Attachment A

Neighborhood & Long Term Planning Committee Meeting

Thursday, February 19th, 2015
Sullivan Chamber, Cambridge City Hall

I. Introduction by Councillor Mazen (10 min) 3:00 - 3:10

II. City Science Overview (15 min) 3:10 - 3:25

Ryan Chin
Managing Director, City Science Initiative
Research Scientist, Changing Places Group
MIT Media Lab

II. CityScope Overview (15 min) 3:25 - 3:40

Ira Winder
Research Scientist, Changing Places Group
MIT Media Lab

III. CityScope Case Studies (15 min) 3:40 -3:55

Ariel Noyman
SMArchs U+D Candidate, School of Architecture and Planning
Research Assistant, Changing Places Group, MIT Media Lab

IV. Q&A (20 min) 3:55 - 4:15

V. Introduction to Open Data Discourse (15 min) 4:15 - 4:30

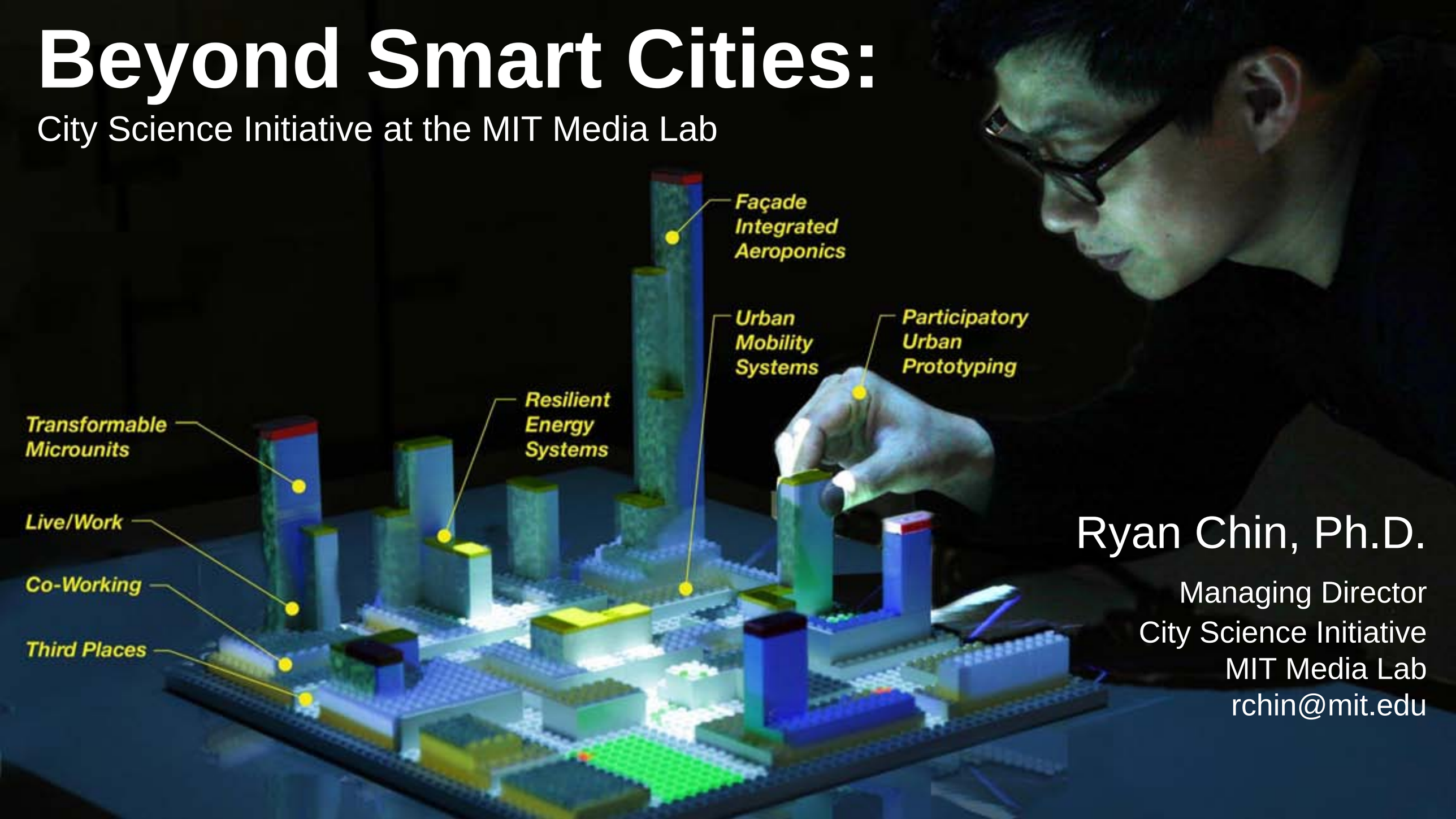
Carey Anne Nadeau
Founder, Open Data Discourse

VI . Street Safety Challenge Winning Presentation (15 min) 4:30 - 4:45

Kristofer Fosmoe
System Design and Management Fellow, MIT Engineering Systems Division
Research Assistant, Post-Traumatic Stress Initiative
MIT Sociotechnical Systems Research Center

Beyond Smart Cities:

City Science Initiative at the MIT Media Lab



Ryan Chin, Ph.D.

Managing Director
City Science Initiative
MIT Media Lab
rchin@mit.edu

MIT Media Lab

School of Architecture and Planning

INSIDE STORY

What really happens in MIT's tech labs

27 Anti-disciplinary Research Groups

Affective Computing
Biomechatronics
Camera Culture
Changing Places
Civic Media
Cognitive Machines
Design Fiction
Digital Intuition
Fluid Interfaces
Human Dynamics
Information Ecology
Lifelong Kindergarten
Macro Connections
Mediated Matter
Molecular Machines
New Media Medicine
Object-Based Media
Opera of the Future
Personal Robots
Playful Systems
Responsive Environments
Social Computing
Software Agents
Speech + Mobility
Synthetic Neurobiology
Tangible Media
Viral Spaces

80 Corporate Sponsors ($45M per year)

Aegis Media
APX Labs
Bank of America
Benesse Corporation
Berwind
BT
Cisco Systems, Inc.
Comcast
Culture Convenience Club Co., Ltd.
Deloitte LP
DENSO
Dentsu Inc. / ISID
Digital Garage
DirecTV
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Hallmark Cards, Inc.
Hasbro, Inc.
Hearst Corporation
Hisense Co. Ltd.
Hyundai Motor Company
ICICI Bank
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Infocast Limited
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Intuit Inc.
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LG Electronics, Inc.
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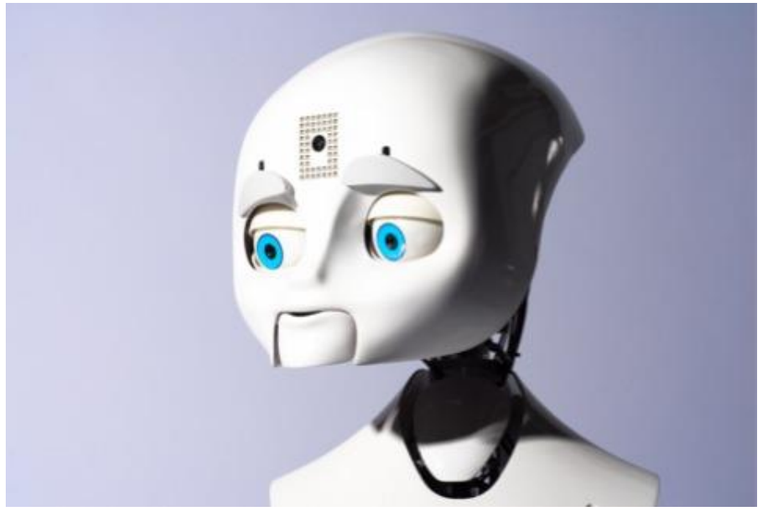
Samsung Electronics Co., Ltd.
Sensormatic Electronics Corp.
Schneider Electric SA
Shell
SingTel
Starcom Mediavest Group
State Farm
State of Minas Gerais
Steelcase Inc.
TCL Multimedia
TED
Telecom Italia *
The Asahi Shimbun Company
Time Inc.
TOPPAN Printing Co., Ltd.
Toyota Motor Corporation
Toshiba Corporation
Toys"R"Us, Inc.
Trends Media Co., Ltd.
Verizon
Volkswagen Group of America, Inc.
Yamaha Corporation*

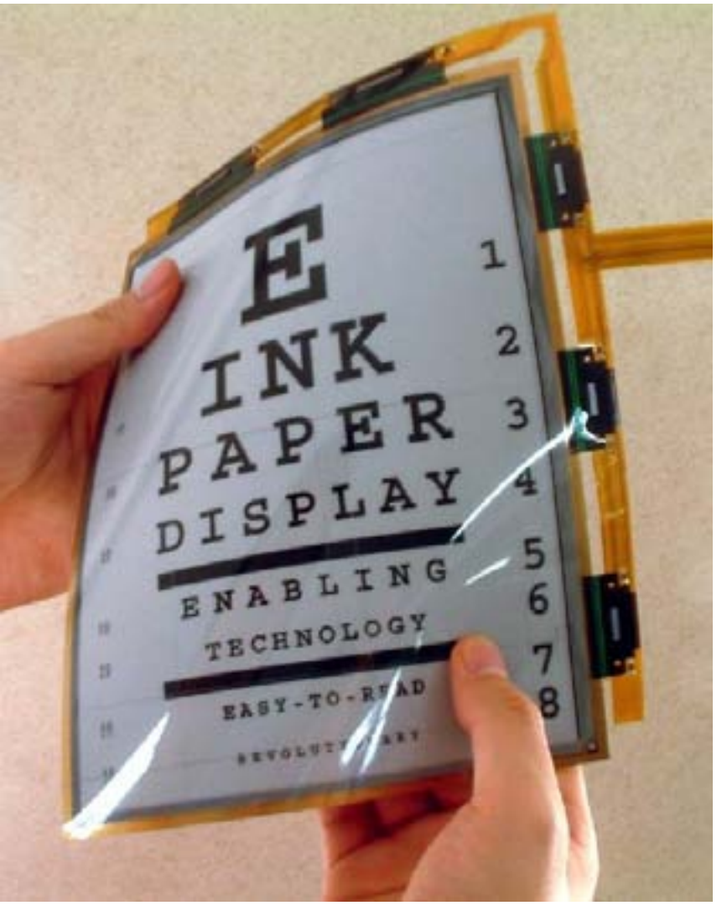
Kismet – Personal Robots

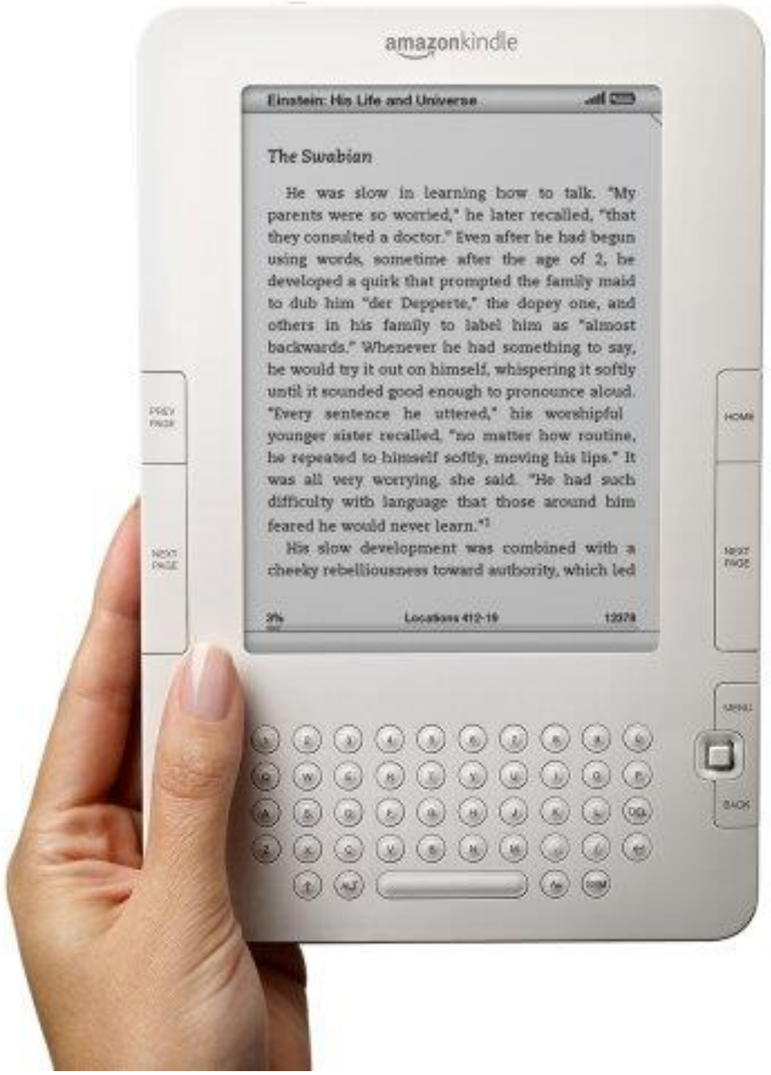
Professor Cynthia Breazeal, MIT Media Lab

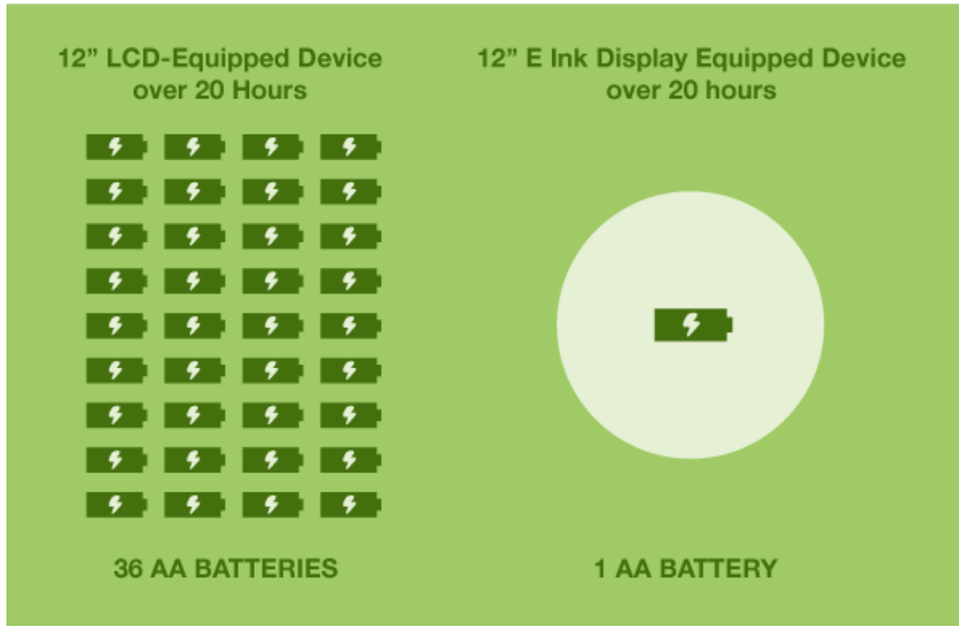


E-Ink Spin-off

Professor Joe Jacobson, MIT Media Lab, Molecular Machines Group

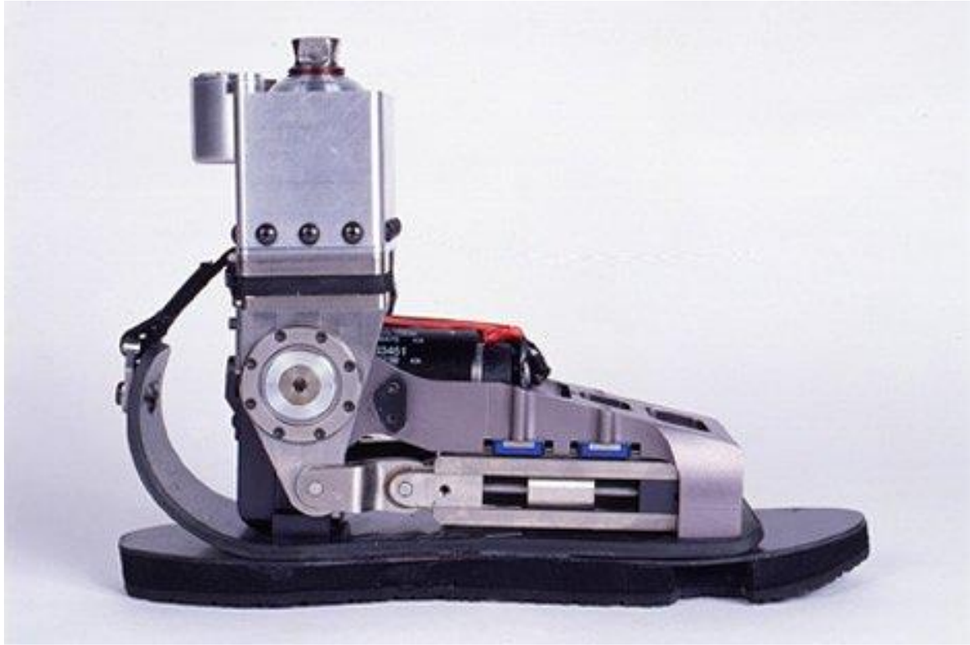






Power Ankle by Professor Hugh Herr

MIT Media Lab, Biomechantronics Group



Guitar Hero

MIT Media Lab Spin off

One Laptop Per Child (Nicholas Negroponte)

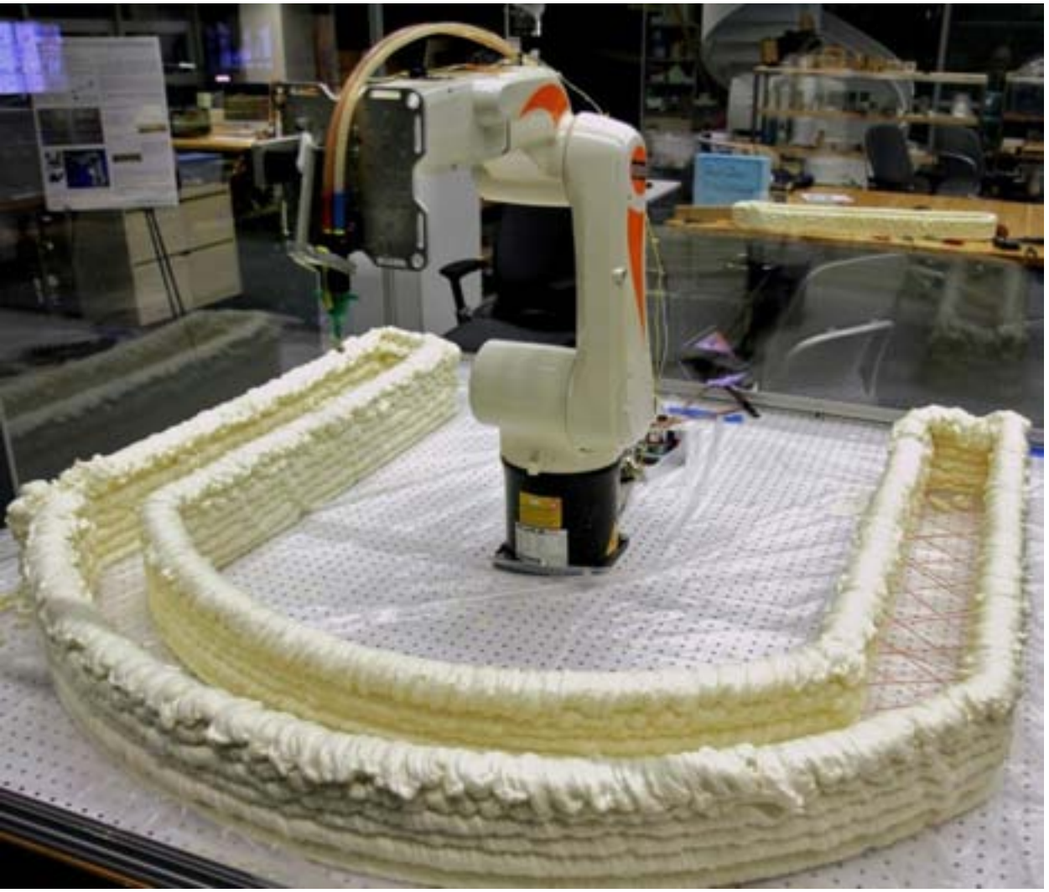
MIT Media Lab non-profit spin-off

Mediated Matter

Professor Neri Oxman, MIT Media Lab

Mediated Matter

Professor Neri Oxman, MIT Media Lab



MIT Living Labs

Our Campus as a Testbed for Mobility, Energy, and Housing Innovations

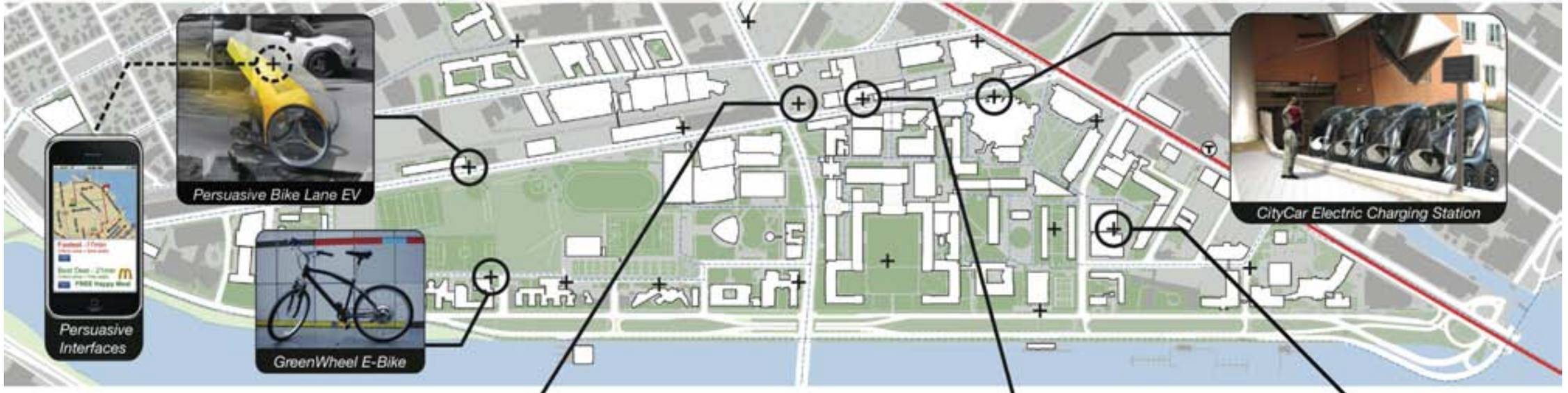
MAS.552J / 4.557J

Kent Larson, Ryan Chin

kll@mit.edu, rchin@media.mit.edu

http://cp.media.mit.edu/education/classes

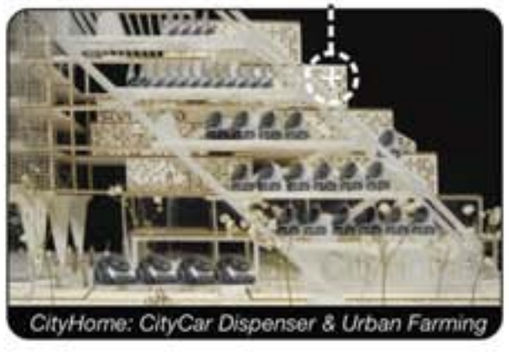
Permission of Instructor
H (Fall), Units: 3-0-9
Wednesday 2-5 pm
First Class, 2pm, Sep. 7
Room E14-525



Class Description – MIT has made a major commitment to long-term breakthrough research on energy. However, we propose that the MIT campus should be a living laboratory to explore how dramatic reductions in energy use can be achieved today. Students will be challenged to develop mobility, energy, and housing innovations that including new lightweight electric vehicles, electric charging and smart grid technologies, transformable high performance housing, persuasive interfaces for energy conservation, and incentives to encourage the use of more energy efficient mobility systems. The potential benefits of an integrated ecosystem approach may include, for example, the freeing up of land for new housing by reducing parking through transportation modal shifts or the introduction of bike sharing programs.

Course Collaborators – Joost Bonsen, Virot Chiraphadhanakul, Karthik Dinakar, William Lark, Jr., Marcus Martinez, Nicholas Pennycooke, Daniel Smithwick, Praveen Subramani

CityHome: Transformable Housing


CityHome: CityCar Dispenser & Urban Farming

New Energy Systems for Electric Vehicles

Research Areas – Lightweight Electric Vehicles, Electric Charging Infrastructure, Customizable Urban Housing, Rethinking the Streetscape, Transformable Housing Modules, and Persuasive Interfaces and Dynamic Incentives for Modal Shifts

RoboScooter - Folding Electric Scooter

Expected Student Deliverables – Students will collaborate in teams, work within existing problem spaces in the urban environment, and propose well-crafted design solutions that creatively address the problems. Students will be expected to propose design solutions through illustrations, building scale prototypes (working and non-working), back-of-the-envelope calculations, videos, and other types of media.

Coordinated with MAS.S63 MIT Urban Ventures
http://miturbanventures.org

Mobility-on-Demand for the New Urban Village

MAS.552J / 4.557J

Instructors Kent Larson, Ryan Chin
Contact kll@mit.edu, rchin@media.mit.edu

Prereq: Permission of instructor
H (Fall)
(Units to be arranged)
Wednesday 2-5 pm
Room E14-493
First Class, 2pm, September 8th

Image: Óbidos, Portugal

Course Description

This workshop will explore how architectural and mobility interventions might transform the municipality of Óbidos in Southern Portugal into a model for the urban village of the future – a globally connected center of living, work, culture, and creative entrepreneurship. The municipality of Óbidos, 80 km north of Lisbon, includes one of the most beautifully preserved hill towns of Portugal, beaches, a lagoon, and the Bom Sucesso resort consisting of several thousand modernist homes designed by over twenty Portuguese and international architects. We will coordinate the workshop with a parallel studio at the Technical University (TU) of Lisbon. Portuguese students will focus on site analysis and the urban plan while MIT students will focus primarily on mobility systems and their interface to buildings and the "smart grid." If funding can be secured, MIT students will travel to Portugal during the third week of October to participate in one-week MIT-TU Óbidos charrette. The Mayor of Óbidos and key members of his staff will participate in sessions.

The workshop will also build upon research on Mobility-on-Demand (MoD) systems which consist of a fleet of light-weight electric vehicles placed at electrical charging stations that are strategically distributed throughout the area served. Users simply walk up to the closest station, swipe a membership card, and are given access to vehicles. They are then allowed to drive to any other station (one-way rental) closest to their desired destination. MoD systems provide high levels of sustainable urban mobility by maximizing vehicle and land usage and dramatically cutting negative externalities like carbon emissions and congestion. This workshop will focus on the design and implementation of MoD systems and encompass the following areas: new vehicles designs, urban implementation, electric charging infrastructure, and smart fleet management systems.

Requirements

Prior enrollment in the previous workshops is NOT a requirement for this class. Both graduate and undergraduate students are encouraged to apply to the course. Backgrounds in Architecture, Computer Science, Electrical Engineering, Management, Material Science, Media Arts and Sciences, Mechanical Engineering, and Urban Planning are preferred.

More Information

http://cities.media.mit.edu/download/mas552J-Fall2010.pdf

MIT Course Collaborators

William Lark, Jr., Dimitris Papanikolaou, Raul-David "Retro" Poblano, Nicholas Pennycooke, and Praveen Subramani

CityCar Prototype: *William Lark, Jr., Nicholas Pennycooke, Raul-David "Retro" Poblano*

Mobility-on-Demand Systems in Vienna, Austria

MAS.552J / 4.557J

Instructors: Kent Larson, Ryan Chin
Contact: kll@mit.edu, rchin@media.mit.edu

Prereq: Permission of instructor*
H (Spring), Units: 3-0-9
Wednesday 2-5 pm
First Class, 2pm, Feb 2nd
Room E14-240

Course Description

This workshop will explore the design and implementation of Mobility-on-Demand (MoD) systems. MoD systems consist of a fleet of lightweight electric vehicles placed at recharge points distributed in an urban area. They form a new type of mobility service whereby users pick-up vehicles from charging stations and are allowed to drop-off at any other charging station (otherwise known as shared one-way rental). A fully networked MoD system will intelligently respond to peak user demand for vehicles, parking space, and energy supply. As MoD systems evolve they will serve not only as a new mobility system for cities, they will be become part of an energy ecosystem which will integrate renewable power generation and distribution as well as efficient buildings to form a new urban nervous system for cities. Taken as a kit-of-parts, MoD systems can be divided into a number of key elements that work together under a set of established rules. We will study this kit-of-parts and develop each major component typology of MoD and then apply it to the city of Vienna, Austria (neighborhood of Aspern) this term.

This workshop will include travel to Vienna to participate in a one-week design charrette with the Austrian Institute of Technology (AIT) during MIT's spring break. We will coordinate the workshop with a parallel studio at AIT, whereby Viennese students will focus on site analysis and the urban master plan, while MIT students will focus primarily on mobility systems, pathways, and their interface to buildings. Key city officials and stakeholders will participate in these sessions.**

****Travel**

The class will travel to Vienna during MIT Spring break (March 19-27) for the MIT-AIT design charrette. This trip including travel and accommodation will be funded by the City of Vienna. This trip is optional and is it is not mandatory to travel to participate in the course. Due to the limited budget, we will limit student enrollment to no more than 15 students.

***Requirements**

Prior enrollment in the previous workshops is NOT a requirement for this class. Both graduate and undergraduate students are encouraged to apply to the course. Backgrounds in Architecture, Computer Science, Electrical Engineering, Management, Material Science, Media Arts and Sciences, Mechanical Engineering, and Urban Planning are preferred.

More Information

http://cities.media.mit.edu/download/mas552J-Spring2011.pdf

Image: MIT Media Lab CityCar half-scale prototype.

MIT Course Collaborators: William Lark, Jr., Dimitris Papanikolaou, Raul-David "Retro" Poblano, Nicholas Pennycooke, Chris Post, Katja Schechtner, and Praveen Subramani

MIT Living Labs Workshop (MAS.552J, 4.557J)

Post-Tsunami Japan

Designing New Resilient Cities

Permission of Instructor
G (Spring), Units: 3-0-9
Wednesdays 230-530pm

First Class, 230pm, Feb. 8
Room E14-525

Instructors Kent Larson, Ryan Chin

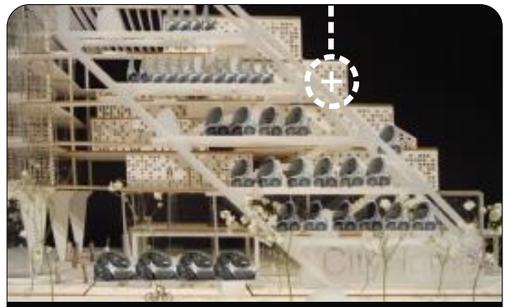
kll@mit.edu, rchin@media.mit.edu

http://cp.media.mit.edu/education/classes

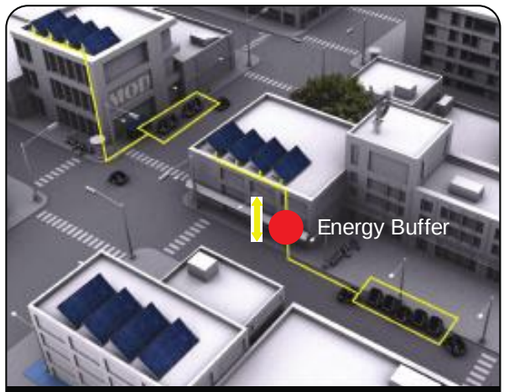
Course Description – The destruction from the events of 3.11 in Japan has forced communities to re-question the concept of resiliency. This class will focus on the design of resilient communities in Tokoku, Japan, by developing new and scaleable housing, mobility, and energy systems. These systems should be designed to be adaptive, robust, reconfigurable, redundant, and exhibit self-healing much like wireless mesh networks in computing. Participants of the course will have the opportunity to travel to Japan during spring break for a one-week design charrette. We will work with community leaders, sponsors, and local universities to design "Living Lab" experiments that can be deployed and tested in Tohoku. Prior to going to Japan, teams will focus on developing key components of a resilient city – in a generalizable fashion – that could scale to new cities in China, India, and Latin America.

