MCPs:

Marcela Angel
Liana Banuelos
Sam Barnard
Sydney Beasley
Kelly Blynn
William Bowling
Max Missner Budovitch
Wan Chantavilasvong
Nicholas E. Cohen
Juan Cristobal Constan Ramos
Tatianna Echevarria
Tiffany Ferguson
Talia Mestel Fox
Fitse Anley Gelaye
Mario A. Giampieri
Benjamin Gillies-Podgorecki
Johanna Greenspan-Johnston
Jonathan Hasoloan
Adam Hasz
Megan Hess-Homeier
Phoebe Holtzman
Erik-Logan Hughes
Sarah Oz Johnson
Reed Jordan
Pim Pitchapa Jular
Alexandra Kahveci
K. Erina Keefe
Lauren Kennedy
DeeDee Kim
Esther Kim
Laura Krull
Louis Liss
Danya M. F. Littlefield
Haijing Liu
Cristina Logg
Fernando Madrazo Vega
Kelly Leilani Main
Daniel Mascoop
Douglas McPherson
Scott Middleton
Mahtab Maxene Moinian
Zoë Taft Mueller
David Lee Newsome
Alicia Noriega
Brandon Peterson
Haleemah Qureshi
Matthew Robayna
Nayeli Rodriguez
Adam Rosenfield
Kara Runsten
Akemi Sato Matsumoto
Jeffrey Schlossberg
Riddhi Shah
Griffin Smith
Nneka Sobers
Evan Spetrini
Andrew Stuntz
Taskina Tareen
Jonathan Tarleton
David Tisel
Sera Tolgay
Sabah Usmani
Eric Van Dreason
Ayna Delivrans Verella
David Chin-Fei Wang
Hannah Weiss
Samuel Weissman
Jessica Sayde Wolff
Joanne Wong
Yiling Xie
Zhekun Xiong
Linyi Zou

SMs:

Cristián Navas Duk

PhDs:

Devanne Brookins
Melissa Chinchilla
Mitchell J. Cook
Gregory J. Falco
Ella Kim
Aditi Mehta
Alexis Schulman
Jingsi Shaw
Alpen Sheth
Christopher Smith
In the development of parks in Bogota, legacies of conflict pull the environmental and post-conflict equity-building agendas apart. This thesis interrogates the relationship between post-conflict, equity-building and the ecology of public parks in order to propose a framework for the development of green open spaces that advances both agendas simultaneously, through everyday city-making processes. In particular, using a case study of Bogotá’s park system, this research explores the challenges when maximizing the benefits of ecological services, while fostering spatial equity, social cohesion, and civic formation in the development of parks in post-conflict contexts. This thesis employs an inductive research methodology that combines qualitative methods with spatial analysis and case study inquiries to identify key assumptions obscured in the everyday city-making processes.

This reveals a phenomenon observable in the development of parks in Bogotá, whereby forces of social exclusion and fear of the other, in combination with ideas of order and security, end up provoking a simultaneous restraint on biodiversity and human diversity. This thesis explores the position of the different actors—both mainstream players and alternative organizations—involving in the design, planning, and operation of parks in Bogotá, and reveals how decision-making tools reinforce their theoretical positions. By doing so, it uncovers competing frameworks and priorities at play in a fragmented institutional context. A selection of exemplary parks, illustrate where legacies of conflict (such as associating nature with crime, and expressing nervousness towards “the other”) still over-determine the ways in which parks are designed, programmed, and maintained. Nevertheless, alternative practices are emerging in the development of natural recreational settings that are promoting ecological conservation, high-use, and civic formation. By identifying opportunities, promoting collaboration, and seeking new processes and decision-making tools, this thesis offers a set of planning strategies and an implementation framework of social inclusion and ecological biodiversity to overcome fear (or perception of fear) and reinforce the potential of parks as peace-building tools.
Overcoming Barriers to Institutionalize Climate Change Resiliency Practices: MassDOT

The most pronounced climate change effects in northeastern United States will be increased precipitation events, more frequent heat waves, and substantial sea level rise. These temperature and flooding outcomes place substantial risk on vital infrastructure that supports economic development, public health, and access to resources and amenities within the state of Massachusetts. As such, there is a need to mitigate these risks through long-range planning and climate change adaptation strategies. The Massachusetts Department of Transportation (MassDOT) recognizes that infrastructure must be fortified through these methods but has yet to establish a systematic approach for quantifying climate change impacts, evaluating the costs and benefits of selective intervention, and implementing adaptation strategies. However, MassDOT operates within a complex political setting of constraints and conditions that may or may not be conducive to particular implementation mechanisms.

Additionally, the hydrologic modeling and spatial analysis needed to identify specific areas of transportation infrastructure that are especially vulnerable to climate change effects will not be completed until late 2018. Cognizant of these constraints, this thesis aims to (1) synthesize the best climate change resiliency strategies from other large infrastructure owners/DOTs and (2) draw upon lessons learned from other agencies to institutionalize climate change adaptation practices within transportation domains to recommend strategies tailored to MassDOT. In this way, the department will be strategically poised to address existing gaps and barriers to implementation once the climate adaptation and vulnerability assessment tool is able to rely on a technically sound evaluation of vulnerability. By strategically protecting infrastructure that will have the greatest benefit to MassDOT’s constituents at the least cost, the department will be able to minimize the impacts of climate change and ensure the longevity of existing infrastructure and new projects.
Managing Neighborhood Change Around New Transit Stops: Community Planning Over Four Decades in Somerville, MA

This thesis explores the way in which local government and community advocacy groups seek to influence the extent and nature of neighborhood change around new transit stops. My interest is in how transit investment can be used to ensure economically prosperous and environmentally sustainable communities while avoiding displacement and exclusion of less wealthy community members. I focus on three mass transit projects in Somerville, MA: the Red Line extension to Davis Square in the early 1980s, the addition of the Orange Line station at Assembly Square in 2014, and the Green Line Extension through central and eastern Somerville that is now under construction. I rely on interviews with key stakeholders involved in these planning processes, a review of planning documents, and attendance at ongoing community meetings.

These cases demonstrate the critical importance of cities establishing strong, community-supported visions for neighborhood change before private developers are involved. The greatest opportunities for preserving affordability, locking-in anti-displacement measures, and ensuring development supports a high quality and healthy public realm are early in the process. The Somerville cases also highlight the potential for community planning and advocacy to drive the nature of neighborhood change, as well as the tensions that can arise when diverse local stakeholders with differing priorities and internal conceptions of the planning process seek to influence lengthy and uncertain development projects. I propose a City-led, inclusive, and deliberative process for better managing these tensions in future transformative developments in Somerville. An economic development strategy.
NGOs are an important actor in rural India, and are increasingly important in implementing water and sanitation infrastructure. This thesis first systematically investigates physical conditions that lead to good bacteriological water quality in rural India, and then investigates how NGOs are inserting themselves into this space. Ultimately, this work examines under what conditions NGOs are able to work with local community groups and implement water and sanitation systems successfully in rural areas in India. Thus, the strategies of two NGOs working in rural India that have implemented water and sanitation infrastructure are analyzed using an extension of Field Theory by Asad & Kay (2014). The way these NGOs create alliances, use resources, and change frames to advance water and sanitation infrastructure are similar in some ways, while distinct in others.

At times they are able to harmonize and negotiate their development agenda with that of the state, while other times the state is somewhat of a barrier to integrated water and sanitation planning. Combining a systems analysis of rural communities water quality with the analysis of NGO strategies illuminates practical implications for how policymakers can expect these NGOs to incorporate new technologies and policies.
Accelerating Bus Electrification:
Enabling a Sustainable Transition to Low Carbon Transportation Systems

With growing agreement that credible pathways to zero carbon electricity exist, many support the notion that widespread electrification of the transportation sector will be essential to meet midcentury climate goals. While transit buses have a relatively small impact on greenhouse gas emissions, they have a larger impact on urban air quality, have commercially available in-service electric models, and have historically commercialized clean technologies that enabled deployment in the rest of the heavy duty vehicle sector. This thesis seeks to understand what factors hinder or enable transit agencies to go beyond initial pilots to largely or wholly electrify their fleets, with the goal of understanding potential policies and strategies that could accelerate such a transition, without inhibiting existing or expanded transit service that also plays a key role in reducing carbon emissions, in order to improve local air pollution and support accelerated electrification of trucks and other heavy duty vehicles.

Using public transit fleets in California, Kentucky, and Massachusetts as case studies, this thesis utilizes quantitative total cost of ownership and greenhouse gas and air pollutant emissions analysis, and analysis of qualitative interviews with transit agency representatives to investigate the barriers, drivers, and potential solutions that could hinder or enable an accelerated yet sustainable transition to an electrified fleet. A total cost of ownership analysis reveals that electric buses may already be more cost effective than diesel buses for many agencies primarily due to fuel and maintenance cost savings, but are sensitive to key parameters such as annual mileage, electricity tariffs that vary widely by location, fossil fuel costs, policy context, and anticipated maintenance savings, and that cost savings from electric buses are likely to increase over time primarily due to anticipated reductions in battery costs and a faster increase in fossil fuel prices than electricity prices.
Double Dipping or Lagniappe?: The Prevalence of Tenant-Based Voucher in Low-Income Housing Tax Credit Developments in New Orleans

Following Hurricane Katrina, New Orleans demolished all of its public housing. Mirroring a national trend, not all of it was replaced. What was replaced largely took different forms: tenants received portable Housing Choice Vouchers and developers built new housing subsidized by the Low Income Housing Tax Credit (LIHTC). Now, New Orleans has over 18,000 voucher households and approximately 10,000 LIHTC units. While this might appear to add up to 28,000 affordable units, the two programs overlap in significant ways. Tenants are permitted to use vouchers in LIHTC developments and LIHTC developers must accept tenants with vouchers. I start with a seemingly simple question: What is the prevalence of this practice? Through spatial analysis, some relationships between LIHTC and vouchers appears. Through interviews and review of property level data, I find that approximately 50% of LIHTC units are occupied by individuals with tenant-based vouchers.

By permitting tenants with portable vouchers to live in LIHTC developments, do we “lose” affordable units? Through interviews with developers, policymakers, and property managers, I find that LIHTC developers do not consider tenant-based subsidy in the development process, nor do they depend on it for underwriting deals. However, due to different methodologies for rent determination, tenant-based vouchers allow LIHTC developers to earn higher rents. This “Tenant-Based Section 8 Overhang” brings additional unanticipated revenue to developments. This is essentially lagniappe - a phrase used in New Orleans to describe an unexpected gift. Using New Orleans as a case study, I analyze payments standards and suggest that by requiring developers to accept the lower LIHTC rents, it may be possible to save millions of dollars per year. I conclude with policy proposals that seek to preserve tenant choice while pushing for maximum program savings to potentially create additional vouchers.
Reform from Above, 
Reinterpretation from Below: 
State Making and Institutional Change in Ghana

The dissertation engages a fundamental question in the social sciences: How do institutions change? The questions that drive this research include: How does institutional change occur, and how do varied forms of social organization within informal institutions influence institutional reforms in the land sector? The dissertation does this by examining land administration reform in Ghana during the period of 2003 – 2016. Theoretically, the dissertation employs the literature on institutions and change, critically engaging the role of the state and the role of society in constituting property rights along with the institutions and organizations that support them. Empirically, the study is based on extensive field research to find that the theoretical assumptions regarding informal organizations are inadequate to understand the role of diverse societal actors in institutional change.

The dissertation argues that the state, seeking to build coherence, employs land administration reform as a mechanism towards the objective of economic transformation. The reform is based on an integrative approach, whereby the state seeks to incorporate customary authorities into a logic of the state, emphasizing coherence instead of autonomy. However, this integrative approach is flawed as it downplays the heterogeneity of organizations, including their interests and internal characteristics. The findings demonstrate that institutional change is mediated by the strategies and behaviors of informal organizations, requiring categorizations of these actors and their behaviors as a necessary component of any theory of institutional change. Such categorization requires an analysis of relative power – economic, political and social – of informal organizations and their ability to not only affect informal institutions, but formal institutions and change.
This thesis argues that community organizations in Chicago, from the Loop to Pilsen to Kenwood, pursue housing justice by employing three modes of action, each of which embodies a particular relationship to the state. They act with the state by ordinance to pass laws and engage in electoral activity; around the state by convening to leverage relationships in the absence of formal legislation; and against the state by contesting to challenge centralized decision-making. Using community planning theory, this view builds on conceptions of collective efficacy by focusing on the relationship of community organizations to the state’s regulatory power rather than on indicators of social capital or civic action. The research is based on 34 interviews with leaders and activists in neighborhood associations, community development corporations, and independent political organizations working on prominent housing justice campaigns since the 2008 foreclosure crisis. These campaigns include a rent-control ballot initiative, the introduction of several anti-eviction ordinances, an affordable housing preservation program, and the establishment of a community zoning board. In each of these cases, the varying isolation, interaction, and blending of the three modes of action complicates dichotomous portrayals of the grassroots—state relationship, providing an analytic lens through which to understand how and why certain issues become important on both neighborhood and citywide scales and how neighborhood groups position themselves and mobilize via-a-vis the state.
The global phenomenon of rural-urban migration presents a great number of challenges, especially for cities in developing countries like Bangkok. While there is an urgency for cities to better accommodate their marginalized emigrant population, not many planners look into rural areas where migration actually begins. Specific to Thailand, most of the migrating population from country to cities are in the working age. With the exodus of this population, new problems begin to emerge in rural towns which include a lack of care for elders and parental care for children. Furthermore, the brain drain phenomenon also diminishes life and economic vibrancy in rural areas.

At the same time, those who migrate into cities are often at risk of being marginalized. In many parts of Thailand, where amenities such as roads, education, and healthcare, have already been provided, migration continues despite some people’s preferences to live back in rural areas.

Tambon Pang Tawai, Amphoe Pang Sila Tong, Kampaeng Phet, Thailand serves as a case study of a typical rural town with low density, most of whose population work on farms. Furthermore, its proximity to the Mae Wong National Forest also presents an interesting relationship between the rural lifestyle and the natural environment. Thus, the development process of Tambon Pang Tawai has the potential become a model for many other rural towns with similar contexts.

