

# Norman B. Leventhal Center for Advanced Urbanism

## Highlights

### Urbanism After Extraction: Poland Urban Design Studio

This past year, the [Norman B. Leventhal Center for Advanced Urbanism](#) (LCAU) supported the joint urban design studio titled, “Urbanism After Extraction,” co-taught by Assistant Professor Rafi Segal (Department of Architecture) and Lecturer Marie Law Adams (Department of Urban Studies and Planning). The studio examined the Silesian region in Poland, with the proposition of reclaiming Europe’s coal towns through housing, landscape, and infrastructure. Students were challenged to address both environmental and social aspects of the region. Students created comprehensive urban design solutions—combining design and landscape strategies with processes of legislation, zoning, financing, and investment structures. The studio won the ARCHITECT 2017 Studio Prize from the American Institute of Architects (AIA) *Architect Magazine*—the highest honor for a design studio in the country.

### Infinite Suburbia

The culmination of a five-year effort studying the future of global suburbia and peri-urban development, this publication curates 52 essays by 74 authors from more than 20 different fields including design, architecture, landscape planning, history, demographics, social justice, policy, energy, mobility, health, environment, and economics. Published by Princeton Architectural Press, this book will be released on October 31, 2018, and is already receiving positive attention.

### Housing +

LCAU is researching the challenge of affordable housing as its new biennial theme. Five graduate-level workshops have been offered, with site visits to Cartagena, Colombia; Kigali, Rwanda; Gujarat, India; Sao Paulo, Brazil; and Hangzhou, China. Two more workshops will be offered during Independent Activities Period 2018, with sites in Guyana and Peru. To date, these workshops have engaged six faculty and 26 students, whose work will inform the basis for the biennial exhibition. The first workshop, undertaken in January 2017, has been shortlisted for a 2017 LafargeHolcim Award, an internationally recognized honor for design and planning excellence.

### Resilient Floridian Urbanism

Ongoing research and design work generated through the Terra-Sorta-Firma urban design studios (co-taught by Adèle Naudé Santos, Alan Berger, and Fadi Masoud) has been gaining traction at a regional level in Florida. Earlier this year, Leonardo Valpiando, deputy director of Environmental Protection and Growth Management for Broward County, shared the studio work at the Regional Climate Action Plan Implementation Workshop, hosted by the Southeast Florida Regional Compact on Climate Change. Valpiando worked with the students throughout the semester, and traveled to MIT to take part in the jury that reviewed their proposals. Valpiando explained to his commission, “Sometimes we get bogged down in the day-to-day details of planning... It

was refreshing to have these students ask questions about science and solutions—[they] weren't tied to any ideology or agenda but simply wanted to fix the problems. They seemed to have experience and knowledge beyond their years."



*Broward County, Florida, aerial photo (photo credit: Matthew Niederhauser and John Fitzgerald)*

## **Research Assistants**

During the past academic year, LCAU supported 10 graduate students from the departments of Architecture and Urban Studies and Planning through research and workshop funding. Additionally, three undergraduates joined LCAU through the Undergraduate Research Opportunity Program. This past year, LCAU has welcomed visiting students, faculty, and scholars from Australia (Australian National University), China (Tsinghua University), Germany (Technical University of Dortmund), Israel (Technion – Israel Institute of Technology), Norway (Oslo School of Architecture and Design), and Pakistan (Lahore University of Management Science).

## **Annual Review**

### **Research**

During AY2017, the Norman B. Leventhal Center for Advanced Urbanism worked with three members, developed 10 sponsored research projects, and embarked on its next biennial theme (2016–2018). Listed below are summaries of research currently under way along with details of the biennial theme.

### ***Strategies for Urban Stormwater Wetlands: Los Angeles and Houston***

Bringing together fluid dynamics and landscape architecture, this research project explores how stormwater retention areas and constructed wetlands can be designed as multi-functional features to manage flooding, improve water quality, enhance biodiversity, and create amenities in cities. Design guidelines are being developed using two cities as example sites: Los Angeles, CA, and Houston, TX. Research has

been presented in the following platforms: *Ecological Engineering*, *Landscape Journal*, *New England Water Environment Association Conference*, *American Society of Civil Engineers*, *World Environment and Water Resources Congress*, and the *MIT Water Summit*—and this research was selected by President Obama’s administration to be featured in the *White House Water Summit: Working Together to Build a Sustainable Water Future*. The project is being published as a report for cities around the world to use in planning new urban wetlands (principal investigators: Alan Berger and Heidi Nepf, six collaborators in three departments).