Coordinated with 4.154 Architecture Studio
Taught by Shun Kanda

CityHome: Transformable Housing



CityHome: CityCar Dispenser & Urban Farming



New Energy Systems for Electric Vehicles

Course Collaborators – Nicholas Pennycooke, Daniel Smithwick, Praveen Subramani, Jenny Broutin, Brandon Martin-Anderson, Shawn Salzberg, Topper Carew, Tyrone Yang, Haiser Larrea Tamayo, Jet SiZhi Zhou, Ira Winder.

Shared Electric Mobility Systems

Rethinking the Streetscape

Expected Student Deliverables – Students will collaborate in small teams and propose well-crafted design solutions through illustrations, building scale prototypes (working and non-working), back-of-the-envelope calculations, videos, and other types of media.

Research Areas – Electric Mobility Systems, New Energy Systems, New Technologies Enabling Art, Culture, and Design,Transformable Housing, Urban Farming, and Rethinking the Streetscape.

Designing Systems for New Resilient Cities in China

Permission of Instructor
Units: 3-0-9
Fridays 1:00-4:00pm

First Class, 1:00pm, Sep 7
Room E14-525

Instructors Kent Larson, Ryan Chin

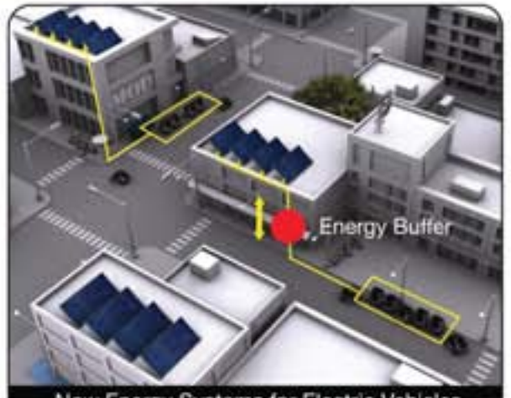
kll@mit.edu, rchin@media.mit.edu

http://cp.media.mit.edu/education/classes

Course Description - The world is experiencing a period of extreme urbanization. In China alone, 300 million rural inhabitants will move to urban areas over the next 15 years. This workshop will explore new housing, mobility, energy, and food production systems for high-density cities that are robust, scalable, adaptable, and reconfigurable. Participants of the course will have the opportunity to travel to Shanghai, China, October 20-28, for a design charrette with students from Tongji University (Shanghai) and Aalto University (Helsinki). During this week, students will work at the Aalto-Tongji Design Factory, and apply their ideas to a selected site in Shanghai.

CityHome: Transformable Housing

CityHome: CityCar Dispenser & Urban Farming



New Energy Systems for Electric Vehicles

Course Collaborators - Praveen Subramani, Michael Lin, Jenny Broutin, Shaun Salzberg, Tyrone Yang, Ira Winder, Topper Carew, Sandra Richter, Aithne Pao, Chih-Chao Chuang, and Carlos Maria Olabarri Santos

Shared Electric Mobility Systems

Rethinking the Streetscape

Expected Student Deliverables – Students will collaborate in small teams and propose well-crafted design solutions through illustrations, building scale prototypes (working and non-working), back-of-the-envelope calculations, videos, and other types of media.

Research Areas - Electric Mobility Ecosystem, Resilient Energy Systems, Transformable City-Homes, Urban Farming, and Streetscapes for Compact Urban Cells

Massachusetts Institute of Technology

Aalto University

Urban Prototyping

IAP 2013 (non-credit course)

Instructors Kent Larson, Ryan Chin
TAs J. Ira Winder, Michael Lin

Using LEGOs and Parametric Modeling for Designing Cities

A City Science Workshop

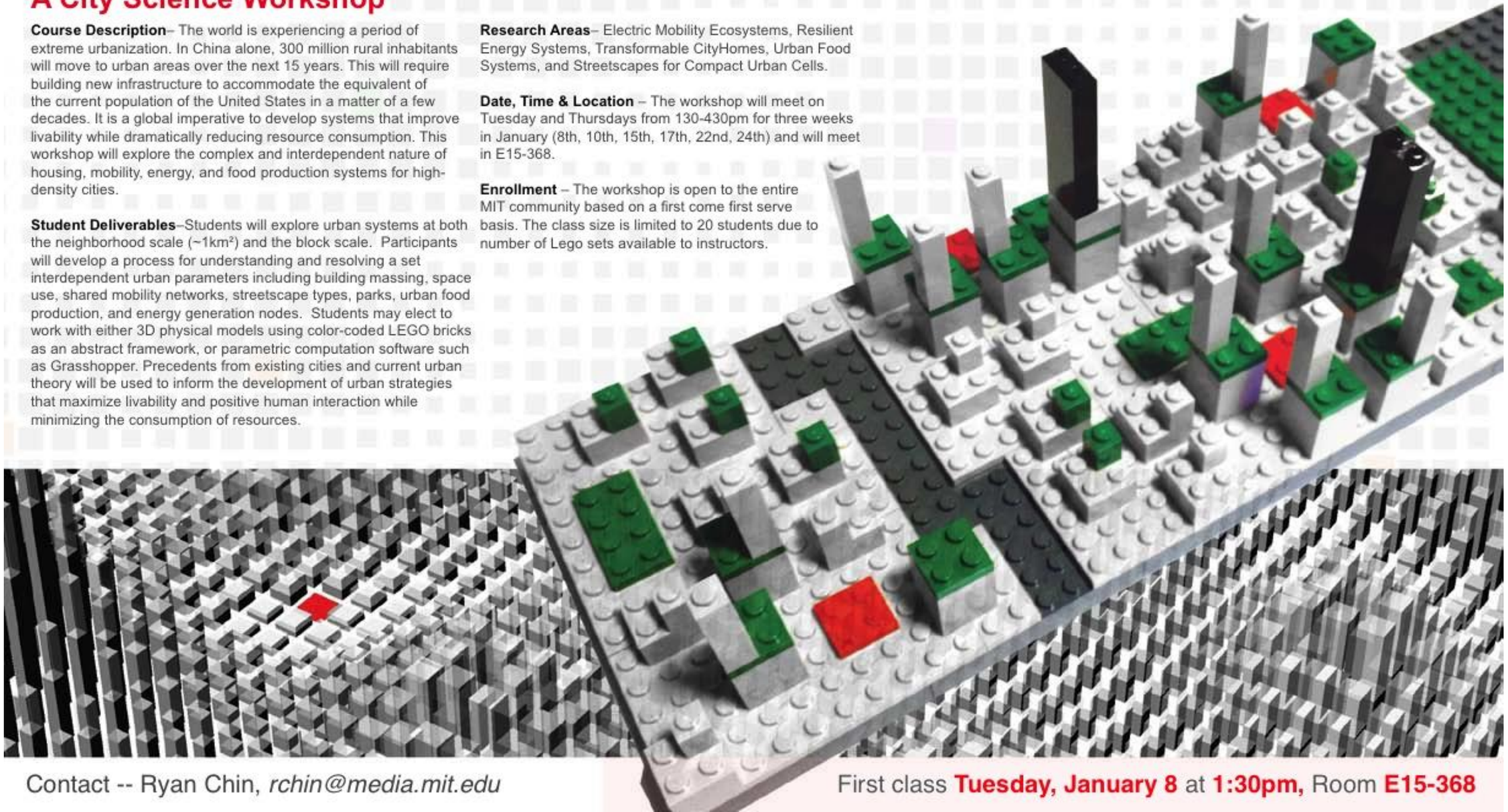
Course Description– The world is experiencing a period of extreme urbanization. In China alone, 300 million rural inhabitants will move to urban areas over the next 15 years. This will require building new infrastructure to accommodate the equivalent of the current population of the United States in a matter of a few decades. It is a global imperative to develop systems that improve livability while dramatically reducing resource consumption. This workshop will explore the complex and interdependent nature of housing, mobility, energy, and food production systems for high-density cities.

Student Deliverables–Students will explore urban systems at both the neighborhood scale (~1km²) and the block scale. Participants will develop a process for understanding and resolving a set interdependent urban parameters including building massing, space use, shared mobility networks, streetscape types, parks, urban food production, and energy generation nodes. Students may elect to work with either 3D physical models using color-coded LEGO bricks as an abstract framework, or parametric computation software such as Grasshopper. Precedents from existing cities and current urban theory will be used to inform the development of urban strategies that maximize livability and positive human interaction while minimizing the consumption of resources.

Research Areas– Electric Mobility Ecosystems, Resilient Energy Systems, Transformable CityHomes, Urban Food Systems, and Streetscapes for Compact Urban Cells.

Date, Time & Location – The workshop will meet on Tuesday and Thursdays from 130-430pm for three weeks in January (8th, 10th, 15th, 17th, 22nd, 24th) and will meet in E15-368.

Enrollment – The workshop is open to the entire MIT community based on a first come first serve basis. The class size is limited to 20 students due to number of Lego sets available to instructors.



Contact -- Ryan Chin, *rchin@media.mit.edu*

First class **Tuesday, January 8** at **1:30pm,** Room **E15-368**

Urban Systems Prototyping

Instructors Kent Larson & Ryan Chin

Using LEGOs and Parametric Modeling to Design Systems for New Cities in China

A City Science Workshop (MAS 552 / 4.557)

Rhino + LEGO Model of Kendall Square: Michael Lin & Ira Winder

Class Description – The world is experiencing a period of extreme urbanization. In China alone, 300 million rural inhabitants will move to urban areas over the next 15 years. This will require building new infrastructure to accommodate the equivalent of the current population of the United States in a matter of a few decades. Cities will account for nearly 90% of global population growth, 80% of wealth creation, and 60% of total energy consumption. It is a global imperative to develop systems that improve livability while dramatically reducing resource consumption. This workshop will explore new housing, mobility, energy, and food production systems for high-density cities. These systems should be resilient, scalable, adaptable, and reconfigurable.

This course will utilize, in parallel, physical (LEGOs) and virtual (3D parametric modeling) prototyping to design new urban systems in order to create Compact Urban Cells – a neighborhood area of approximately one square kilometer in diameter that contains most of what citizens need for everyday life. Compact Urban Cells are walkable neighborhoods with a diverse mix of live/work areas that utilize shared mobility systems, distributed renewable power generation, shared spaces, and integrated vertical urban farming. This course will initially focus on the redesign of Kendall Square (and then shift to China) by building LEGO scale models and accompanying 3D parametric models (Rhino + Grasshopper) to not only represent existing environments, but also design propositions.

Requirements – All backgrounds are welcome to participate in the workshop. Both graduate and undergraduate students are encouraged to apply to the course. Experience in Architecture, Computer Science, Electrical Engineering, Management, Material Science, Media Arts and Sciences, Mechanical Engineering, and Urban Planning are preferred. Proficiency in LEGO building, 3D modeling in Rhino (or similar program) and Grasshopper is preferred, but not required to take the course.

Five Exploration Areas – This workshop will build upon the research of the Changing Places Research Group to explore five distinct research areas, each led by research assistants. Students in the class may identify where their own interests overlap with the research group and select an exploration area as a starting point. The research areas include: Electric Mobility Ecosystems, Resilient Energy Systems, Transformable CityHomes, Urban Food Systems, and Cityscapes for Compact Urban Cells.

Prerequisites –
Permission of Instructor, Units (3-0-9)

Schedule – The workshop will meet each Wednesday from 2:00pm – 5:00pm in Room E14-525, (5th Floor, New Media Lab Building).

Course Collaborators – Praveen Subramani, Michael Lin, Jenny Broutin, Shaun Salzberg, Tyrone Yang, Ira Winder, Sandra Richter, Lucy Zhao, Chen Chen, and Carlos Maria Olabarri Santos

Reference Websites –
Changing Places, MIT Media Lab – http://cp.media.mit.edu/
City Science Initiative, MIT Media Lab – http://cities.media.mit.edu/

Contact – Ryan Chin, rchin@media.mit.edu

First Class: Wednesday, February 6th at 2pm, Room E14-525

Innovation Hubs

Instructors Kent Larson & Ryan Chin

Kendall Square as Laboratory for High-Density Urban Living

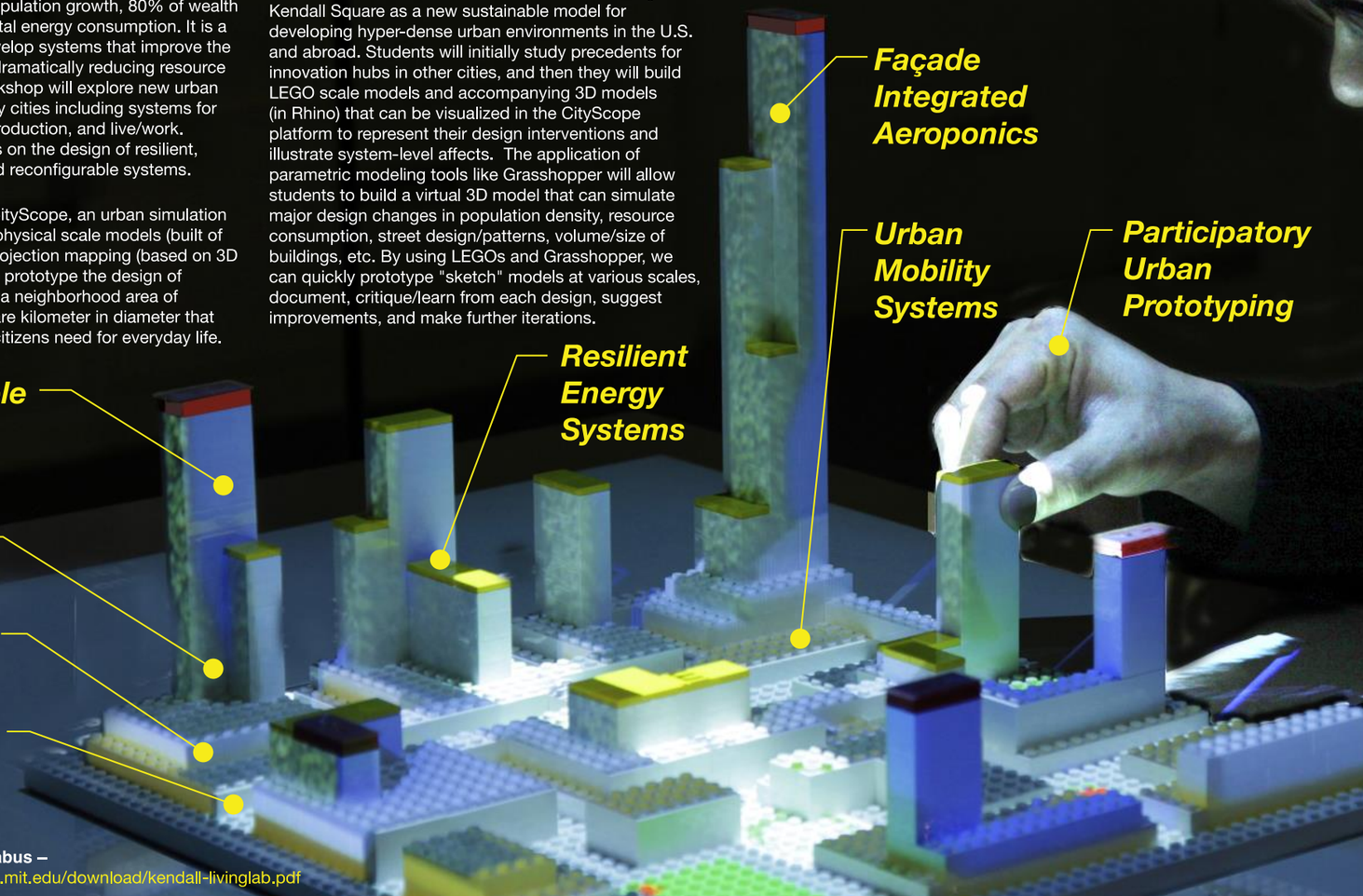
A City Science Design Workshop (MAS 552 / 4.557)

Class Description – The world is experiencing a period of extreme urbanization. In China alone, 250+ million rural inhabitants will move to urban areas over the next 15 years. This will require building new infrastructure to accommodate nearly the equivalent of the current population of the United States in a matter of a few decades. Cities in the 21st century will account for nearly 90% of global population growth, 80% of wealth creation, and 60% of total energy consumption. It is a global imperative to develop systems that improve the livability of cities while dramatically reducing resource consumption. This workshop will explore new urban systems for high-density cities including systems for mobility, energy, food production, and live/work. The workshop will focus on the design of resilient, scalable, adaptable, and reconfigurable systems.

This course will utilize CityScope, an urban simulation tool, which consists of physical scale models (built of LEGO bricks) and 3D projection mapping (based on 3D parametric modeling) to prototype the design of Compact Urban Cells – a neighborhood area of approximately one square kilometer in diameter that contains most of what citizens need for everyday life.

Compact Urban Cells are walkable neighborhoods with a diverse mix of live/work areas that utilize shared mobility systems, distributed renewable power generation, shared spaces, and integrated vertical urban farming.

As a test case, the course will focus on the redesign of Kendall Square as a new sustainable model for developing hyper-dense urban environments in the U.S. and abroad. Students will initially study precedents for innovation hubs in other cities, and then they will build LEGO scale models and accompanying 3D models (in Rhino) that can be visualized in the CityScope platform to represent their design interventions and illustrate system-level affects. The application of parametric modeling tools like Grasshopper will allow students to build a virtual 3D model that can simulate major design changes in population density, resource consumption, street design/patterns, volume/size of buildings, etc. By using LEGOs and Grasshopper, we can quickly prototype "sketch" models at various scales, document, critique/learn from each design, suggest improvements, and make further iterations.



Prerequisites –
Permission of Instructor, Units (3-0-9)

Requirements – This course is particularly relevant to graduate students with backgrounds in engineering systems design, computer science, data visualization, user interface, mechanical engineering, architecture, and urban design. Proficiency in LEGO building, 3D modeling in Rhino (or similar CAD program) and Grasshopper is preferred, but not required to take the course. Students of all academic backgrounds are welcome to participate in the workshop. Both graduate and undergraduate students are encouraged to apply to the course.

Schedule – This Fall 2013 workshop will meet each Wednesday from 2:00pm – 5:00pm in Room E14-525 (5th Floor, New Media Lab Building). In addition to class, each week will start off with a lunchtime guest speaker from the City Science talk series from 12:30-2pm (details in syllabus).

MIT Media Lab Reference Websites –
Changing Places – http://cp.media.mit.edu/
City Science Initiative – http://cities.media.mit.edu/

Image *CityScope*
Michael Lin & Ira Winder
Photo *Paula Aguilera*

Course Flyer and Syllabus –
http://smartcities.media.mit.edu/download/kendall-livinglab.pdf

Contact – Ryan Chin, rchin@media.mit.edu

First Class: Wednesday, September 4th at 2pm, Room E14-525

INNOVATION HUBS
INTEGRATING TECHNOLOGY + DESIGN
[QUITO LAB]

SPRING 2014 // MAS 552 / 4.557
INSTRUCTORS: KENT LARSON, RYAN CHIN, RAMIRO ALMEIDA
CLASS TIME Wednesdays 130-430pm
ROOM E14-525
FIRST CLASS WEDNESDAY FEB 5, 2014

DESCRIPTION

The world is experiencing a period of extreme urbanization and we are radically changing the way we live. There is a unique opportunity to design innovation districts to spur economic growth, attract new talent and foster creativity. We want to explore potential strategies for defining how cities best undertake "innovation" activities in existing urban environments. This semester, we will focus on the historical center of Quito, Ecuador, the first World Heritage Site declared by UNESCO in 1978.

Experts from relevant fields will conduct guest lectures. We will engage students in the process of identifying relevant problems, designing project ideas, and evolving them to a detailed set of digital technology and design scenarios for urban and technology ventures. To capture the multi-disciplinary nature of such projects, students are challenged to focus on diverse fields for their proposals, such as city planning, social innovation, architecture, engineering, computer science, and social science. The concepts developed will be evaluated and critiqued throughout the semester.

Students will be asked to develop project proposals to support their initiatives, and focus on the design of resilient, scalable, adaptable, and reconfigurable systems. We will focus on themes and challenges defined by the city. Quito is looking to attract 21st century industries and activities to build a new Innovation District as well as improve the quality of life for the community in the historic town center.

CITY SCIENCE LUNCH TALKS

Each week the City Science Initiative brings in expert guest speakers to talk about innovation in cities immediately before class from 12-130pm (in room E15-383). Students of the class are expected to attend a key number of these talks as they are integral to the course. The mandatory talk schedule will be discussed on the first day of class (Feb 5, 2014)

ENROLLMENT

Students interested in joining the class will be required to submit a CV and/or portfolio, a short essay of interest, and sign up for a short 15-minute interview by email: ramiroal@mit.edu

TRAVEL

This class is open to all students at MIT and Harvard and will involve optional travel to Quito, Ecuador for a site visit during MIT Spring Break March 22nd to 29th.

Changing Cities

How to Prototype New Urban Systems

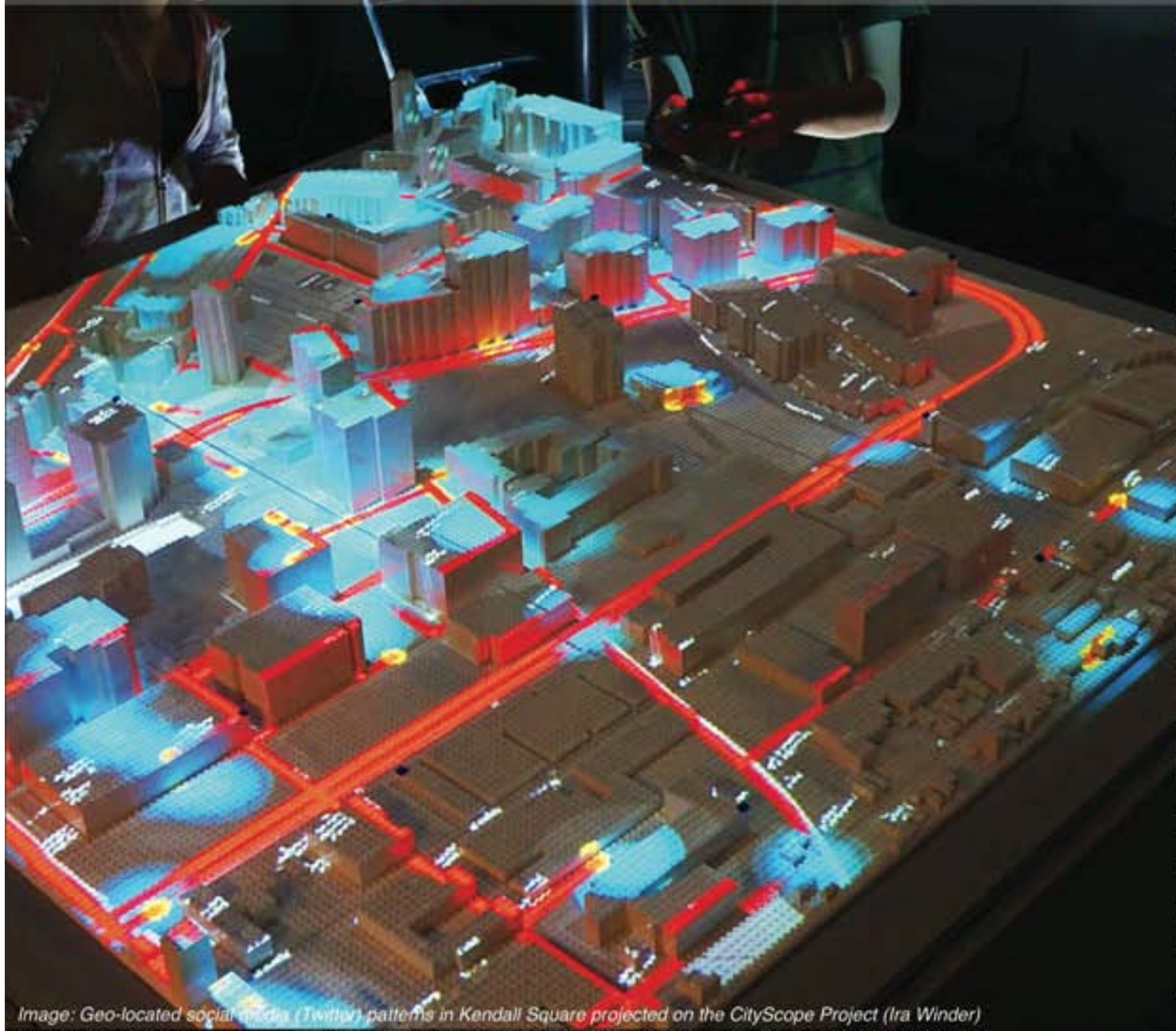


Image: Geo-located social media (Twitter) patterns in Kendall Square projected on the CityScope Project (Ira Winder)

A City Science Design Workshop (MAS 552 / 4.557)

Offered by the Changing Places Research Group, Media Lab

Instructors – Kent Larson, Ryan Chin
kll@mit.edu, rchin@media.mit.edu

Website – http://cp.media.mit.edu/workshops/

Class Description – Today's rapidly urbanizing cities desperately need disruptive innovation that move beyond "Smart Cities" solutions that have traditionally focused on optimization of cities rather than inventing new urban systems. This course will focus on how to design and prototype new systems to address the problems of urban mobility, food production, and live/work spaces. This course will also develop urban analytical tools to inform the design of semi-autonomous, resilient, dense urban neighborhoods where places of living, work, culture, shopping, and play are within a 20-minute walk.

This course will focus on five "How to" modules:

- How to prototype autonomous, shared, electric mobility systems
- How to prototype hyper-efficient, transformable spaces (robotic architecture)
- How to prototype controlled environment urban food systems
- How to realize computational urbanism using augmented tangible models
- How to quantify innovation, entrepreneurship, and creative vitality in cities

Class participants will be divided into small teams (2-4 students) to focus on one "How to" module for the duration of the semester based on their interest, experience and skill sets. Each module will be lead by a mentor(s) from the City Science Initiative. Student teams are expected work together as a unit to conceptualize, design, fabricate, and assemble a series of working prototypes on throughout the term.

This class seeks highly motivated students with the necessary skills to prototype new urban systems. Additional information on the pre-requisites for each module can be found on the syllabus posted on the class website (above).

Prerequisites – Permission of Instructor, Units (3-0-9), Fall 2014

First Class – Wednesday, 2:00 – 5:00pm,Room E15-341 (First Class Sept. 3rd)

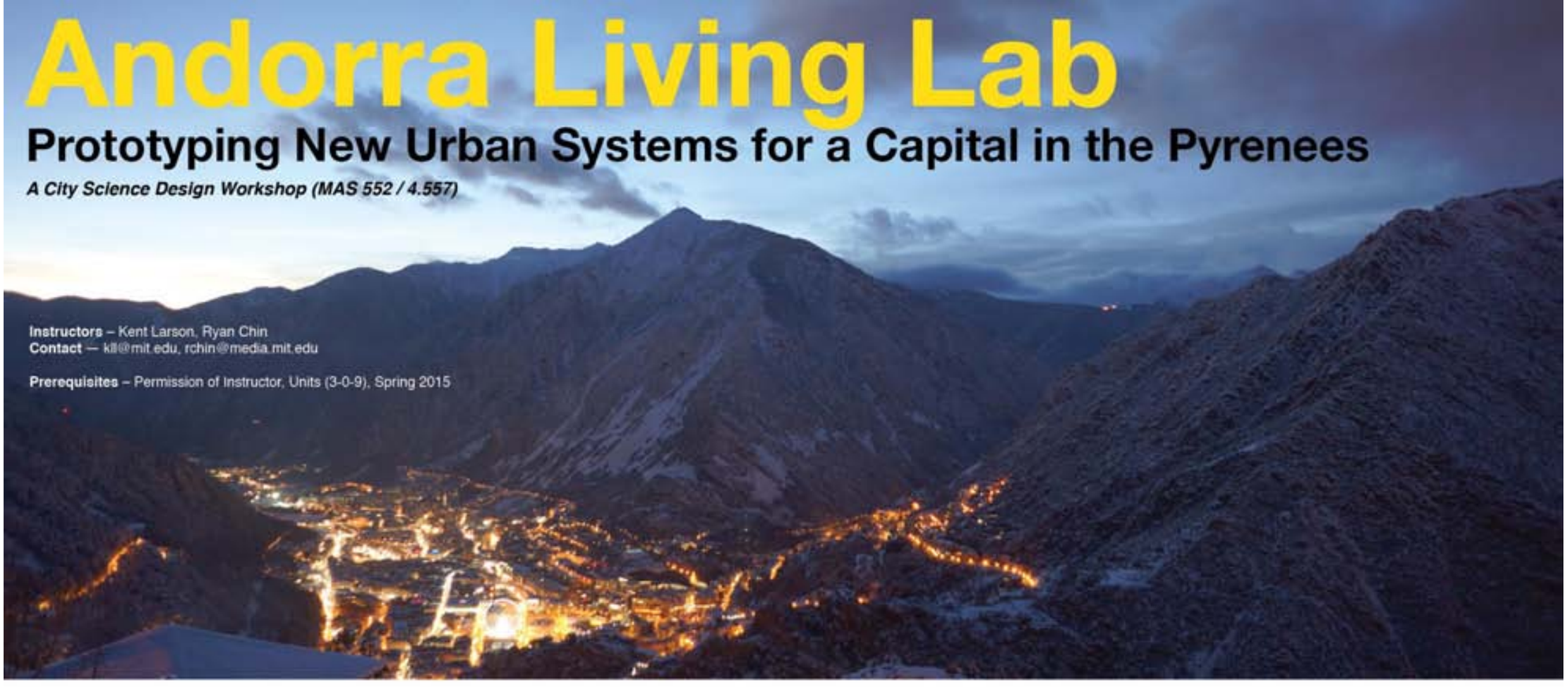
Module Mentors – Daan Archer, Joost Bonsen, Rich Fletcher, Caleb Harper, Dan Harple, Carson Smuts, Michael Lin, Jason Nawyn, Jennifer Saura, Hasier Larrea-Tamayo, Ira Winder

Course Advisor – Ramiro Almeida

Andorra Living Lab

Prototyping New Urban Systems for a Capital in the Pyrenees

A City Science Design Workshop (MAS 552 / 4.557)



Instructors – Kent Larson, Ryan Chin
Contact — kll@mit.edu, rchin@media.mit.edu

Prerequisites – Permission of Instructor, Units (3-0-9), Spring 2015

Class Description – The European micro-nation of Andorra, with a population of fewer than 80,000 people, receives about 8 million visitors per year. With no airport or train service, most people arrive by automobile and concentrate in the commercial center of the capital, making traffic management and parking some of the most important challenges to overcome in the future. Andorra has demonstrated a commitment to innovation by creating new events and initiatives such as Scalada, and by taking steps to diversify its economy and to draw in foreign investment. As a sovereign nation and a city-state, Andorra is able to expeditiously cut through bureaucratic barriers in order to resolve regulatory issues, provide public policy and create incentives. This course will investigate the application of urban innovation in the capital of Andorra, with an emphasis on mobility, entrepreneurship, street experience, and urban simulation for decision-making and community engagement.

Today's rapidly urbanizing cities need disruptive innovation that can move beyond "Smart Cities" solutions that have traditionally focused on optimization of cities rather than inventing new urban systems. This course will focus on the design and prototyping new systems to address the problems of urban mobility, live/work spaces, and creative interaction through technology. This course will also develop urban analytical tools to inform the design of semi-autonomous, resilient, dense, and entrepreneurial neighborhoods where places of living, work, culture, shopping, and play are within a 20-minute walk.