By using photography and participatory workshops as tools to engage youth and glean insights from their perspectives, this research found ways in which rural areas in Thailand can be improved and sustain themselves socially, economically, and environmentally. Additionally, the methodology of this research can also contribute to a cross-disciplinary framework of education and community development.
My research provides an understanding of how multiple levels of policy implementation – program application, personal factors, voucher type, and service use – impact formerly homeless individuals’ community integration process, i.e. how they function in their new communities including their relationships with others, ability to maintain independent living, and engagement in vocational activities.

My dissertation uses mixed methods to understand housing placement of HUD-VASH participants in Los Angeles County and their community integration outcomes once housed. This dissertation is made up of three manuscripts; (1) Paper one provides an overview of housing models under the HUD-VASH program, including a description of socio-demographics, clinical diagnoses, service utilization patterns, and neighborhood quality of project based and tenant based voucher types; (2) Paper two uses quantitative analysis to identify factors, including personal characteristics, voucher type (i.e., project and tenant-based), and service utilization, that mediate community integration outcomes (i.e. employment, community adjustment, and housing retention); and (3) Paper three provides a qualitative analysis of VA staff and HUD-VASH participants’ perspectives of the role that housing type (project-based vs. tenant-based), neighborhood characteristics, and social networks play on participants’ community integration.

Homelessness Among Veterans Fell As Targeted Voucher Program Expanded

Note: Voucher figures are for Veterans Affairs Supportive Housing (VASH) vouchers and are based on monthly data from January of each year.
Source: Department of Housing and Urban Development Homelessness Point-in-Time Counts and HUD Voucher Management System
Integrating Green and Gray: Lessons Learned from Ecological and Engineering Approaches to Flood Resilience around Three U.S. Rivers

There is increased interest in flood resilience around U.S. cities, especially following devastating flooding from recent intense storms. These events have demonstrated challenges associated with both riverine and coastal flooding, involving surface drainage and storm surge. Climate change is anticipated to exacerbate these types of events due to observed and projected sea level rise and increased frequency and intensity of precipitation events. With that context, flood resilience projects are often categorized as either following an engineering approach with hardened, ‘gray’ infrastructure like berms that seek to keep water out, thus blocking floods, or an ecological approach with soft, ‘green’ infrastructure around natural systems, like wetlands, that allow water in, absorbing floods and buffering adjacent communities. However, terms such as these, as well resilience itself, often have varying and overlapping definitions in different disciplines.

Further, while engineering approaches and ecological approaches may seem at odds with one another, with associated tradeoffs, in reality, projects often integrate elements of both approaches, especially in urban settings.

This paper reviews these approaches by comparing case studies around three U.S. urban rivers and understanding the ways ecological and engineering approaches have been integrated into flood resilience projects. Because of the differences between ecological and engineering approaches, this paper first presents a review and comparison of the existing literature on flood resilience and ecological and engineering approaches, along with associated terminologies, utilizing that literature to understand the approaches presented in the case studies. Further, this paper incorporates commentary from existing practitioners involved in these topics and cases to analyze and understand their perspectives. In particular, the paper’s focus is on approaches and processes, as project elements most relevant to planners, arguing that the key lessons learned and common features from these projects are the integration of ecological and engineering approaches, collaboration across disciplines, the importance of political and social contexts, the role of non-governmental actors, implementation challenges and strategies, opportunities and limitations presented by reacting to flooding disasters, and sources of funding. Such key common features and lessons learned particularly highlight the critical role of planners in these types of projects.
Cities and regions across the world have embarked on designing and implementing place-based economic development strategies for clustering innovation and entrepreneurship. This rising trend can be seen in the proliferation of Innovation Districts and Regional Innovation Ecosystems across many metropolitan regions in the US, Europe, and cities in the Global South. While many of these strategies rely heavily on urban physical transformation, most of them are the manifestation of a well-defined economic development policy that has been proven conducive to rising inequality.

Moreover, the policies designed for territorializing innovation through regional ecosystems have prioritized wealth creation in ways that ladders of opportunity are only accessible to specific sectors of society. In turn, this has contributed to increasing inequality and disproportionately affected minorities and disenfranchised communities.

Together with the negative consequences of skill-biased technological change and its profound impact on labor, the proliferation of strategies for clustering innovation have also created challenges in spatial and socioeconomic segregation in regions.

Using the case of the Basque Country in Spain, this thesis examines the conditions that have enabled the establishment of a successful regional innovation ecosystem while advancing economic democracy at the same time. By examining the political economy of Basque economic development planning, the emergence of cooperative networks of firms such as Mondragon, and the local social and cultural enabling factors, this thesis will produce a set of recommendations to policymakers and practitioners engaged in developing regional innovation ecosystems.
Decentralization policy in India has coalesced in recent years around interrelated concerns over the transparency of local government financial management and reporting systems and the capacity of urban local bodies to implement modern performance budgeting and accrual accounting structures. This dissertation examines the relationship between these policy concerns in the case of Bangalore and looks deeply into the role of information technology providers in advocating for greater local government financial transparency and accountability through financial management information system projects.

Utilizing the concept of legitimacy games I find that mechanisms to support coordination in project implementation are subject to partially predictable but ultimately uncontrollable contingent interactions of norms, values, and structural arrangements that surround government financial management information systems.

Under such conditions, forms of collective action around political accountability in urban governance spur a double movement of information democratization and information closure in entrepreneurial issue networks. As a result, the extent of effective local government financial transparency becomes increasingly dependent on the internal characteristics and relative power of information gatekeepers. The findings of the case study contribute to new knowledge on the relationship between information technology and local public financial management procedures and practices.

The notion of legitimacy games draws stark contrast to conventional assumptions surrounding competition in public sector outsourcing arrangements, namely that it is driven by the desire for larger contracts so as to maximize profits or that it bids down prices in government outsourcing. The case illustrates how behavioral incentives to link financial management information systems to public transparency and accountability mechanisms emerge in highly localized confrontations not as a concerted response to national policy. The real effect of such technologies on local state capacity has been limited in the case of Bangalore. In order to achieve more transformational impact, policymakers, public managers, and technology providers must carefully consider how to handle large volumes of financial information corresponding to irregular transactions.
Buenaventura: How Can “New City” Dreams Meet Existing Local Needs?

This thesis explores the perspectives and development needs of Afro Colombian communities in Buenaventura, Colombia. These perspectives and needs are used to analyze a megaproject proposed for the city, known as the Economic Activities Complex of Buenaventura (CAEB). I argue that in order for the CAEB project to improve social and economic conditions within the municipality, its structure and implementation will have to look beyond macro economic growth and private sector profits to integrate community based knowledge and create real benefits for the local population. Based on this argument, I offer recommendations for strategic policy, programmatic and project based responses to the challenges for realizing the project’s mission.
Gregory J. Falco  
Dissertation Advisor: Lawrence Susskind

Cybersecurity for Urban Critical Infrastructure

Our cities are under attack. Urban critical infrastructure which includes the electric grid, water networks, transportation systems and public health and safety services are constantly being targeted by cyberattacks. Urban critical infrastructure has been increasingly connected to the internet for the purpose of operational convenience and efficiency. Unfortunately, when deciding to connect these systems, their cybersecurity was not taken seriously. This dissertation describes three steps cities should take to prepare for cyberattacks and defend themselves accordingly.

First, cities must understand how an attacker might compromise its critical infrastructure. In the first chapter, I describe and demonstrate a methodology for enumerating attack vectors across a city’s CCTV security system. The attack methodology uses established cybersecurity typologies to develop an attack ruleset for an AI planner that performs attack generation. With this, cities can automatically determine all possible approaches hackers can take to compromise their critical infrastructure.

Second, cities need to prioritize their cyber risks. There are hundreds of attack permutations for a given system and thousands for a city overall. In the second chapter, I developed a risk model for urban critical infrastructure. The model helps prioritize infrastructure attack vectors, that are most frequently exploited for IIoT Supervisory Control and Data Acquisition (SCADA) systems.

Finally, cities need tools to defend themselves. In the third chapter, I present a non-technical approach to defending against attacks called cyber negotiation. Cyber negotiation is one of several non-technical cyberdefense tools I call Defensive Social Engineering, where victims can use social engineering against the hacker. Cyber negotiation involves using a negotiation framework to defend against attacks with steps urban critical infrastructure operators can take before, during and after an attack.

This study combines computer science and urban planning (Urban Science) to provide a starting point for cities to prepare for and protect themselves against cyberattacks.
Local Public Space, Global Spectacle: A Case Study on South Africa’s First Shipping Container Shopping Center

This thesis is the explication of a journey to reconcile Johannesburg’s aspiration to become a ‘spatially just world class African city’ through the lens of the underperforming 27 Boxes, a globally inspired yet locally contested retail center in the popular Johannesburg suburb of Melville. By examining the project’s public space, market, retail, and design features – features that play a critical role in its imagined local economic development promise – I argue that the project’s ‘failure’ can be seen through a prism of factors that are simultaneously local and global. Furthermore, the perceived failure and reinvention of the center exemplify the tensions inherent in municipal, developer, and community aspirations for who such projects should serve and subsequently, who is welcome to access and utilize Melville public spaces.
Co-opting Sustainabilities: The Transformative Politics of Labor and Extended Producer Responsibility under Brazil’s National Solid Waste Policy

Growing levels of global solid waste production implore society to identify the actors responsible for preventing, reducing, and disposing of wasted material in a sustainable manner. Extended producer responsibility (EPR) and corporate social responsibility (CSR) are policy frameworks that hold accountable the manufacturers of goods that create post-consumer waste. National and state governments typically prescribe EPR through market mechanisms, performance standards, and disclosure requirements. CSR relies largely on voluntary programs that international bodies and corporations themselves establish to prevent or remediate socially and environmentally destructive behaviors. Responding to a paucity of research regarding adaptations of EPR to the global South, this thesis traces the origins and outcomes of the 2010 National Solid Waste Policy of Brazil (PNRS), which mandates EPR.

I focus on a provision of the PNRS that prescribes CSR in fulfillment of EPR through partnerships between corporations and cooperatives of wastepickers: collectively-organized, self-employed individuals who separate, sort, and sell recyclable materials. Guiding this inquiry is a question regarding the implications of the interactions between the transnational sustainability frameworks of corporations and laborers. Through an analysis of the histories and realities of these interactions, I interrogate the dynamics that shape the structures of CSR programs and their evaluative tools under the PNRS, from the perspective of wastepickers. I assert that these CSR programs, while sources of technical and financial support for wastepickers, by design cannot actualize the concept of EPR because they fail to remunerate wastepickers as market actors. Furthermore, I demonstrate that by controlling the processes that assign and assess responsibility for waste management in Brazil, corporations have co-opted a sustainability discourse of labor that is intended to advance wastepickers’ own fight for fair pay, rights, and recognition.
Converging Intentions, Diverging Realities: Rights vs. Growth-Based Approaches to Safe Sanitation Provision in Addis Ababa, Ethiopia

Although we are now well into the twenty first century, the possibility of achieving equitable, universal access to water and sanitation is still out of reach. According to a progress report by the Joint Monitoring Program, in 2015, 844 million people lacked even the most basic access to safe drinking water. The case for sanitation is even more dire, as about 2.3 billion people have no access to the most basic sanitation service. Moreover, 1.5 million children under five years old died each year as a result of water- and sanitation-related diseases. This harsh reality is consistently reflected in Addis Ababa, Ethiopia, where much like many other cities in the global south, water cuts are a norm and access to safe sanitation services is unfortunately minimal.

Caught between the influences of the normative recognition of water and sanitation as a right and an ambitious development agenda that sees Addis Ababa as the driver for economic progress, the city’s utility is struggling to provide adequate access to its inhabitants. This thesis uses the Addis Ababa Water and Sewerage Authority’s recent, ambitious plan to transition Addis on to the country’s first sewage grid as a sight for investigating how these influences play out on the ground and understand how residents are being serviced or excluded from accessing safe sanitation. Drawing on multiple interviews, close readings of policy documents, and physical analysis of the distribution of services, I conclude that that both normative and growth-centric approaches fail to reach their goals of achieving equitable, universal access to safe sanitation services for the city’s residents. This is in large part because these approaches are not adequately responding to the realities of Addis Ababa, which is as much a city informality and gradients of poverty as it is the capital of Africa’s fastest growing economy.
Vulnerability of What? Vulnerability of Whom? Evaluating and Communicating Vulnerability to Extreme Floods in Houston, TX Using a Novel Web-Based Platform

The global climate is changing and these changes will continue to have adverse effects on cities and their residents. Coastal cities in particular, which contain the majority of the global urban population, are becoming increasingly sensitive to changing climactic conditions. The particularly devastating extreme storm season experienced in 2017-18 on the east coast of the United States (including storms Harvey, Irma, Maria, and nor’easters on the mid-Atlantic coast) has intensified discussion regarding the preparation for, response to, and communication of risk and vulnerabilities related to extreme weather events. Vulnerability to extreme weather events is the susceptibility of a system to internal or external stressors, exposure to those stressors, and the capacity of that system to adapt or respond to that extreme event.

These concepts are understood in terms of social, economic, environmental, infrastructural, institutional, and built environment systems, and the focus of policymakers and stakeholders is often split between these domains. Furthermore, responses to vulnerability of any one categorical domain is potentially incongruous with responses to other domains. The modes by which this information is presented to decision-makers often either preferences single domains of interest or obscures the degree to which individual categories influence overall measures of vulnerability. This project begins with a review of relevant literature exploring definitions and measures of vulnerability to extreme flood events, identifying gaps in existing categorical domain combinations and opportunities for the application of a novel method of synthesis for Houston, Texas, a city hit by three 500-year storms in as many years and in the process of updating building codes and flood zone designations. The result of this analysis is presented in a novel way using web-based technologies that transcend the strictly-planimetric view of the city. This method blends traditional cartographic techniques with perspective, elevation, and diagrammatic representation methods to contextualize estimated vulnerability.
Don’t Get Taken for a Ride!:
Designing and Implementing
Effective Autonomous Vehicle
Regulation in Toronto, Ontario

Studies suggest autonomous vehicles can enable a more equitable, efficient, and sustainable transportation network. Yet, experts point out this outcome is not guaranteed, and that without outside policy intervention autonomous vehicle (AV) use might actually exacerbate congestion, sprawl, and inequitable access to travel. These challenges will be most acutely felt in areas under the purview of local governments—such as transportation congestion, land use, and impacts on public transit. As such, the goal of this thesis is to assist municipal policymakers with mitigating these impacts by answering the question: How can local governments effectively regulate autonomous vehicles?

