normafa, two popular places on the Buda side of the capital for hiking and relaxation. Students completed the planning projects in groups.

The planning had to accommodate special requirements at each location:

1. Kamaraerdő: recreational developments, expanding existing elements
2. Bitterwater: recreational development while preserving the environmental protection
3. Madárhegy (Birdhill): development of the green infrastructure network taking into account the new functions (parking, tree planting)

on the streets, potential future public transportation)

4. Rupp-hegy (Rupp Hill): recreational development while preserving the environmental protection

5. Normafa: creating the link to the areas in District 11, expanding the green infrastructure network between it and the district's border

Two variants were created of the plans for both areas, which we presented to the local government and local population at a forum in May 2017. The local government of the district plans to use the materials created by the students as part of a tender for financing the greenway.

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**Ágnes Sallay** is a landscape architect with her PhD in Landscape Planning, and is currently an associate professor at the Szent István University.

## **Green Belt as a Tool for Containing Urban Sprawl: Exploring Best Practices in Germany**

Edward Gyan

*Geislingen University, Germany*

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The world economy is undergoing series of metamorphosis. Among the major driving forces of this change process is urbanization. The United Nations forecasts that the global population will hit approximately 9.6 billion by mid-2050 out of which about two-thirds is projected to live in cities (United Nations, 2013 & 2014). Already, more than fifty percent of the world's population lives in urban areas.

The inability of the city's inner core to accommodate the influx of population has encouraged what some experts have termed as "urban sprawl". In fact, the phenomenon of urban sprawl has taken a central focus in contemporary urban planning and development discourses. While urban sprawl may be viewed as a consequence of socio-economic development, it poses a plethora of threats to sustainable city management and land-use planning. The common reason being that urban sprawl results in the outward expansion of cities

characterized by low densities, separated land uses and car dependent communities. Indeed, in most cities, especially in developing countries, it is now uncommon to see several make shift structures and informal settlements springing up along the main communication lines such as road and railway lines among others. This kind of physical dilution of urban space that occurs discontinuously further aggravates social segregation and generates countless environmental impacts that urban planners and development authorities are unable to cope.

One effective planning and growth management tool for containing urban sprawl is the conscious creation of green belts. This paper discusses how green belts can be used to counteract excessive occurrence of urban sprawl and explores some of the best practices of the use of green belts to control urban sprawl in some selected German cities. The paper also draws profound lessons that can be replicated in cities experiencing the phenomenon of urban sprawl, especially those in developing countries.

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**Edward Gyan** is currently pursuing a Master of Science program in Sustainable Mobilities at the HfWU Nuertingen-Geislingen University. He also holds an M.Sc. Infrastructure Planning at the University of Stuttgart, Germany and a B.Sc. Planning from the Kwame Nkrumah University of Science and Technology, Kumasi, Ghana. Between 2011 and 2013, Edward worked as a development consultant with MAPLE Consult where he had the opportunity to consult for several government institutions and bilateral and multi-lateral organizations including The World Bank, KfW, EU, UNICEF, DANIDA and VNG International in a wide range of fields including urban development planning; water, sanitation and hygiene (WASH); public sector management; local government and decentralization. Prior to that, he worked in Ghana's local government as an Assistant Development Planning Officer in the Sekyere Afram Plains District Assembly, Kumawu, Ashanti Region. His research interests include urbanization and sub-urbanization, land-use planning, climate change and resilient cities, local government and decentralization.



# Poster Session

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Saturday, 12:30pm - 2:30pm  
UMass Design Building Atrium

## The Emerald Network: Connecting & Extending Boston's Greenways

BSLA Senior Studio

with Professors Theodore Eisenman and Ethan Carr

*University of Massachusetts, Amherst, Department of Landscape Architecture and Regional Planning*

The Emerald Network is a nonprofit-led vision to create a 200-mile system of green corridors that connect every neighborhood in Boston, Massachusetts to open space, transit, and jobs, and thereby increase mobility, promote physical activity, improve climate change resiliency, and enhance the city's competitiveness in a global economy. This contemporary vision builds upon a rich legacy of greenway planning and design in Boston, extending from the Emerald Necklace in the 19th century to the Rose Kennedy Greenway in the early 21st century.