This course will focus on the following research areas:

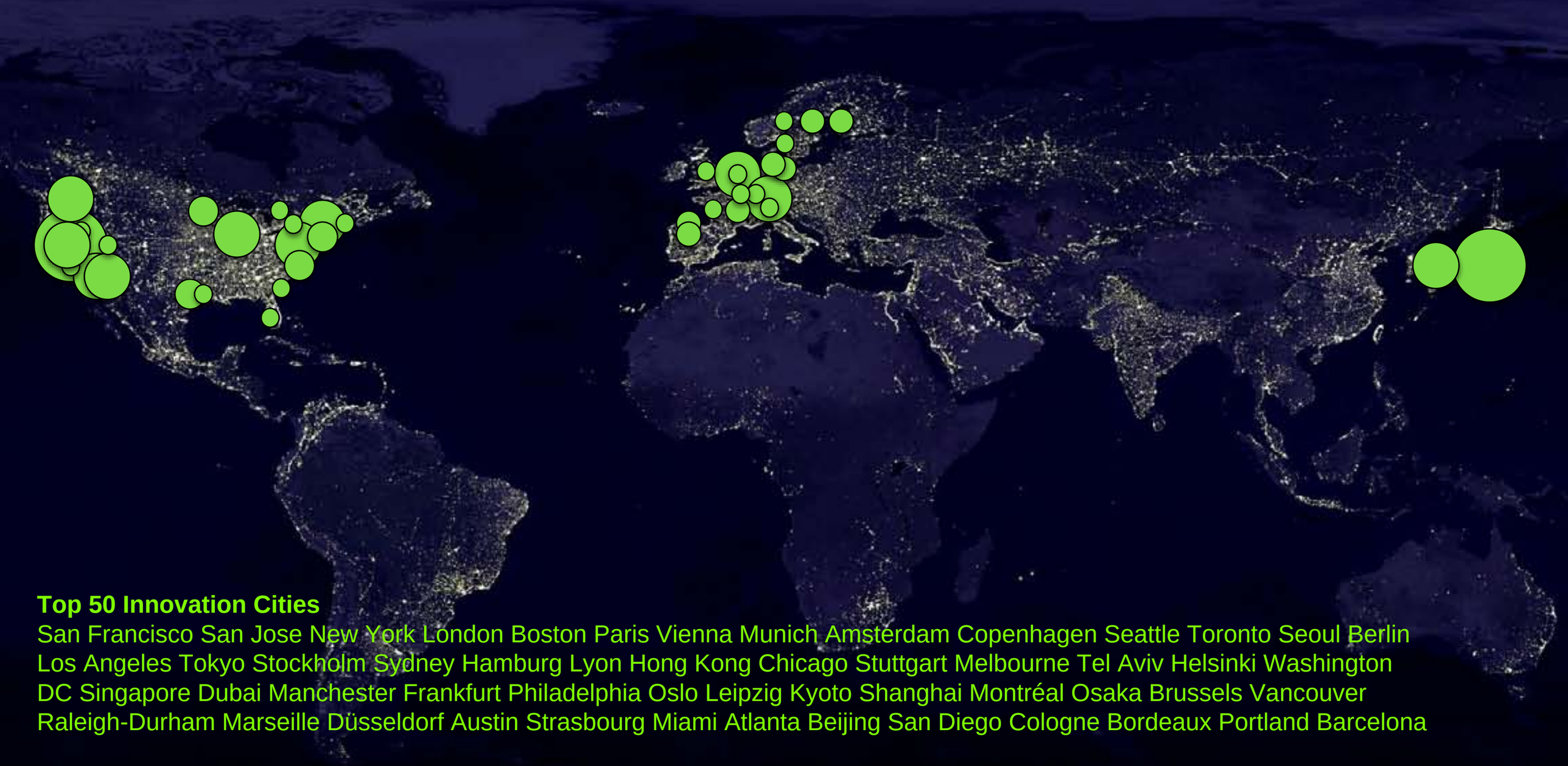
- New urban mobility systems that are autonomous, shared, and electric
- Sensing and responsive technology for new street experiences
- Urban analytical tools (CityScope) to visualize data and simulate urban interventions
- Innovation districts that incorporate co-working spaces, fab-labs, and micro-units
- Transformable, hyper-efficient, live/work spaces

Class participants will be divided into small teams to focus on one research area for the duration of the semester based on their interest, experience and skill sets. Each area will be lead by a mentor from the City Science Initiative. Student teams are expected to work together as a unit to conceptualize, design, fabricate, and assemble a series of prototypes throughout the term.

Enrollment – This class seeks highly motivated students with the necessary skills to prototype new urban systems. Students interested in joining the class will be required to submit a short essay of interest, CV and/or portfolio, and sign up for a short 15-minute interview to be held on either Feb 9th or 10th.

Travel – A limited number of course participants will possibly travel to Andorra over spring break (March 21st to 28th) to conduct an on-site design workshop.

Cities: 90% of Population Growth

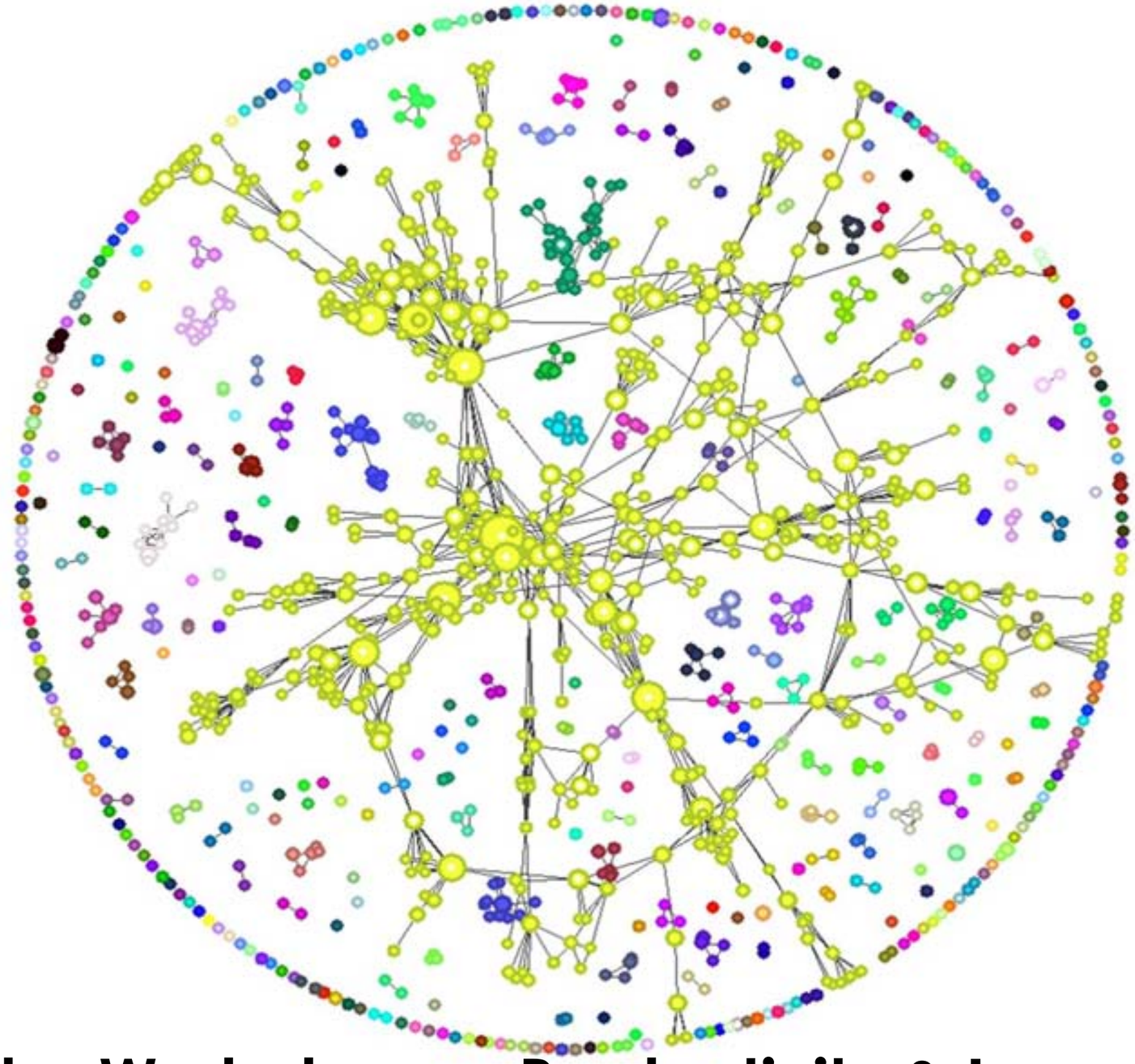


Top 50 Innovation Cities

San Francisco San Jose New York London Boston Paris Vienna Munich Amsterdam Copenhagen Seattle Toronto Seoul Berlin Los Angeles Tokyo Stockholm Sydney Hamburg Lyon Hong Kong Chicago Stuttgart Melbourne Tel Aviv Helsinki Washington DC Singapore Dubai Manchester Frankfurt Philadelphia Oslo Leipzig Kyoto Shanghai Montréal Osaka Brussels Vancouver Raleigh-Durham Marseille Düsseldorf Austin Strasbourg Miami Atlanta Beijing San Diego Cologne Bordeaux Portland Barcelona

Cities: 93% of Patented Inventions

What enables innovative entrepreneurial, high-performance cities?



Social Ties in the Workplace = Productivity & Innovation

Social Ties in the Community = Productivity & Innovation

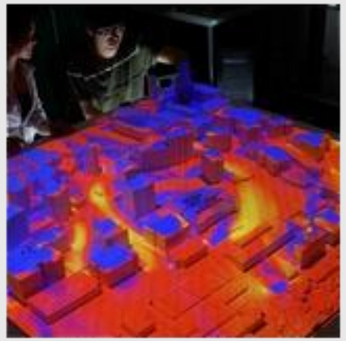
Density + Proximity + Diversity

Residential
Employment
Cafes, shops, restaurants
Cultural venues…

Home to workplace
…to recreation, nature
…to shopping, eating
…to schools, healthcare…

Demographic
Enterprise
Housing
Activity…

+ New Urban Systems



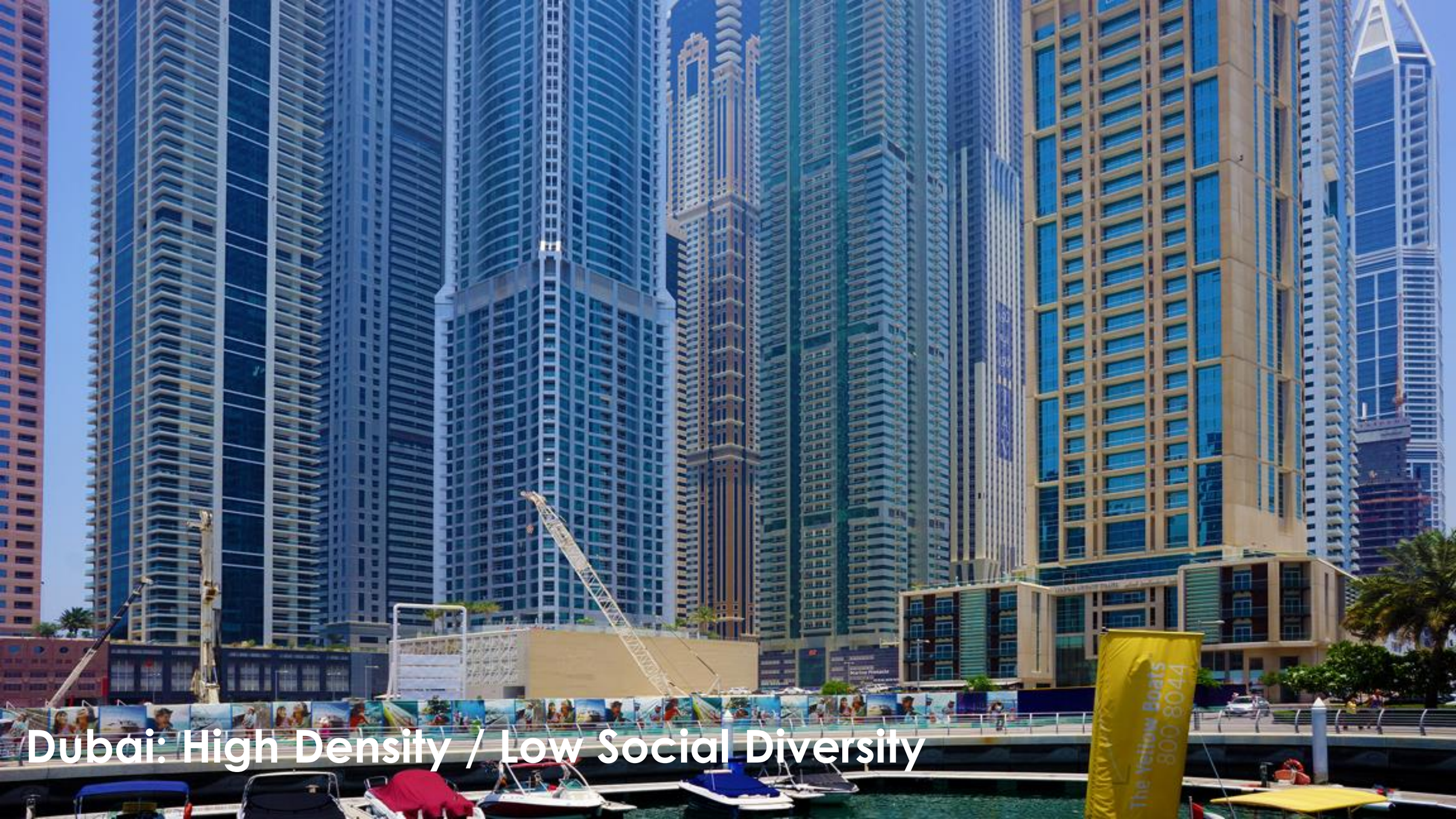
City Simulation

Places of Living & Work

Mobility-on-Demand

Building-integrated Agriculture

= Quality of Life + Innovation + Sustainability



Dubai: High Density / Low Social Diversity

Rio Favella: High Density / Low Social Diversity

Kendall Square: High Job Density / Low Residential Density

The Telegraph

'Cool' London is dead

The cool, creative class has been priced out of London, which means the capital is becoming more bland and boring by the minute

CityHOME

ARCHITECTURAL RECORD

Cities Court Creatives with Micro-Units

By Fred A. Bernstein

September 13, 2012

CRAIN'S NEW YORK BUSINESS Sunday, June 22, 2014

Micro-units could be housing's big solution

Mayor Bill de Blasio should make micro-units a standard building option to reach his affordable housing goals.

THE WALL STREET JOURNAL. U.S.

Cities Try to Lure Young Professionals With Cheap 'Micro' Units

Officials in many of the nation's most expensive housing markets have embraced 'micro apartments'

Exercise

Horizontal Translation

Vertical Translation

Vertical Translation

What if 200ft² could be 3x larger?

Hasier Larrea, Daniel Goodman, Phillip Ewing, Oier Arino

Mobility-on-Demand

CityCar Concept
(2009)

Full-Scale Working Prototype
(2012)

MIT CityCar

Ryan Chin, William Lark, Jr., Raul-David “Retro” Poblano, Nicholas Pennycooke, Praveen Subramani, Kent Larson, William J. Mitchell

Persuasive Electric Vehicle (PEV)

Ryan Chin, Michael Lin, Sandra Richter

EU Bike Lane Regulations
Weight Limitation: 60 KG Weight
Speed Limitation: 20 KPH

Persuasive Electric Vehicle (PEV)

Ryan Chin, Michael Lin, Sandra Richter

Package Delivery Mode

People Mover Mode

Persuasive Electric Vehicle (PEV)

Ryan Chin, Michael Lin, Sandra Richter

PEV loading and offloading

Persuasive Electric Vehicle (PEV)

Ryan Chin, Michael Lin, Sandra Richter

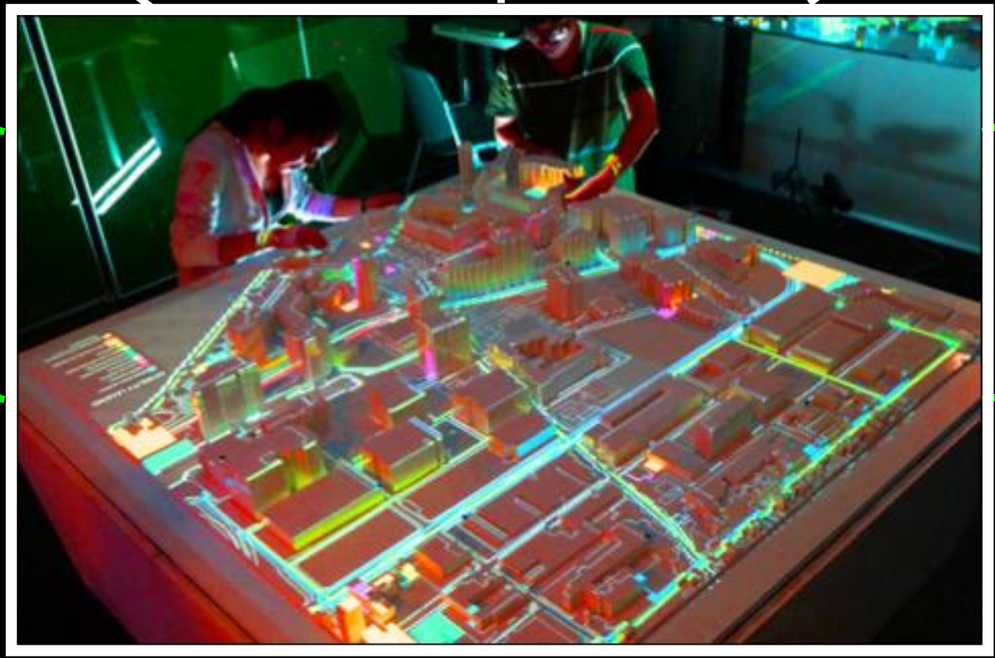
Walking (Privileged Mode)

Shared Bikes

On Demand Bus / Tram

Autonomous CityCars

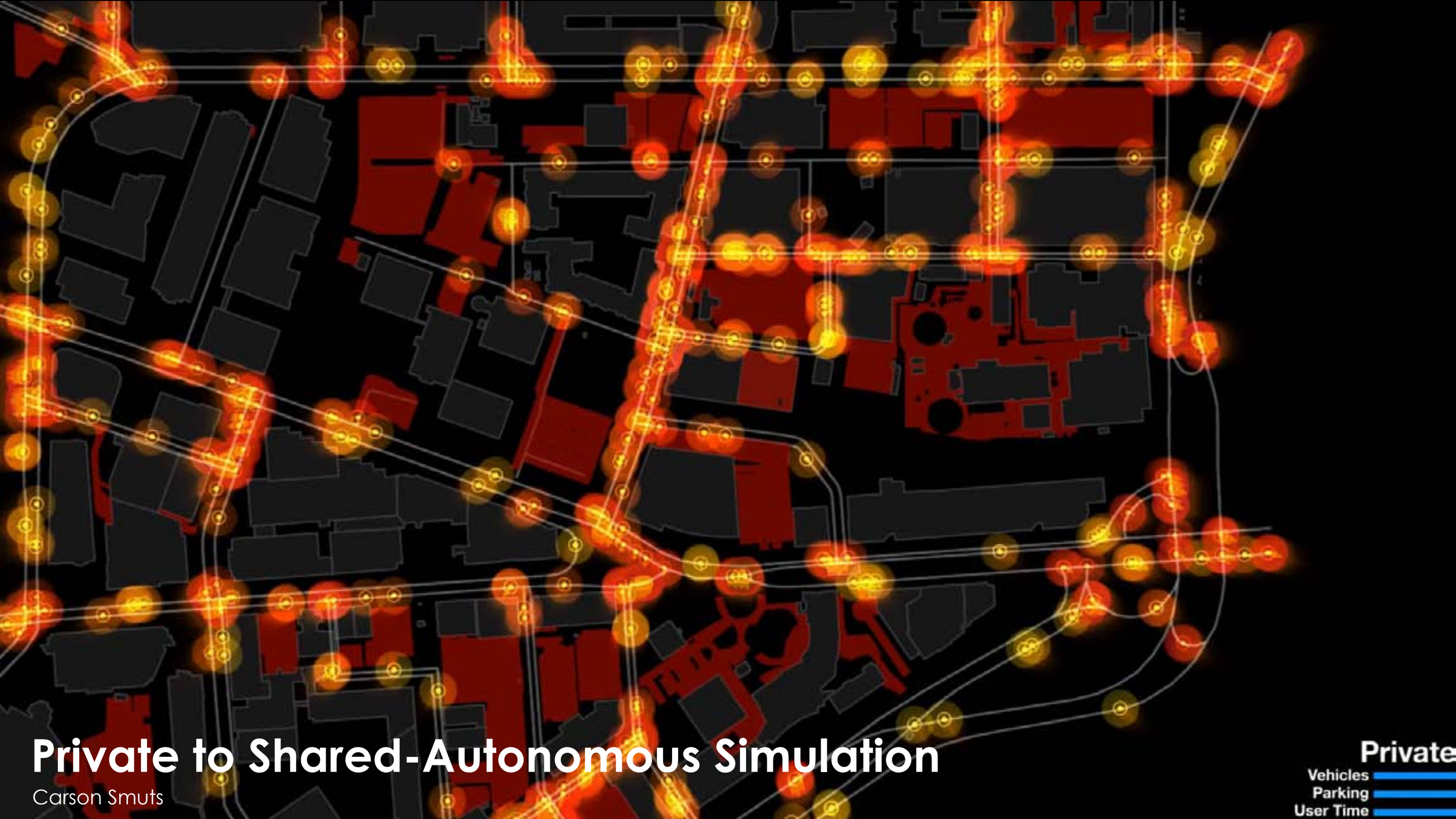
Shared eBikes



Mobility-on-Demand Modes

Shared eScooters

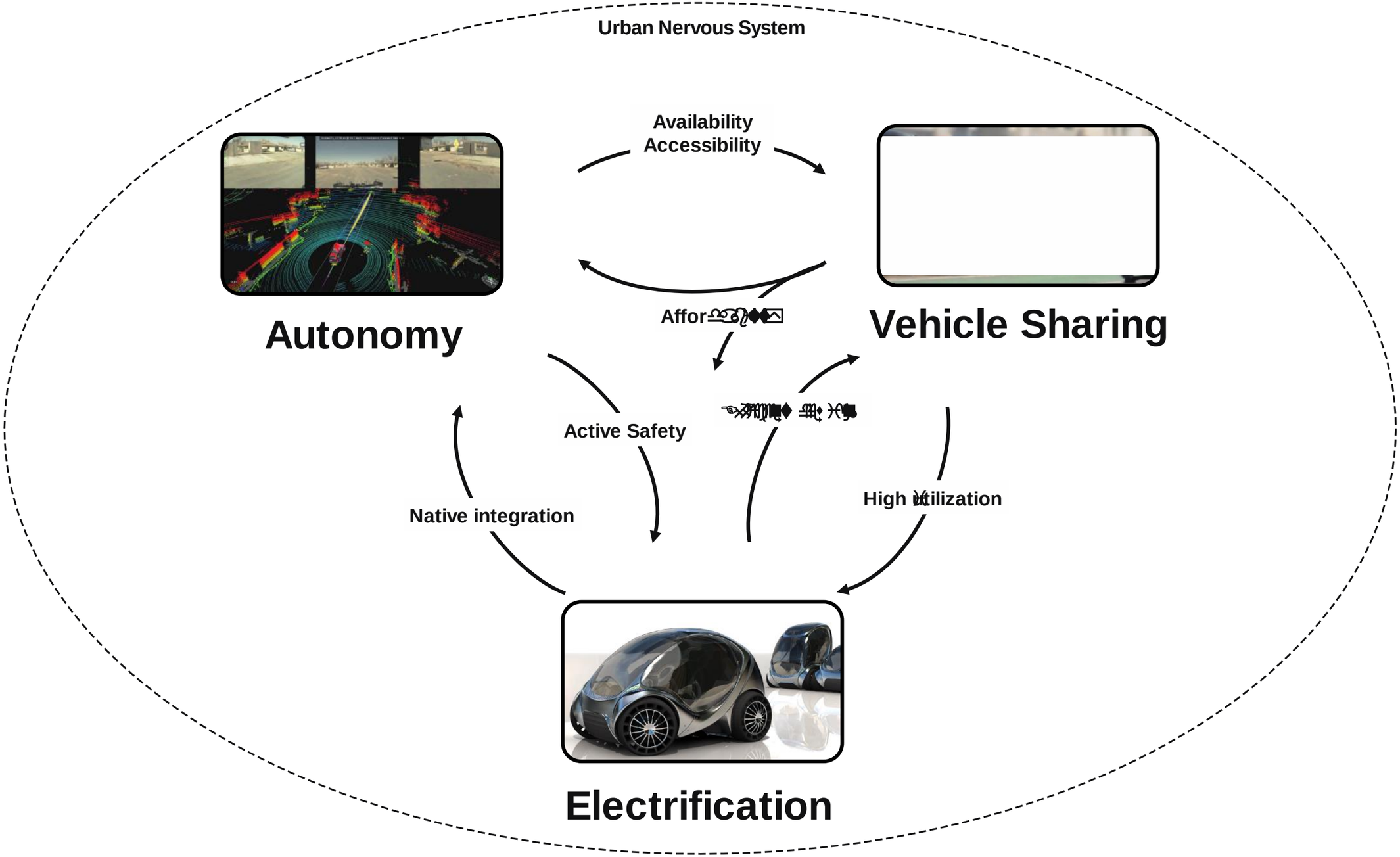
Autonomous Shared PEVs



Private to Shared-Autonomous Simulation

Carson Smuts

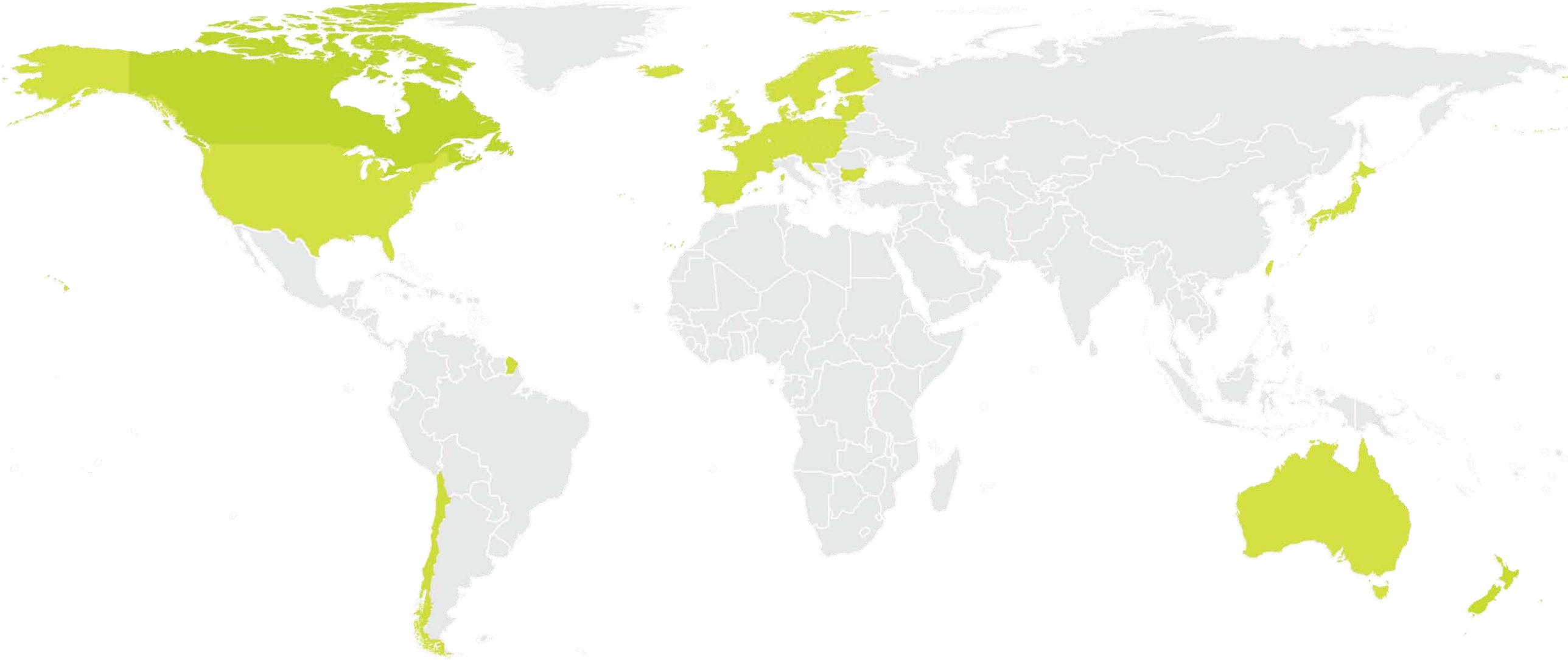
Sensor Networks



CityFARM

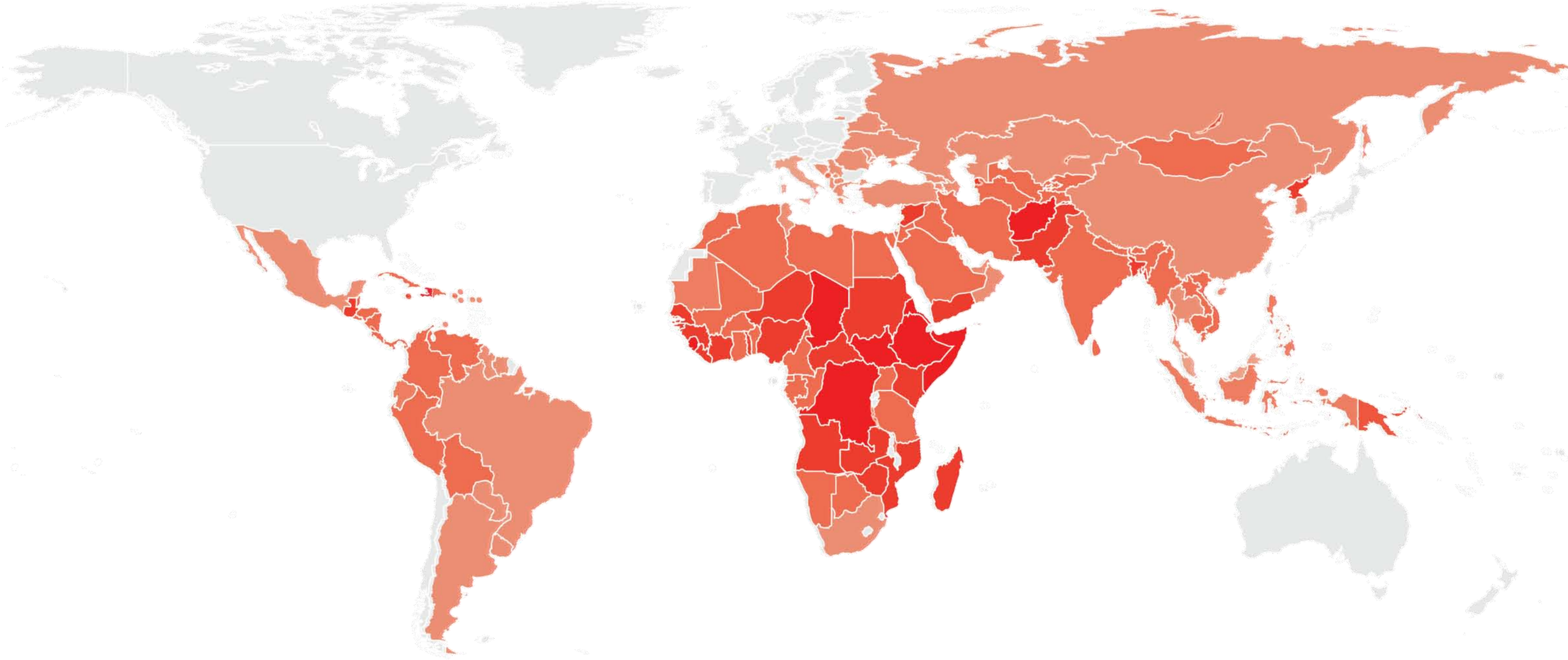
Why CityFARM?