Looking at Toronto, Canada, specifically, this thesis addresses the following issues:

- When is a contract, and when is a regulation, the most appropriate tool to encourage AV companies to act in ways that help foster a sustainable and equitable transportation network?
- What does the City of Toronto require to develop effective AV regulation?
- How can the City of Toronto codify broad AV policies into specific, enforceable regulations?

This thesis employs three research methods: a literature review, a document analysis, and qualitative interviews with relevant experts. The primary literature review looks at the possible benefits and harms that might come from AV development and the policies local governments can enact to correct for these externalities. Interviews were conducted with 23 experts from the public and private sectors and academia, with responses analysed and themes drawn out to develop answers to the above research questions. Finally, analysis of Toronto’s Official Plan and Municipal Code helped inform the creation of a proposed Article 10-A of the code to regulate AV rideshare companies.
Preparedness through Partnership: Integrating Climate Change and Public Health in the City of Boston

In coordination with the City of Boston’s Environment Department and Public Health Commission, this thesis examines the intersection between climate change adaptation and public health preparedness in Boston, proposing a cross-disciplinary integration of methods and concepts to strengthen both functions, thereby improving the preparedness and resilience of all residents. This thesis reviews the current role of public health in local climate adaption and preparedness, highlighting climate-related human health impacts specific to Boston’s geographic setting, vulnerable populations, and current planning efforts, to identify opportunities for expanded and enhanced action. Lessons for Boston are drawn from an in-depth review of nine other U.S. cities and counties’ relevant or innovative programs, strategies, and experiences. Grounded in an institutional context through engagement with and observations of the City of Boston’s interdepartmental extreme temperature planning process, the research draws lessons, illustrative case studies, and recommendations for strategic planning and coordination to strengthen capacity, improve communication, and mitigate risk. Major themes presented include: the development of a professional workforce knowledgeable about climate-health and invested in taking action; the broad role public health can play in communicating, evaluating and mitigating the human impacts of climate change; and the potential for local agencies’ strategic use of innovative external partnerships, data-driven analysis, and adaptive planning processes to allocate limited resources for more efficient and equitable climate-health actions.
Defining Transit-Oriented Development Potential along The Commuter Line Stations in Jakarta

Transit oriented development (TOD) has been an emerging concept in Jakarta, particularly since the construction of the new Mass Rapid Transit (MRT) and Light Rail Transit (LRT). Besides the two incoming new transit, Jakarta also operates an existing Commuter Line which has significant ridership, even compared to the expected ridership for the MRT Line and the LRT Line, and extensive network coverage across the metropolitan area. The ubiquitous TOD in Jakarta currently focuses on producing typical vertical mixed-use development, whereas there are many forms of TOD. Therefore, this thesis seeks to provide a comprehensive approach to achieve sustainable TOD, using the Commuter Line as the case study.

Two imperative studies in TOD planning are combined. First is to investigate TOD as a network of different node, place, and market value that distinguishes development potential for each stations and thus, creates development typologies. Second is to investigate station neighborhood as the arena for development itself. Based on the first study, three stations are considered as the immediate potential for TOD and selected as case studies to understand the prevalent urban fabric around the station and how future development could and should transpire on such fabric. The combination of the two studies could help decision-makers to better allocate and prioritize different development and interventions along the Commuter Line to achieve sustainable TOD.
Equitable Energy for Massachusetts: How Can Climate Policy Reduce Inequality?

Massachusetts is widely recognized as a climate leader and a state that prioritizes social equity. However, existing Massachusetts climate policy does not effectively reduce greenhouse gas emissions and has limited support for marginalized communities. The state’s annual $730 million of investment in energy efficiency is governed by the Green Communities Act, which emphasizes cost-savings for consumers rather than environmental benefits or social equity. The state’s Global Warming Solutions Act does impose a legal obligation to reduce greenhouse gas emissions to 25% by 2020 and 80% by 2050 based on 1990 levels. However, these emission reductions will not be achieved unless new policies are enacted that effectively regulate carbon emissions. Finally, the state’s existing environmental justice policy of Executive Order 552 is not legally enforced and does not govern the $730 million of annual investment for energy efficiency.

This thesis explores these challenges and suggests a new climate policy framework of “equitable electrification.” To achieve this framework, Massachusetts should impose regulations that ban the use of petroleum in new home heating systems. The state should also reform the Mass Save energy efficiency investment plans to prioritize electric heat pumps. To increase support for environmental justice communities, municipalities should consider administering their energy efficiency investments directly instead of using existing utility program. Finally, policymakers should consider new legislation that imposes a progressive carbon price and prioritizes investments for environmental justice communities. By pursuing these recommendations, Massachusetts can develop more effective climate policy that reduces greenhouse gas emissions while increasing social equity.
Integration and Parent Preference in New York City Public Schools

Schools in New York City are deeply segregated by both race and class. The confluent forces of residential segregation and family school preference have led to increasingly segregated schools since the 1980s. The New York City Department of Education (DOE) has taken steps to desegregate schools since a 2014 report by the UCLA Civil Rights Project named New York State the state with the most segregated schools. Though the DOE is doing more to address segregation than most districts, their efforts are still cautious, careful not to alienate the high status families needed for racial and economic integration. Additionally, the Department of Education is working towards school ‘diversity’ but their policy fails to adequately address the closely linked issue of ongoing education inequality. This project explores how parent choice impacts school segregation, provides recommendations for how the DOE should address parent choice in its diversity policy and develops a framework for moving beyond desegregation to build deep and stable integration in city schools.
Neighborhoods are complex and dynamic. An attempt to tease out how and why neighborhoods change requires interdisciplinary study that reflects the layers of interrelated people, places and things that make up an urban neighborhood. Urban data science aims to measure neighborhood change, yet it is challenging to quantify how a place changes over time, space and people. Moreover, these measures are important because planning and economic development policy that relies on these measures impacts future place-making and community development. To understand neighborhood change at a granular scale that can be useful to decision makers, I conduct a data-driven ethnography in which I assemble, analyze, and integrate over 45 urban planning and real estate datasets to develop quantitative metrics that measure the rate of change for the 1817 to 2017 period for Block 800 in New York City.

Quantitatively, long-run metrics on rates of neighborhood change were previously unable to identify. In this way, I was able to document that change is always happening to a building, property, person or price, but its positive and or negative trends are often very slow to articulate in datasets or statistical models. The quantitative results suggest that, on average, buildings move slowly by netting 0.01 buildings per annum over the 1817 to 2017 period, properties more rapidly at 0.45 per annum and people even more rapidly at a projected rate of 1400 people per annum. In addition, not all changes are equal in speed or impact, where change can accelerate at so-called inflection points where technological progress in society is meeting the built environment and the people operating within. At these points, the speed of a neighborhood can increase rapidly causing displacement and gentrification and at other times, progress is absent with long periods of decay.

Importantly, calculating rates of change could not be done without data-driven ethnographic methods that allows for integrating and not aggregating data. Integrated place data are intricately linked to retell a long, wide, and big data neighborhood story. These methods can now be replicated at a larger scale with the proliferation of city science to drive decision-making in cities at these new scales.
Where Did the Green Jobs Go? A case study of the Boston Metropolitan Region

The green jobs movement was a part of a nation-wide effort to address economic injustice while also directly contributing to the preservation or enhancement of environmental quality in America’s urban centers. Attempts to realize the movement were seeded largely through American Recovery and Reinvestment Act funding, at a time when the United States was facing its greatest economic recession since the Great Depression. With high hopes, urban governments organized and implemented green workforce development programs with the vision of creating family supporting, career pathways that would help address the challenges of climate change.

This thesis, through the use of semi-structured interviews, analyzes how the green jobs movement began and ended in the Boston metropolitan region. My findings support that the primary reasons for the collapse of green workforce development programs were that cooperation between organizations was minimal, which resulted in duplicate programs or programs that were never fully realized. Additionally, my findings support the conclusion discussed in the literature that green jobs do not constitute a separate classification of work. Finally, the green jobs movement was not capable of alleviating the stress placed on the Bostonian labor supply by the Great Recession beginning in late 2008 and ending in 2012.

The conclusion of the case study is not that the green-collar economy cannot be realized in the Boston metropolitan region. Instead, the summary findings are that progress was made towards achieving sustainable development goals, propelled predominantly by the success of the clean energy industry and the emergence of municipal energy functions. Policymakers who wish to support the growth of the green-collar economy and sustainability can do so through more coordinated efforts, utilizing the groundwork laid by the green jobs movement.
Making Urban Progress Legible: The Role of Territorial Social Indicators in the New Economy

In the 1960s, a social indicator movement flourished in the United States: agencies ranging from the USDA to NASA advocated for a national social accounting body, cities regularly published data-driven reports on urban wellbeing, and academics assembled comprehensive social progress indices for cities, counties, and states. However, the social indicator movement stalled amidst the economic turbulence of the 1970s, and has never regained its strength.

This thesis argues that there is an urgent need for the resurrection of the urban social indicator movement, particularly as technological and macroeconomic changes have driven a wedge between economic development and human wellbeing, with the gains generated by economic growth increasingly accruing to capital rather than labor. If gross product is a misleading and incomplete proxy for urban progress, other measures are needed to make urban progress legible.

To demonstrate the utility of such a measure, I present an Urban Progress Index of 486 urbanized areas in the United States for 2012 and 2016, using indicators of health, education, prosperity, income equality, gender equality, racial equality, and safety. I evaluate the index rankings with respect to population size, mean income, and change over time, and compare two cluster analyses of cities based on their social indicator scores and their industrial compositions, revealing how patterns of wellbeing correlate with the presence of particular industries.
The Dutch Urban Areas Act and the Perversion of Neighborhood Distress

The Dutch Urban Areas Special Measures Act is a national policy in the Netherlands intended to improve the quality of life in distressed neighborhoods. The Act allows a municipality to designate neighborhoods where the municipality can alter the demographic composition through a housing permit system that regulates access to homes. Cities are allowed to deny permits for residence therefore exclude in-moving people who do not have an income from work or who have certain police records. What began as a 2004 policy experiment in the City of Rotterdam animated by a far-right anti-immigrant nationalistic movement, the Act is now an institutionalized policy accessible to any city in the Netherlands. In this thesis I present two key missing perspectives on the Dutch Urban Areas Act: how other Dutch cities are using the Act after its origins in Rotterdam and how to understand the Act through what has to date been a sorely missing analytical frameworks around race. With these perspectives on the Dutch Urban Area Act I present two distinct arguments.

The first is that the Dutch Urban Areas Act’s diffusion to cities outside of Rotterdam is in severe conflict with its own statutory and regulatory basis. Through a complete reassessment of the Act’s social and political origins in Rotterdam, my second core argument is that the Dutch Urban Areas Act was conceived to be a spatial policy of racial exclusion. The base idea undergirding the Urban Areas Act, as developed in Rotterdam in the early 2000s, operates under the same propositions of controlling the movement of a racialized group of people as the propositions expressed by state sanctioned segregation found in the Western segregationist history in the United States and South Africa.
Visible Flows: The Dynamics of Community-Based Water Resource and Flood Management Governance in Uthai Thani

In Thailand, centralized vertical governance with its ‘line-of-command’ approach continues to hamper holistic integration of water resource and flood management. In addition, the capacity of small-scale community actors and self-organized entities are not visible to the central bureaucrats. Using the mega 2011 flood as the baseline example, the four chapters of the documentary film, ‘Visible Flows’, are the synthesis of both formal, and informal conversations the Hart Thanong community who devised strategies to mitigate flood impacts with less reliance on external assistance, and continue to do so in the present. Conducted from 19th December of 2017 to 4th February of 2018, the discovery of the values, knowledge and actions embedded within these individuals demonstrated a paradigm shift for the water resource and flood management adaptation strategies in several ways. Firstly, it reframes the notion of crisis as opportunity, beyond embracing uncertainties as norms. Secondly, it demonstrates that a fully adaptive strategy requires highly collaborative organizational arrangement, through both formal and informal rules, based on iterative processes and continual development. Lastly, self-governance is central to increasing adaptive capacity in uncertain times.

Documentary film is a powerful medium to digest serious knowledge and insights of the individuals and the collectives. With the intention to bring about voices that are often invisible and marginalized in the water resource and flood management arena, the community members of the Hart Thanong Municipality, Thailand, become our educators, researchers and storytellers for this thesis.

Using visual research of documentary video as the tool of investigation, I seek to understand the underlying structure that has led them to successful adaptation in order to prioritize collective actions in the water resource and flood management framework.
Promoting Alternative Dispute Resolution in the Massachusetts Land Court: Current Perceptions and Use

The Massachusetts Land Court is overburdened. More than 15,000 new cases are filed each year, with the even more cases carried over from previous years. Each emotionally taxing case can cost litigants between $50,000- $250,000 to try, with no guarantee of winning. One promising option that would relieve the overload, reduce the cost to litigants, and give them control over the outcome is Alternative Dispute Resolution (ADR). This is an approach to resolving disputes that allows parties to find mutually beneficial agreements with the help of a neutral mediator. The Land Court already has an ADR program – and has since 1999. But the program is underutilized and it is not clear why that is the case. Despite unanimous support for ADR among mediators, Land Court judges, and attorneys, less than 1% of cases that go through the Court are mediated. I find that the Massachusetts Land Court ADR program is perceived as “second-class justice” - less desirable than a trial. A lack of understanding about ADR and its value, a perception that the costs of mediation not worth the service, and emotional factors emerged as the key barriers to wider use of mediation in Land Court cases. I make recommendations for each of the involved parties. For the courts, I recommend reinstating an in-court ADR program (rather then sending cases to external mediators) and giving judges and clerks more responsibility for addressing litigants’ misperceptions of ADR. For legislators, I recommend increasing ADR-specific funding for the Land Court. For attorneys, I suggest ensuring that all of their clients fully understand how ADR can improve their prospects, and bringing their clients with them to case management conferences or a similar court-tracked meeting. And lastly, for mediators, I recommend providing in-court screening of cases for the possibility of mediation and establishing long-term professional relationships with judges.
Beyond a Bad Day: Exploring Social, Economic, and Environmental Co-benefits of Resilience in the National Disaster Resilience Competition

Despite the evidence that climate change is responsible for an increase in the frequency and intensity of extreme weather events worldwide, communities underinvest in building resilience to manage disaster risk. This is due in large part to high cost, which is not justified by the traditional method of determining the benefits of such investment.