### ***A New Model for the Urban-Rural Fringe in Jiangsu Province***

This research began by analyzing selected cases of existing rural-urban conditions across the world, alongside particularly successful Chinese examples of renewed villages. Following this, in partnership with Southeast University colleagues and representatives of the local government, researchers identified an area within Jiangsu province that could act as a case study in which to explore a rural-urban typology best fit for its future transformation. The professors are currently in the process of detailing two comprehensive strategies for urban development, prepared specifically for the district of Baima town and its surrounding villages. The strategies produced will be presented as a case study in LCAU’s biennial exhibition. The collaboration continued during the summer, with another workshop, this time co-taught by professors Antón García-Abril and Wang Shu (principal investigators: Adèle Naudé Santos and Rafi Segal, four collaborators in two departments).

### ***Metro Boston Resilient District***

The “resilient district” concept has been explored at multiple scales through the New Meadowlands project and through research done for Boston. However, there are essential further steps required to develop implementable, immediately financeable, constructible, and maintainable site-specific interventions in the Boston area. The proposed exhibition will allow for design exploration and development. The exhibited design strategies will provide the basis for conversation among the local community about the larger issue of resilience in Boston, and allow for further development through critique of the resilient district concept. The conversation will be hosted through an evening symposium following the opening of the exhibition in fall 2018. The concept paper has been submitted for peer review in a major urban design academic journal (principal investigator: Alan Berger, two collaborators in one department).

### ***A New Neighborhood: Livelihood-based Approach to the Idea of Home***

In collaboration with the Fundación Mario Santo Domingo (FMSD), this research has examined residential communities in Barranquilla and Cartagena (Colombia). The design workshop sought to propose alternative neighborhood typologies that expand upon the basic programming of residential units with community facilities. Using local codes and current economic constraints, the workshop tested the idea of a prefabricated construction system that could save time and cost for most of the structures. Design propositions from the workshop were developed further during the spring semester and were submitted for a LafargeHolcim Award (principal investigators: Adèle Naudé Santos and Débora Mesa, five collaborators in two departments).



*Ciudad del Bicentenario, a Fundación Mario Santo Domingo Macro Project, Cartagena de Indias (photo credit: Manuela Uribe)*

### ***Developing the Littoral Gradient***

The process of coastal land reclamation is heavily associated with real estate development pressures in China. The research stems out of the need for a more robust environmental strategy that combines technological advances in dredging techniques with a novel, resilient, adaptive, and dynamic coastal urban development typology. After producing a case study atlas of Chinese urban developments built on reclaimed land, the team has been focusing on producing a coastal terrain prototyping catalog to guide coastal management of future developments on reclaimed land (principal investigators: Brent Ryan and Fadi Masoud, four collaborators in two departments).



*Bohai Bay, China (photo credit: Matthew Niederhauser and John Fitzgerald)*

### ***Assessing Urban Resilience for Low-income Housing Enterprises in Colombia***

The Resilient Cities Housing Initiative sought to help the Fundación Mario Santo Domingo address this question: “What should affordable housing developers do when the focus shifts to ‘building communities’ rather than just building housing?” They used a broader framework that operationalized four interconnected principles of social resiliency, with the intended outcomes of: improving the capacity of FMSD in the design, implementation, and evaluation of projects; establishing an evaluation system to measure impacts in the long-term; documenting and sharing best practices; and driving change in policy makers towards the implementation of more sustainable and equitable housing (principal investigator: Lawrence Vale, four collaborators in one department).