To advance the vision of a citywide Emerald Network, undergraduate landscape architecture students under the direction of the coauthors have undertaken greenway planning and design studios at the University of Massachusetts, Amherst. The scope of the studio is three-fold: first, to examine how greenway planning and design in Boston has changed over time in response to historical conditions; second, to conduct a city scale analysis of opportunities to connect and extend existing greenways; and third, to identify specific sites and develop site scale design proposals in support of the Emerald Network vision.

This approach reveals some of the unique challenges and opportunities for contemporary greenway planning and design, as students tackle sites ranging in scale, spatial configuration, and socioecological condition. Our presentation will share work from these undergraduate studios, exploring ways for greenway planning to respond to 21st century needs.

## Connectivity and Place-Making in the Lower Raritan Watershed

Sanja Martić and Sophia Trinidad

*Rutgers University, Department of Landscape Architecture*

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Two student research projects located in the Lower Raritan Watershed address placemaking and post-industrial reuse. Metuchen Greenway extension and New Brunswick Greenway and Waterway create networks of multimodal greenway connectors by reprogramming pre-existing transportation infrastructure. They forge new connections between the Delaware and Raritan Canal, emerging greenway systems such as the East Coast Greenway, and natural systems.

Lower Raritan Greenway and Waterway:

Undertaken as a part of an MLA thesis, the project context along the Raritan River changes from peri-urban to urban. The project spans urban, suburban and rural environments, with a rich industrial, revolutionary and precolonial history. It reactivates connections between past and present, people and place, nature and built environment.

Potential stakeholders and agencies working on the project would involve federal, state and local government agencies (USACE, NJDEP, NJDOT, Delaware and Raritan Canal Commission, Middlesex County, local municipalities) as well as nonprofits such as Lower Raritan Watershed Partnership, Raritan Riverkeepers, Rutgers University - Sustainable Raritan River Initiative. The project significance is a comprehensive river-centric approach to planning, sensitive to multiple layers of history and social fabric of the area. It will result in a Regional Master Plan and two site scale interventions, each dealing with a specific point of connection.

Middlesex Greenway Extension:

The Middlesex Greenway extension lies along abandoned rail lines adjacent to a 1,000-acre reserve along the East Coast flyway, and connects the community to the Great Swamp and local nature. Partners

included: Rutgers University, Middlesex County, the municipality of Metuchen, the New Jersey Chapter of the American Society of Landscape Architects (NJASLA) and the National Park Service (NPS). The NPS is investigating collaborating with U.S. Fish and Wildlife to make the project an Urban Wildlife Refuge.

**Sanja Martić** is a Masters of Landscape Architecture candidate 2019, at Rutgers University in New Jersey. She holds a BA in Environmental Planning and Design from Rutgers University. Over the course of her education she worked on projects involving watershed monitoring and management, multimodal path design as well as trail design, building and management. Some of the other interests include sustainable storm water management, green infrastructure, urban farming and ethnobotany.

## **Urban Transformation of Old West Gate (Laoximen) Phase I, Changde, China**

Yanhong Tang, Yuezhong Chen and Vince Abercrombie

*ECOLAND Planning and Design*

Together with a canal water system cleaning effort, the project transformed 6.4 acres of a forgotten old town littered with structurally unsafe buildings into a culturally-rich urban green space and popular waterfront district in Changde, Hunan Province, China. Laoximen (meaning Old West Gate) sets a precedent and benchmark for urban renewal, reclaiming a historic canal and the adjacent streets for new use. The project promotes the timely principles of urban regeneration, adaptive re-use, historic preservation, and ecological sustainability, whilst avoiding the current practice in China of demolition and radical reconstruction. After 100 years of tumultuous history, including WWII and the Cultural Revolution, the project's goal was to rejuvenate the site as a modern metropolis, maintaining links with its history through design and preservation of on-site materials. Innovation and preservation come together to establish an urban core and waterfront corridor for people, plants and wildlife. In addition to providing valuable open space, Laoximen has become an economic generator for the neighborhood, attracting investment toward new retail, commercial, and residential development.