The benefits of resilience are often unclear, distant, and limited to a narrow understanding of a project’s impact. Infrastructure and program investments can offer social, economic, and environmental co-benefits that extend beyond a project’s disaster risk reduction and help to meet community needs every day, not just during the rare occurrence of a disaster. Decision-makers need a way to incorporate co-benefits into the evaluation of these investments. However, a standard methodology to assess quantitative and qualitative value of community resilience co-benefits does not exist.

The Department of Housing and Development offered a way to resolve the disconnect between project costs and benefits in a novel requirement for the one-time National Disaster Resilience Competition (NDRC) of 2014-2015. The NDRC required forty U.S. state, county, and city applicants to develop a qualitative benefit-cost analysis (BCA), encouraging consideration of the hard-to-quantify benefits.

This thesis analyzes the interpretation of social, economic, and environmental co-benefits by these communities as reported through the competition BCAs, examining the identification and quantification of co-benefits across proposals. The findings and recommendations in this thesis build the foundation of a standard assessment methodology for resilience co-benefits. Through adaption of the traditional BCA model, decision-makers will ultimately be empowered to strengthen the case for resilience investment in their communities as critical to reclaiming their rights as citizens.
Contracting Disaster Reconstruction

The combination of more powerful and unpredictable storms and growing urban populations have led to increasing demands for disaster response and an opportunity for the logistics community to provide meaningful evaluation and expertise. In the United States, FEMA is continually updating their disaster response methods to accommodate the changing dynamics of disasters—most recently in rethinking strategies to provide interim housing for large populations of survivors. One of FEMA’s most complicated challenges has been forecasting and securing the large number of skilled contractors required to complete the multitude of assessments, reconstruction projects, and rebuilding missions in the wake of large-scale storms.

International governments have faced similar challenges, and through case studies and informant interviews, an evaluation of contractual structures that affect FEMA’s post-disaster housing provision is presented. This thesis will present a cross case study analysis of how contracts were structured between the government and private firms hired as part of the reconstruction efforts following the 2016 flooding in Louisiana and the 2010-2011 earthquake sequence in New Zealand to find recommendations and future learning opportunities for the US government.
DeeDee Kim
Thesis Advisor: Eric Huntley

Data + Disasters: Rethinking the role of Metro Boston’s data intermediaries in disaster management

Recent U.S. hurricanes such as Hurricane Harvey in 2017 have raised urgent questions about the role of data providers in disaster response and recovery. Digital tools such as maps that display emergency shelter locations or levels of E.Coli contamination in floodwaters are typically created and managed by a local data intermediary. A data intermediary is defined by the National Neighborhood Indicators Partnership as a mediator between data and local stakeholders such as community groups and residents who use data from advocacy to program planning and policy-making. Currently, the Data Services department at the Metropolitan Area Planning Council (MAPC), the regional planning agency for Metro Boston, serves as a data intermediary for the region. This research will argue that in addition to their daily functions, MAPC should assume new roles as the ‘disaster data intermediary’ during times of crisis given their technical capacity and ability to be more localized than their federal and state counterparts.

Natural disasters impact regionally as they tend to cross jurisdictional boundaries and require coordination amongst many municipalities and players who could benefit from shared resources. Drawing conclusions from interviews of data entities who experienced Hurricanes Katrina, Sandy, and Harvey, this thesis will propose new tasks for MAPC. From enacting an internal protocol during emergencies to long-term advocacy for open data policies and portals, these recommendations are organized in the context of disaster mitigation, preparedness, response, and recovery.
Current urban climate adaptation planning efforts tend to focus on protecting a city’s physical assets from potential climate-related disasters, with an increasing emphasis on enhancing resilience, or building places that can absorb and withstand climatic shocks. Scholars and practitioners have critiqued climate adaptation planning’s current focus on protecting physical assets, pointing out that adaptation plans rarely incorporate equity or social vulnerability. Consequently, calls have emerged for climate adaptation planning to focus on human vulnerabilities instead.

To that end, my dissertation probes why and how the health impacts of climate change should be given a more prominent role in climate adaptation planning efforts. In reality, to structure the conversation around climate change to be about public health, cities will need new approaches to enhance public awareness of and facilitate engagement with climate risk management choices. Responding to calls for research on ways for cities to operationalize a focus on the health impacts of climate change, my dissertation project tested three methods of engaging citizens in public health-oriented climate adaptation planning.

I find that cities have much to gain from framing climate change as a public health issue, as it boosts public concern about the severity of the problem and builds public support for policy action. I also find that serious games enhance awareness of local climate-related health risks and collective decision-making capacities, and argue that cities should utilize face-to-face and digital game-based engagement in climate adaptation planning efforts. My dissertation concludes with recommendations for cities on how to use a variety of public engagement methods to create pathways for envisioning local preferences in climate adaptation planning.

This dissertation engages with and contributes to three areas of theory and practice. First, the dissertation examines the proposed normative and pragmatic benefits of cities adopting a public health orientation to climate adaptation planning. Second, the dissertation presents new tools for cities to enhance public awareness of and facilitate engagement with climate risk management choices. Finally, the dissertation project considers planners’ roles in science-intensive planning and policymaking processes, in particular, through addressing the unique challenges to enhancing public engagement around climate change. Furthermore, it examines how planners can foster collective decision-making capacities among different publics, and ultimately, enable technically sound and politically feasible responses by individuals and communities to adapt to climate change.
Show Me What Community Looks Like: Designing a Popular Education Curriculum for a Los Angeles-Based CLT

This thesis project is a reflection on how popular education can empower individuals and foster community control. It is based on my experience co-creating a curriculum with a South Los Angeles community land trust. This project incorporates elements of popular education, critical pedagogy, alternative models of housing tenure, and participatory knowledge creation, both in the content and the process of designing the curriculum. I begin the thesis with overview of theoretical frameworks for popular education, which provides a basis for mutual learning among the program participants. I then explore ways in which residents build community to provide a foundation for establishing control.

This thesis consists of the curriculum and a brief guideline to it. The curriculum centers democratic housing in South LA and explores radical alternative housing, economic democracy, land use and rights, and the legacy of US housing discrimination. It aims to empower residents to establish community control in their transition from being renters to becoming joint owners and representatives of a community. The lessons use elements of participatory action research to redefine knowledge and its production, adapted to reverberate in South Los Angeles. Some lessons build from successfully implemented interactive learning activities, tailored to the South Los Angeles experience, while others are an opportunity to share information. Others borrow from community organizing and require students to take on the role of the community educator. This thesis incorporates lessons learned from the design process, by utilizing different theoretical elements of popular education as a baseline to create the themes for each lesson.
Many cities across the U.S. have begun investing in bike infrastructure and bike share systems in the last 10 years. Even though bicycling rates have increased, this increase is not necessarily increasing across all demographics. Depending on location, men outnumber females for using bikes for utilitarian purposes at least two to one. Some of this difference is hypothesized to be attributed to men and women having different travel behaviors, gender roles, and preferences in where and why men and women bike. These varied preferences and usage can mean that cities have distinct (unintended) gendered geographies based on built environment and infrastructure factors. In order to broaden the cycling demographic, cities need to understand how these differing preferences impacts usage, and in turn what methods can be used to plan networks that are preferred by a broader demographic.

Using trip level data from the greater Boston region’s bike share system, Hubway, this thesis uses an OLS model to examine how built environment, land use, and bicycle infrastructure factors impact usage for men and women. The results can help cities, advocates, and planners support female cyclists through better understanding the factors that are impacting where bike share trips are happening spatially and temporally. The thesis uses open source data so that the methods can be used for any city with a bike share system.
MassDevelopment’s Transformative Development Initiative (TDI) has brought coordination, local capacity building and in some cases, added investment to Gateway Cities struggling to bring investment into their cores. However, real estate development in weak markets remains fundamentally challenging, with each project requiring substantial development expertise and political support to cobble together a complex stack of public and private capital.

Existing knowledge on the community development ecosystem suggests that commercial and mixed-use projects that rehabilitate existing buildings can be the most challenging to implement due to capital intensiveness and risk. These projects can often also deliver significant place-making and economic development benefits. This client-based thesis seeks to consider the role that state equity investments could play across different project types.

After considering the policy and political context of TDI, this thesis will use the Brockton context as a lens for recommending an alternative strategy—the “condo approach”—for MassDevelopment to deploy its TDI Equity Investment funds. Client-based learning, market research, stakeholder interviews, and financial modeling help to inform this strategy.
Urban industrial land is dwindling in cities, becoming increasingly in danger of conversion to other uses. The shuttering of factories across the country has led many municipal planning departments to consider how industrial land can be preserved in order to maintain land dedicated to employment for residents. At the same time, market pressures on individual industrial sites have shown that this same industrial land may be able to support a wide range of uses, depending on the level of contamination and its integration with the rest of the city fabric. These dueling pressures come to a head when large, prominent industrial employers close their operations in a municipality, leaving a gap in both the local economy and the landscape.

Often redevelopment is largely private-sector endeavor, but the prominence of large industrial employers, the size of older industrial sites, the cleanup efforts required, the potential for rezoning these parcels, and the city goals that could be reflected in redevelopment of these sites inspire publicly led redevelopment planning efforts in some cases. Through case studies in Milwaukee, WI and Saint Paul, MN, this research uncovers some of the pressures and forces that guide public land use planning and decision-making on formerly industrial land at the site level.

Through analysis of the planning processes and tools used to respond to these pressures, land use planning recommendations are made for a third city: Madison, WI, where the Oscar Mayer headquarters was located from 1919 until it closed in 2017. Recommended actions for both the city-led committee and the ownership team include the use of scenario planning to model land use outcomes and measure the impact of different land uses through metrics and description; engaging community members in the strategic assessment phase of planning as soon as possible; tying employment goals directly to employment land through redevelopment performance requirements; consideration of mixed-use employment districts; and marketing the vision for the land to potential tenants and developers.
Collective Innovation Spaces in Shanghai - Spatial Patterns and Social Life

In 2014, the Chinese central government began an initiative - “mass innovation and entrepreneurship” - as its new strategy of economic development. Collective innovation spaces were promoted as the physical manifestation to fuel this economic development strategy. As a result, the establishment of Collective Innovation Spaces (CIS) has since received significant funding from both the public and the private sector. The number of collective innovation spaces has grown exponentially over the years. With this significant growth rate, collective innovation spaces have started to exhibit a distinctive spatial pattern and make an impact on urban life. However, few systematic studies have been carried out to understand this spatial pattern and the mechanisms behind it. This thesis takes Shanghai as the study site. Using statistical model and spatial analysis, the study identifies several clusters of collective innovation spaces (CIS) in Shanghai as well as their spatial characteristics.

It is demonstrated that rental housing units, IT companies, universities, restaurants, bars and coffee shops have a positive relationship with CIS clusters. However, housing developments and parks have a negative relationship with CIS clusters. Development of CIS and the thriving third places, which are privatized social spaces other than home and workspaces, generate an innovation network that facilitates social interactions, innovation, and entrepreneurship. It represents a new kind of urban development in China, integrating, connecting and preserving the existing urban fabric. By investigating in two case studies in Shanghai, the thesis gives policy and design suggestions on the development of CIS clusters.
Crowdsourcing Corporate Water Data: A Validity Test of a Pilot Survey Instrument to Map Public Water Management Related Risk Worldwide

Easy to access, localized information on public water management and its impact on local water risk does not exist at a granularity that would be useful for industrial facilities and localized utilities. Given this gap, the World Resources Institute (WRI) and the Massachusetts Institute of Technology Sloan Sustainability Initiative (MIT-SSI) are seeking to crowdsource multinational companies’ information on public water management and water risk to see whether a reliable, globally comparable, and centralized geodatabase can be developed by pooling information and analyses that private actors use to map and identify localized water risk and public water management efforts essential to their decision-making.

WRI and MIT-SSI began an initial pilot study in 2017 with a survey of six multinational companies and 41 of their industrial processing and manufacturing facilities in 14 countries.

I set out to determine whether the risk indicators used by the WRI/MIT-SSI partnership accurately portray on-the-ground public water management circumstances at the facility level for companies operating in both low and high-risk areas. I also tried to determine whether the water risk indicators developed by WRI/MIT-SSI are comparable, credible, and relevant across a range of manufacturing and industrial processing sites.

In order to assess the validity of the initial survey instrument and the data it generated, I conducted a series of interviews and site visits in India and California. I found that the survey responses generally reflected local public water risk management conditions and were trusted and found credible by all the stakeholder groups interviewed. Furthermore, officials and stakeholders engaged in public water management, advocacy, and oversight thought the data generated by the survey instrument would be useful as long as enough data points are provided and anonymity of corporate respondents is maintained. Unless responses can remain anonymous, there were fears that particular sites might be subject to litigation or regulatory retaliation. My recommendations for improving the survey instrument emphasize the need to expand the scope of the survey to include recycled and reclaimed water and to address regulations that require the use and treatment of wastewater on-site.
Breaking Barriers:
An Examination and Recommendations Regarding the Role of Clean Distributed Electricity Generation in Mexico

Through the 2013 Energy Reform, the Law of Energy Transition, and the General Law of Climate Change, policy makers in Mexico have aimed to lower electricity tariffs, generate 35% of electricity from clean energy sources by 2024, and reduce greenhouse gas emissions by 30% in 2020 and 50% in 2050 compared to greenhouse gas emissions in 2000. Furthermore, the 2013 Energy Reform aims to promote economic development and reduce electricity subsidies. In an effort to achieve these goals, policy makers have tried to diversify the country’s electricity generation profile, including the promotion of clean distributed generation (DG) technologies.

A broad cross section of governmental and non-governmental stakeholders has publicly supported these objectives; however, low domestic electricity prices, high system acquisition costs, and a lack of financing have and will continue to limit the deployment of clean DG systems in Mexico. Furthermore, deep penetration of clean distributed generation under current net metering policies and electricity tariff structures may actually undercut the effective operation of Mexico’s electricity market by increasing operation costs and adding technical complexities to the electricity network.