### ***Atlas of Lighting: Urban Attractors***

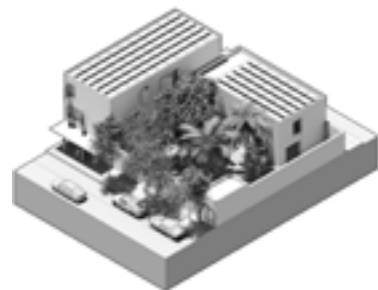
This research has been developing a method for measuring the qualitative value of light using social media data, and combined that measurement with quantitative data sets derived from various spatial and statistical data sources. The tool being developed will be able to capture important social spaces in cities which use or need lighting and would benefit from other urban design elements. The tool will benefit the larger field of urban analytics by providing a new method for understanding the dynamics that make good social spaces, thereby creating a guide for urban planners in future developments (principal investigator: Sarah Williams, five collaborators in one department).

### ***CityScope: Responsive Urban Lighting Simulation***

This research explores how responsive urban lighting can better respond to dynamic conditions in the city, including the movement of pedestrians, bicycles, and vehicles. Simulations of various scenarios will be deployed on the CityScope. CityScope is an interactive, tangible, data visualization and simulation platform for urban planning, system integration, and decision support. It integrates 3D physical models and augmented reality into a collaborative tool that enables stakeholders to observe existing urban patterns and simulate future scenarios (principal investigator: Kent Larson, three collaborators in one department).

### ***Designing Sustainable Neighborhood Typologies for Native Housing, Abu Dhabi***

This project focuses on achieving higher levels of environmental, economic, and sociocultural sustainability among Emirati neighborhoods in Abu Dhabi. It aims to develop: a comprehensive methodology which begins by identifying the most critical indicators for regional sustainability; computational tools for assessing both existing and speculative neighborhood designs; and the most sustainable neighborhood typologies through suggestions for new design guidelines. In fall 2016, two conference papers were published in the proceedings of the eighth international Conference of the Arab Society for Computer Aided Architectural Design. One paper focused on digital simulation of external privacy in neighborhoods and the other focused on the simulation of neighborhood water use—both within the context of Abu Dhabi (principal investigator: Alan Berger and Khaled Alawadi, seven collaborators in two departments).



*A new housing typology (L-type) developed as part of designing sustainable neighborhoods in Abu Dhabi (photo credit: David Birge and Waishan Qiu)*

### ***Enabling New Water Planning Regions with Data Analytics, Visualization, and Decision Support System Tools***

The MIT International Science and Technology Initiatives Global Seed Fund supported an ongoing collaboration between MIT and the Center for Water Informatics and Technology at Lahore University of Management Science (principal investigator: James Wescoat).

## Members

During FY2017, LCAU worked with three members: Fundación Mario Santo Domingo, Philips Lighting, and Toyota Research Institute of North America. Each of these relationships has developed from the initial corporate membership level into a sustaining member with the center. All three have also continued to support sponsored research projects on topics such as affordable housing, autonomous driving in the suburbs, and the application of the “Internet of things” to the urban environment.

## Biennial Theme

In its third biennial theme, the Center for Advanced Urbanism is exploring the global condition of affordable housing. Affordable housing affects all humans, directly or indirectly—and there is an urgent need for new solutions. With growing concerns of rapid rural-to-urban migration, natural disasters, and unprecedented rates of urbanization, LCAU seeks to reimagine affordable housing so that it reflects the following:

- Housing as essential for a functional life
- Housing as the foundation for a social community
- Housing as an essential part of infrastructure
- Housing as a community-building mechanism
- Housing that needs the support of services and institutions
- Housing as an important factor in community health
- Housing as the largest fabric of urbanity
- Housing ownership as an entry into the economy
- Housing as a financial good
- Housing as real estate investment

Attempts at comprehensive solutions have escaped the best efforts of governments, cities, non-government organizations, and private enterprises—yet there are excellent examples of progress being made through the lens of the social sciences, policy fields, and other humanitarian enterprises. “Design,” however, is typically not what comes to mind when one refers to housing affordability, whether at the scale of the house, neighborhood, or city. Affordable housing design is, generally, not yet as inspiring, sustainable, inclusive, or meaningful as it needs to be to satisfy the full spectrum of human rights and aspirations.

The Center for Advanced Urbanism seeks to investigate what impacts multi-scalar design can have in improving the global condition of affordable housing. This is termed, “Affordable Housing +.” The “+” shifts the field of affordable housing design toward:

- New models of “home”
- Hybridization of rural and urban (“rurban”) housing
- A new generation of high-density urban settlement
- New coalitions of housing development and construction

LCAU will drive these innovations and more, culminating in an international exhibition and conference in May 2018.