See session 6B for Tang biography

## **Exploring the opportunities for (re)developing natural coastal buffer through the strategy of managed retreat.**

### **Case study: Coney Island**

Onam Bisht

*Cornell University, Department of Landscape Architecture*

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With the rising number of flooding and storm-surge events due to climate change, the once promising waterfront properties are now gradually diminishing in their real-estate value. While this depreciation in their property value was imminent given the looming threats of climate-change and sea-level rise, this presents an opportunity for landscape planners to reclaim the coastal edges to develop resiliency towards climate-change induced flooding.

Coney Island is one of the most vulnerable neighborhoods in the metropolitan of New York, highly susceptible to sea-level rise and storm-surges. It was one of the most severely devastated communities in the aftermath of hurricane Sandy, with its public infrastructure, such as electricity, inaccessible for several days due to inundation. While the disaster mitigation efforts following the 2012 hurricane, focused on restoring and re-enhancing the coastal defenses; a more permanent approach involves a paradigm shift towards inland migration of the coastal communities. While inland migration in itself faces major challenges in terms of social inequality that would be inherent to their rehabilitation efforts, this paper will focus on the opportunity that arises out of rapidly increasing vacancy of parcels situated along vulnerable coastal edges.

Managed retreat looks at a more sustainable, long-term approach towards mitigating the impacts of sea-level rise and storm-surges along the flood-prone coastal landscapes. It focuses on integrating the otherwise fragmented parcels into a more connected network of green infrastructure, that restores natural coastal habitat and provides a more resilient and natural response to climate-change. This paper looks at the factors that make Coney Island one of the most vulnerable communities to coastal inundation, and the reasons and opportunities for creating a natural coastal buffer along the Coney Island creek for a climate-change adaptive and resilient shoreline.

## Pedaling Parks to People

Reid Bertone-Johnson, Phoebe Uman, Elisabeth Nesmith, Anna Levine and Zoe Nadig

*Smith College, Landscape Studies Program*

The ParKit, a mobile park-making kit, makes small temporary parks mobile. In the spirit of ReBAR's Art & Design Studio and the practice of Tactical Urbanism and Urban Acupuncture as practiced and written about by Mike Lyndon, Anthony Garcia, and Jaime Lerner, the ParKit's main objective is enacting temporary models of potential permanent park installations. The ParKit team has developed a survey that we administer to visitors of our temporary parks to help us make decisions about how to iterate the ParKit components and identify new potential locations to deploy.

The current ParKit, creating a small temporary park, consists of a deck box, wooden chairs designed and created by the ParKit team, a patio umbrella, low fencing for demarcating space, various modified milk crates for seating and tables, and a bean-bag-toss game. A bike pulls a trailer holding all of these components. The ParKit is designed to be ridden around a city by one person, assembled quickly, and deployed for short periods of time. Previously unused spaces can quickly and easily be made inviting places for people to gather. The ParKit allows us to test the efficacy of a design intervention without the costs associated with a fully developed park. Since all components are pulled on a trailer, the park design can be easily adapted to many potential locations and to the community's interest and needs by changing out the components.

We are still in the prototyping phase of the ParKit design. Elements of the ParKit will be designed, created, and/or improved by members of the ParKit team in our Center for Design and Fabrication. We plan to create more chairs, a sturdier and more versatile box, interactive games, and a more cohesive aesthetic. Throughout this process, we will consider how these pieces best fit together on the bike trailer.