Caleb Harper @MITCityFARM



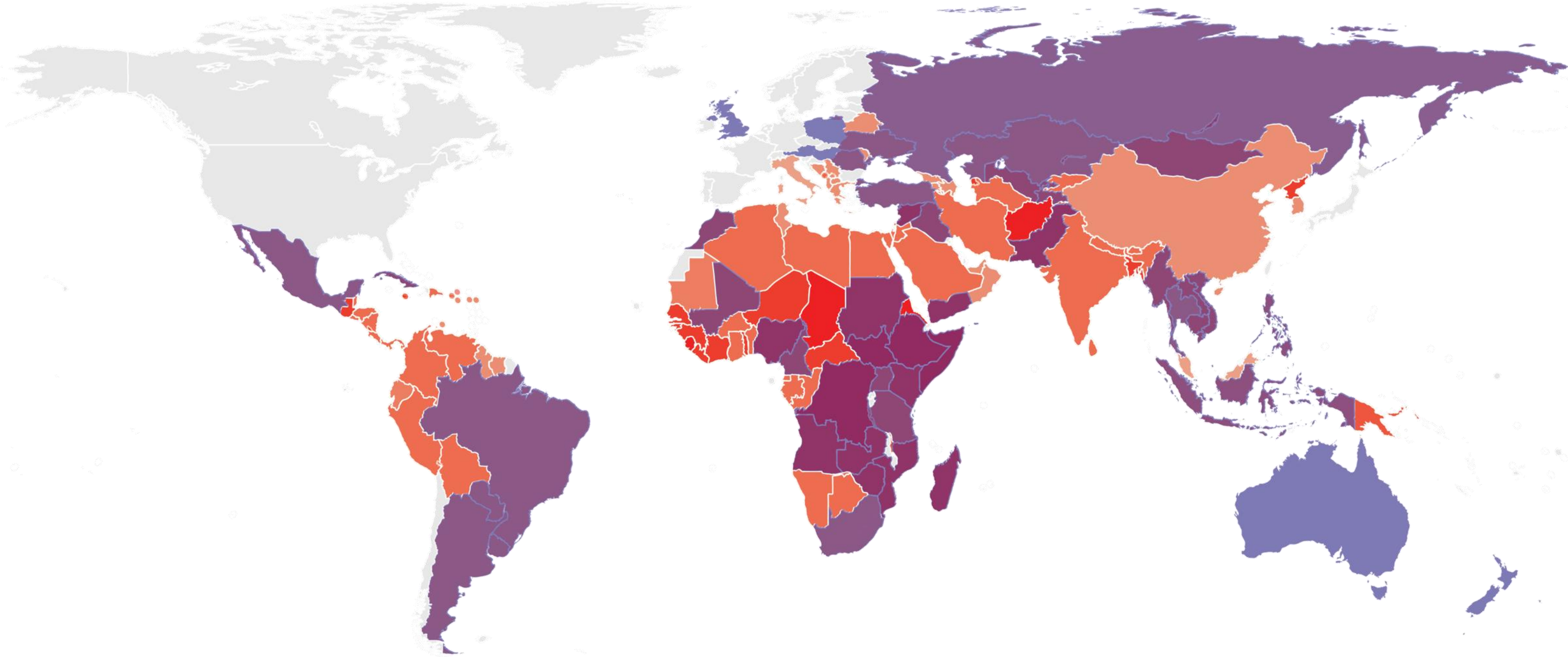
Food Secure Countries (2013)

Caleb Harper @MITCityFARM



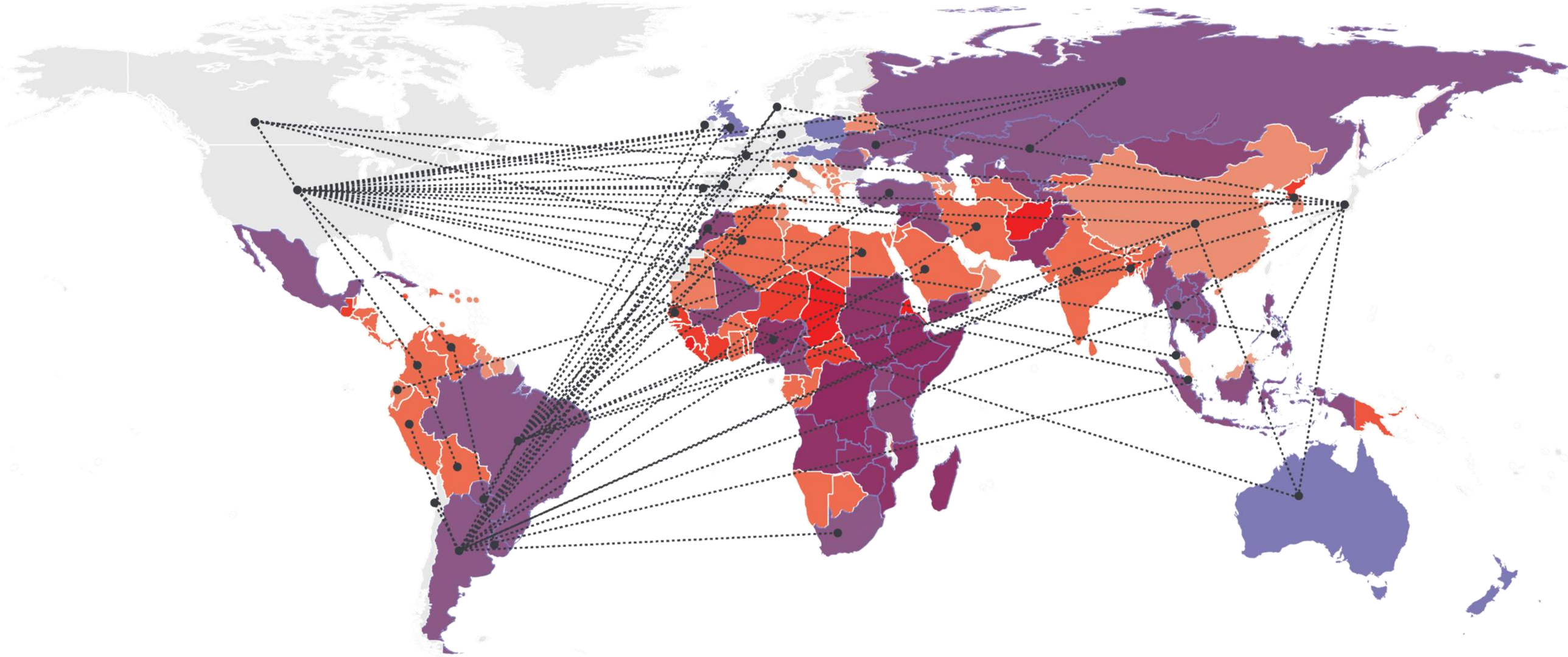
Food Insecure Countries (2013)

Caleb Harper @MITCityFARM



Food Colonies (purple)

Caleb Harper @MITCityFARM



Global Food Picture (2014)

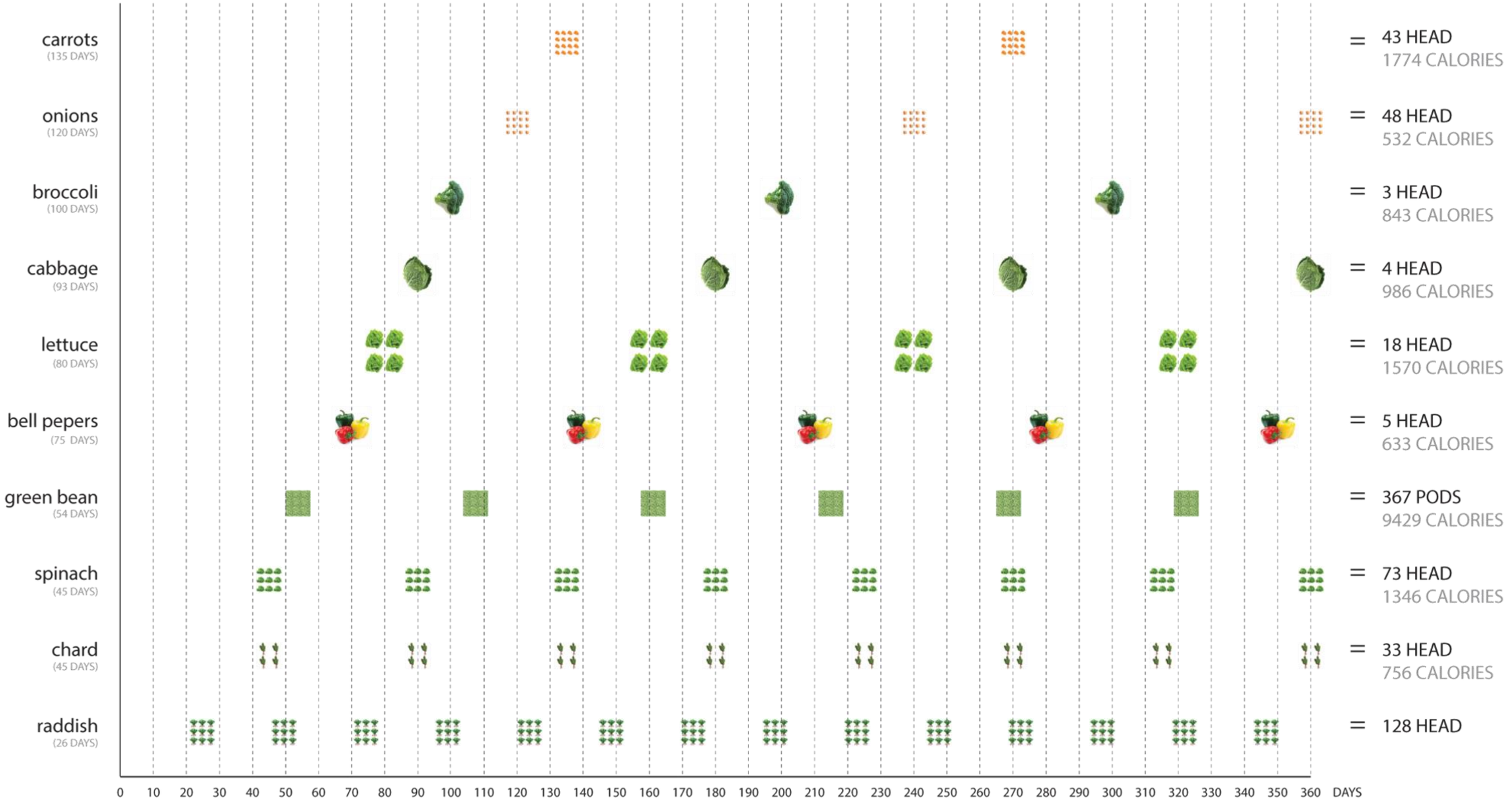
Caleb Harper @MITCityFARM

What if cities produced more of what they consumed?

Caleb Harper @MITCityFARM

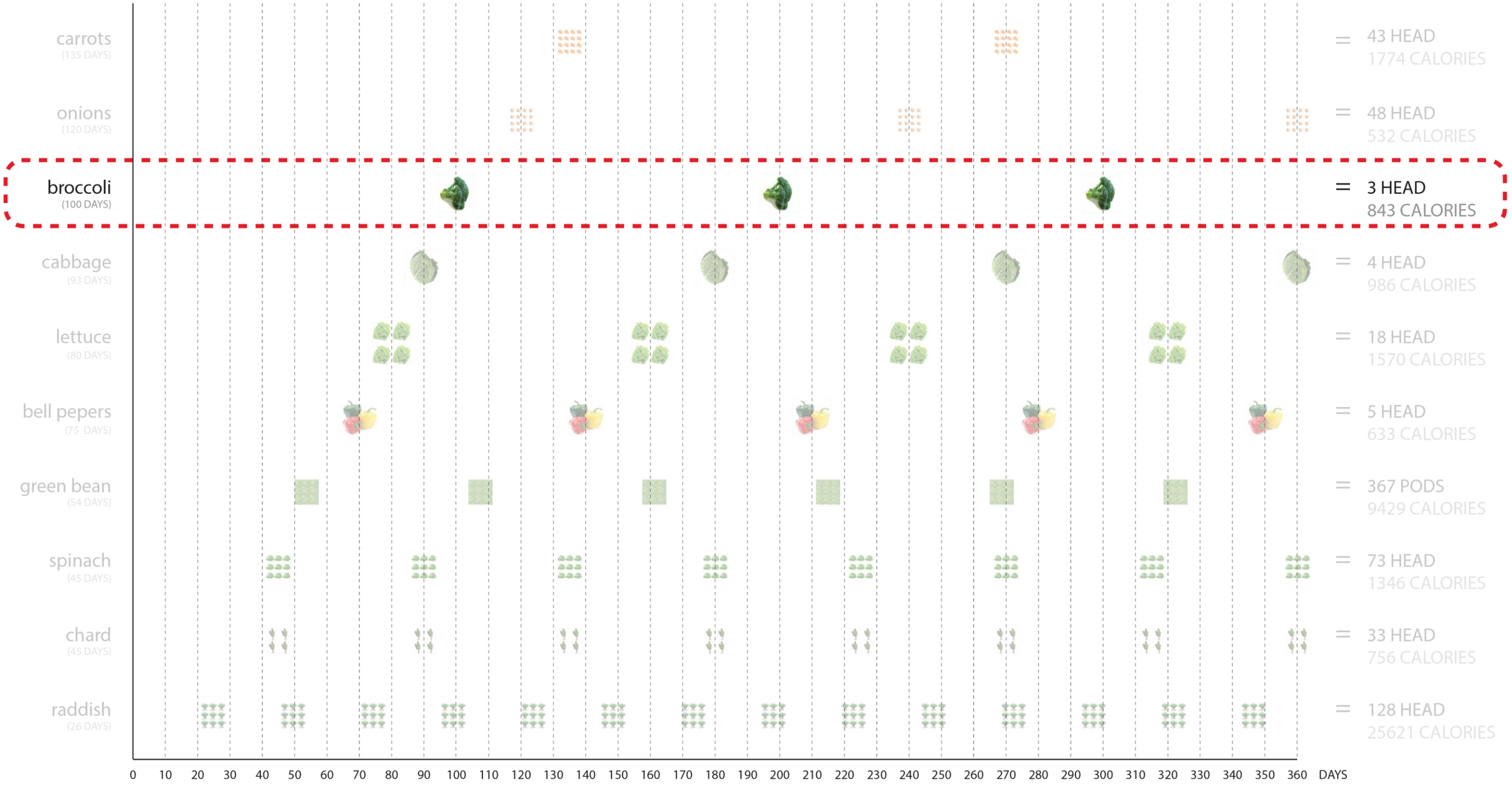
Advanced Growing Technology

NASA, Caleb Harper @MITCityFARM



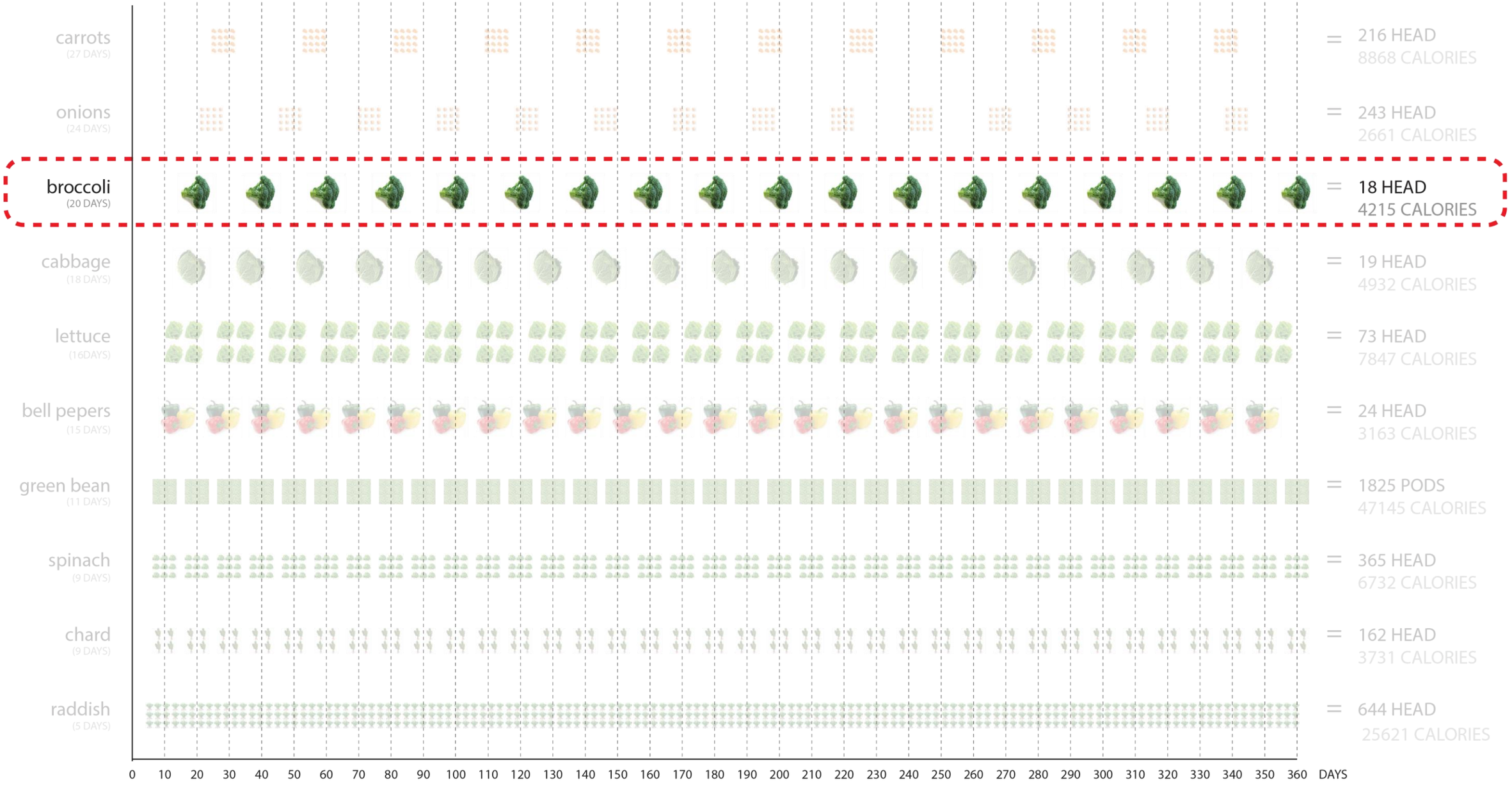
Soil Metrics

Caleb Harper @MITCityFARM



Soil Metrics

Caleb Harper @MITCityFARM

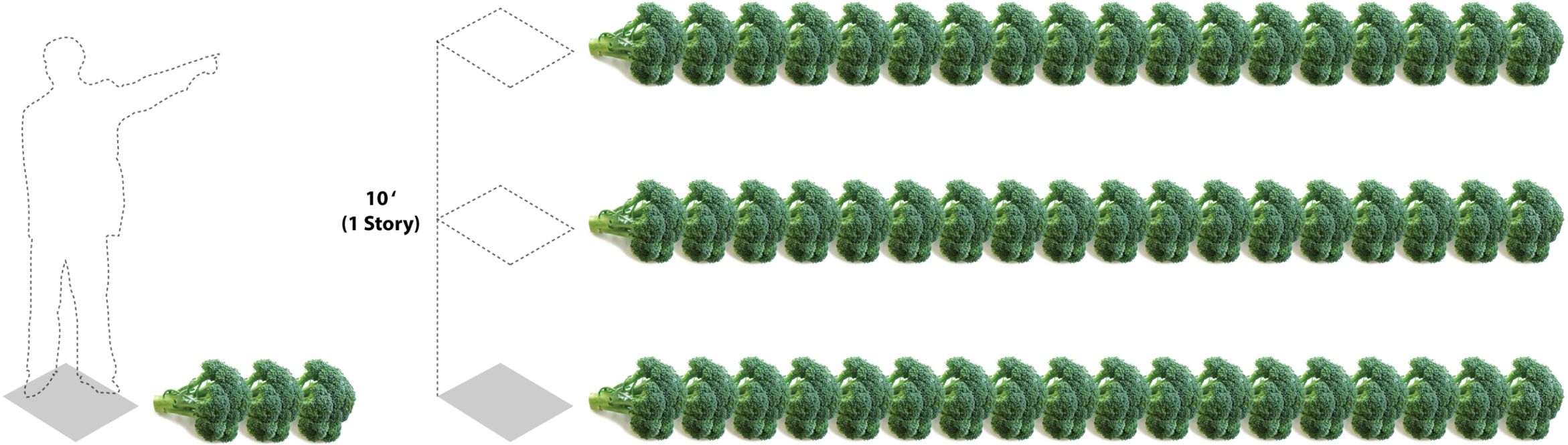


Aeroponic Metrics (5x)

NASA, Caleb Harper @MITCityFARM

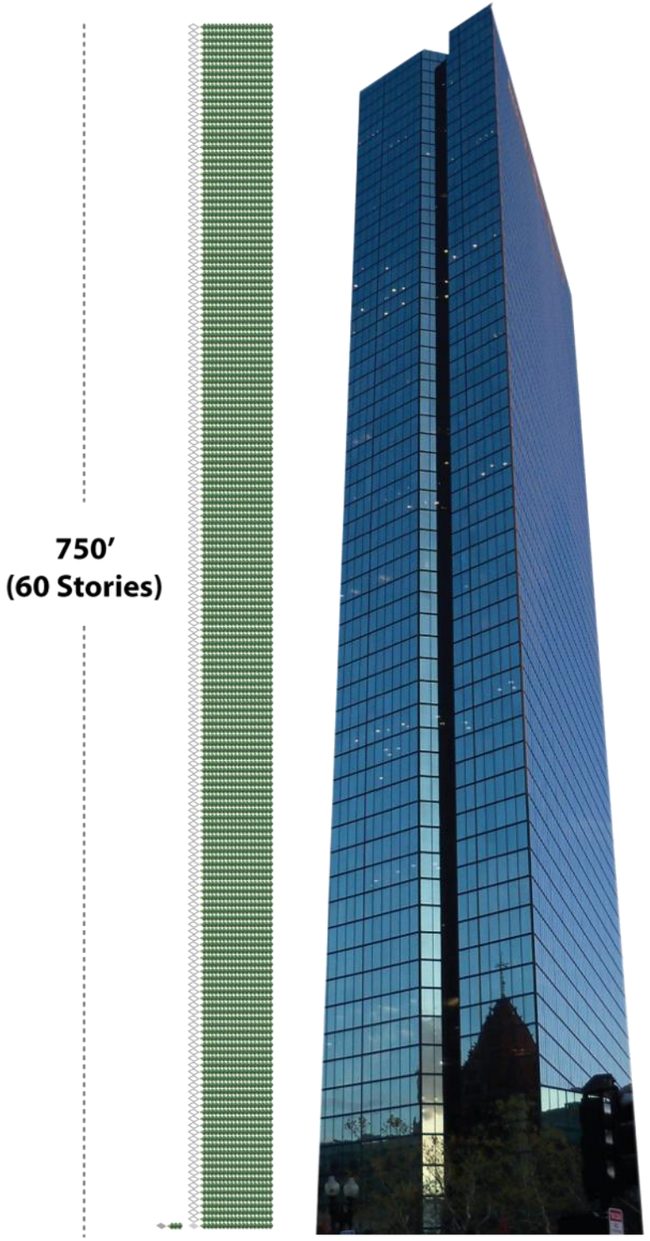
Soil = 3 Aeroponics = 18 (5x)

Caleb Harper @MITCityFARM



Soil = 3 Aeroponics = 54 (18X)

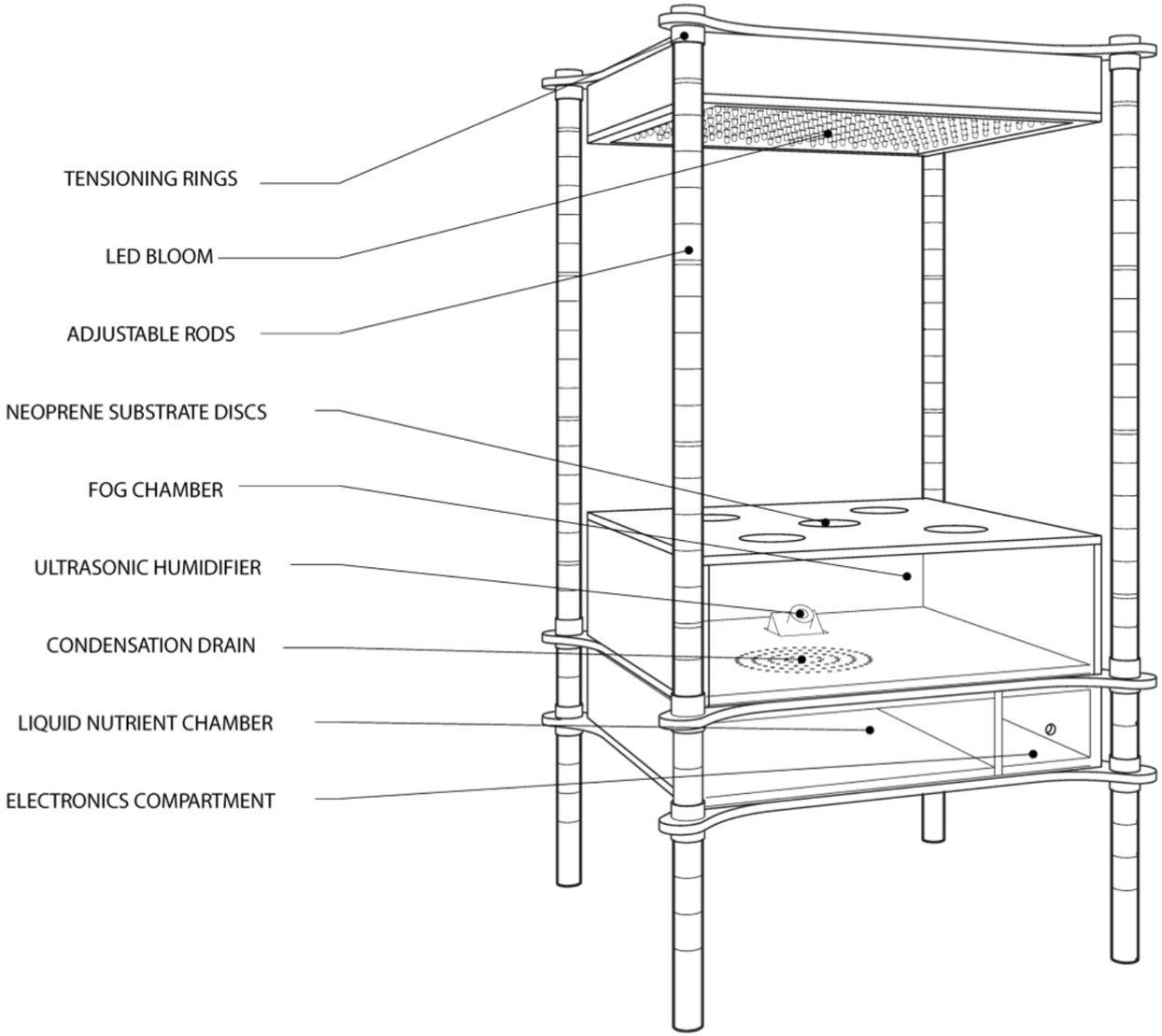
Caleb Harper @MITCityFARM



Soil = 3 Aeroponics = 3,240 (1080X)

NASA, Caleb Harper @MITCityFARM

Yea…ok…but PROVE IT



Demo or Die (2012) – v1.0

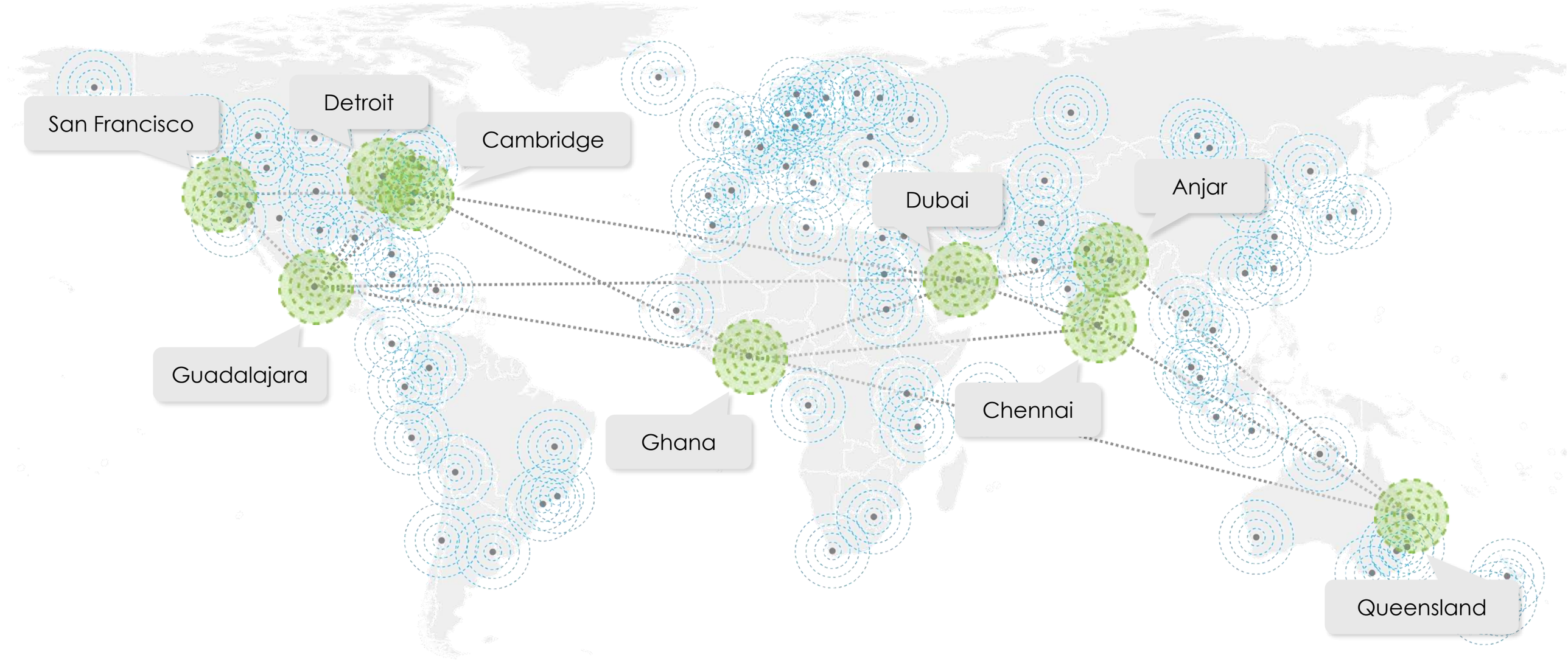
Caleb Harper @MITCityFARM

Demo or Die (2014) – v2.5

Caleb Harper, Camille Richman, Sophie Jaffee, Emma Feshbach, Preethi Vaidyanath, Elaine Kung

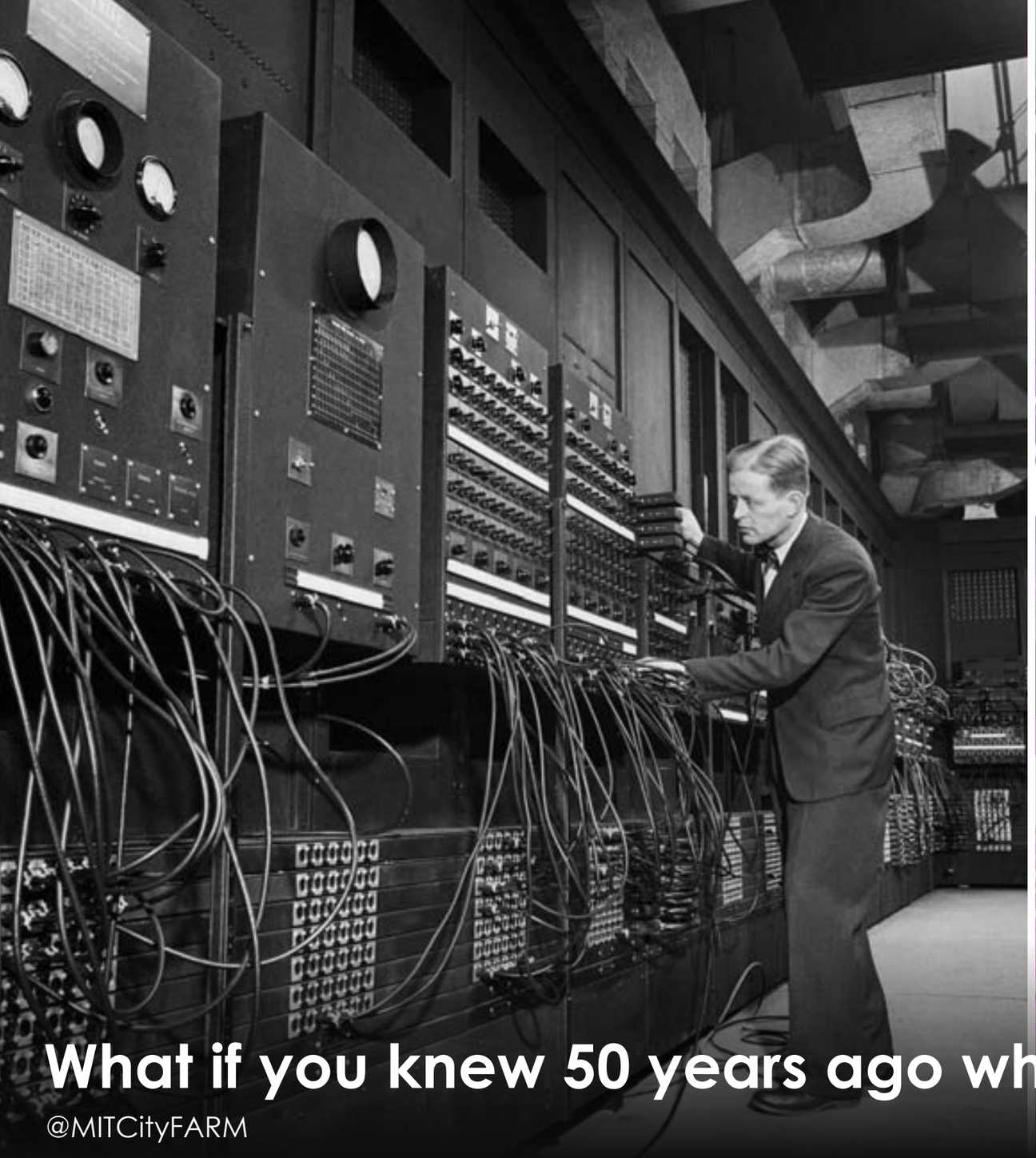
Demo or Die (2014) – v2.5

Caleb Harper, Jason Nawyn, Rich Fletcher, Emma Feshbech, Preethi Vaidyanathan, Camille Richman, Li Haung, Sophia Jaffee Elaine Kung