In this thesis, I make three short-term and one long-term recommendations to the Ministry of Energy and the Energy Regulatory Commission to promote the deployment of clean DG technologies beyond current barriers to entry and without adding economic and technical strain to the electricity industry. I recommend that these organizations (1) add clean DG to grid planning and develop a distributed energy resources strategy, (2) execute community-scale clean DG capacity auctions, (3) increase investment and financing opportunities for the public, and (4) modify electricity tariff structures and net metering policies. I hope these recommendations to the Ministry of Energy and the Energy Regulatory Commission will help the State achieve its energy policy and greenhouse gas emission reduction goals.
Revisiting Barriers to Climate Change Adaptation in Coastal Massachusetts

While research on climate adaptation processes is growing, the literature on how barriers to adaptation at the municipal level change over time has not kept pace. Massachusetts has positioned itself as a leader in climate adaptation and mitigation strategies since the Global Warming Solutions Act of 2008, but there is little knowledge about how exactly climate adaptation is occurring at the local level and what barriers municipalities in the state face. In light of a 2011 study on barriers to climate adaptation in coastal municipalities in Massachusetts, which found “leadership” and “values and beliefs” as the two main barriers to adaptation, this thesis sets out to ask how, given the increase in extreme weather events and the presence of significant political leadership and guidance at the state level, have barriers to climate adaptation for coastal municipalities changed? And if the barriers have changed, what are the new barriers?

The research draws on fifteen interviews with municipal staff in six municipalities and arrives at three important findings: barriers to adaptation have shifted significantly from “values and beliefs” and “leadership” to “regulatory/permitting” and “funding” constraints, although barriers in leadership and beliefs still exist; uncertainty about the future has led to significant decision-making challenges and constraints in regards to funding adaptation projects, especially given home rule municipal charters, which leaves decision-making and funding discretion up to the voting public; and, a number of “social surprises” act as barriers for towns, with the property rights challenges associated with obtaining easements a significant barrier for the implementation of adaptation projects. While this exploratory investigation cannot reach conclusive arguments about barriers to adaptation across the entire state, it suggests that policy makers and researchers interested in coastal climate adaptation in Massachusetts will have to focus on new processes of decision-making and agency at the state level.
This thesis explores the relationship between high-speed rail development, local rail station development and land development. The efficacy of a high-speed rail system depends, in part, upon rail stations’ locations close to urban centers and integration into the broader transportation networks and urban realm. Through economies of agglomeration, high-speed rail can bring wider economic benefits to regions, cities and local areas. Transit-oriented development can be used as a strategy to capture these local-level benefits and also bring urban development to the high-speed rail system. In order to evaluate these relationships, this thesis examines two case studies.

In the United Kingdom, the government chose St. Pancras Station as the London terminus for High-Speed 1, the first high-speed rail route in the UK. Although protected under historic landmark status, St. Pancras Station had been neglected for decades and required an £800 million refurbishment. This project also opened up new land, which currently is being developed as part of the £3 billion mixed-use project. Property values in the vicinity of the station have increased significantly, and this project has garnered wide acclaim for its architectural and place-making achievements.

XpressWest, a private high-speed rail developer founded in 2005, is proposing to build and operate a high-speed rail line between Victorville, California, and Las Vegas, Nevada. XpressWest plans to compete mainly with driving, since this is the most common mode of transportation on this corridor. A benefit-cost analysis shows that the project likely will have net negative impacts when considering only transportation benefits, such as time-savings. Wider economic benefits, however, could be on the order of billions of dollars, and have the potential to exceed the project’s costs.

In conducting stakeholder analyses and in comparing these two case studies, this thesis determines that high-speed rail systems have the potential to generate a variety of local social and economic benefits, which are valued differently by different stakeholders. Through collaboration, these stakeholders may ensure that these local benefits are maximized. As long as these benefits hold value to the relevant stakeholders, there may be opportunities for local benefits to exceed the costs of infrastructure development.
A revival in linear park development has brought new open space to a growing number of communities previously characterized by low-income populations, obsolete infrastructure, and difficulties in attracting outside investment. This thesis examines the relationship between linear park development and escalation in property values using the case of the Atlanta BeltLine.
The Politics of Community Media in the Post-Disaster City

Disasters are times of information deficits and mass media misrepresentations. While mainstream media reports an array of narratives about crisis situations, it often ignores a variety of perspectives and the lived experiences of minority populations. This creates a biased knowledge base for city planners and the general public about the events before, during, immediately following, and long after the disaster. Accordingly, such events can trigger new forms of community media to amplify marginalized voices in the city. As information communication technologies (ICTs) become more accessible, it is easier for people to produce and disseminate community media, which manifests in varied forms with diverse purposes. This dissertation seeks to understand how and why people use ICTs to create community media in the aftermath of a disaster during recovery and rebuilding, as well as identify the multi-scalar gains of these activities.

Using extensive qualitative interview data, this dissertation creates a framework and comprehensively analyzes the evolution of over forty initiatives such as low-powered FM radio, neighborhood Wifi mesh networks, the innovative use of social networking sites, blogs, and participatory documentaries, among others, that emerged in post-Katrina New Orleans (2005) and in post-Sandy New York City (2012). Applying grounded theory and emergent coding from these examples, it presents a timeless Post-Disaster Community Media Typology that outlines the primary action(s) and progression of these digital activities including: to inform (resource-sharing), to investigate (bottom-up journalism), to incite (organize for place), to include (crowd-sourced deliberation), to interact (therapeutic networking), to interpret (memorialize), and to income-generate (economic self-determination). Two in-depth ethnographic case studies with youth of color in both cities further verify the typology and illustrate how the community media production process can be an emancipatory form of rebuilding.
Discrimination, Regulation, and Design in Ridehailing

In the past decade transportation network companies (TNCs) like Uber and Lyft have replaced, supplemented, and disrupted traditional modes of transportation. The rapid growth of these companies makes equitable access to their platforms an issue that is simply too big to ignore. Indeed, these ridehailing services have the potential to extend an ugly legacy of discrimination in transportation services, or to deliver a more equitable mobility system for future generations.

In this vein, prior studies have provided evidence of discrimination between drivers and passengers in the context of ridehailing. This thesis extends research in three important ways. First, this thesis investigates rider-to-rider discriminatory attitudes in the context of dynamic ridesharing. To that end, this thesis uses data from a survey of 1,110 TNC users to argue that discriminatory attitudes toward fellow passengers of differing class and race are positively correlated with demographic and environmental characteristics, as well as one’s generic social dominance orientation.

Second, this thesis uses a second national survey of TNC users (n=1,113) to argue that the advent of autonomous ridesharing will exacerbate discriminatory attitudes toward fellow passengers in shared rides. What’s more, this effect will be particularly acute with regard autonomous ridesharing with passengers of a different gender. Finally, this thesis proposes fourteen regulations and platform design interventions to prevent and mitigate possible discrimination in ridehailing and ridesharing. These interventions are vetted through a survey of national experts in ridehailing policy and design. Of these interventions, this thesis calls for additional data reporting requirements and a series of changes to the TNCs’ star rating systems.
Future Earth Catalog: Urban Design in Climate Change

What is the agency of urban planning and design in climate change? This project explores new ways of engaging with the environmental narrative of our time. I present Future Earth Catalog as six representations of the same body of research, spanning a spectrum from academic thesis to media object, and catalog to playbook. The project departs from convention, both in process and product, in order to place learning and practice into an unfamiliar territory and form a new dynamic with climate change. This is a work in progress, to see the full project please visit www.futureearthcatalog.com.
Steering Change from the Shore: The Working Waterfronts of Marine Highway 95

The primary contribution of this research is to discover, describe and argue for urban design strategies that connect public ports to their urban context in a way that improves environmental performance, clarifies freight circulation, and enhances workforce accessibility.

The thesis begins at a regional scale looking at the networks and norms that effect maritime freight logistics along the Atlantic Coast of the US with an eye to how those networks and norms translate into site design and urban relationships. The regional scale analysis is then balanced with a in-depth site-specific case study focusing on the range of working waterfront conditions of the public port authority of Philadelphia, Pennsylvania.

This case study serves as an entry point to transition from observations on the existing relationship of ports and their urban context into speculation and design of the future relationship of ports to their urban context. The Philadelphia case study explores the shore-side development implications of changes in the volume and type of cargo moving through Philadelphia’s public port authority and concludes with a proposal for what types of urban design interventions would improve the port’s environmental performance, clarify its freight circulation, and enhance its workforce accessibility. I then generalize from this case study to offer working waterfront intervention typologies as defined by the spatial, political and operational relationships observed in Philadelphia. These intervention typologies are then keyed to a series of precedent projects that demonstrate how the proposed interventions might come to life.

Through observational and spatial analysis, this thesis seeks to explore the social value of selective integration of maritime industrial systems with urban public life. Overall, I hope these models for selective integration of industrial use will challenge inherited notions about industrial urban form and the relationship of white collar and blue collar work.
Testing Collaborative
Accessibility-Based Engagement Tools: the Santiago de Chile Case

The population of metropolitan areas in developing countries has been rapidly growing and transport externalities – such as congestion, pollution and traffic fatalities – have followed, in most cases, the same trend. Latin American metropolitan areas, where generally public transit is still predominant, has important challenges in continuing their economic development without severe increases in transport externalities. At least partly in response, citizens are raising their voices for more reliable and people-oriented solutions. Transportation planning, thus, plays an important role and within transportation planning, increasing public participation in decision-making has emerged as key to providing better transport solutions. As part of a transport planning engagement process, new technologies and new forms of measuring benefits are emerging in practice. Accessibility-based metrics and web-based map visualizations could improve the engagement process with easy-to-read results and analysis, decreasing the complexity of traditional transit project appraisal.

CoAXs, short for Collaborative Accessibility-based Stakeholder Engagement System, has been tested in several simulated instances of public participation in the U.S., showing interesting results including potential for co-creation and mutual understanding. This thesis presents an application of CoAXs in a developing country context, specifically in Santiago de Chile. The Santiago experience will attempt to answer questions regarding CoAXs’ potential for improving the engagement process and its performance for encouraging higher-scale (metropolitan) conversations, among Decision Makers and Stakeholders. By analyzing the results of the tool application, this research argues that CoAXs use in public settings is capable to promote project impact understanding and project learning among participants, which might improve the engagement process in transportation planning. Additionally, CoAXs Santiago version seems to represent better high scale (metropolitan) project impacts, which provide an initial indication of CoAXs’ encouragement for metropolitan level discussions.
Nontraditional Roles for Philanthropic Capital in Urban Redevelopment

Across the United States, neighborhoods of persistent urban disinvestment continue to elude revitalization. Despite efforts from private, public, and social sector leaders, these areas continue to produce unacceptable health, safety, education, economic, and well-being outcomes for their residents. Philanthropy has long been a stakeholder in urban revitalization efforts, yet is often understood and described only as a source of grant capital. However, understanding some of the roles of philanthropic capital beyond grants, specifically philanthropic investments, knowledge creation, leadership, and operations, may reveal powerful, unexpected roles for philanthropy. While urban revitalization can occur without philanthropic involvement, these various tools and approaches should be considered, either individually or jointly, in planning for and implementing revitalizations efforts in neighborhoods across America.
Energy Resilience on a Local Level: Planning for Disaster

The nature of today’s energy and technology relationship means that there is a vulnerable relationship between energy delivery systems and the range of social, medical, and fiscal systems they currently support. In the past decade, the inherent fragility of electric power grids with inadequate redundant generation, transmission or distribution capacity, has been clearly revealed by the power losses resulting from Hurricanes Ike, Katrina, Superstorm Sandy, and now Hurricane Maria. A single downed pole can disable such traditional systems, leaving thousands without power for an extended time. Endemic financial strife only exacerbates these conditions, causing complicating factors like deferred maintenance and cheap materials selection. For electricity systems, shocks could also come in the form of physical shortages of fuel, global fuel price increases, natural disasters, and unplanned surges in demand. Islands in the Caribbean tend to have a confluence of unfortunate factors in this regard; poorly funded and run utilities, dependence on imported fuels, and exposure to some of the highest winds in the western hemisphere.

Puerto Rico is not unique in its anticipatory but also reactionary local response to a disaster like Hurricane Maria. Grid resilience is an increasing topic of interest for critical infrastructure planners globally as climate change and worsening storms spark debates on the most appropriate mitigative strategies, especially given a financially constrained context. Energy access in post-disaster contexts is crucial for an interconnected web of life-sustaining infrastructure on a large and small scale, as well as continuity of daily life. This thesis does not seek to present a solution to all of these energy-resilience related concerns, but rather to propose a framework for planning for local solutions which are financially and temporally feasible in the impending hurricane season. Further, it will look specifically at ways that existing community organization around energy self-sufficiency can avoid being stifled, but rather supported and integrated into providing disaster resiliency.
Demolition Space and Housing Removal Policy in Detroit

In 2014 the city of Detroit began a program of “targeted and rapid demolition” of its housing stock, aimed at removing all of the city’s “blighted” buildings. As the largest currently ongoing housing removal operation in the United States, with $250 million in funding and over 13,000 houses demolished so far, the impact of Detroit’s housing demolitions on the city is substantial, and its popularity has grown despite charges of price-gouging, misuse of funds, and ineffectiveness. The scale by which this initiative is reshaping the city should be familiar to anyone with knowledge of twentieth century urban renewal efforts; it likewise deserves a great deal of careful study to understand its inherent benefits and harms.

Evidence of blight removal’s ability to reduce crime, improve property values, revitalize neighborhoods, and spur economic growth (generally called “neighborhood stabilization”) is widely cited, and many city residents are approving of the practice. However, criticism of blight removal programs and the concept of blight in general is growing as scholars find fault with the tenuous relationship between demolition and stabilization, and city governments contend with accusations of displacement, corruption, lack of redevelopment plans, and unjust use of resources.

In response, this thesis examines Detroit’s housing removal program in light of its rapid growth and potentially problematic effects. It evaluates the impacts of housing removal at the community level by comparing short term outcomes in case study neighborhoods against the stated goal of neighborhood revitalization through its various metrics, and then recommends strategies for future demolition programs and for neighborhoods experiencing high amounts of removal.
With declining federal assistance for essential infrastructure upgrades, water and wastewater utilities have increasingly relied on customer revenue to fill funding gaps. This has led most recently to “water crises” in cities such as Baltimore and Detroit, where residents who cannot afford to pay increasing rates have been disconnected from water services altogether. Although utility disconnection is a common practice to collect unpaid revenue, the scale and duration of these shut-offs is unprecedented, and, in both cases, the result of concurrent urban fiscal and social crises. In the absence of legislation that secures the right to water for all American citizens, people addressing the problems have typically tried to identify sources of infrastructure funding that would be more equitable, or calculate levels of payment that are truly affordable. In light of these debates, this thesis asks whether processes of deliberation between the government and the public might serve a critical role in alleviating the problem.