The ParKit evolves through community engagement. We ask visitors to the ParKit a standard set of questions (approved by our Institutional Review Board) at multiple stages in the process, and record and analyze survey data using Geographic Information Systems. Community engaged research will allow us to adapt the ParKit components to address user likes, dislikes, and desired location/landscape typographies for small park development.

**Reid Bertone-Johnson** received a B.S. from Tufts University, where he majored in geological sciences and environmental studies. He received an Ed.M. from the Harvard Graduate School of Education in 1998. After five years of teaching at Amherst Regional High School in Amherst, MA, Reid went back to graduate school to earn an M.L.A. from the University of Massachusetts Amherst. He has worked professionally for Dodson Associates and for the Library of American Landscape History. Bertone-Johnson has been at Smith since 2007 and is a core lecturer in the Landscape Studies program. Previously he also managed the Ada & Archibald MacLeish Field Station for Smith and oversaw the development of the field station.

## **Integrating Commute Cycling with Green Infrastructure for Coastal Resiliency: Designing a Model for the Adaptive Future of East Boston**

Jessica Schoendorf

*University of Massachusetts, Amherst, Department of Landscape Architecture and Regional Planning*

This study, resulting in a final design project, is based on utilizing East Boston as a testing ground for integrating bicycle commuting into coastal resilience planning and infrastructure. Most recent studies have shown that cities are increasingly looking towards an ecological and green infrastructure approach with recreation and cultural uses woven throughout (Nordensen, 2015). However, it is not evident that there has been a focus on the important role transportation plays in either increasing or mitigating future climate change issues in this coastal resilient context. Bicycling for transportation should be integrated into future designs and planning for resilient coastal cities because it holds a greater possibility to move us towards the same goals of a socially, economically, and environmentally sustainable future that coastal

resiliency planning is targeting. The research to support this design project aims to understand how and why these two indispensable topics might go together and looks for ways in which they can be combined to create strong and adaptable cities now and for years to come.

These research methods will include analyzing case studies related to coastal resilience design and planning and how transportation biking may or may not be integrated into these examples. Two of these case studies are “The BIG U” in New York City and SCAPE’s very recent design “Resilient Boston Harbor.” While both projects address access and connectivity in conceptual terms, this analysis will focus on diving deeper into the details of integrating a catalyst for transportation bicycling.

The findings will then be applied to a design project in East Boston, MA. This area of Boston is a major priority for Mayor Marty Walsh’s “Climate Ready” resilience planning due to its’ exposed location within Boston Harbor and is home to unique demographics that could greatly benefit from bicycle commuting (Climate Ready Boston, 2017). This includes vulnerable lower income and immigrant residents, medium to higher income residents (positively or negatively) contributing to gentrifying neighborhoods, and tourists coming and going through Logan Airport. Transportation bicycling has the capacity to positively impact these populations by encouraging community development through improved social cohesion, decreasing spending on transportation, increasing the mental and physical health of individuals, and contributing to the local economy by bringing tourists in direct contact with businesses (Gilderbloom, J. et al, 2016). The existing East Boston greenway can be both improved to better connect the area through bicycling and utilized in a coastal resiliency design.

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**Jessica Schoendorf** is a third year graduate student in the Landscape Architecture program at UMass Amherst. She is passionate about designing urban areas in a way that encourages people to be out in the world experiencing nature and their community on a daily basis. Bostonians spend around 500 days of their life commuting (EducatedDriver.org, 2018). Jessica believes this is an ideal opportunity for professionals to design a positive active commuting experience to increase social cohesion and decrease our carbon footprints.