What if we farm in the cloud? (deploy or die)

@MITCityFARM



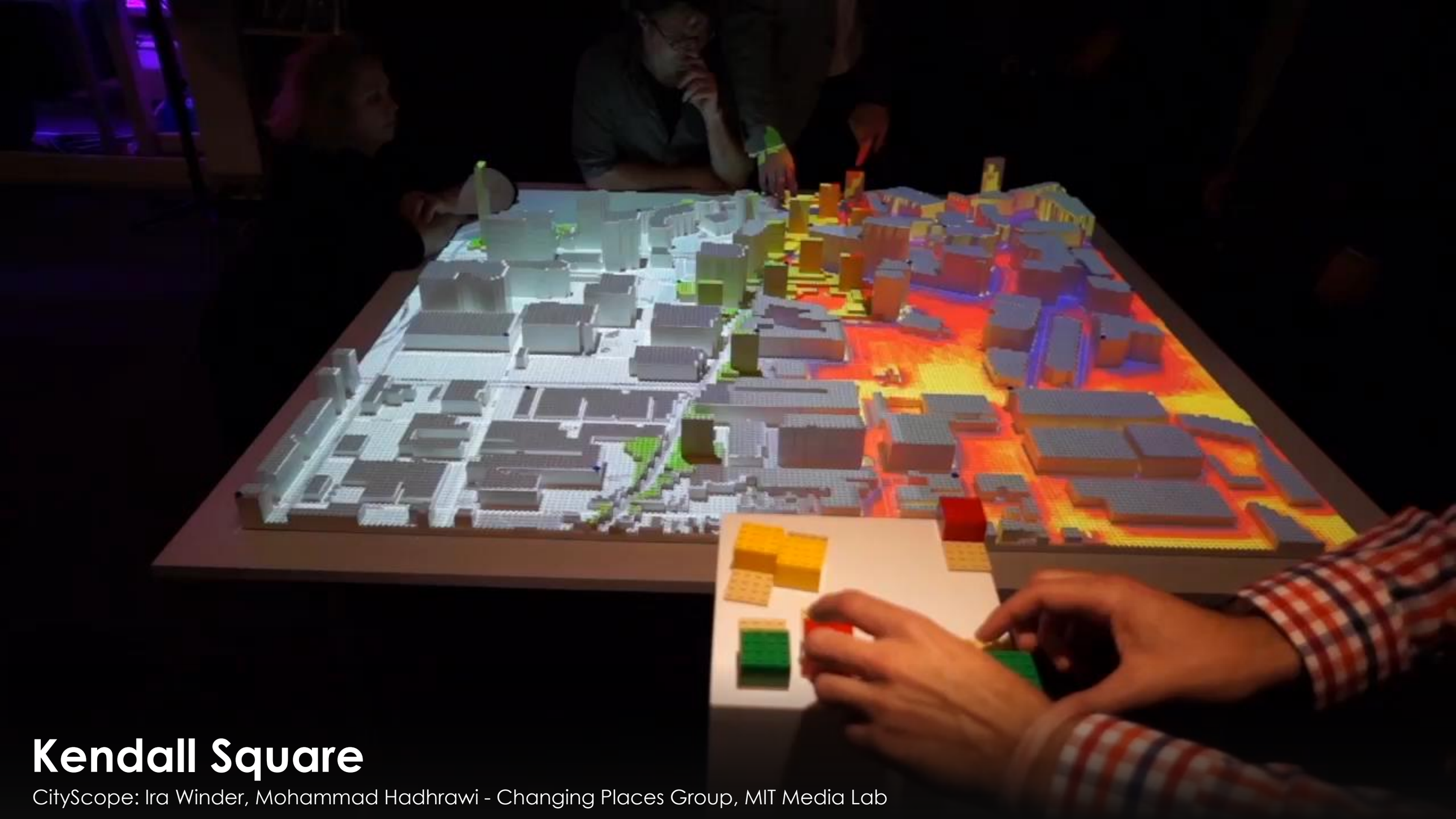
What if you knew 50 years ago where computers would be today?

@MITCityFARM

CityScope

Modeling Form/Function

Changing Places Group, MIT Media Lab

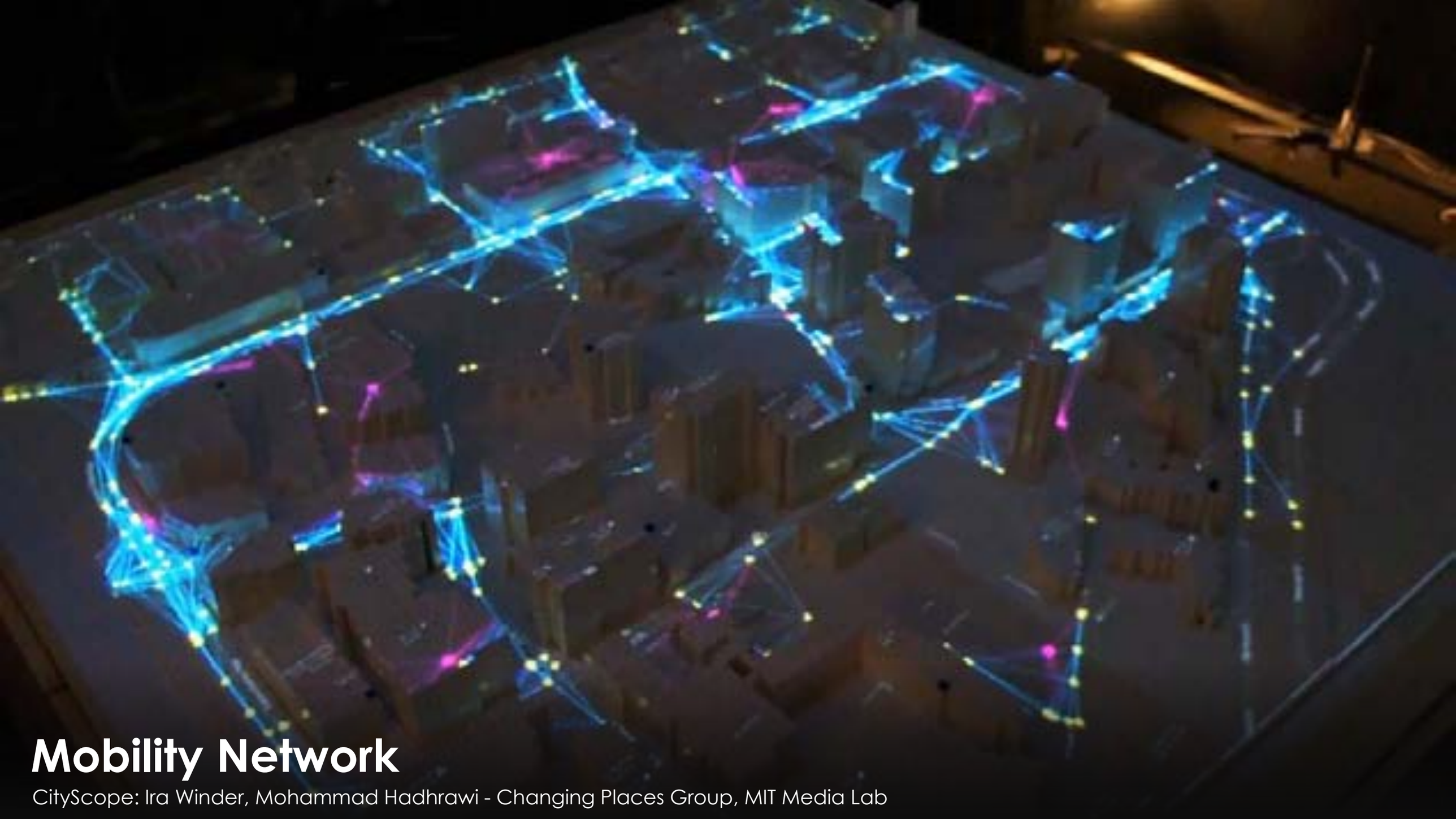


Kendall Square

CityScope: Ira Winder, Mohammad Hadhrawi - Changing Places Group, MIT Media Lab

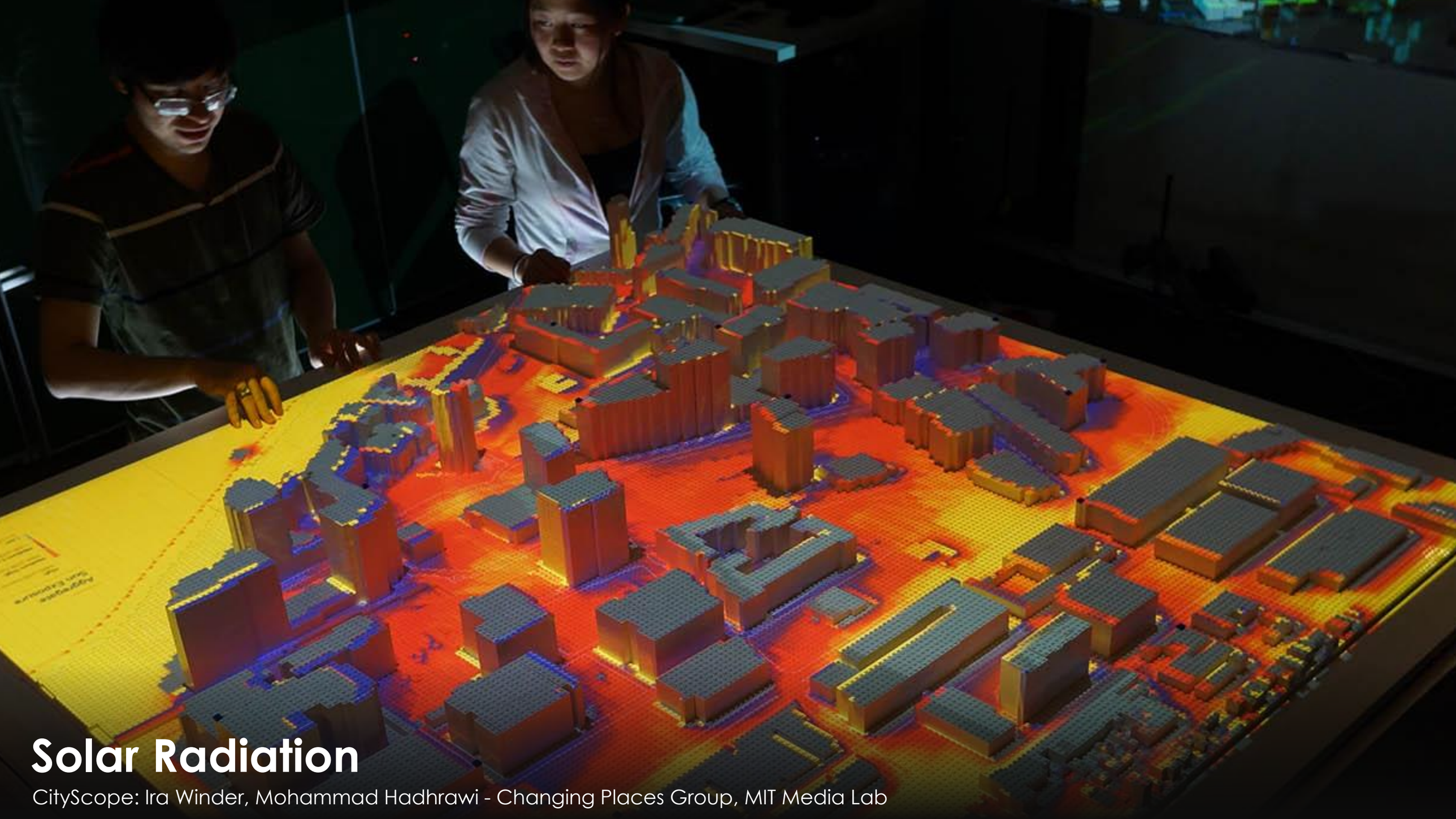
Satellite View

CityScope: Ira Winder, Mohammad Hadhrawi - Changing Places Group, MIT Media Lab



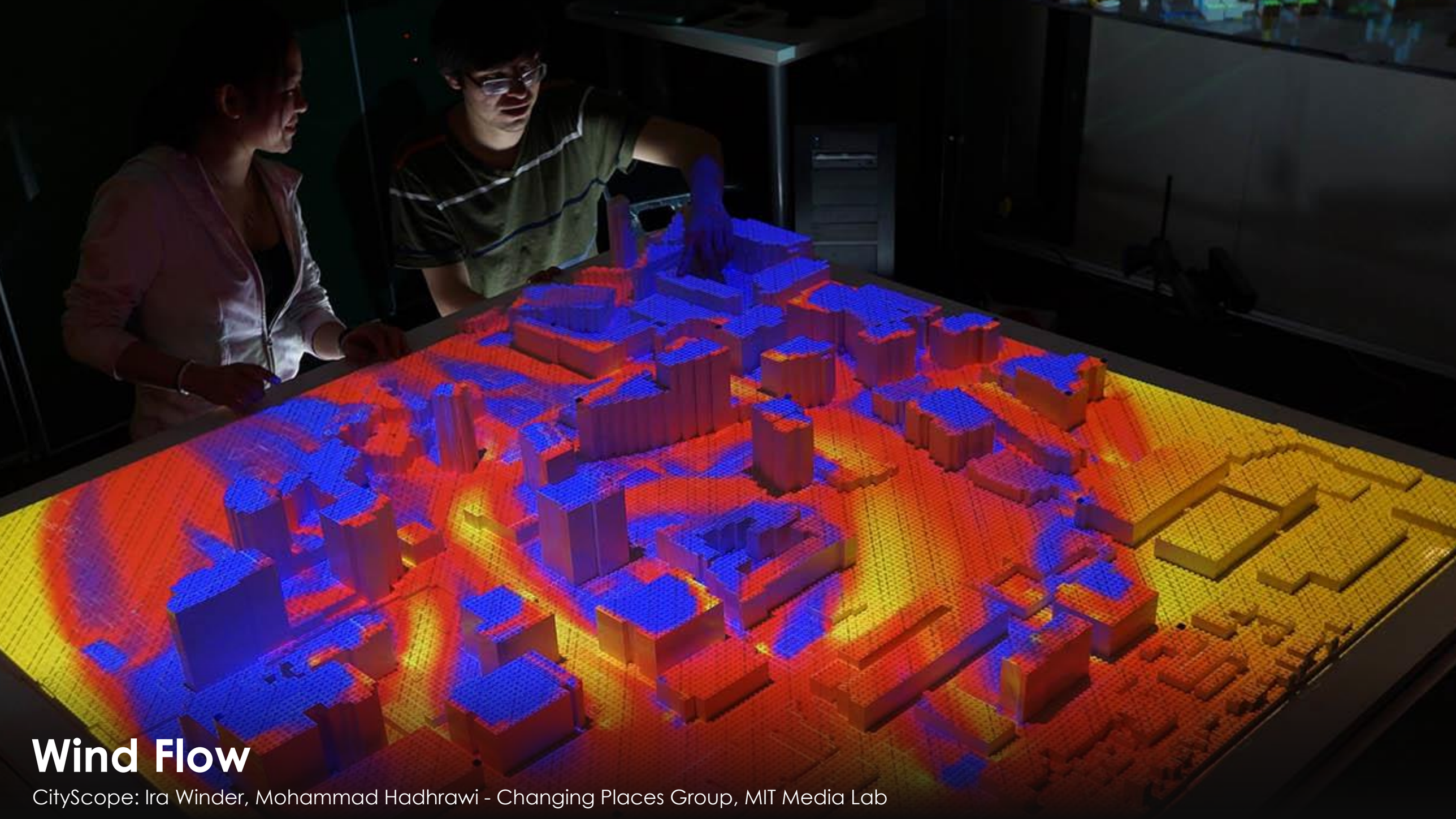
Mobility Network

CityScope: Ira Winder, Mohammad Hadhrawi - Changing Places Group, MIT Media Lab



Solar Radiation

CityScope: Ira Winder, Mohammad Hadhrawi - Changing Places Group, MIT Media Lab



Wind Flow

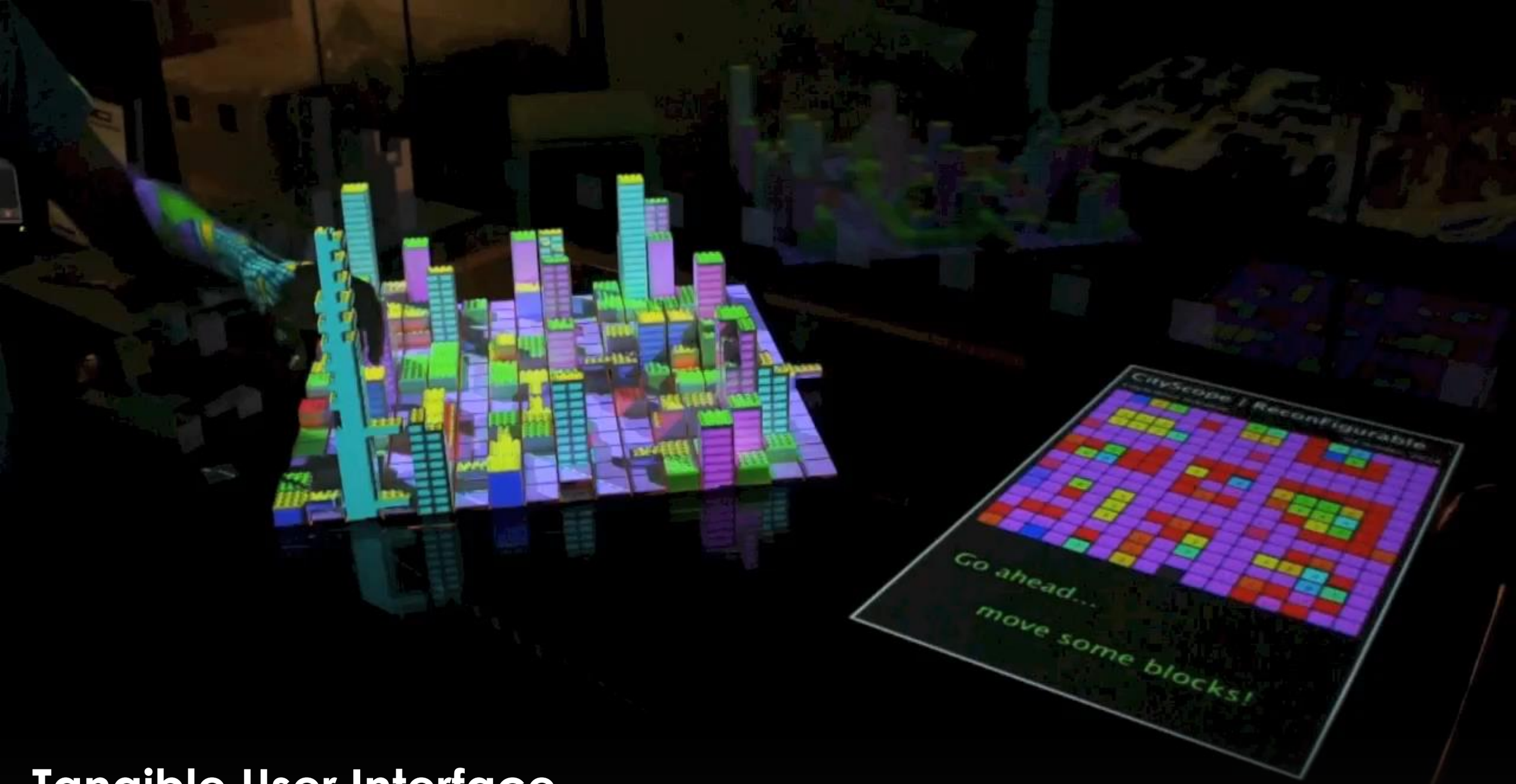
CityScope: Ira Winder, Mohammad Hadhrawi - Changing Places Group, MIT Media Lab

Venture Capital

CityScope: Ira Winder, Mohammad Hadhrawi, Context Labs - Changing Places Group, MIT Media Lab

Twitter Activity

CityScope: Ira Winder, Mohammad Hadhrawi, Carson Smuts - Changing Places Group, MIT Media Lab

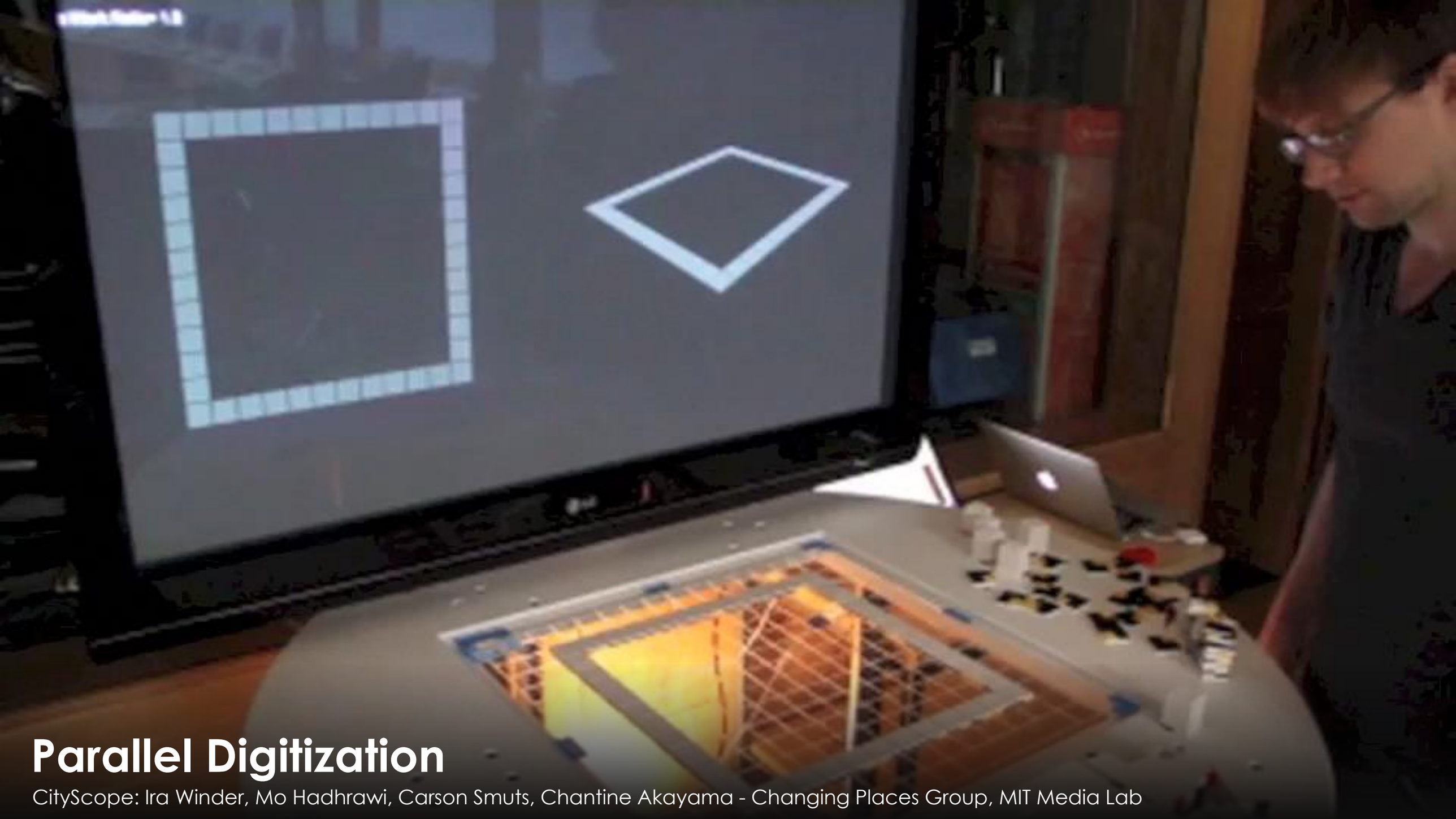


Tangible User Interface

CityScope: Ira Winder, Joshua Fabian, Grady Sain, Chantine Akayama - Changing Places Group, MIT Media Lab

Interactive Land Use Planning

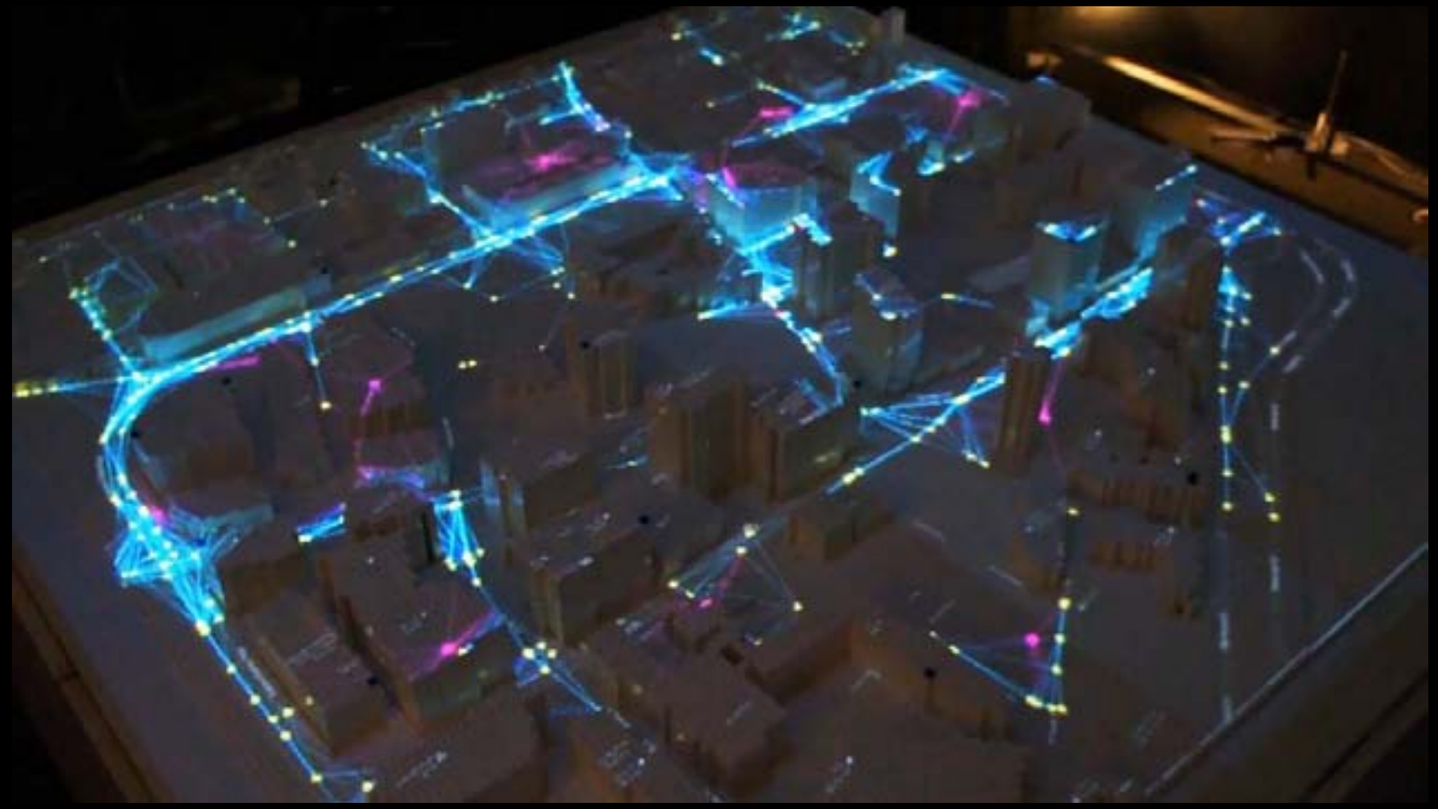
CityScope: Ira Winder, Josh Fabian - Changing Places Group, MIT Media Lab



Parallel Digitization

CityScope: Ira Winder, Mo Hadhrawi, Carson Smuts, Chantine Akayama - Changing Places Group, MIT Media Lab

Static Scale Model



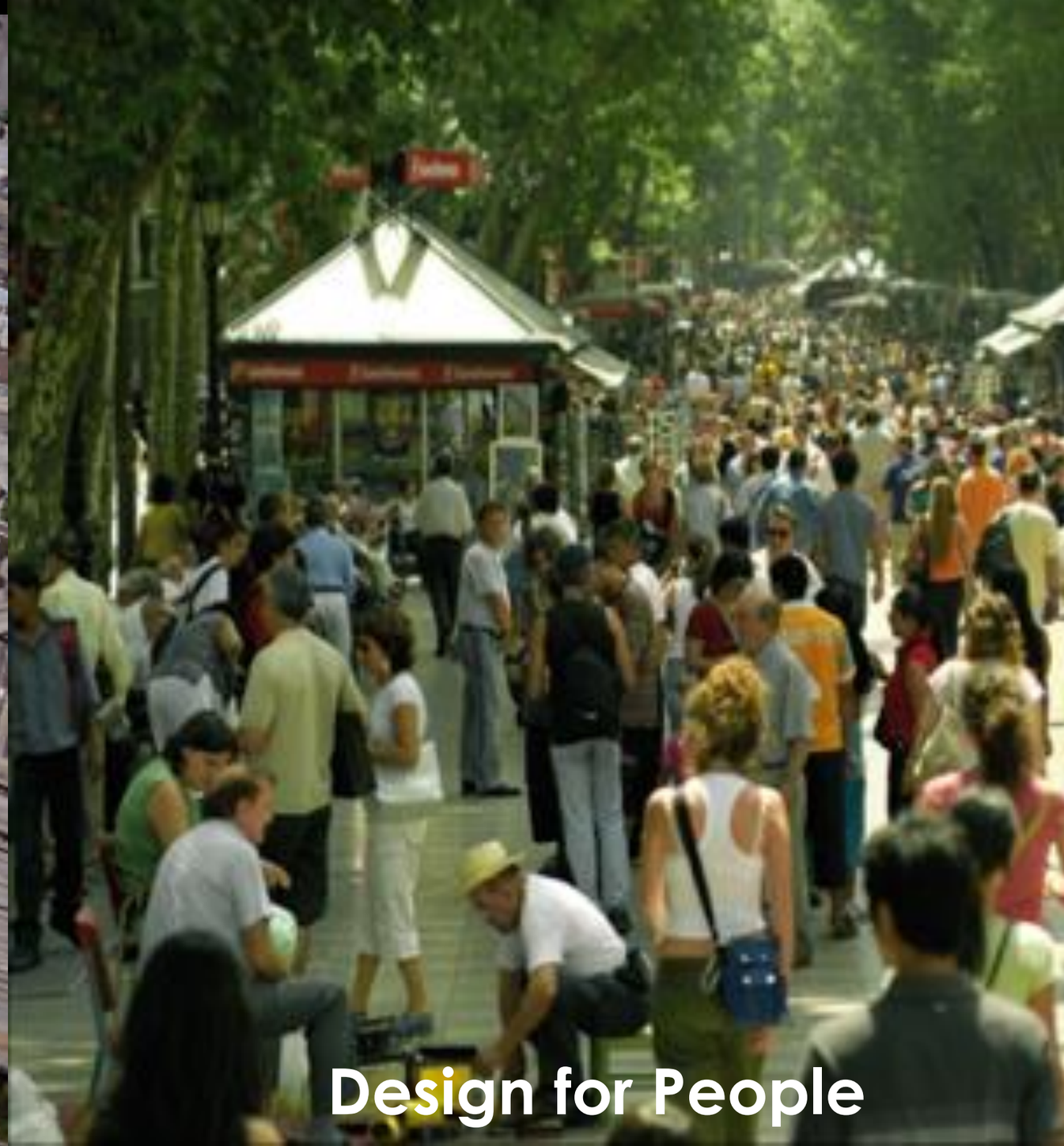
Dynamic Scale Model

What enables innovative entrepreneurial, high-performance cities?