### **Housing Workshops**

During Independent Activities Period 2017 and throughout summer 2017, LCAU undertook workshops across three continents as part of the biennial theme. Faculty driving these workshops included Adèle Naudé Santos, Rafi Segal, Marie Law Adams, James Wescoat, Brent Ryan, Lorena Bello, and Débora Mesa.

#### ***Cartagena, Colombia***

In collaboration with the FMSD, the team undertook an investigation into a livelihood-based approach to the idea of home, where neighborhood supports both living and working for displaced communities. This research explored these issues and others through the design of alternatives for a neighborhood using a “superblock” (which is much larger than a traditional city block) in the master plan for Ciudad Bicentenario. Researchers used local codes and economic constraints, and tested the idea of a prefabricated construction system that could save time and costs for most of the structures.

#### ***Kigali, Rwanda***

In collaboration with the Rwandan Housing Authority, a team developed a low-cost village house prototype and new model neighborhood for the East African region that integrates flexible housing, urban agriculture, and incremental infrastructure. Experiments include the use of various locally extracted materials, including bricks and dried straw panels for prefabricating houses.



*Site visit, Kigali, Rwanda (photo credit: Mary Lynch Lloyd)*

#### ***São Paulo, Brazil***

This workshop focused on strategies to enhance the relationship between housing design and finance innovation. Researchers from São Paulo’s Architecture and Urbanism College at the University of São Paulo explored the complexities of building affordable housing within a dense urban setting. The workshop participants designed within the constraints of the local conditions, reflecting the current political and socio-economic frameworks. Zoning regulations are needed to create attractive conditions for private developers to invest in a public-private partnership.

### **Gujarat, India**

In collaboration with the Aga Khan Agency for Habitat, a team from MIT explored new ideas in disaster-resilient, “rurban” housing in Gujarat, India. The first results come from intensive work with low-income families—leading to insights into how housing becomes “homes.” This will be coupled with the Government of India “Housing for All” policies. Another research direction is connecting housing with liquid and solid waste innovations at the three scales of *ghar, galli, and gaon* (*home, street, and village*).



*School of Architecture and Planning students undertaking site visits and field work as part of the Gujarat workshop (photo credit: Ranu Singh)*

### **Jiangsu Province, China**

Working with Southeast University in Nanjing, China, and the Chinese Academy of Art, students were given the opportunity to work intimately in a rural village in China. They learned hands-on techniques through mock-ups with local craftspeople and builders, and designed two civic structures that will be built by the local government.

### **Biennial Sponsors**

Initial fundraising around the biennial theme has centered on support for the design workshops. Sponsors include the MIT-India Program, the Aga Khan Program for Islamic Architecture, the Tata Trusts, the MIT-Brazil Program, the MIT-Africa Program, and the MIT Center for Art, Science and Technology.

During AY2017, the School of Architecture and Planning received the Charles Correa (1955) Endowed Fund for Urbanization and Human Settlements. The initial gift, managed by the School’s Dean’s Office, will be dispersed to the Center for Advanced Urbanism in support of the biennial theme.

### **Philips Lighting Grand Challenge Awards**

This year’s MIT-Philips Lighting Grand Challenge was awarded to two recipients. Principal investigators (PIs) Michael Siegel and Stuart Madnick received \$100,000 for their proposal “Improving the Adoption of Smart Lighting Infrastructure: Understanding and Mitigating the Impacts of Cybersecurity,” while PIs Peter Gloor and Thomas Malone were awarded \$100,000 for their proposal “Body-sensing Smartwatches to Enable Adaptive Lighting Systems.” LCAU ran the challenge for Philips and Alan Berger chaired the jury and research steering committee.



## Leventhal Graduate Fellowships

As part of its new, endowed program, LCAU has established an additional graduate research assistantship (RA) for a Master of Science in Architectural Studies (SMArchS) Urbanism student. This will match the existing RA that has been awarded in the Department of Urban Studies and Planning (DUSP). During AY2017, nominations were solicited from SMArchS Urbanism faculty, with two students ranking highest. In AY2018, the Leventhal Graduate Fellowships from the Department of Architecture were awarded to Justin Lim and Alexander Wiegering. Each will receive a partial fellowship to supplement their tuition and stipend, and they will work with Adèle Naudé Santos on the housing biennial theme. In addition, the existing Leventhal Graduate Fellowship, which has traditionally been awarded to a Master of City Planning student in DUSP, will this year be awarded to Sarah Dalton Brown.