## The Art of Healing the Landscape: The Application of Phytotechnology in Garden Art

Tia Novak

*University of Massachusetts, Amherst, Department of Landscape Architecture and Regional Planning*

Gas stations are an iconic component of the American vernacular landscape. Today, many abandoned gas stations - along with the contamination they left behind - remain scattered across the United States. Petroleum hydrocarbons are some of the most common contaminants in soils and sediments worldwide (Stroud et al., 2007); between 1984 and 2011, over 500,000 instances of leaking underground storage tanks (LUSTS) were reported in the U.S. alone. Although conventional methods of remediation are time consuming and expensive, phytotechnology techniques like rhizodegradation, phytohydraulics, phytovolatilization, and phytodegradation, are cost-effective tools to transform abandoned gas stations into functional landscapes (Kennen and Kirkwood, 2015). While the utilitarian aspects of phytotechnology for physical remediation through mechanical and chemical mechanisms is well-documented, the direct use of phytotechnology to create landscape legibility and transform the perception of previously polluted site is less explored. This project will explore the application of phytoremediation in garden and land art to create legibility and a sense of place within the remediated landscape.

**Tia Novak** is an MLA candidate at the University of Massachusetts Amherst. She holds a MS in Ecological Design and Planning from the Conway School of Ecological Landscape Design and a BA in Biology and Environmental Science and Policy from Smith College.

## Green Network in the Changing Urban Structure

Vera Iváncsics

*Szent István University, Faculty Of Landscape Architecture And Urbanism, Department Of Landscape Planning And Regional Development*

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The evolution of the extent and nature of green spaces is explained by a number of reasons. For the research area we have chosen a Hungarian town, the capital of the first county of the Hungarian Kingdom due to its geographical location and because it still retains its strategic role. Now it is a flourishing cultural and economic centre in the vicinity of Balaton recreational area. Veszprém has a unique spatial structure, located at the junction of three small regions; north, northwest is the Bakony mountain range, south is Balaton Uplands, east is Veszpreml Plateau. The research attempts to find answers for the changing role and structure of green network in the changing urban structure with the case of Veszpreml from historical perspective: What are the dynamics of the expansion of green areas? How have the functions been changed? Where were the green areas located? What did green network in the last century mean and what is currently? The results of the analysis of historical maps of Veszpreml County Archives were compared against population data, size of built-up areas and prevailing urban development philosophies in order to understand the driving forces behind the changes of green areas. Finally, we explore the present challenges of protection and preservation of the green network due to the fact that after a strong suburbanization process, Veszpreml became a popular destination of in-migration, again resulting in high pressure of urban growth. As a result, insight is gained into the motivations of the changing role of green spaces in Veszpreml. Relationship between urban planning concepts and development of green network through a Hungarian example is shown.

## Reclaiming the River: Green Infrastructure Design for a Small City Center

Tasuku Kamei

*University of Massachusetts, Amherst, Department of Landscape Architecture and Regional Planning*

The City of Northampton is a small city in Western Massachusetts that developed in close connection with the Mill River, a tributary of the Connecticut River, which used to flow in the heart of the city. The river was diverted away from downtown Northampton to prevent flooding, and the old river is now hidden underneath pavement and dense vegetation. This design project explores ways to bring back the presence of the Mill River in downtown Northampton as part of the citizen-led vision of the Mill River Greenway Initiative.

The project focuses particularly on parking lots and remnant forest along an existing rail-trail in downtown, where the river used to flow. The goal of the project is to bring back the river in the community of Northampton, to create ecologically functional spaces where people can interact with nature, and to bring additional vibrancy and functionality to the heart of Northampton. Based on the multi-scale approach of green infrastructure (Rouse & Bunster-Ossa, 2013), the larger context of the greenway network is examined along with potential site-scale interventions. The project also explores ways to improve multi-modal transportation connections between key downtown destinations. Given the critical impact of impervious surfaces and stormwater runoff on the stream corridor, the project proposes implementing various types of green infrastructure and river restoration strategies, including ecological and symbolic restoration (Paul & Meyer, 2001; Palmer et al., 2014; Walsh et al., 2005). This project provides insights for restoring hidden rivers in other small urban centers.

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**Tasuku Kamei** is a 3rd year Master's of Landscape Architecture student at University of Massachusetts, Amherst.