After investigating Baltimore’s financial structures and exploring causes of confrontation between the public and the utility, this thesis suggests transparency and accountability reforms that enhance planning processes which involve citizens so Baltimore’s DPW can move beyond the practice of counting meters, to one of seeing and hearing customers. The thesis argues that, short of improving the infrastructure, the processes of data collection and measurement, particularly via the collaboration of various state and utility departments, will help improve the technical and financial efficiency of the utility and create greater equity for customers through providing data and records that bolster various processes and programs, from account classification to collection to customer assistance to information about cognate programs such as affordable housing—all of which will make it easier to assess and determine equity. The ultimate goal is to meet the financial and physical needs of water and wastewater utilities, while also addressing issues of equity, with a focus on deliberation and data collection that places an emphasis on process that leads to both desired outcomes.
When Incentives Aren’t Enough: Challenges in Chapter 40R Massachusetts Smart Growth Zoning Overlay District Act Implementation

The Greater Boston area has some of the highest housing costs in the country, a trend which has only intensified through the nation’s recovery from the recent global financial crisis. Greater Boston has a fragmented municipal system, with individual cities and towns controlling their own land use regulations. This fragmentation has led to a system where cities and towns regulate land use in an uncoordinated manner, leaving the entire region with a shortage of housing and raising housing costs. In 2004, the Commonwealth of Massachusetts enacted Chapter 40R, the Smart Growth Overlay District Act, to incentivize communities to implement zoning districts that allow dense housing by right. To date, very few communities in Greater Boston have enacted Chapter 40R districts, and once those districts are enacted, very few of the newly-zoned units are built.

This thesis seeks to explore the causes behind these phenomena. Communities in the region are loath to implement 40R districts because of an aversion to growth, in particular multifamily development. Misconceptions about program requirements may also prevent town planners from using 40R as a planning tool for their communities. Developers don’t often utilize 40R as a permitting mechanism because it is riskier to implement than Chapter 40B permitting. Even when 40R districts are established, units are not always built because of market conditions or land availability. While 40R has produced successful developments across the state, this report calls into question whether an incentive-based development policy is sufficient to deal with the region’s current housing shortage.
Alternatives to Permanence: Reflections on Temporary Use in Planning

As cities shift from centers of production to centers of consumption all over the world, the profile of temporary initiatives will continue to grow. Temporary uses not only have a rising profile in the context of economic revitalization and commercial/cultural placemaking; they have also been recognized by municipal governments, private design firms, and community organizers as a means of engaging and involving citizens in the planning process.

Temporary use for the most part doesn’t generate non-permanent outcomes. However, an alternative pathway to permanence through temporary use planning may be used to build consensus and solicit the unexpected. This approach addresses a range of urban planning and development goals from raising real estate value and stimulating development, to promoting diversity and affordability, creating economic opportunity and prosperity, fostering communities of creative entrepreneurs, and evolving more sustainable urban forms.

This thesis examines why and how temporary use may be implemented as a more common practice among urban planners and designers. Part I is a review of existing theories and typologies of temporary use. Part II is a case study analysis of former and current temporary use projects initiated by private and public actors. Part III proposes a toolkit and process for city planning through temporary use. The temporary planning toolkit is a set of planning tools which can be combined, adapted, and re-ordered as an alternative to more traditional methods of urban planning. Part IV—a conceptual proposal for Sidewalk Labs and the Quayside waterfront redevelopment in Toronto—demonstrates how temporary planning tools and processes can be deployed in an actual setting, and reflects on the facilitating role of technology in futuristic public engagement.
Driving Change: How Workplace Benefits Can Nudge Solo Car Commuters Towards Sustainable Modes

This thesis presents an evaluation of efforts aimed at reducing drive-alone commuting through workplace-based policies and incentives. It discusses two case studies of Boston area employers: the first is a case study of MIT employees. In 2016, over ten thousand staff were provided with a series of benefits in a program called ‘AccessMIT’. Its flagship benefit is a 100% subsidized transit pass, which is paid for by the employer on a pay-per-use arrangement with the transit agency. In addition, drivers have been switched from monthly parking permits to daily billing, designed with the goal of eliminating the sunk cost of parking and promoting multi-modal commuting. The program led to an 8% drop in parking demand observed after the first year and a 13% reduction in parking permit sales into the second year.

In addition to an evaluation of campus-wide commuting reforms, the thesis presents a randomized controlled experiment conducted on two thousand of the most frequent on-campus parkers to investigate how behavioral ‘nudges’ like targeted information provision and small monetary incentives could further encourage drivers to use alternative modes of transportation. While no significant reduction in parking was observed across treatment groups, the combination of informational nudges and token monetary rewards was found to be the most effective at shifting travel behavior. A second case study presented is of Partners HealthCare. In 2016, four thousand administrative staff at fourteen worksites across greater Boston were re-located to a centralized, transit-accessible office. At the same time, commuter benefits were enhanced to include daily parking pricing rates tied to income and increased transit subsidies. Analysis of employee parking and transit records, along with a post-move commuter survey, found that daily parking rates were an effective motivator to reduce driving. Further, employees who moved from worksites inaccessible by transit to the new site showed a drastic increase in transit usage, challenging conventional assumptions on the habitual nature of commuting.
Climate Ready Boston?:
Identifying Indicators to Evaluate the City of Boston’s Efforts to Implement its Climate Change Adaptation Initiatives

As a leader in municipal climate change adaptation, the City of Boston has recently updated its climate projections, completed a climate vulnerability assessment, and identified several resilience initiatives. To understand whether these initiatives are leading to a less vulnerable, more resilient Boston, I offer a set of indicators the City can use to start monitoring and evaluating its adaptation efforts.

To create these indicators, I analyzed Boston’s vulnerability assessment and resilience plans to understand the types of hazards, risks, and actions the City intends to emphasize. I also interviewed the authors of six recently published indicator frameworks for urban resilience developed by other cities, federal agencies, and nongovernmental groups.

I combine the results of these inquiries into an explicit set of 20 indicators that Boston can use with its 2018 Climate Action Plan (CAP), and update regularly thereafter. For each indicator, I identify a specific proxy metric and data source and include details on data collection, available scales, and limitations. Because many of my indicators are high-level and citywide, I also include sub-metrics that the City may use for a more in-depth analysis on the impacts of preparedness actions. Finally, I present several key findings for Boston and other cities thinking about creating, publishing, and maintaining their own set of indicators.

In addition to helping the city government monitor its own efforts, the indicators I provide can be used by Boston citizens to hold elected and appointed officials accountable for their promises to create a more resilient city. Boston has taken a leadership role on climate change issues by positioning itself to be among the first cities (in the U.S. and internationally) to publish a monitoring and evaluation framework it will use to track the success of its adaptation efforts.
Rural Risk Reduction in Mexico: Making National Reconstruction Plans More Effective at the Local Level

In September 2017, two earthquakes hit Mexico, killing hundreds of people and destroying thousands of buildings. As a consequence, 18,851 settlements were declared disaster areas; 96% of which are rancherías, rural settlements and the smallest geo-political unit in Mexico. Because they tend to be very poor, the Mexican federal government intervened by providing conditional cash transfers for self-building, with the aim of facilitating housing reconstruction. However, this housing reconstruction program, like other Mexican federal programs, uses a top-down approach that has been criticized as a one-size-fits-all-solution that does not address the overwhelming needs of those living in rancherías.

This thesis studies the Mexican post-earthquake house reconstruction program at national, state, ranchería and household levels, with the objective of:

1. examining the federal program for housing reconstruction,
2. analyzing how national plans can be made more efficient at local levels, and
3. making recommendations to increase program efficiency through the proposal of a new policy initiative.

In order to understand the housing reconstruction process, I first studied the protocols deployed at national and state levels. I then visited families in the reconstruction process in three rancherías — La Nopalera in Yautepec, Morelos; Acatzingo de la Piedra in Tenancingo, Estado de Mexico; and San Juan Tlacotompa in Ecatzingo, Estado de México.

This research proved that reconstruction is being led by external urban-oriented agents that fail to understand rural needs, consequently imposing urban housing on rancherías, thereby creating new risks. Furthermore, post-disaster capacity building is concentrated on these external agents, leaving local communities with minimal training in seismic-proof reconstruction. Based on these findings, this thesis provides recommendations on how to address the misdirection of reconstruction efforts and proposes the creation of a university-based Network for Rural Risk Reduction, so as to decentralize capacity building, currently concentrated in cities, while integrating local knowledge about rural-specific needs.
Massachusetts and the Boston metro area benefit from a diverse and thriving economy. However, the metro area’s cost of living, and housing prices in particular, are among the highest in the nation. Housing supply will not keep pace with forecasted demand over the next several decades, which will substantially reduce expected population and economic growth. In addition, the region is expected to see a shift in demand from single-family homes to multifamily apartments as younger people enter the workforce and look for housing in urban areas. If the region’s housing stock does not adapt and provide the types of housing as well as the needed quantity, companies and individuals are likely to leave the area for regions with lower cost of living and easier access to housing. Fortunately, the Boston metro area has one of the most expansive commuter rail systems in the country. Many of the system’s station areas are underutilized and have the potential to accommodate more units of housing if smart growth policies are implemented and development occurs.

These station areas represent a future source of land area for transit-oriented development that few other regions can match. This thesis estimates the current supply of housing along the commuter rail system and estimates how much additional supply could be accommodated if municipalities pursued smart growth policies, like Chapter 40R, that encourage transit-oriented development near commuter rail stations. Recognizing that zoning changes and development are slow processes, this thesis also proposes a model for prioritizing which specific stations are most suitable for new housing development and most appropriate for smart growth advocates and housing developers to focus their zoning and development efforts.
It is widely argued that a sustainable future depends on the capacity of cities to substantially alter how they grow and consume natural resources. Research on sustainable cities has typically emphasized how this change ought to be achieved, outlining specific interventions in the form of new policies and technologies. Problematically, we know far less about why urban institutions change, when they do, in the support of sustainability objectives. Why have some cities progressed in translating ideas about environmental sustainability into enduring institutional reforms while other similarly situated cities persist under the status quo?

Over the past fifteen years, for example, sustainability advocates in the United States have touted green stormwater infrastructure (GSI)—a decentralized network of rainwater capture and infiltration systems—as a more sustainable and less costly alternative to building more and bigger underground pipes to control polluted urban runoff and sewer overflows, as required under the Clean Water Act.

Yet the extent to which cities facing very similar municipal pollution problems adopt GSI varies widely. This dissertation seeks to account for the disparate adoption of, and investment in, this innovative, land-based practice through an in-depth investigation of four US cities: Boston, Philadelphia, Portland, and Washington, DC.

Some observers characterize the development of sustainable urban infrastructure as contingent on the commitment of environmentally-minded local decision makers or a supportive, engaged public. In contrast, my research shows that cities that have invested most heavily in GSI have done so to achieve compliance with the stringent National Combined Sewer Overflow (CSO) Policy. Yet whether or not a city adopts GSI to control CSOs it is a function of three things: the structure of municipal water management and infrastructure, which I term the “legacy system;” the existence of an effective change agent or “policy entrepreneur” within the local water utility; and the acceptance of GSI as a legitimate control technology in the regulatory policy system at the time a city planned and implemented its CSO program. Based on my analysis, I provide recommendations for how innovative stormwater management technology and practices might be stimulated in varied municipal planning contexts.
Globally, more people live in urban areas than in rural areas. As cities grow and urban areas expand, rural villages are facing a unique problem of experiencing an in-between state identified as Peri-Urban. An increasing number of children are growing up without access to basic amenities like playgrounds in these geographies. This thesis is an exploration of integrating playful landscapes into early childcare experience by analysis anganwadi model. While the importance of education is undisputed, there is a lack of awareness about engaging children with their immediate surroundings through play. Play is essential to a country’s development because it contributes to the cognitive, physical, social, and emotional well-being of children. However, there is no theoretical understanding of a construct such as child friendly playscapes in peri-urban areas which fall under rural governance but face urban problems.

An in-depth analytic ethnography was conducted in Khanapur village in Haveli Taluka, Pune District India, with children in the ages 0-6 years to validate the above proposition. The study used four kinds of data: interviews, observations, drawings by children, and archival documents and records. Research showed that peri-urban areas have an abundance of natural resources but with increasing vehicular movement and real-estate safety issues and landcrunch have affected children’s free-play in outdoor space. It is important to use the existing network of temple and community spaces to enhance play experience. This led to the development of a framework at village and district level to propose playscapes using natural materials at a multi-scalar level: 1)Anganwadi design 2)Streetscapes 3)Communityscapes 4)Regionscapes. The conceptual framework was scaled up to provide a set of urban design guidelines, programs and changes under the Integrated Child Development Services (ICDS) scheme. The design catalogue provides easy low-cost solutions using community participation empowering the anganwadi workers and care-givers.
Household Moving and Tenure Behavior: Translating Retrospective “Recent Mover” Surveys into Prospective Moving Decisions

To assist policy makers with evaluating urban development policies and anticipating trends in the evolution of cities, researchers have significantly improved modern urban land-use-and-transportation (LUT) simulations. Despite extensive studies regarding the interdependency of household life cycle stages and moving decisions in demography, most existing LUT simulations do not address households changing life cycle stages when modeling residential relocation behavior. The reasons include 1) the data that capture households and housing transitions is hard to obtain, and 2) the analysis methods are mainly for cross-sectional datasets. This dissertation focuses on these issues and contributes to the literature in three respects: behavior exploration, methodology, and applications to housing and transportation policy analysis.

The ultimate goal of this study is to have a better understanding of the relationship between household life cycle stages and their moving decisions when the housing market is heavily regulated with incentives based on age, family structure, and income.