Design for Machines

Design for Machines

Design for Machines


Design for People

Design for Machines

A compact, diverse, walkable, community with strong social ties

+

New Urban Systems

=

Innovation

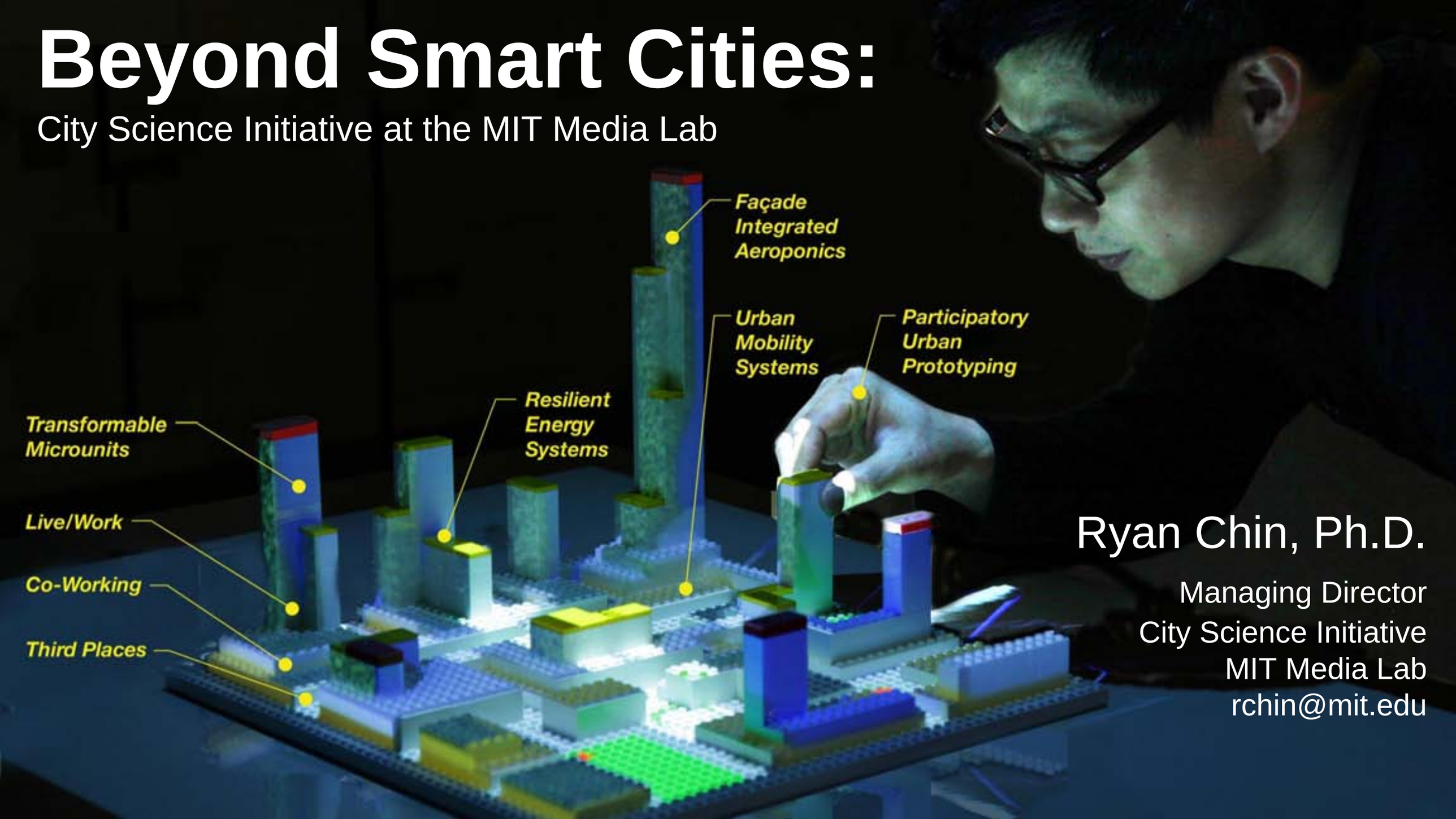
"eco" city
"green" city
"sustainable" city
"smart" city
"intelligent" city
"low-carbon" city
...
(by default)

Design for People

Cities are for people, not machines (add technology when useful)

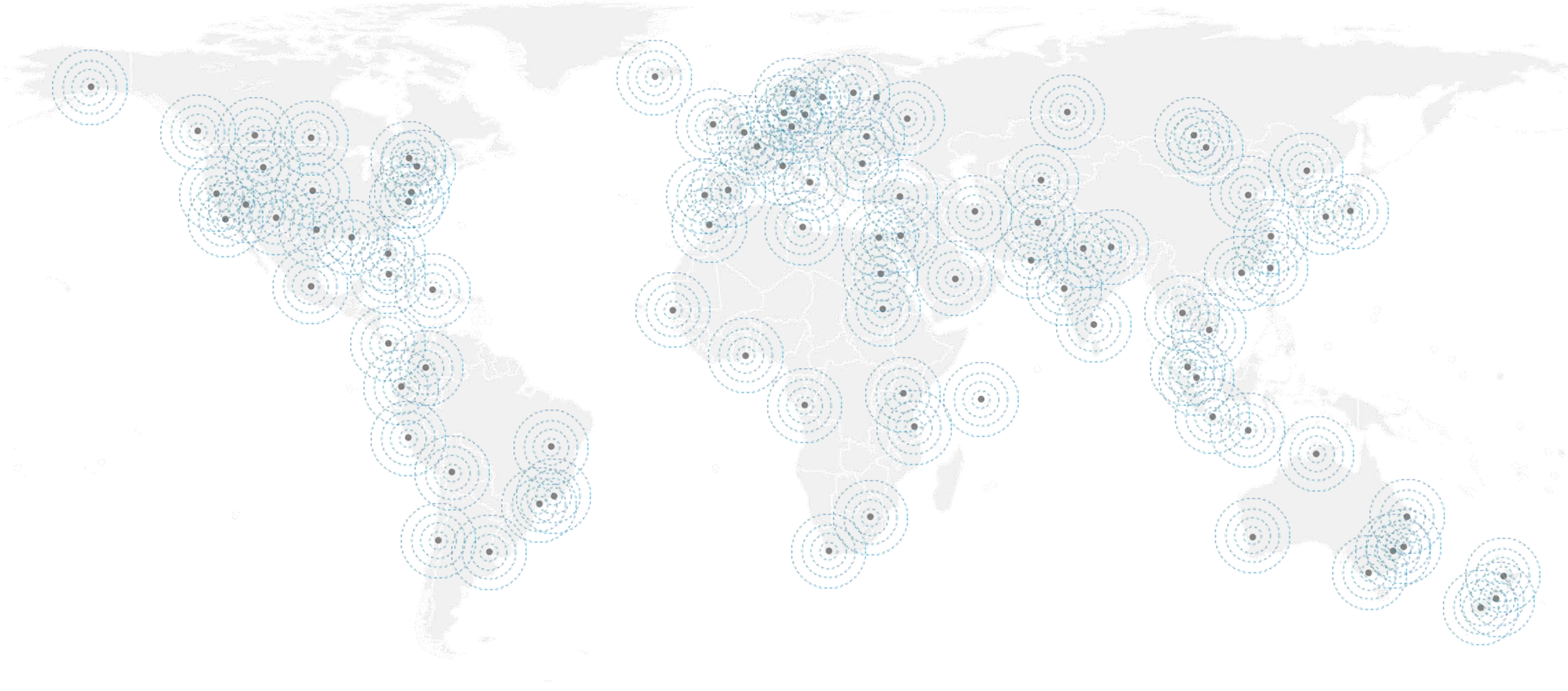
Beyond Smart Cities:

City Science Initiative at the MIT Media Lab



Ryan Chin, Ph.D.

Managing Director
City Science Initiative
MIT Media Lab
rchin@mit.edu



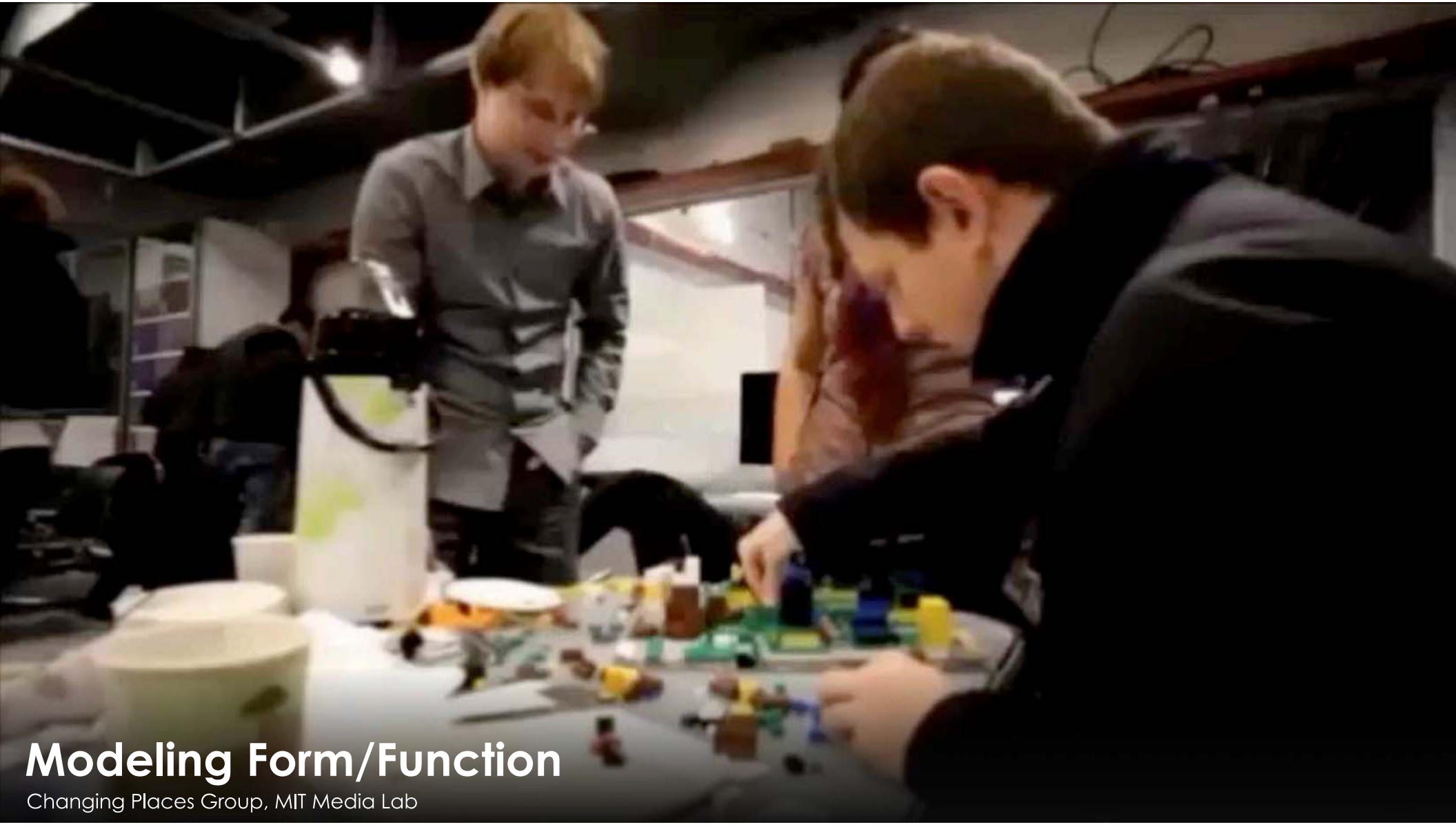
What if we farm in the cloud? (deploy or die)

Caleb Harper @MITCityFARM

CityScope

cp.media.mit.edu/city-simulation

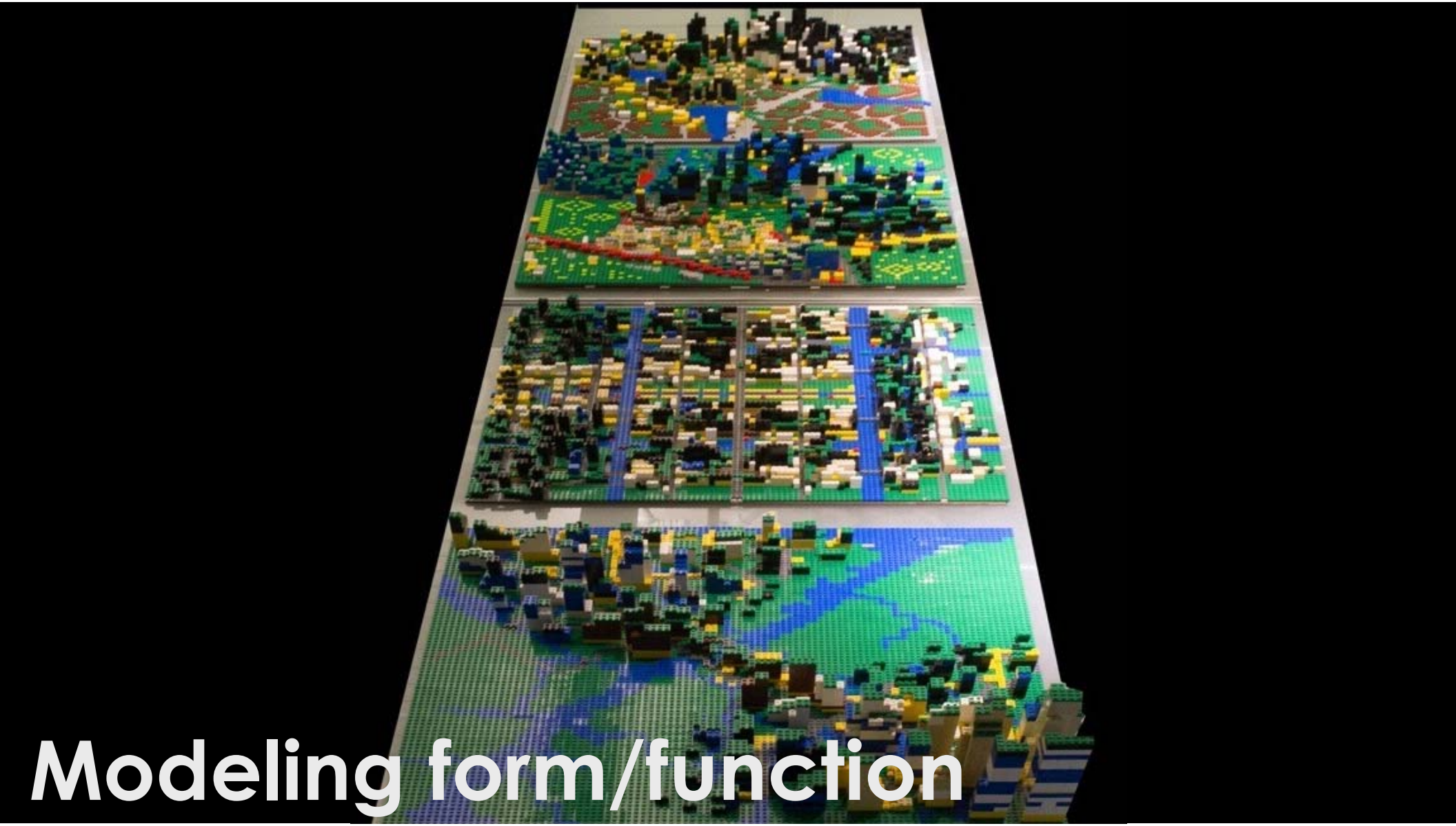
Ira Winder | @irawinder
MIT Media Lab



Modeling Form/Function

Changing Places Group, MIT Media Lab

Modeling with Data (LEGO) Units



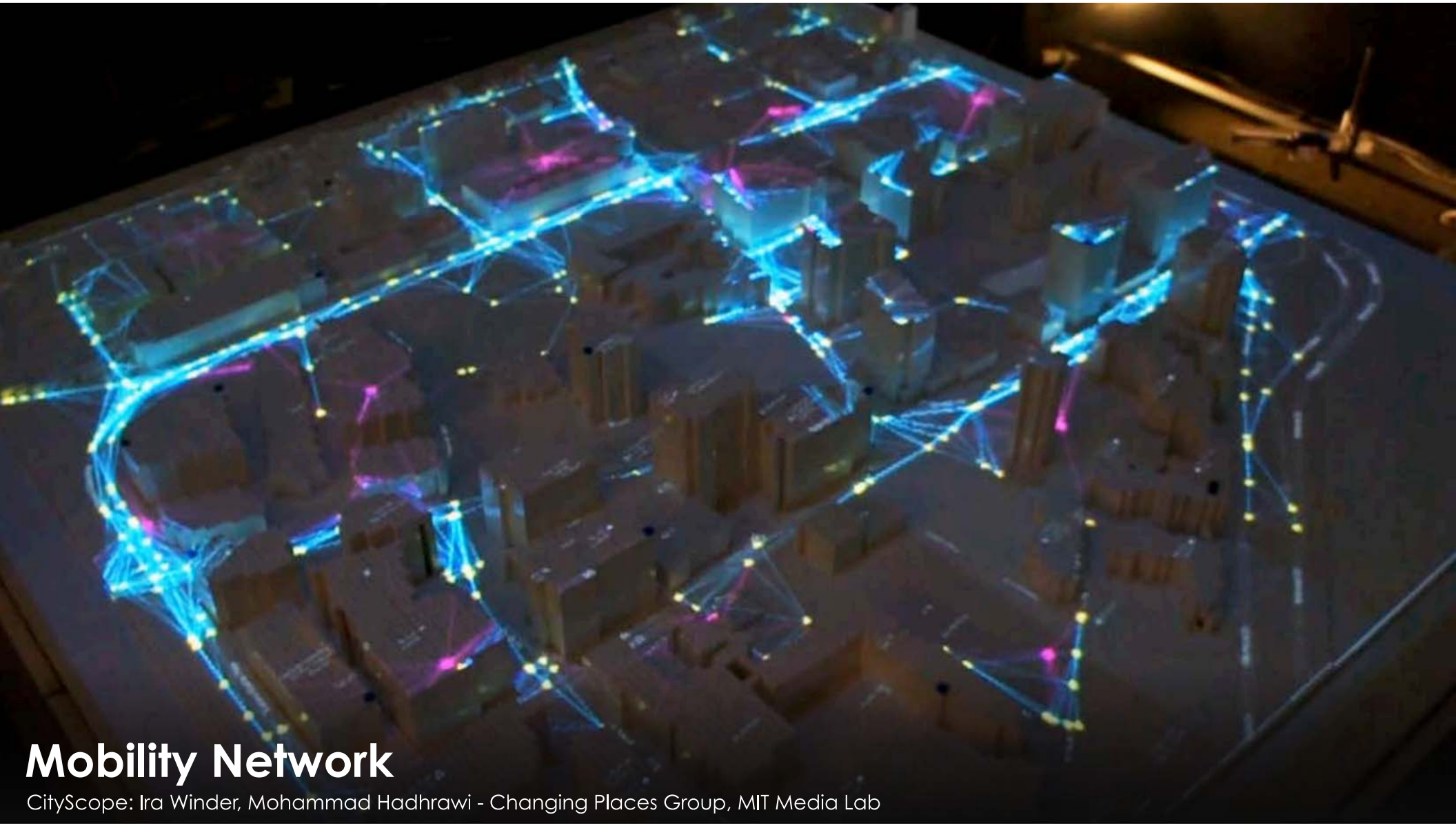
Modeling form/function

Kendall Square

CityScope: Ira Winder, Mohammad Hadhrawi - Changing Places Group, MIT Media Lab

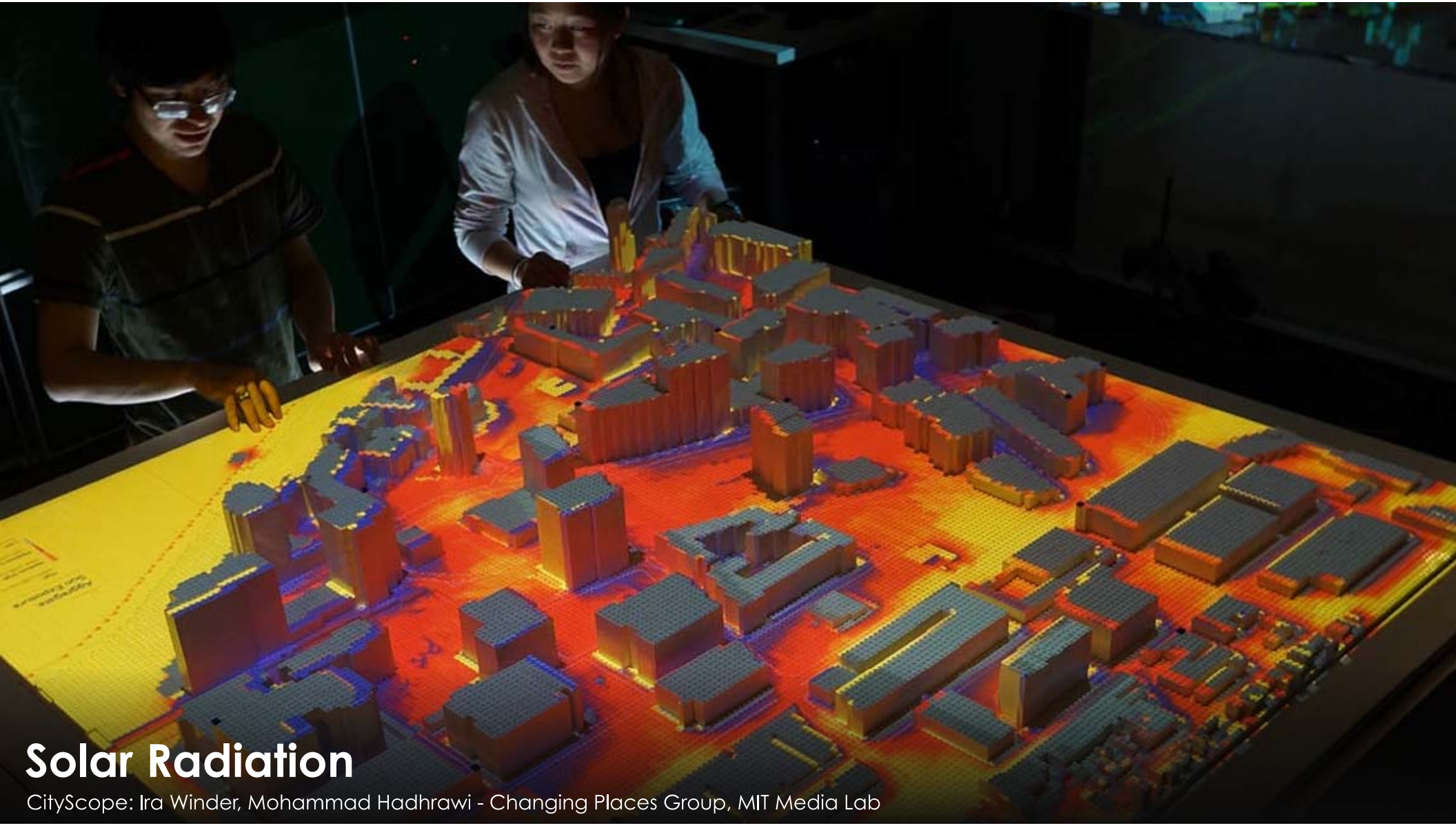
Satellite View

CityScope: Ira Winder, Mohammad Hadhrawi - Changing Places Group, MIT Media Lab



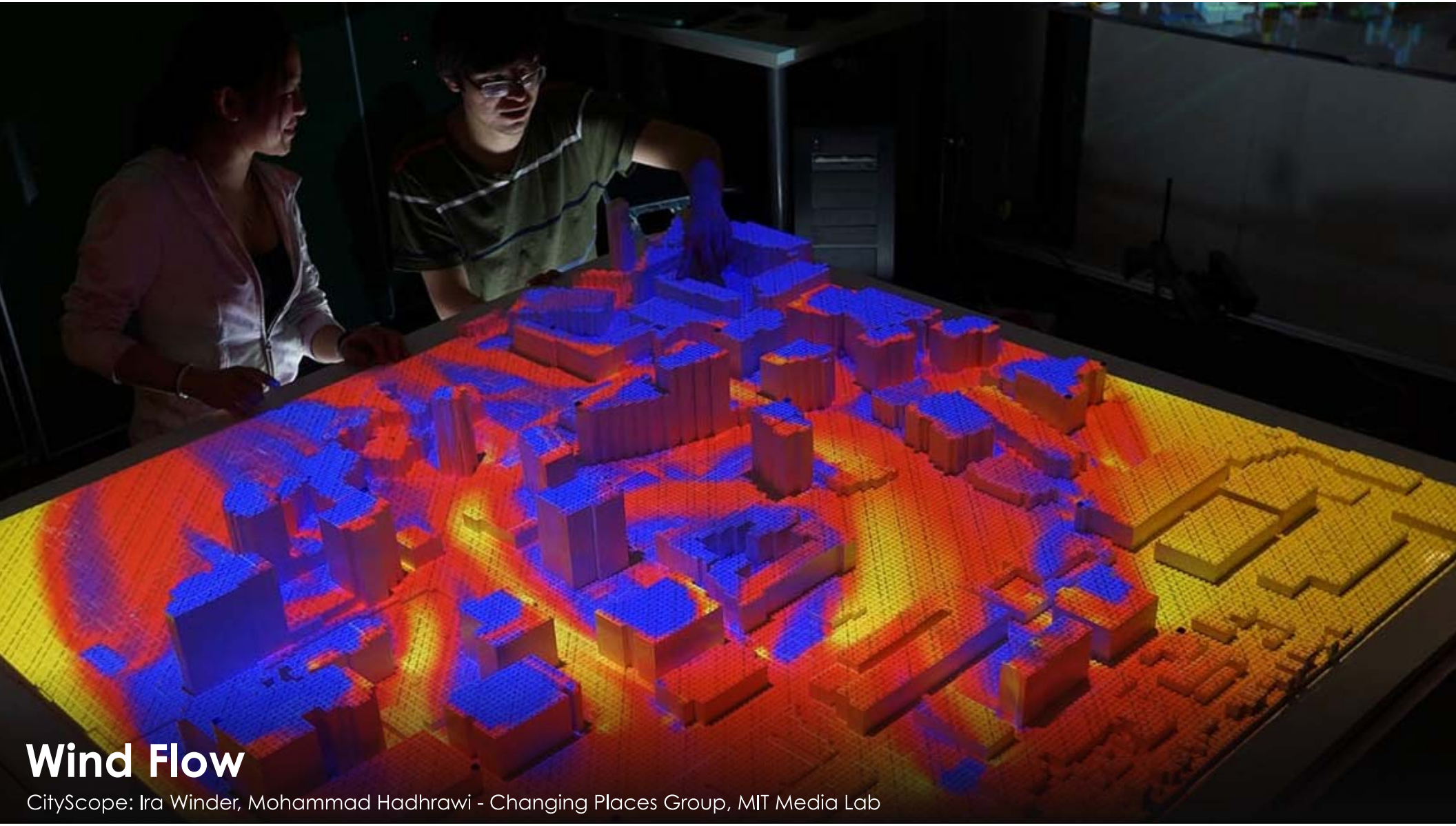
Mobility Network

CityScope: Ira Winder, Mohammad Hadhrawi - Changing Places Group, MIT Media Lab



Solar Radiation

CityScope: Ira Winder, Mohammad Hadhrawi - Changing Places Group, MIT Media Lab

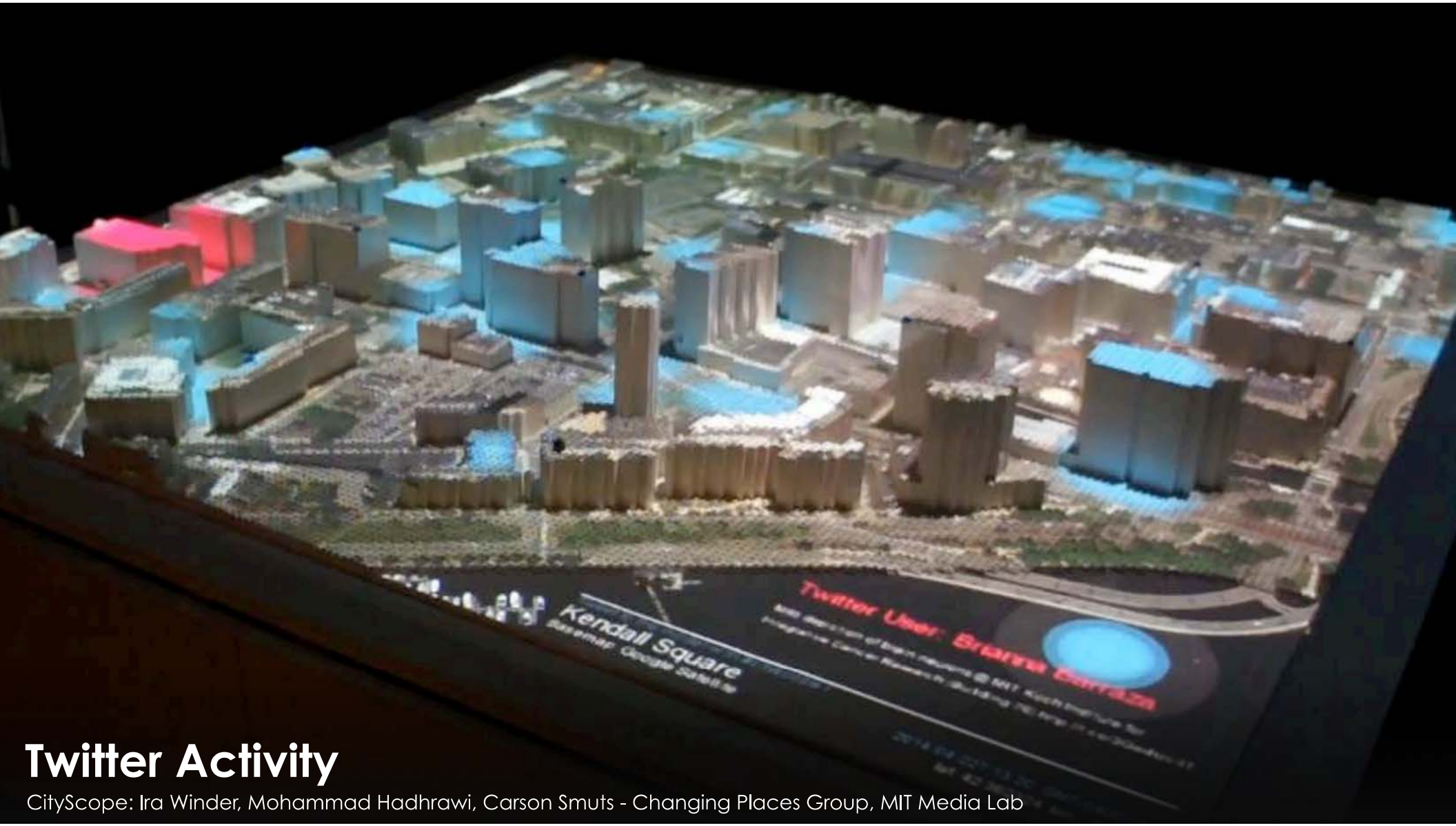


Wind Flow

CityScope: Ira Winder, Mohammad Hadhrawi - Changing Places Group, MIT Media Lab

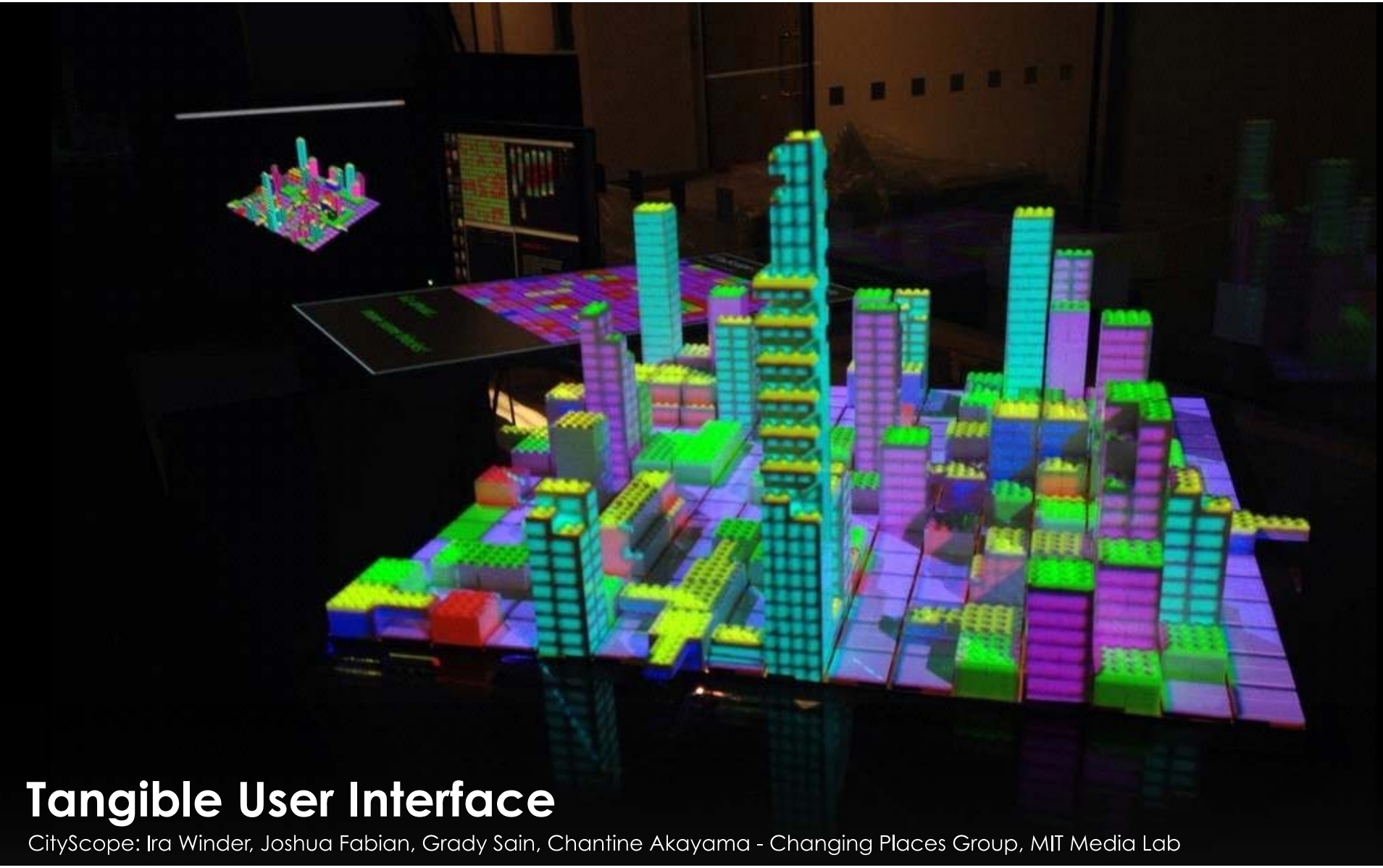
Venture Capital

CityScope: Ira Winder, Mohammad Hadhrawi, Context Labs - Changing Places Group, MIT Media Lab