Justin Lim is pursuing his Master of Science in Architectural Studies (SMArchS) in Architecture and Urbanism at MIT. He is a research assistant at LCAU, where his primary research is focused on social and affordable housing in Latin America. He is also a co-founder of Officeless, a multidisciplinary international research and design firm based in Cambridge and Rotterdam.

Lim's creative work on large-scale, mixed-use projects respects the authentic culture and unique environmental characteristics of every site. He designs conceptual master plans focused on the human experience, with a preference for the complex challenges of urban redevelopment and for connecting the past with the future. He designs walkable urban districts within a civic infrastructure of public open spaces. His previous work in the United States, China, and Australia also includes campus master plans for universities and hospitals.

Lim holds a bachelor's degree in architecture with a concentration in urban planning from the Illinois Institute of Technology (IIT). Lim's work is influenced by his education at IIT but his design approach is rooted in his broad experience at Skidmore, Owings & Merrill LLP, which he first joined as a student intern while attending IIT in 2008. He was named a senior urban designer of the Chicago office in 2012.

Alexander Wiegering is a Peruvian architect with a genuine interest in giving the city back to pedestrians. His ongoing work and research with LCAU is focused on developing successful community-led, affordable housing projects in Latin America. He graduated from the Pontificia Universidad Católica del Perú, after attending programs at the Escuela Técnica Superior de Arquitectura de Madrid and the Architectural Association School of Architecture. His main academic and professional experiences have been oriented towards improving living conditions and human interactions in urban environments and developing communities.

He is co-founder and director of La Fabrica Design Lab, a collaborative design platform that explores the role of architecture and urbanism as a mediator between people and the city, using multidisciplinary and participatory processes as well as critical design thinking. Previous projects have included metropolitan and district urban regenerations for Peruvian cities, urban mobility plans for developing settlements, and planning the legacy for the Pan American Games 2019 in Peru with LLAMA Urban Design.

After a year at MIT, Wiegering has been working on developing two multidisciplinary startups, Joro and Kawsay, that address the topic of new forms of infrastructure. Joro is a holistic carbon-emission tracking application that has won the MIT Clean Energy Prize and the MIT Ideas Global Challenge competition. Kawsay is being funded by MIT Sandbox and focuses on creating new forms of micro-infrastructures and management in developing and developed communities that challenge and redefine the concept of infrastructure.

Sarah Dalton Brown is a research assistant at LCAU and a dual-degree graduate student in City Planning and Real Estate Development at MIT. Her studies lie at the intersection of urban design and development, and she is particularly interested in the production, design, meaning, and politics of public space.

This past summer, Brown worked for Asiye eTafuleni, a South African non-governmental organization, where she conducted research on real estate and infrastructure investment for an informal marketplace in Durban. She also interned with Goody Clancy, a Boston-based planning firm, where she examined the potential of public-private partnerships in the institutional campus planning space.

Prior to MIT, Brown lived and worked in New York City as an associate at Lazard Asset Management. Under the supervision of senior investment professionals, she worked with institutional investors and supported a book of business with over four billion dollars in assets.

Brown received her bachelor's degree in American studies, with a concentration in built environments, from Yale University. As an undergraduate, Brown interned with a number of architecture and urbanism related organizations. She researched the design, construction, and renovation of Louis Kahn's Yale Center for British Art to help develop building conservation policies; she interned with both the New Haven Preservation Trust and the New Haven City Plan Department; and she spent a summer in the curatorial department of the Royal Institute of British Architects in London. Brown's undergraduate thesis on the evolution of a New Haven city street received the Richard Hegel Prize for outstanding senior essay.

**Alan M. Berger**  
**Professor of Urban Design and Landscape Architecture**  
**Co-director**

**James L. Wescoat**  
**Aga Khan Professor and Professor of Urban Studies and Planning**  
**Co-director**