This research focuses on the housing market in Singapore as a case and utilizes a new dataset of recent movers. First, this study generates sampling weights both at the individual and household levels to correct sample bias. Then, this study uses discrete choice models to identify key household and housing factors that influence households’ moving behavior at the household-level. In order to capture household characteristics at the time of decision-making, the household characteristics for those households that changed structure when moving had to be reconstructed. The results show that household moving decisions are mainly influenced by three sets of factors: life cycle stages, tenure choices and housing submarkets. Finally, this research adopts a Markov Chain Model (MCM) approach to estimate a set of forward-looking moving and tenure transition rates accounting for various issues, such as sample bias and “missing-move” problems. The final results improve the estimate of moving and tenure transition rates in several ways: adding more demographic factors, handling household structure changes, and relaxing the memoryless assumption to accommodate a special feature of the public housing sector in Singapore.
Alpen Sheth  
Dissertation Advisor: Janelle Knox-Hayes

Cultivating Risk: Weather Insurance, Technology and Financialization in India

Climate change, technological innovation, and financialization are three of the most transformative processes shaping spatial planning and policymaking. Yet, each of these macro-structural processes and their consequences are experienced in the short-term and at geographically-specific scales. In the context of planning, financialization needs to be better understood to evaluate its actual processes and consequences through in-depth analyses of specific cases. Since 2007, India’s weather insurance programs have become the largest in the world offering farmers access to new financial instruments and automated technologies to manage the increasing risks of agricultural cultivation. Insurance has come to be seen as a systematic response to the increasing impacts of drought and flooding since the green revolution and an agrarian crisis that has witnessed over 300,000 farmers commit suicide between 1995-2015.

In this dissertation, I ask how and why insurance, which never played a significant role several decades ago, has come to be a central planning strategy for agricultural policymakers, outpacing all other government expenditure in the form of premium subsidies. I study the development of weather insurance programs in India and examine implementation across four major agricultural states-Maharashtra, Andhra Pradesh, West Bengal, and Punjab-to show how risk transfer in the agricultural sector has been increasingly financialized, with a growing dependence on new derivative instruments and the rising penetration of international reinsurance capital. The overarching research questions motivating my dissertation include: how does the introduction of new insurance policies, financial instruments, and weather technologies impact the agrarian landscape? how do these insurance programs define and measure risk? what are the spatial dimensions of insurance, its variation and its coverage? what is the importance of these developments in terms of how agricultural risk gets financialized for long-term planning as well as political contestation? and what it means to plan for weather risk and climate change in a context of the rapid churning of technologies and the financialization of risk?
Enhancing Trust in US Nuclear Waste Management Institutions

The failure of US policymakers to develop a permanent geological disposal solution has led to the accumulation of spent nuclear fuel and high-level radioactive waste material at nuclear power plants and former weapons manufacturing facilities. This situation poses a growing long-term public safety hazard, and it hampers the possibility of a revival of commercial nuclear power generation for electricity decarbonization. Policymakers have struggled to resolve the nuclear waste management problem in the face of determined opposition from state governments and some host communities. At present we have a policy process stalemate. A key factor contributing to the stalemate has been a deficiency of public trust in nuclear waste management institutions. I argue that nuclear waste management institutions, such as the Department of Energy, have inspired distrust as a result of behavior that has undermined public perceptions of their trustworthiness, including their competence and fairness.

In exploring parallel policy system cases involving high levels of complexity, uncertainty, and risk, I find that strong consent regimes produce three approaches to achieving public consent: coercion, cooperation, and concession. Policy systems with relatively weak consent regimes allow governance institutions to exercise greater autonomy but at risk of losing legitimacy. I argue that the cooperation approach is the best fit for pursuing public consent for high-level nuclear waste policies, and that institutional trust makes the cooperation approach more effective. I propose the adoption of a national “trust strategy” to enhance trust in nuclear waste management institutions by demonstrating and promoting institutional trustworthiness. Repairing damaged trust will be as important a strategic objective as building new levels of trust.
As Malaysia goes, so may the world. Since 2000, Malaysia's GDP has risen by 264.4% and its population by 30.4%. Malaysia's government pushes economic growth and development, aiming to reach high-income status by 2020. At the same time, Malaysia has publicly committed to reducing its carbon intensity on a GDP basis by up to 45%. The outcome of this tension between Malaysia’s economic and development ambitions and its climate change goals may foreshadow the carbon trajectory for much of the rest of the developing world that will similarly seek to obtain high-income status in the coming decades.

To this end, I draw on data from conversations with approximately 85 stakeholders to explore the nature of Malaysia’s carbon mitigation ecosystem, uncovering the obstacles and drivers of influence. In particular, I explore policy toolkits within three sectors – renewable energy, transportation, and forestry – to understand the approaches employed and their successes and challenges. I also highlight cross-cutting themes from the interviews that inhibit and enable progress within Malaysia’s carbon mitigation policy ecosystem. I map the system to the literature on carbon pathways and path dependencies to understand linkages between theory and practice and to exact actionable lessons from these linkages.

On May 9, 2018, a new government rose to power after almost 70 years of one party rule. I conclude by offering five main recommendations for this new government target towards shifting Malaysia away from its high carbon trajectory towards economic growth built around a sustainable economy. These entail: improving public transportation connectivity; maximizing efficacy of existing renewable energy policies; shifting the energy system; aligning federal and state incentives around forest protection; and improving the government’s internal program management.
A joint collaboration, this thesis explored the development of our start-up, ALL PPL. ALL PPL’s aim is to develop a Peer-to-Peer (P2P) decentralized risk exchange platform that leverages blockchain technology to facilitate access to capital through local exchange and community empowerment. Capitalizing on how people informally lend each other resources and money, ALL PPL automates a trust network centered to increasing access to capital for underbanked users through two options; small crowdsourced loans and quick jobs through community projects. As part of our joint thesis, we have created and collected a shared database of quantitative and qualitative data for our initial market study in Accra, Ghana. Focused on marginalized communities as our targeted pilot group, we were interested in the community of Ayawaso East.
Artists are often viewed as the precursor to gentrification, and it is true that artists tend to move into neglected parts of the city where rents are cheap and regulations are lax, typically in industrially zoned districts. When this happens, real estate values typically rise over time, pushing out the previous residents, and often the artists themselves. Planners have used land use regulatory tools to encourage artists to locate in certain areas for the purpose of urban revitalization but little has been said on what to do when the cycle completes itself and artists are priced out of the areas they had helped to revitalize.

Somerville, Massachusetts is one of a few municipalities that has attempted to use zoning as a tool to protect and promote the development of artist workspaces in a high value real estate market. This thesis explores four major zoning techniques that the City has used to support artist spaces: relaxing use regulations, providing incentives through density bonuses, mandating a percentage of artist space in new developments, and separating uses to limit real estate competition.

Through case study analysis, this thesis shows that even though artist workspaces have often existed in fringe areas of the city, the trend of physical isolation is unsustainable in growing, land-constrained cities. Moving forward, artist workspaces must adapt to serve a variety of users and fulfill both the consumption and production aspects of artist spaces. Using these findings as a baseline, this research seeks to evaluate and improve Somerville’s zoning code by utilizing these four techniques in order to protect existing studios and promote the development of forward-looking artist workspaces.
Transit Fare Policy: Use of Automated Data to Improve Incremental Decision Making

Incremental changes in fare policy can have substantial and long-term impacts on transit ridership and revenue, but they are often driven by near-term revenue needs and determined within short time frames with limited analysis. This thesis proposes a procedural framework to organize analysis of incremental fare changes, linking exploration of current pricing strategies to estimation of behavioral parameters and modeling of fare change scenarios. Within this framework, empirical case studies are presented at two of the five largest transit agencies in the U.S. – the Massachusetts Bay Transportation Authority (MBTA) and the Chicago Transit Authority (CTA). These agencies have increased the price of passes relative to pay-per-use fares in recent years, motivating three particular applications that make extensive use of automated fare collection (AFC) data:

1) differentiating employer-based, pre-tax, automatically-renewing pass sales from other pass sales, 2) estimating cost sensitivity of both ridership frequency and fare product choice using only recent experience at a single agency, and 3) incorporating fare product choice in a traditional elasticity spreadsheet model to predict impacts of fare change scenarios. Passes sold through employer programs and online are found to have lower use than other passes, contributing substantially to revenue while increasing ridership. Individual-level AFC data are used to estimate fare-related behavioral parameters: ridership induced by pass use, pay-per-use and pass elasticities, and a model of fare product choice. A CTA fare model combining product choice and elasticities predicts substantial switching between fare products when pass multiples are changed, and a simplified model illustrates that passes should be priced below revenue maximization to capture low-cost gains in ridership. The procedural framework in this thesis applies to all transit agencies, and the empirical applications are relevant to agencies that collect AFC data and offer multiple payment structures.
In 2017, the city of Cape Town released a version of its Municipal Spatial Development Framework, in which its principal statement positions Transit Oriented Development (TOD) as a key approach to redressing apartheid spatial legacies, with the intent of building a more inclusive, integrated and vibrant city. Accordingly, the City made the bold move of integrating the functions of its transport, urban development and human settlements departments in order to effectively involve all lines of departments that will have the most impact on achieving TOD. While integrating transport infrastructure and spatial planning can be a promising long-term strategy as portrayed by other successful cities, its application in the global South comes with certain challenges.

In Cape Town, this becomes especially visible at the local planning scale, where existing township contexts are comprised of fragmented urban and social forms that have suffered neglect since apartheid years, and thus present a challenging arena for a common spatial and urban vision to take place.

This study takes the position that in order to truly build an inclusive, integrated and vibrant city, there needs to be a reciprocal conversation between local contextual planning at the township settlement scale, and the broader, metropolitan-scale TOD framework. The research therefore asks: What local spatial planning approaches and processes can foster inclusive TOD initiatives in previously neglected township areas? Using the Philippi Township, one of the city’s prioritized station areas as a case study, the thesis employs process tracing, theory, and mapping to identify a series of contextual site elements pertinent to TOD, and then presents suggestions for alternative integrated urban approaches and inclusive processes that conceptualizes the regeneration of disadvantaged township areas like the Philippi in Cape Town.
The Power of Equity: Private Motivations and Public Implications of Dissolving Affordable Housing Cooperatives

From 1955 to 1978, New York City and state subsidized the construction of over 67,000 middle-income, limited-equity cooperatives in the city through Mitchell-Lama—a program often considered one of the most successful efforts to produce affordable housing in American history. By restricting the resale of shares and removing the housing from the open market, limited-equity co-ops allow for the long-term maintenance of housing affordability and make the benefits of homeownership accessible to lower-income individuals than those served by stereotypical homeownership. While most Mitchell-Lama co-ops endure as affordable housing, dramatic increases in housing values in New York City increasingly incentivize cooperators to remove the restriction on the sale of their shares through a collective vote.

Through qualitative interviews and advocacy material reviews at two case cooperatives—Southbridge Towers in Manhattan’s Financial District and St. James Towers in Clinton Hill, Brooklyn—this research identifies factors that influence limited-equity cooperators’ ultimate decision to vote to remain in the Mitchell-Lama program or to convert to a market-rate cooperative. In doing so, I interrogate what leads individuals to prioritize (or not) collective benefits over individual ones. In addition to describing how cooperators develop a feeling of entitlement to profit from publicly subsidized housing or a sense of obligation to future potential recipients of this housing, I identify the role that cooperators’ understanding of ownership, their experience of internal governance and government supervision, and their perspectives on race and class play in their decision on conversion.

Drawing from the factors identified and outcomes observed, I recommend strategies to preserve Mitchell-Lama cooperatives as affordable housing for cooperators, public officials, and advocates. Given the observed irrelevance of existing financial incentives offered by government to cooperatives to remain in Mitchell-Lama, I pay specific attention to non-financial approaches that address the varied social processes inherent in these explosive debates.
In this client-based thesis project, I sought to pass a law in Massachusetts, and in the process, to generate knowledge about how regular people can engender progressive policy change. I worked with State Representative Denise Provost, local elected officials, and affordable housing practitioners to write legislation based on Washington D.C.’s Tenant Opportunity to Purchase Act (TOPA) for Massachusetts. While developing this legislation, I lobbied legislators, mobilized advocates, and organized a constituency to try to pass the bill at the state and local levels. Political interest groups representing property owners and the real estate industry opposed the bill and successfully prevented its passage in the Statehouse and in the City of Cambridge in this legislative session, although the campaign for a Somerville Home Rule Petition is ongoing.

To better understand why the urban displacement crisis has not resulted in stronger legal protections for tenants, and to offer strategies for change, I analyze this campaign as an extended case study on the nature of power in state and local governance. I argue that Lukes’ three dimensions of power are at work in this case: first, landlords and real estate interests have won all recent open political conflicts with tenants in Massachusetts, creating a path-dependence effect that reinforces the power imbalance; second, governance in Greater Boston represents a pro-development regime (Stone, Molotch), which has removed tenants’ rights from the public agenda and reframed the affordable housing issue in terms of supply and demand; third, many tenants do not question their lack of rights as renters due to the ideological supremacy of private property rights. To overcome these obstacles to change, advocates for anti-displacement legislation should focus on developing tenant leadership by building organizations that create new sources of power.
Planning for Water Scarcity in Jordan Valley: In Defense of Environmental Flows in Arid Climates

Scarcity is relative, as water resources can be mismanaged, shared inequitably and allocated asymmetrically. Half a billion people live under conditions of severe water scarcity in many arid and semi-arid regions, marked by an increasing demand for water and unprecedented droughts. The Jordan River basin, a peri-urban regional corridor, is in a particularly water-stressed region with worldwide lows in per capita water availability that is projected to decrease further by 20 percent by 2050. Both the valley’s communities, especially smallholders, and fragile habitats of the watershed will be hard hit by the impact of a drying climate. The collapse of Jordan River, which has seen its flow reduced to a small fragment, and decline of the Dead Sea downstream are flagged as ecological disasters. However, beyond being merely a physical constraint or a supply issue, the problem of scarcity is also shaped by the politics of allocation.

Through layers of geospatial data, from archival maps, surveys and remote sensing data, I show how the history of land resettlement, water allocation and infrastructural development can complicate restoration efforts today. The Regional NGO Master Plan, drafted by experts from Israel, Jordan and Palestine, makes the case for the need to rehabilitate Jordan River by allocating 400 MCM, a third of pre-modern levels, as the required inflow for restoration. I argue that restoring the river goes beyond direct flows and should be defined to include critical ecosystems that affect the hydrological cycle of the entire basin, including buffer systems and conservation reserves that support local communities.