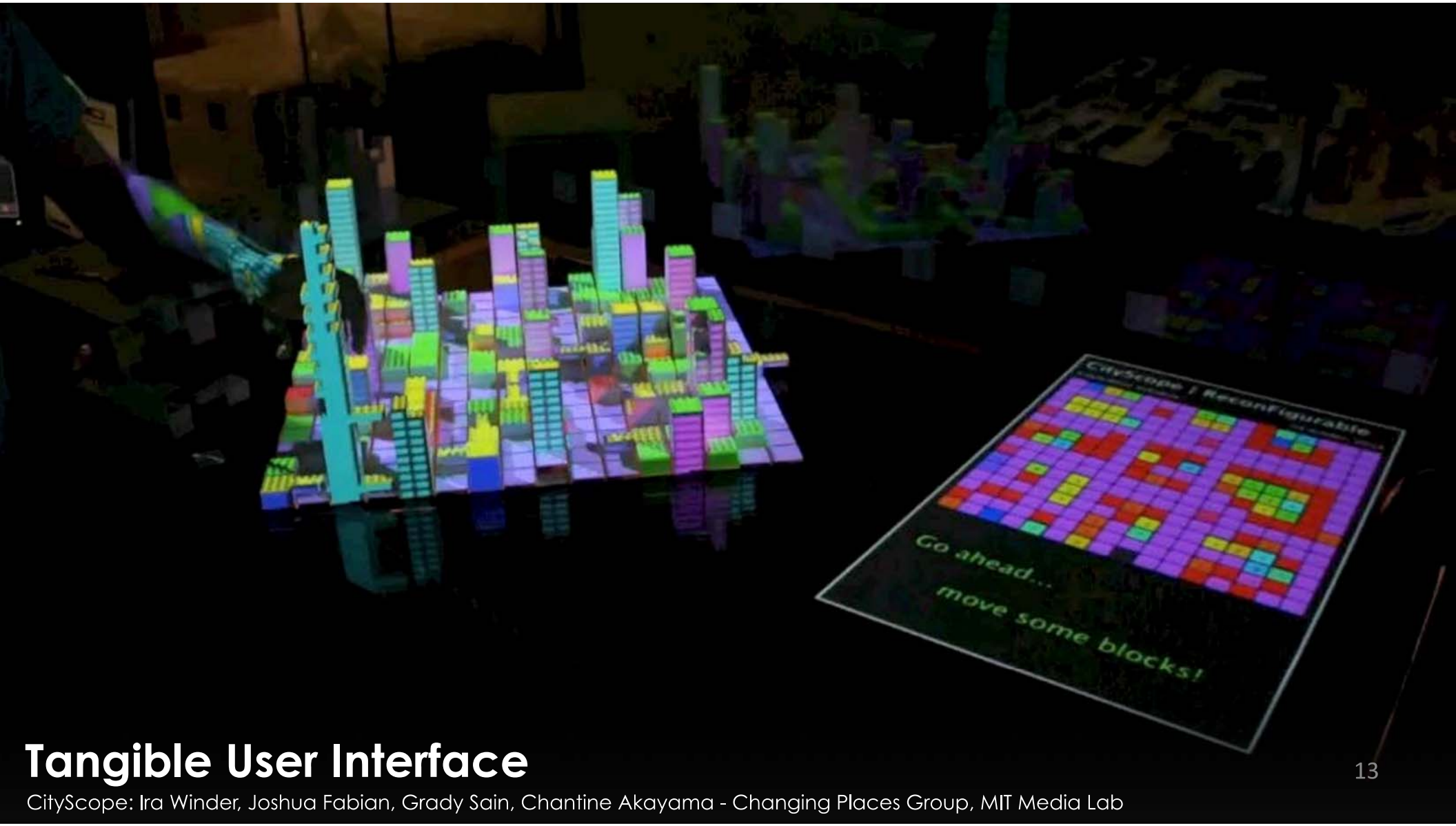
Twitter Activity

CityScope: Ira Winder, Mohammad Hadhrawi, Carson Smuts - Changing Places Group, MIT Media Lab



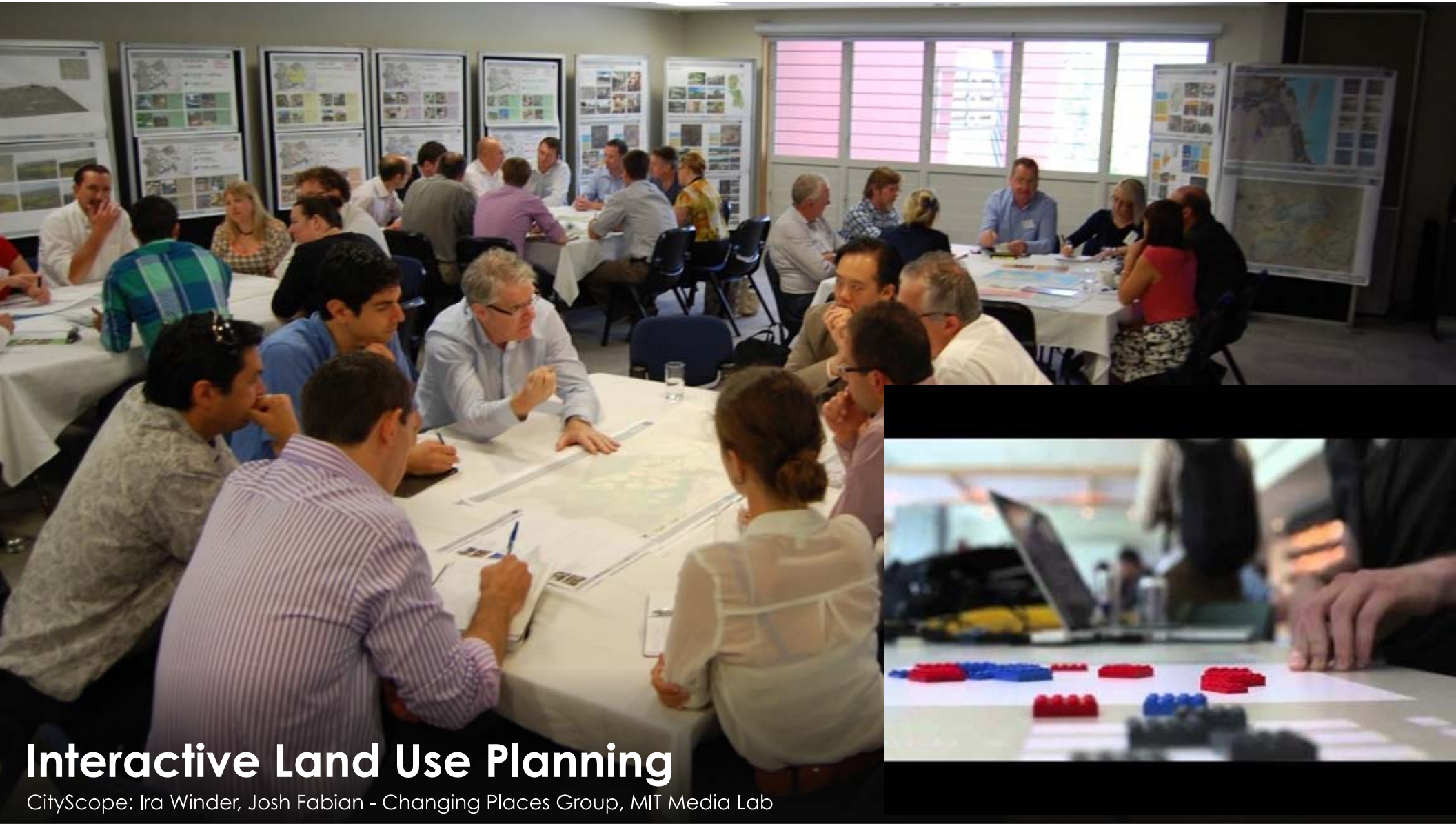
Tangible User Interface

CityScope: Ira Winder, Joshua Fabian, Grady Sain, Chantine Akayama - Changing Places Group, MIT Media Lab



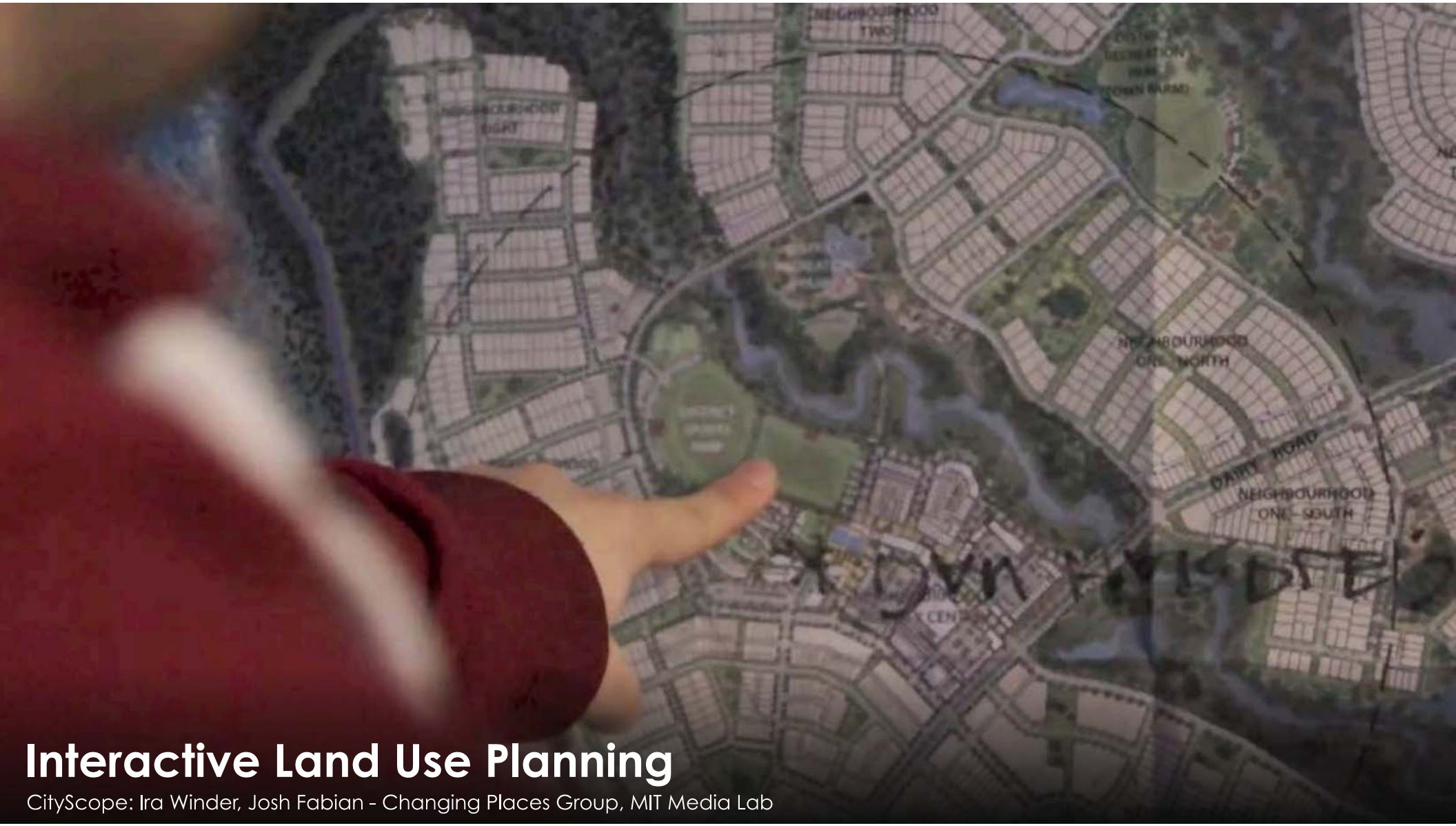
Tangible User Interface

CityScope: Ira Winder, Joshua Fabian, Grady Sain, Chantine Akayama - Changing Places Group, MIT Media Lab



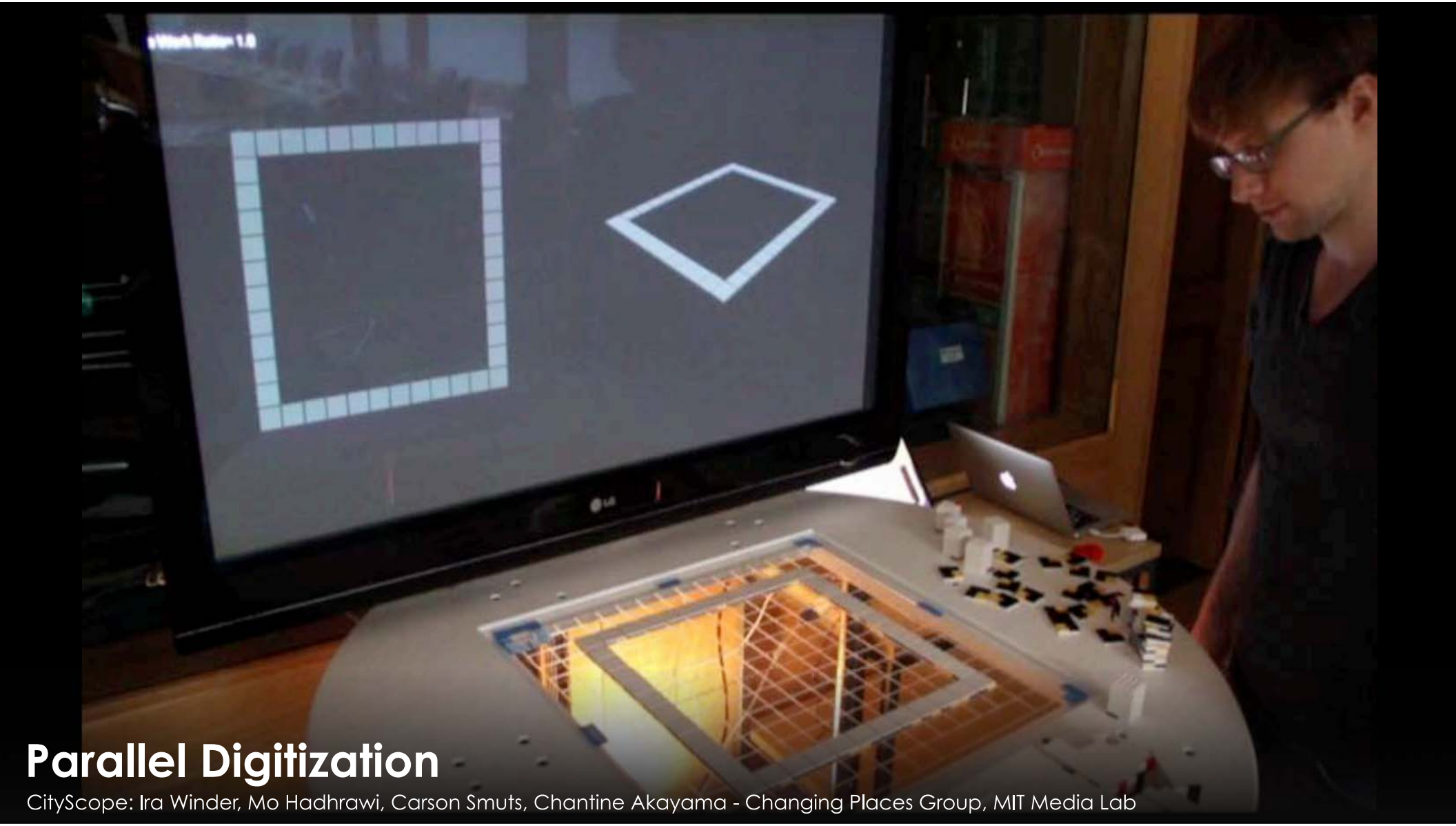
Interactive Land Use Planning

CityScope: Ira Winder, Josh Fabian - Changing Places Group, MIT Media Lab



Interactive Land Use Planning

CityScope: Ira Winder, Josh Fabian - Changing Places Group, MIT Media Lab

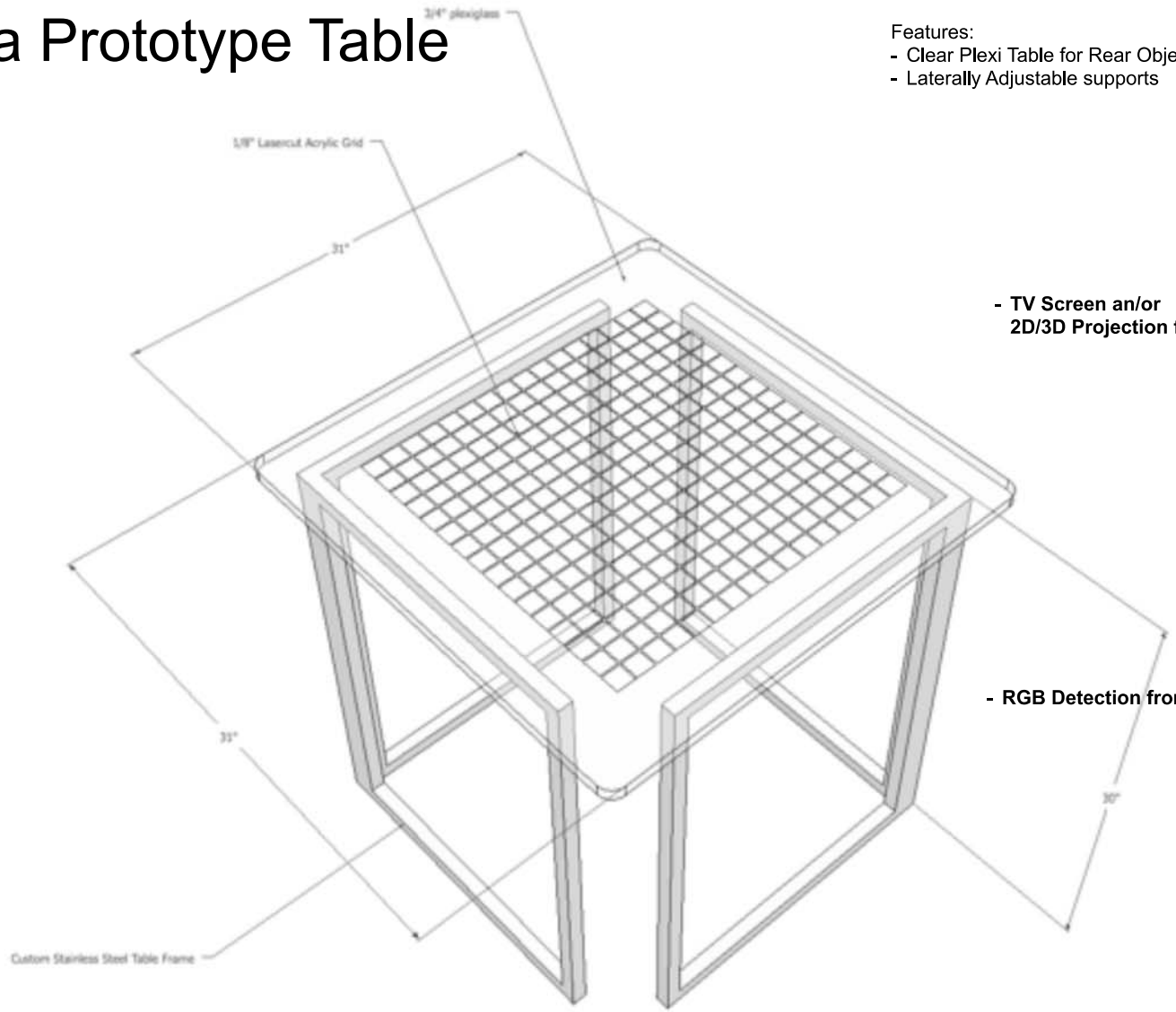


Parallel Digitization

CityScope: Ira Winder, Mo Hadhrawi, Carson Smuts, Chantine Akayama - Changing Places Group, MIT Media Lab

3. MarkIVa Prototype Table

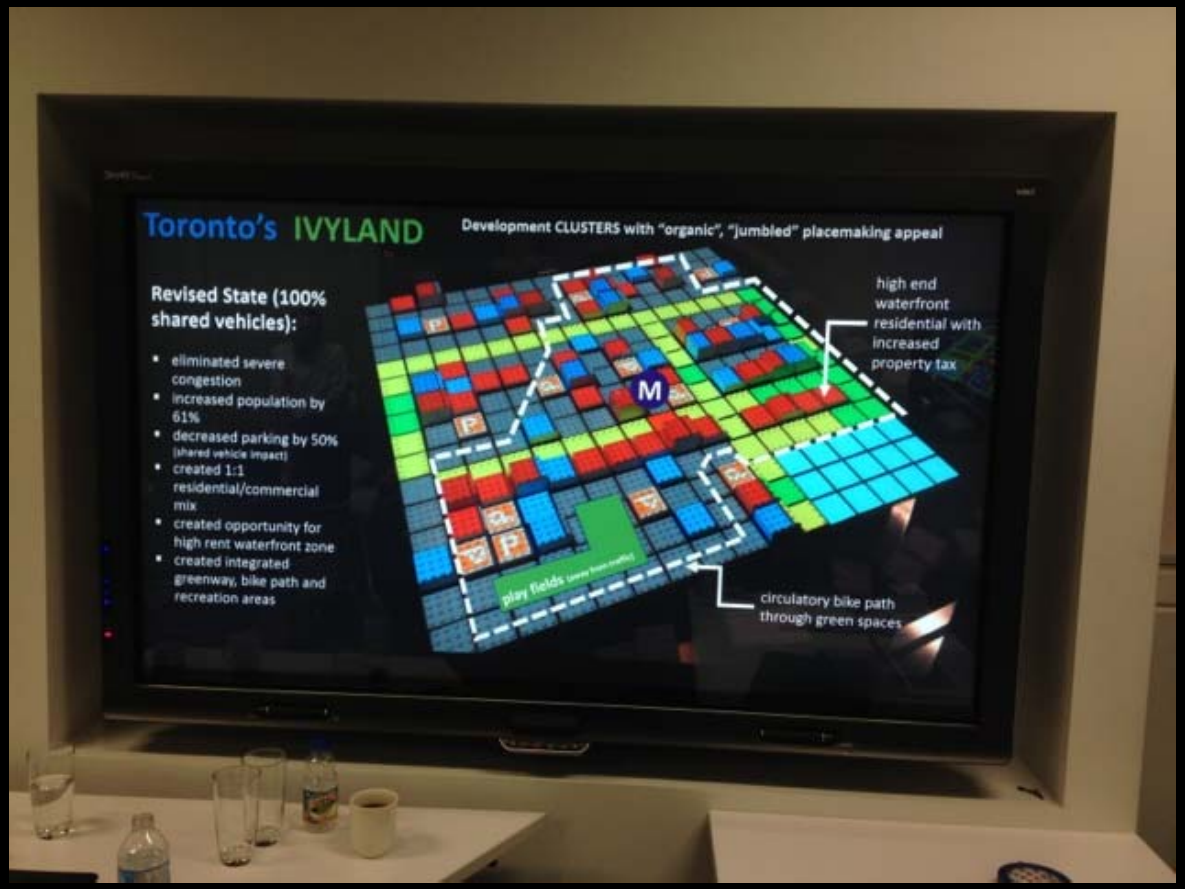
Features:
- Clear Plexi Table for Rear Object Scanning
- Laterally Adjustable supports



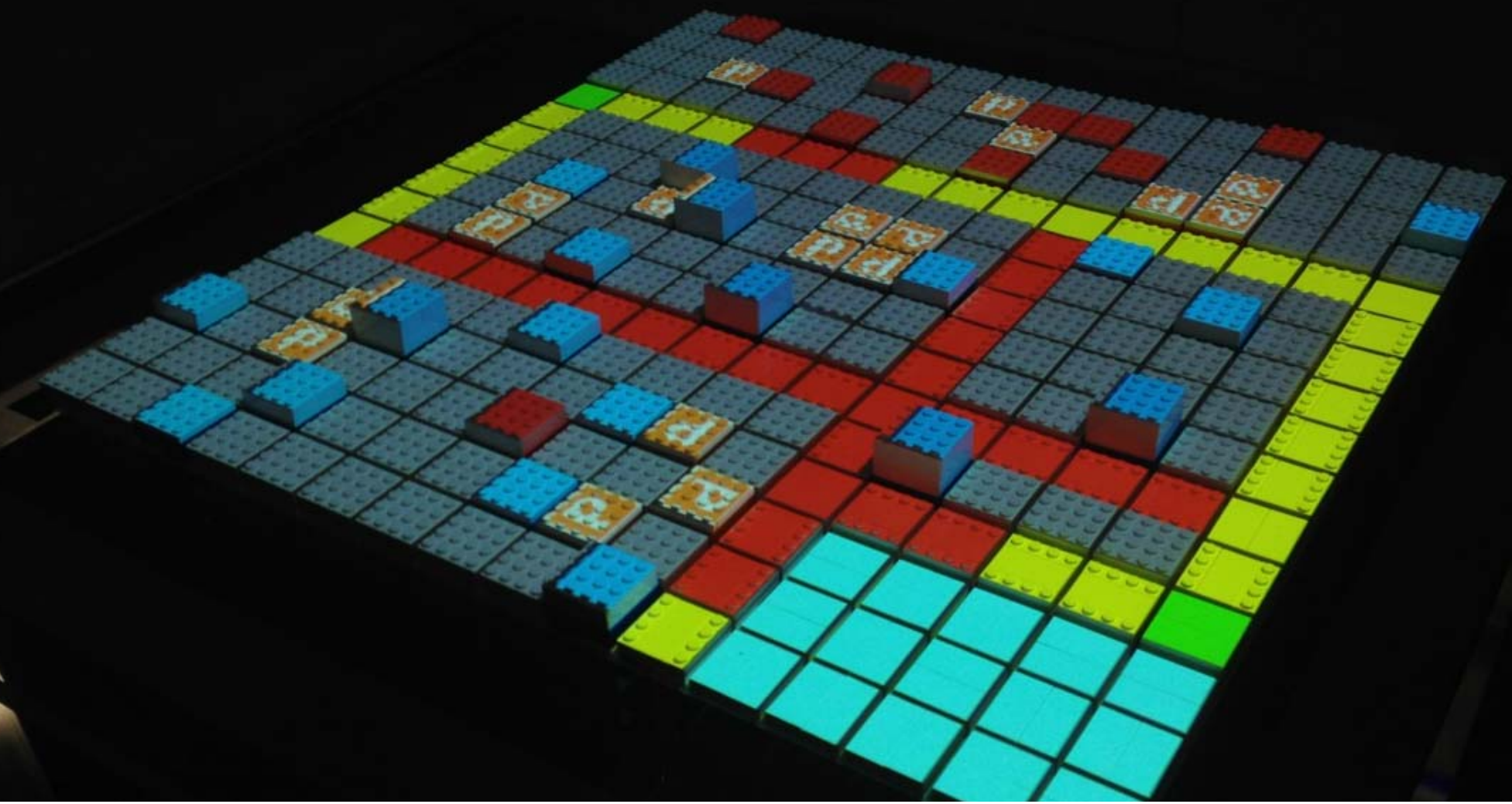
- **TV Screen an/or 2D/3D Projection from Above**

- **RGB Detection from Below**

MIT CityScope, BETA


Toronto's IVYLAND
Development CLUSTERS with "organic", "jumbled" placemaking appeal
Revised State (100% shared vehicles):
eliminated severe congestion
increased population by 61%
decreased parking by 50% (shared vehicle impact)
created 1:1 residential/commercial mix
created opportunity for high rent waterfront zone
created integrated greenway, bike path and recreation areas
high end waterfront residential with increased property tax
M
play fields
circulatory bike path through green spaces

Toronto (Mark IVa Mobility Game)



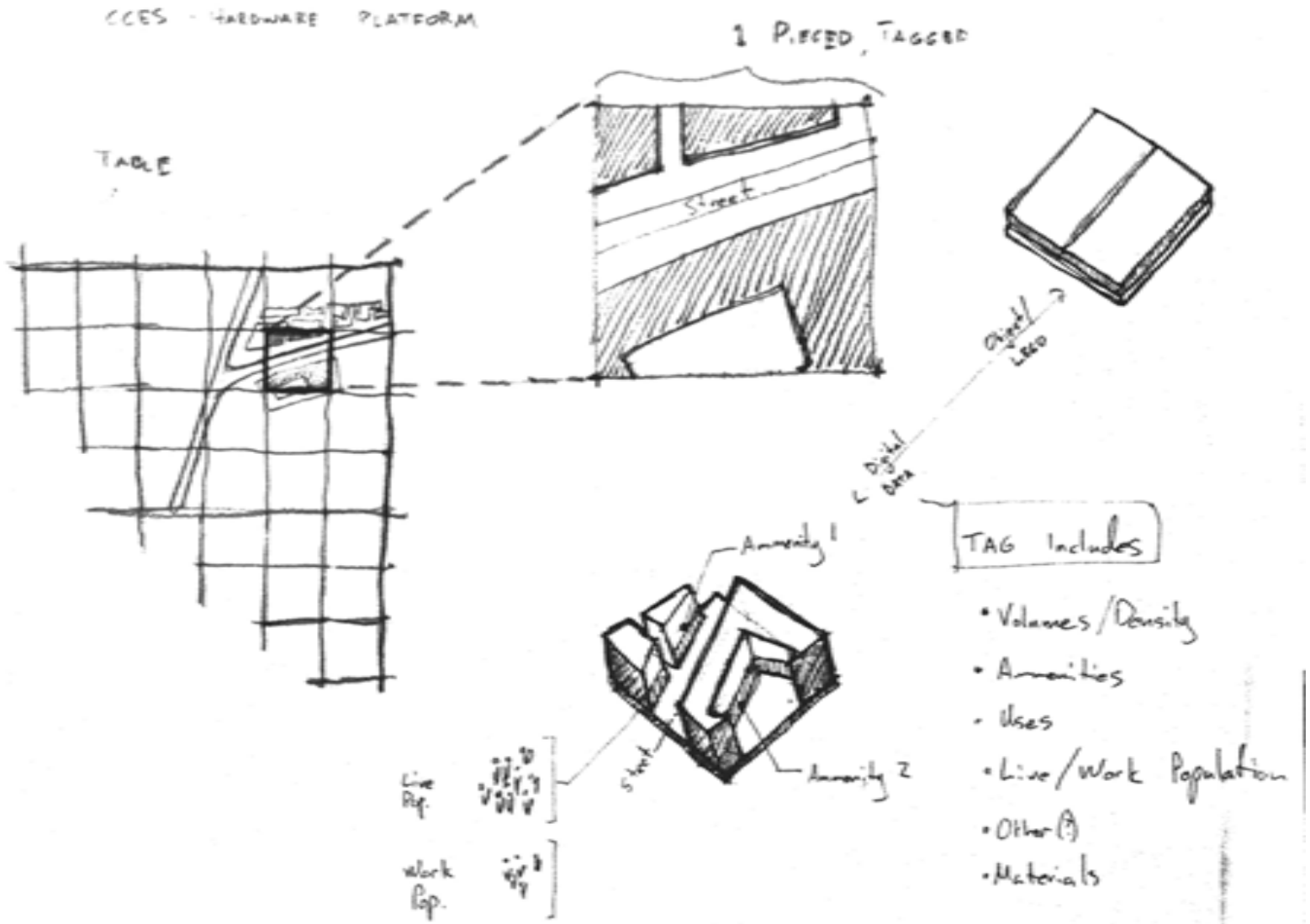
Area of Study

Kendal Square

The area is currently occupied by mostly academic and business.