## **Uncovering the Potential of Peabody's Hidden North River: A Greenway for Social and Ecological Connectivity**

Mitchell Johnson

*University of Massachusetts, Amherst, Department of Landscape Architecture and Regional Planning*

Being located at the convergence of three significant streams, the Proctor Brook, Goldthwaite Brook and North River, made Peabody, MA a booming industrial town. Over time, as urban and industrial development grew the streams were canalized and covered over in places. By the 1960's, industry started to move elsewhere, and by today, parking lots and rundown buildings surround the downtown. Due to recurring flooding problems, its location within the city, and traffic, the area of downtown Peabody struggles to bring in development like its neighboring cities. This project proposes a multi-purpose urban greenway for the downtown district in Peabody, MA that will be phased to guide further planning and development. The greenway design proposal includes a larger scale conceptual plan and a focused area plan. The large-scale plan creates a green network that better connects downtown to its surrounding neighborhoods and addresses the issues of flooding in the area. The finer scale plan creates a park in Peabody Square that provides a green space in heart of the city's downtown that can be a catalyst for major economic redevelopment in the downtown. This multi-level and multi-functional urban greenway explores the possibility of a more sustainable urban environment in the future for the downtown of Peabody. The plan addresses needs

that are undeserved in the community, visions are shared through an engagement process with citizens to find out more about specific needs and potential program elements. The plan provides ecosystem services, adds locations where residents can hold gathering and events, connects to a larger greenway network. The methods include GIS mapping, site observation, interviews with planning officials and stakeholders, case study research of successful urban greenway in urban floodplains, literature review of greenway history and theory. This multi-level and multi-functional urban greenway explores the possibility of a more sustainable urban environment in the future for downtown Peabody.

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**Mitchell Johnson** is a third year graduate student in landscape architecture at Umass-Amherst.

## **Reutilization and Remediation of Sunset Park's Brownfield Opportunity Area**

Yincheng Zhang

*University of Massachusetts, Amherst, Department of Landscape Architecture and Regional Planning*

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This proposal is based on the topic of brownfield restoration and reconstructing post-industrial communities. The problem found in my study area is universal and practical and ubiquitous all over the world. My research explains the inevitability of brownfield development in the process of industrialization and urbanization of human society, and the importance and necessity of brownfield restoration. Sunset Park is an industrial community that was developed very early in Brooklyn, New York City. It was a very active one in the last century as it was used for shipping, storage and manufacturing. However, due to the large amount of space required by the container transportation industry in the port and because of the outdated equipment, limited footprint, and lack of rail transport, many factories have moved out of the area, leaving a large concentration of brownfields in the neighborhood. The economic recession created a bad environment for both businesses and residents. High crime rates and poverty have followed the decline of the environment. New York, as one of the

largest economic centers in the world, has a very high value of land. The reconstruction of the Sunset Park community will give this area an opportunity to increase the value of real estate and also increase ecological and economic sustainability. The proposed design will focus on decreasing environmental hazards and the remediation and development of key brownfield properties through creating public access links to brownfield waterfront, enhancing climate resiliency, and building a network public green space to revitalize the community.

**Yincheng Zhang** is a 3rd year graduate student in the Master's of Landscape Architecture program of University of Massachusetts Amherst. She got her bachelor degree at Beijing Sports University. She got LEED GA certificate in 2018 and is very interested in up-to-date understanding of the most current sustainable landscape design and green building principles and practices.

## **Project Eddy Gate: An Experiment in Transforming one of Collegetown's Few Open Spaces**

Rhea Lopez and Elyse Belarge

*Cornell University, Department of Landscape Architecture*

In 1896, the Andrew D. White gate at the end of Eddy Street was built to serve as Cornell's grand entrance. 122 years since its construction, the arches now invite people into a parking lot. Situated between one of Ithaca's scenic gorges, a dorm building and a performing arts center, this corridor is perfectly situated to be one of Collegetown's only open spaces.

