Kent Larson - City Science
Danielle Wood - Space Enabled
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Home, to me, is not anchored to physical places: borders lost their meaning after living in five different cities across Europe and America in the past seven years. Instead, I feel at home when part of a diverse community working together to build something greater than themselves, acting upon what Amory Lovins calls “applied hope”, the belief that our actions can result in meaningful change. The MIT Media Lab is such a space, where I could invent, realize and deploy radical ideas that would be otherwise dismissed by conventional wisdom. There, I would keep bridging disciplines to explore how new technologies can transform our energy, mobility, water, health and education systems, and steer these innovations from smart cities towards just cities.

A proponent of tactical urbanism, I am investigating novel ways to involve citizens and leverage social influence to create more livable environments. For instance, the two way information flow between smartphones and their users opens up tremendous opportunities for co-designing mobility systems and urban spaces. At the National Renewable Energy Lab (NREL), I am exploring the energy-mobility nexus from a data-driven, human-centered perspective. My research aims to accelerate the transition to a sustainable and equitable mobility ecosystem, through electrification, sharing and automation. As part of the US DOE Smart Mobility consortium, I am collaborating with five National Labs to evaluate the energy impacts and infrastructure needs of electrifying shared fleets, and the links between urban form, mode share and vehicle ownership.

I focused my graduate research on implementing adaptive, robust, nonlinear control strategies for torque estimation in automotive powertrains, to improve fuel economy. Although my master’s thesis won several awards, I realized that incremental improvements would have limited impact, and that only disruptive innovations can lead to successful climate action. This led me to pivot my attention towards electric vehicles at NREL, where I codeveloped an electric vehicle simulation to plan charging infrastructure deployment for Massachusetts, California, Colorado, Columbus, and a nationwide roadmap. I am now in the process of making this tool available to the public, and integrating machine learning techniques to improve charger siting. In the coming months, I will apply behavioral science methods to analyze the factors influencing people’s mobility choices.

Outside of work, activism plays a large role in my life. Helping a family of refugees rebuild their lives in the US, through the African Community Center, gave me a desire to use technology to empower minority groups. I have been saving and distributing hundreds of pounds of food every weekend with Denver Food Rescue, Food Cycle, and Food not Bombs. These movements tackle health justice and food waste by using donated produce to serve wholesome, fresh food to disadvantaged and/or homeless communities. My belief in intersectionality as a force for change led me to create the Thelonious Collective, a collaborative publication and online platform which connects artists and activists from all over the world, breaking down borders through art and poetry. This project is a testimony to the power of art to resist oppression, apathy and cynicism.

My mentor Agnis Stibe introduced me to the concept of transformational design in the context of persuasive cities. Grounded in social cognitive theory, he proposes to redesign urban environments so as to induce healthier and more sustainable behaviors. The idea of transformational design deeply resonated with me, as it embeds societal impact in the design process. Visiting the Media Lab last Spring, I was impressed by the CityScope project, especially

by applications such as Finding Places, which directly involve citizens in refugee resettlement. Yet, I was startled by the absence of lego people on the lego models of Andorra and Cambridge: putting humans - and society - in the loop, for example through app-based micro-surveys, would better represent the feedbacks and synergies between humans and their environment.

Collaborating with Denver's Smart City Living Lab, the Smart Columbus initiative, and RideAustin (a nonprofit ride-hailing service built by the Austin tech community) gave me an understanding of complex urban issues, and of pathways to solve them. With the City Science group, I endeavor to partner with cities both locally - e.g. Boston's office of New Urban Mechanics - and internationally - e.g. Medellin, Colombia, the cradle of social urbanism - to deploy original solutions at scale.

I believe we have a lot to learn from the 'developing world' - for lack of a better word - as it leapfrogs our traditional centralized, resource-intensive, individual ownership-based systems towards distributed, leaner and shared solutions. Emerging technologies from blockchain to microgrids are putting power back into the hands of people who can now bypass outdated infrastructure or rigid bureaucracies. However, rapid urbanization poses monumental challenges to both sustainable and equitable development which we must confront proactively.

With the Space Enabled group, I aim to leverage my systems engineering background to empower communities through participatory design. Satellite imagery enables us not only to monitor the effects of climate change, but also anticipate them for greater resilience. Reversing deforestation is a crucial step to climate change mitigation, which I plan to address using my GIS experience of mining large land use raster datasets and solar irradiance maps. In addition, I am seeking to harness remote sensing technology to observe the urban metabolism of megaregions.

I discovered bio-inspired design at Silicon Audio, where I helped develop a microfabricated piezoelectric microphone emulating fly Ormia Ochracea's hearing organ and an optical interferometry seismometer. I am fascinated by the intricate phenomena that make up living beings and ecosystems and view nature as an endless source of inspiration. In particular, I intend to apply swarm intelligence to control connected automated vehicle fleets, and neural networks - or capsule networks - to unveil deeper insights from ubiquitous sensing.

With the Responsive Environments group, I seek to combine my sensor design and data science skills to create unconventional ways to collect and perceive data. Interning at CERN while still in high school, I was more impressed by the ground-breaking engineering making the Large Hadron Collider possible than by the resulting scientific discoveries. I want to develop tools to advance our understanding of the world, and open up entirely new possibilities, in the way that progress in computational technology allowed neuroscience or genomics research to take off.

In this age of entanglement, I strive to dynamically weave design, activism, science and art in my research. I believe my experiences, combined with a drive to embrace risk and a boundless curiosity, can uniquely contribute to the Media Lab's mission. Whether through transformational urban design, emerging civic technology or ubiquitous sensor networks, I hope to join you on this journey and create tangible impact in people's lives together.

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