In the absence of fair reallocation mechanisms and regional design at the scale of the watershed, a roadmap to establishing common environmental flows is infeasible. Rather than offering a utopian vision for the rehabilitation of Jordan River, as an addendum to the masterplan, I develop six geospatial propositions in defense of establishing environmental flows in contexts of scarcity.
Energy Generation in the Canal Irrigation Network in India: A Case for Integrated Spatial Planning

There is an extensive canal irrigation network in India, consisting of thousands of kilometers of constructed channels and distributaries that divert water from rivers to farms for irrigation purposes. These canals cut across district and state boundaries, crossing many energy-poor regions along their paths. In India, these large-scale canal network provides a unique opportunity for renewable energy generation on (or along) the canal that is yet to be realised, while simultaneously providing a number of secondary benefits. Existing technologies for energy generation on canals include small hydropower (that uses canal falls) and, more recently, canal-top solar (mounted solar panels above the canal surface). The potential for hydrokinetic generation in irrigation canals, which uses the energy captured from flowing water, has not been rigorously investigated. Indeed, there are currently no canal-network level methods for energy planning that integrate generation and local energy needs of canal contiguous regions (i.e. canal corridors).

This makes the potential for an integrated spatial assessment of renewable energy systems for irrigation canals an opportune research frontier.

This thesis provides a framework for an integrated spatial assessment of the Supply (the renewable energy generation potential of the canal) and Demand (the unmet energy needs in the canal-corridor region) using the Upper Ganga Canal in Uttar Pradesh as a case study. For this analysis, I consider the theoretical (ideal maximum) and technological potential of hydropower and solar power on the Upper Ganga Canal. The energy planning framework presented in this thesis promotes more efficient resource allocation for energy-planning on irrigation canals. It facilitates the selection of electricity service (on-grid/off-grid) through a prioritization of canal reaches based on the spatial distribution of generation potential and canal-corridor village energy needs. While this thesis focuses on the specific case of the Upper Ganga Canal in Uttar Pradesh, the framework presented here is generalizable for canal corridors across South Asia.
Between Landschaft and Landskip: Examining the Landscape Urbanism Discourse through Post-Infrastructural Open Space Projects in Berlin

This research examines how post-infrastructural open space has been approached in contemporary design practice using three urban parks in Berlin as sites for investigation: Tempelhofer Feld, Park am Gleisdreieck, and Natur-Park Schöneberger Südgelände. These sites are analyzed in juxtaposition with the discourse around “landscape urbanism,” as these projects’ timelines are dispersed across the beginning, rise, and plateau of that movement. First, I have tracked how landscape urbanism has been discussed in the literature since its coinage — what terms are used most frequently within the discourse and in what manner, which projects are most often called upon to illustrate central themes, and what theoretical building blocks are used in support of the concept.

I then pull out specific themes prevalent in the literature that help to construct a method for analyzing the three aforementioned open spaces: how the historically dichotomized conceptions of “urban” and “nature” are approached in each space by examining edge conditions in relation to their surrounding urban fabric, how time and process are considered in each site’s staging of new programmatic interventions, and how the sites incorporate elements of previous infrastructural use, including relics and ruins. This section contains a series of drawings, diagrams, and annotated photographs illustrating this analysis, along with experiential observations and timelines describing the development process in each site’s transformation from infrastructure to open space. Overall, the critique explores how the theoretical discourse around landscape urbanism has engaged built projects and why such an examination is critical as the larger discipline continues to evolve and reorient.
Alight: Enriching bus rides with user-generated, location-based audio content

What happens when you transform hundreds of public bus routes into immersive tours of the city using a mobile app?

In this maker-thesis, I developed a mobile app called “Alight” which delivers location-specific audio content to riders on the MBTA public buses. The app also provides the ability for users to upload their own recordings and visuals to the bus routes for future riders to enjoy.

By releasing this app to a series of trials and then surveying the users’ impressions of the content, technology, and city, this thesis develops an argument for a distributed and digital approach to placemaking. By creating an aural soundscape on top of the points-of-interest the bus passes, Alight offers the opportunity for cities and their people to craft new narratives for the city. The effect of this kind of distributed production and consumption of placemaking can help drive economic development in places needing increased foot traffic; provide a platform for voices not usually heard from in the city’s dominant narrative; and make riding the bus super fun!

(The app is available for download on Android’s Google Play Store. Apple iOS version to come! www.AlightApp.com)
Home is Where the Heart is: Trauma-Informed Practices, Fraught Transitions to Housing, and Radical Hope Among Those Fighting Homelessness in Boston

Through the experiences and perspectives of clients, direct service workers, and policymakers, I endeavor to tell the story of transitioning from chronic homelessness to stable housing, identifying this as a uniquely unstable period and documenting a need for increased attention on both the trauma of homelessness and the tumultuous transition to housing, in an effort to support clients towards stable housing, and ideally a point of thriving. The thesis makes five key points. First, homelessness is a manifestation of structural inequities, not individual deficiencies, and, as such, is best addressed through policy.

Like an iceberg, causes of homelessness exist beneath the surface, and include: housing market inefficiencies, wage stagnation, a diminished social safety net, social reproduction theory, racism, and financial and power inequalities of capitalism. Second, homelessness is traumatic, and I define five categories of traumatic suffering: trauma wrought by power relationships, physical trauma, emotional trauma, trauma wrought by other systems, and trauma wrought by instability. Third, housing is the solution to homelessness, and yet, fourth, the transition to housing is traumatic in its own rite. Viewing housing purely as a solution neglects the trauma of homelessness and turmoil of this transition, and may accordingly fuel cyclical homelessness. This transition is complicated by three challenges: change and new responsibilities, loss of programmatic supports, and loss of social supports. Finally, as individuals transition from chronic homelessness to stable housing, thriving, an evolving concept, is tentatively defined here as engaging in reciprocal volunteer work, deepening bonds with family, and lending leadership and expertise towards efforts to fight homelessness. With admiration and hope, I note the innovative programs already in place in Boston and humbly suggest considerations for next steps. People who experience homelessness demonstrate resilience in the face of deep tragedy. When stably housed, society can benefit even more from their contributions.
The Boston Seaport: An Economic Analysis of Large Scale Urban Redevelopment on Adjacent Residential Real Estate Values

This paper develops a Repeat-Sales Price Index on an unbalanced panel of residential real estate properties. Facilitated by price index creation, this study analyzes the change in housing price levels in South Boston, Massachusetts over the period of time of a major adjacent redevelopment, The Seaport. The main purpose is to determine the effect of large scale urban redevelopment projects on adjacent housing prices over time. Using comprehensive residential sales data from The Warren Group, this paper offers an analytical tool that can be utilized by stakeholders such as policy makers, investors, developers and homeowners. It informs a deeper understanding of the potential effects of large scale redevelopment on affordable housing and gentrification, investment returns, urban land theory and homeowner equity.

During the study period from 1996 – 2017, results show that South Boston housing in the “Closest to the Seaport Redevelopment” distance quartile range earned an additional 6.21% in annual price growth than South Boston housing in the “Furthest from the Seaport Redevelopment” distance quartile range. This result is compared with a composite Boston housing benchmark of 15 zip codes (excluding South Boston and The Seaport). Results demonstrate that South Boston residential real estate located closer to the Seaport grew a total of 130% more than South Boston residential real estate located further away from 1996 – 2017, statistically significant at 95% confidence.
Land Use Planning Innovations in the Midst of a ‘Migration Crisis’: Developing a Spatial Definition of Refugee Integration

According to the United Nations High Commissioner for Refugees’ 2016 Global Trends Report, global human displacement is at a record high and refugee crises are increasingly urban. Research on forced migration has historically focused on the obligations of the nation state, overshadowing the role of cities in urban displacement. Using the conceptual framework of a refugee’s ‘right to the city,’ this thesis seeks to contribute to literature on urban displacement by beginning to develop a spatial definition of refugee integration. A case study of state-provided refugee housing in Hamburg, Germany identifies innovations at the federal and state levels that outline a new model of how urban planning can contribute to refugee housing policy. This research provides an alternative to leading refugee housing models and highlights the importance of linking the historically segmented phases of emergency housing with long-term development and land use planning in cities experiencing rapid urbanization as a result of migration. Practices from this case study, as well as opportunities to refine the approach, provide insight into the development of refugee housing policy in land-constrained urban areas in the future.
Autonomous vehicles (AV) have captured the collective imagination of everyone from traditional auto manufacturers to computer software startups, from government administrators to urban planners. This thesis articulates a likely future for the deployment of AVs. Through stakeholder interviews and industry case studies, I show that there is general optimism about the progress of AV technology and its power to positively impact society. Stakeholders across sectors are expecting a future of autonomous electric fleets, but have divergent attitudes toward the regulation needed to facilitate its implementation. I demonstrate that, given the immense upfront capital investments and the nature of network effects intrinsic to data-intensive platforms, the autonomous mobility-as-a-service system is likely to tend toward a natural monopoly. This view is corroborated by key informants as well as recent industry trends.

In order to better anticipate the characteristics of this emerging platform, I look back at the developmental trajectories of two classical public utilities – telecommunications and the electricity industry. I argue that the aspiring monopolists in autonomous mobility, like icons in these traditional industries, will succeed in supplanting a legacy technology with a new, transformative one, and use pricing and market consolidation tactics to gain regional dominance. The discussion on monopoly power is then adapted to the new business models of internet-enabled technology giants, and I examine two additional industry case studies in Google and Amazon. I argue that the autonomous mobility platform will first be designed to prioritize scale over everything else, including profits, and that firms are likely to pursue both horizontal and vertical integration strategies to achieve sustained market leadership. I conclude by recommending next steps for reining in platforms that may harm the public interest, and encourage planners to traverse disciplinary boundaries to better facilitate discussions between innovators and regulators.
Performance of Metro-Based Transit Oriented Development (TOD): A Comparative Study between Beijing and Singapore

Transit oriented Developments (TOD) is a package that consists of urban form and development strategies that aims to foster efficient land use patterns to create sustainable neighborhoods. By using public transit as a focal point to create an attractive environment, TOD is a promising approach to tackle urban issues such as traffic congestions, ineffective land use, and air pollution in metropolises like Beijing. Beijing, and even the entire country of China, is at its ‘Golden Age’ of metro system expansion. As China’s metro system has the large capacity to reshape urban mobility and urban form, it is considered one of the key roles for TOD and thus poses transformational opportunities for Beijing to embrace better TOD. Yet to provide suggestions to future TOD implementation, we need to first evaluate the performance of existing TOD in Beijing, including the outputs and outcomes of TOD. Singapore is a well-recognized TOD city in Asia with comparable density to Beijing and thus is used as an international example to make a comparison.

In this thesis, I see the outputs of TOD as a spectrum of built environment indicators that characterize TOD, and the outcome of TOD as increased metro ridership. I construct a TOD evaluation framework that contains indicators of density, diversity, design, and connection — and measures the TOD-ness of metro station area. I find that Singapore has an overall higher TOD score across its MRT station area than Beijing. Yet the spatial distribution of TOD-ness is not even in both cities. I then use the TOD indicators and station-level ridership to estimate direct ridership models for both cities. I find evidence that built environment indicators, such as population density, ground-floor retail density, and the number of metro entrances, are positively associated with ridership. I compare different models for the two cities. Last, I discuss implications of TOD outputs and outcomes and identified several challenges for improving TOD performance in Beijing by analyzing semi-structural interview results.
Evaluating and Predicting Urban Performance Through Behavioral Patterns in Temporal Telecom Data – A Case Study in Andorra

Evaluating and predicting performance of urban space has always set a challenge for the design and planning community. The lack of tools and data that can shed a light on how human flow is affected by urban spaces left many design decisions unexplained or unproven. However, with the constant emergence of advanced spatial-temporal analysis methods and availability of massive datasets, researchers can now better expose human behavioral patterns within dense urban settings. Focusing on the case study area of Andorra, this research experiments in analyzing Radio Network Controller (RNC) records of cell phone data, which is of higher accuracy and precision, and uses computational data science algorithms such as Stay Point Detection algorithm and Density-based Spatial Clustering of Application with Noise (DBSCAN) to evaluate performance of urban space.

By leveraging regression models of machine learning technique, the research attempts to match characteristics of human behavioral patterns of clustering including persistence, size and diversity, with discrete urban features such as urban function, transportation network, natural landscape, and built environment. In this way, the research aims to find evidence-based correlation between urban performance and the design of urban form. On one hand, the results provide statistical analysis for potential opportunities to improve urban performance in Andorra particularly, and guidance in practice for urban planning and urban design field. On the other hand, this research explores a novel method to analyze diverse behavioral patterns in large urban populations and to associate them with discrete urban features, which can be applied to urban spaces in similar scale.
REITs and Securitization as Innovative Modes to Finance Affordable Housing in China

Affordable housing finance in China is a hot issue, which mainly relies on government budgets and bank loans. These two financing channels are insufficient to support the large number of affordable housing projects, and there is a need to explore innovative channels. Within them, this thesis focuses on REITs and other types of securitization (ABN and ABS), in order to research their implementations in affordable housing finance, as well as the obstacles and impacts. In 2005, Hong Kong Government created the first REIT by privatizing and securitizing the retail and parking facilities affiliated to affordable housing owned by the government. This REIT was financially successful with good stock performance; nonetheless, as an equity REIT, its underlying assets were fully owned by private REIT manager with profit-oriented strategy, which undermined its affordability and caused negative social impacts. Four years later, mainland China wanted to learn from Hong Kong and create the first REIT by securitizing the affordable housing properties in Tianjin Municipality.

However, this practice was unsuccessful, due to a lack of REITs legislation in mainland China and a tightening of government regulations on the overheated real estate market. It turned out this pilot project of REIT had to be restructured in 2012 as ABN, an existing financial instrument that could be issued quickly. In 2014, mainland China began a new experiment of using ABS to securitize and finance affordable housing projects in Xuzhou City. Compared with ABN, the ABS business was more advanced and similar to REITs in terms of structures, thus mainland China has taken one step closer to REITs. This thesis predicts that mainland China will establish its REITs legislation in the near future, which might be based on and modified from the ABS regulations, due to their similarities. Besides, future REITs could be implemented in affordable housing through debt financing instead of equity financing: on one hand, affordable housing projects have low return (below-market rent) and low risk (government guarantee), which are suitable for debt financing; on the other hand, the government could keep ownership of affordable housing in order to ensure its affordability.