Every day, hundreds of students walk through Eddy Gate to a dark thruway that leads to Cornell's campus and other parts of Collegetown. At its best, this asphalt pathway is uninviting and merely just a means to get somewhere. At night, it's dark and unsafe. As one of the only open spaces in Collegetown with this grand gate to welcome people, Eddy Gate is not meeting its full potential.

That's why Design Connect, a student-led multi-disciplinary design organization, and Cornell's Office of Planning, partnered to pursue Project Eddy Gate, a three-day transformation of the space from dark

corridor to lively outdoor living room. The goal of the Project was to give Cornell's Planning Office preliminary data on the Eddy Gate Corridor in order to help them turn this dreary space into a public space that people would want to spend time in. Over 2 months, students designed, fundraised and applied for permitting for, programmed and built the Eddy Gate pop-up park.

Using a tactical urbanism approach and methods, the team transformed the space into a pop-up park. The space featured food trucks, live music and performances, collaborative art installations, projected movies and grassy picnics, increased seating, life sized games, and many more ways for people to interact, with each other and their environment. In this way, Project Eddy Gate envisioned a grand urban experiment, an exercise in bottom-up, democratic decision making to create a space that will be for good, for everyone, and for each generation after us.

Throughout the weekend, visitors were able to rearrange furniture and seating, paint on walls, creatively interact with installations, and otherwise participate in the design process. This data, along with survey data, was handed over to the Office of Planning, and serves as the foundation for the future permanent redesign of Eddy Gate <https://www.youtube.com/watch?v=HLO23GRJLyE>

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**Elyse and Rhea** are second year Master's Candidates in Cornell University's City and Regional Planning Department. Rhea has a Bachelor's degree in Architecture from the University of Mumbai. Rhea's interests include climate change and water management. She is currently researching infrastructure management tools for co-development in Indonesia. Elyse has a Bachelor's degree in Environmental Science and Geography from SUNY Binghamton. Her interests include environmental stewardship and tactical urbanism. Elyse is currently working on a waterfront re-zoning project with the Town of North Hempstead on Long Island, NY.

## **The use of Geotechnologies in the analysis of Vegetation Index and Heat Island in the city of São Paulo, SP, Brazil.**

Amanda L. Fruehauf<sup>1</sup>, Magda A. Lombardo<sup>2</sup> and Paulo Renato Mesquita Pelligrino<sup>3</sup>

<sup>1,2</sup>*Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ),  
Universidade de São Paulo (USP)*

<sup>3</sup>*Faculdade de Arquitetura e urbanismo da Universidade de São Paulo*

There is a solid body of knowledge linking urban growth to the decline of green spaces in Brazilian cities. In this context, this research aims to analyze the heat island, landscape ecology, and ecosystem services and their associated green infrastructure in São Paulo's metropolitan area. Landscape Information will be applied to the open spaces and mapping will be done with the use of remote sensing techniques in Geographic Information System (GIS). High-resolution imagery will be used, including satellites World View-2 (panchromatic and multispectral from 0.5 to 2m), with the presence of the RGB bands and near infrared, pre-image processing will be done with filter Kuwahara. Subsequently, the classification will be supervised by MultiSpec 3.4 software, version 2010, with the following classes of land use: built area (including commercial area, residential multi-family, and single family, industrial area), asphalt, urban forest and other areas of vegetation and water surfaces. Also, the Kappa statistic will be used to calculate the accuracy of the classifications applied. Geotechnology will provide the basis for the examination of green infrastructure and the associated ecosystem services in the landscape. The vegetation index map was elaborated. The most widespread vegetation index is the Normalized Difference Vegetation Index (NDVI). The NDVI is used to characterize large areas on the density of vegetation. A thermal map will be produced in order to analyze possible heat islands in the study area. The NDVI index was related with the different temperatures in every subprefecture of the city of São Paulo. As a result of this research, it was found that areas with greater vegetation index feature smaller surface temperatures. Therefore, it is intended to contribute to the local public policies emphasizing the importance of landscape planning in the pursuit of the population's quality of life in São Paulo, SP, Brazil.