The lack of residential results in a high concentration of parking and traffic.

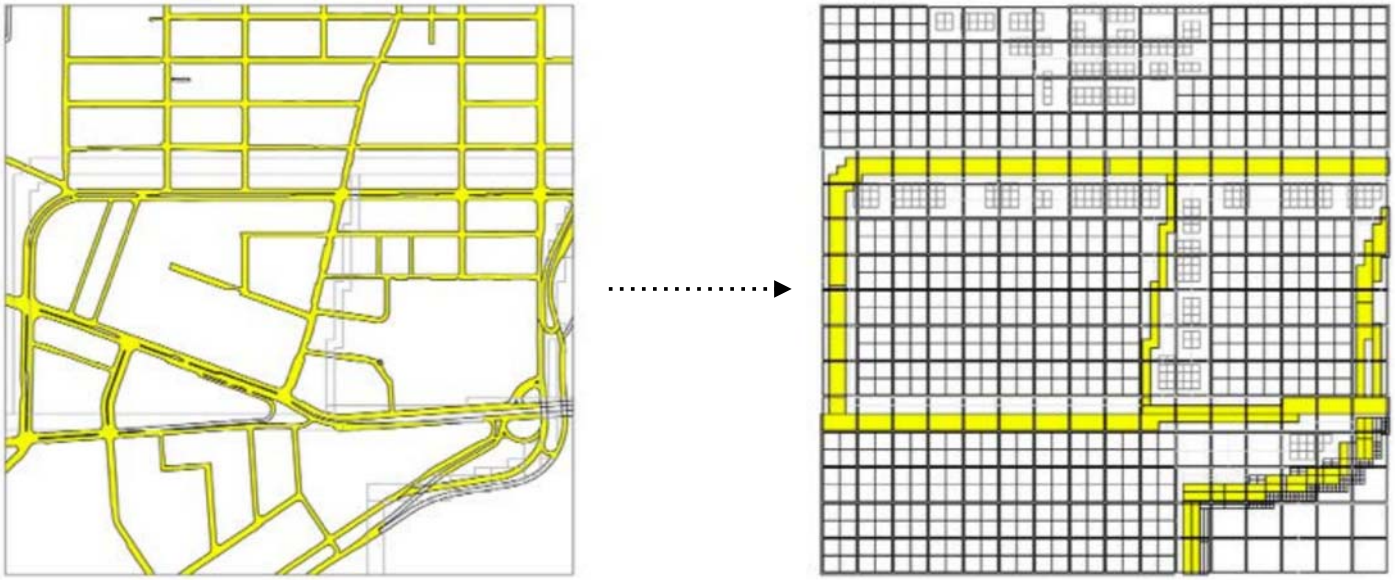
src: Carson Smuts


CCES - HARDWARE PLATFORM
1 PIECED, TAGGED
TABLE
Street
Digital Data
TAG Includes
• Volumes/Density
• Amenities
• Uses
• Live/Work Population
• Other (?)
• Materials
Amenity 1
Amenity 2
Street
Live Pop.
Work Pop.

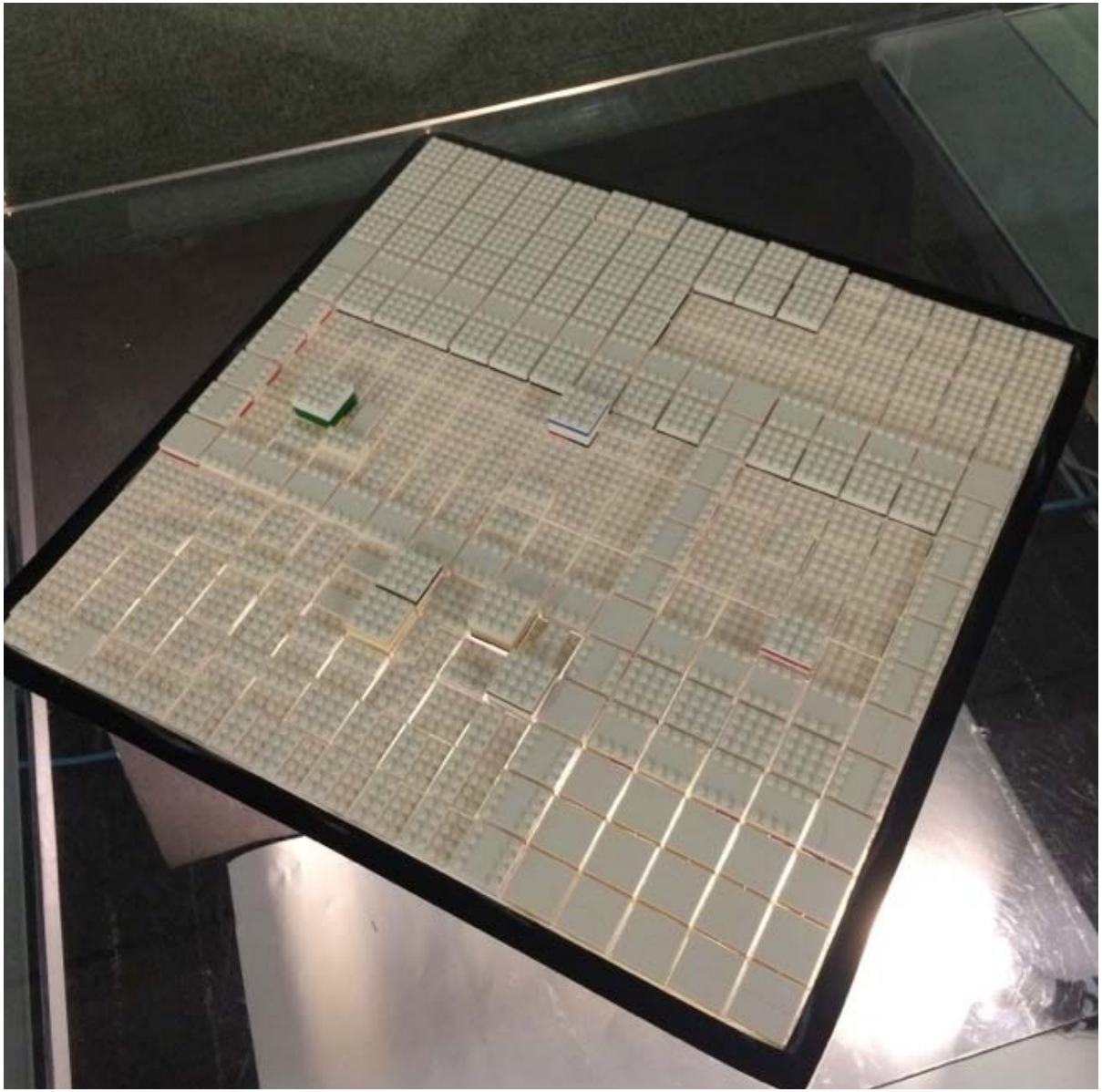
Abstraction of Area

For the purposes of our demonstration platform Kendall Square has been abstracted into modular lego pieces.

This image shows the transformation of the road networks.



src: Carson Smuts



Game Platform

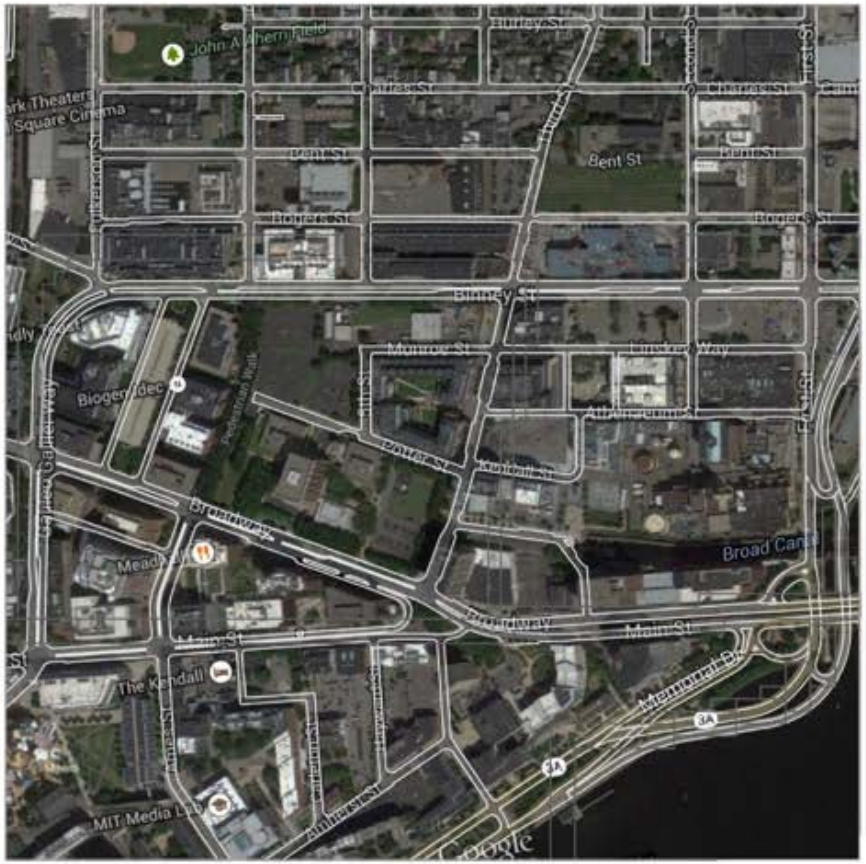
- Grid consists of 16 X16 block layout
- Each block consist of ID codes that define typology, area, occupancy and parking.
- Block IDs are scanned from beneath.
- Response to user inputs is projected onto the surface.

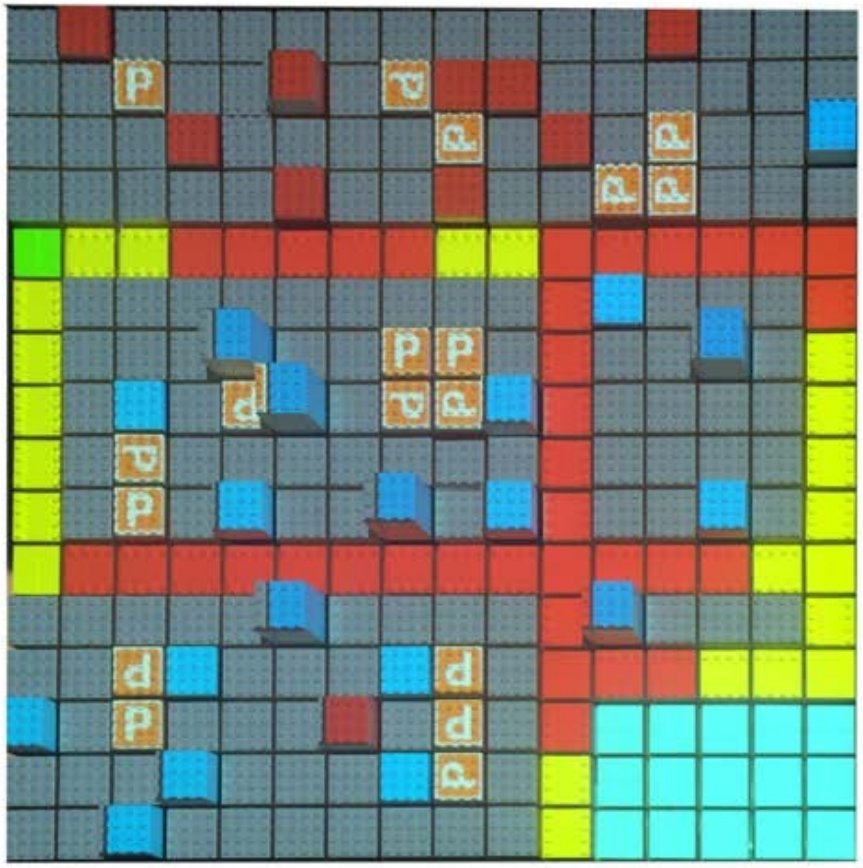
src: Carson Smuts

Variables

- **Population**: # of Residents *vs* # of Employees
- **Land Use**: Residential Area *vs* Retail + Office Area
- **Mobility System**: Private *vs* Shared vehicle system

src: Carson Smuts





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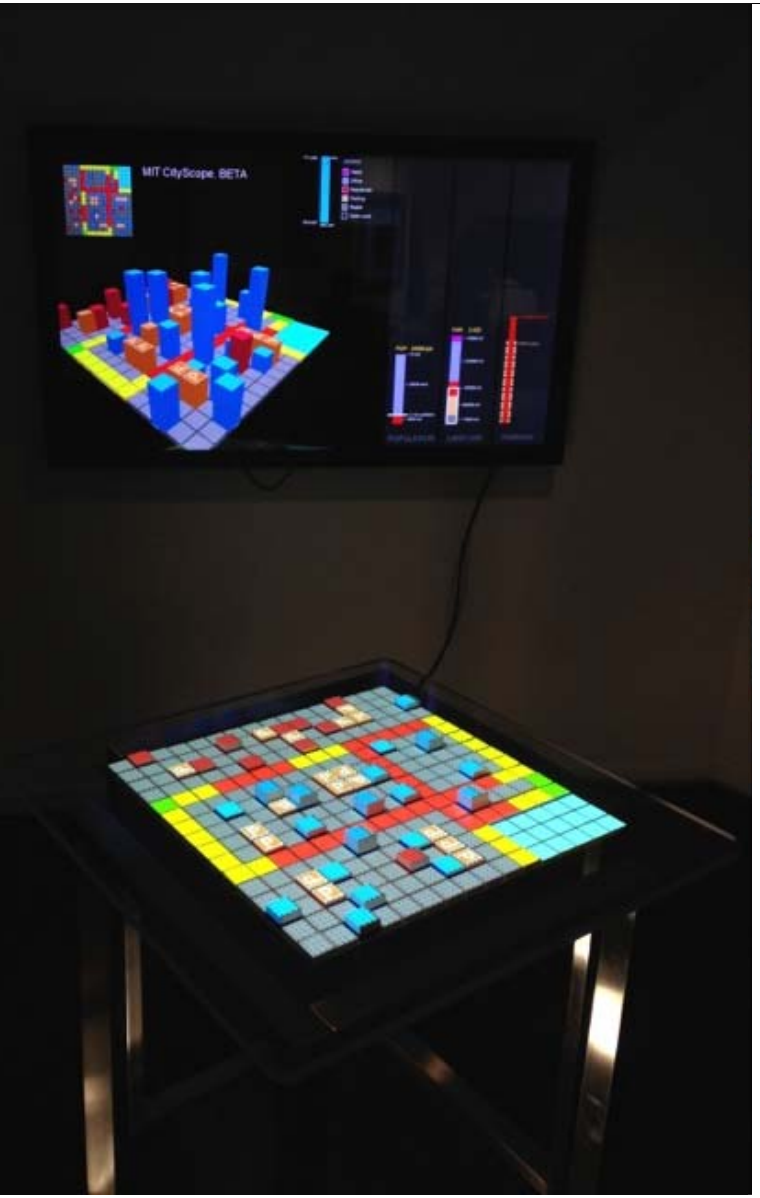
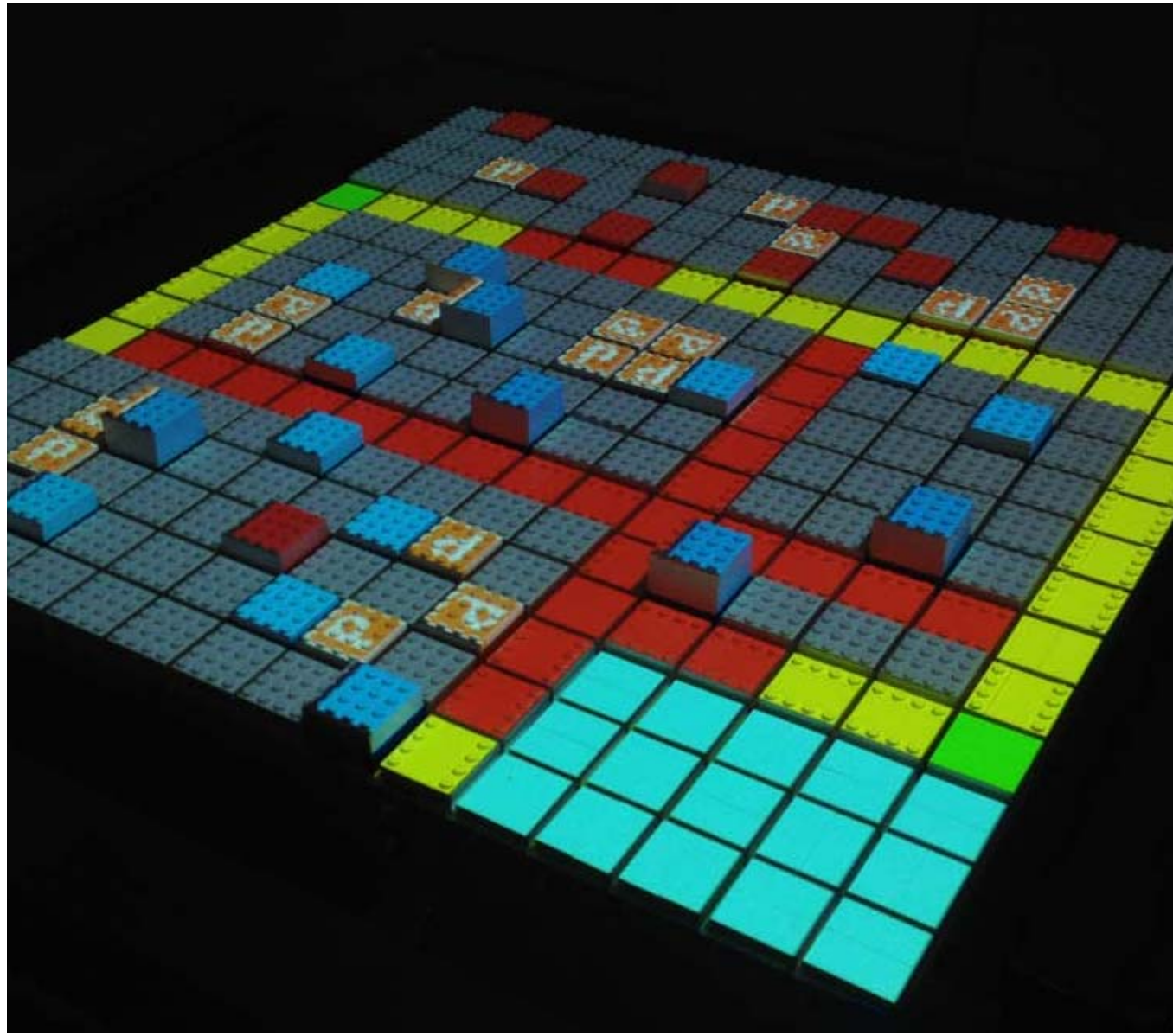
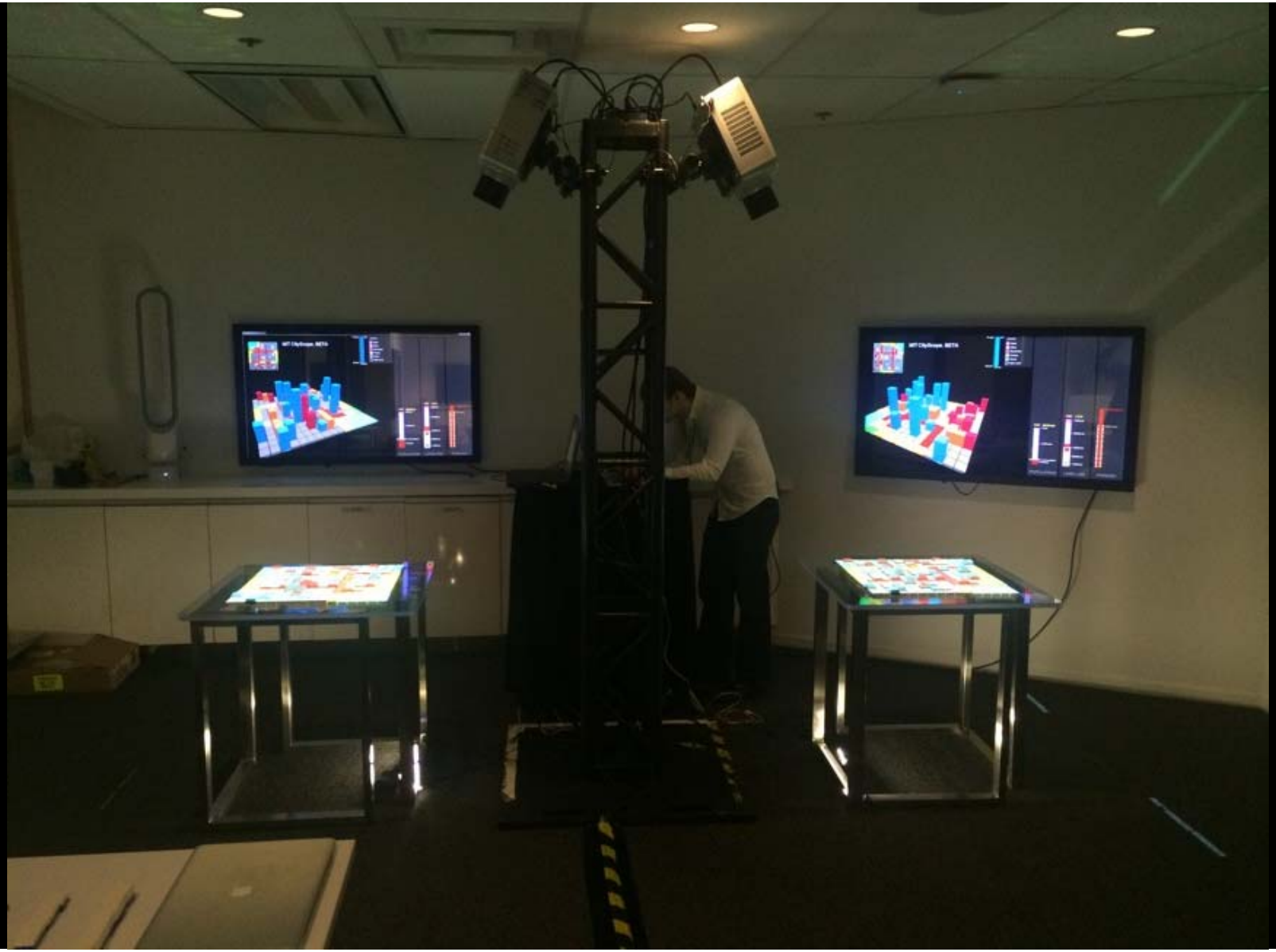

MIT CityScope: BETA

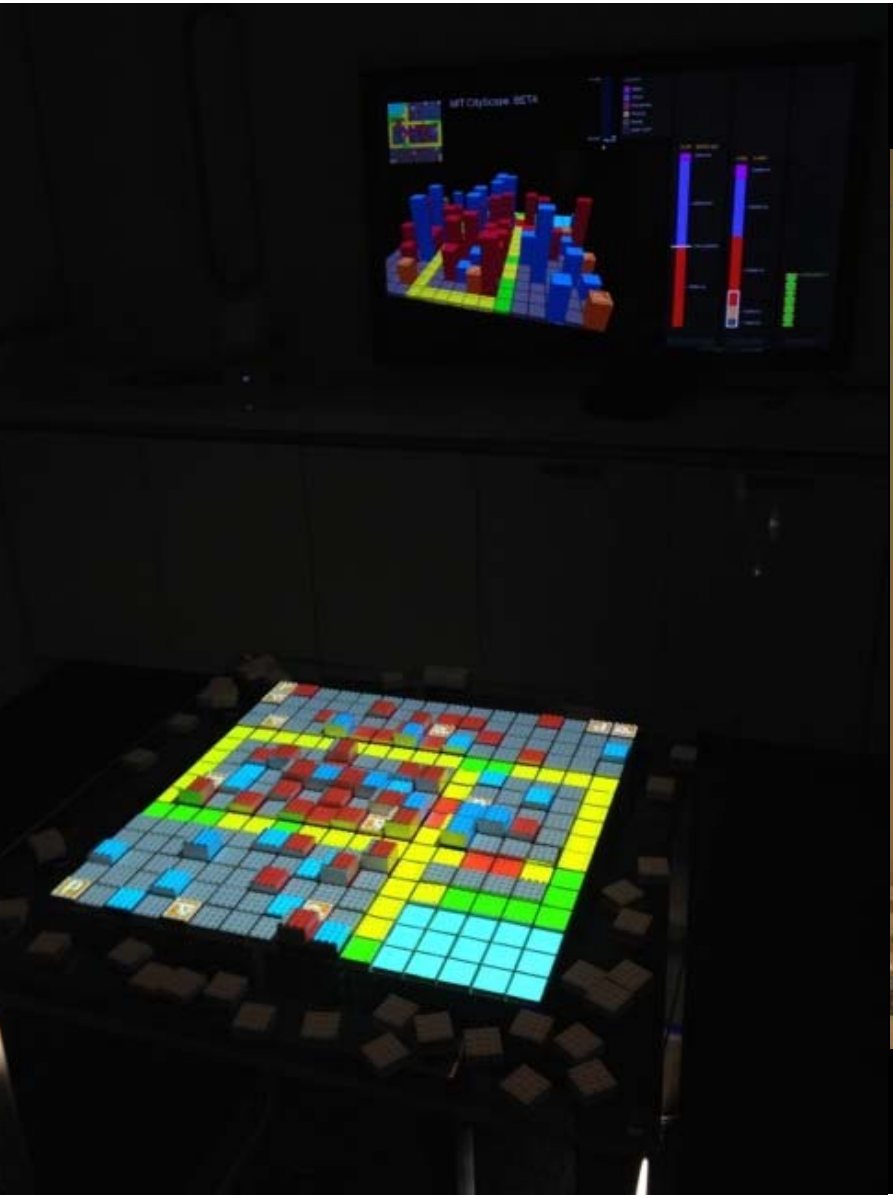


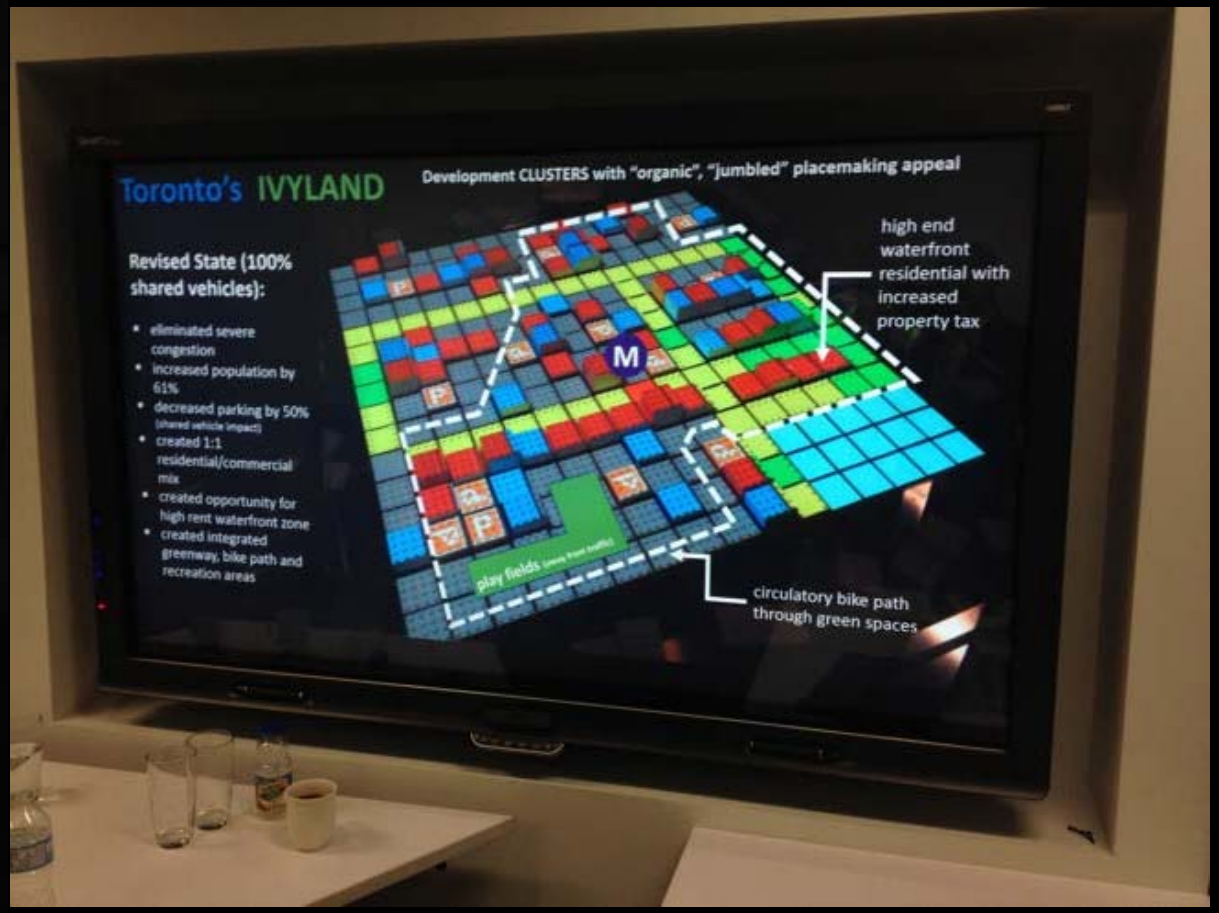
MIT CityScope, BETA
Private
Shared
LEGEND
Retail
Office
Residential
Parking
Roads
Open Land
POP: 86400 ppl
2860 visit
42660 work
0.95 Live/Work
40660 live
FAR: 4.440
180000 m2
808000 m2
976000 m2
152000 m2
118000 m2
POPULATION
LAND USE
PARKING



MIT CityScope, BETA
Design,
Entrepreneurship,
& Digital Natives
Kent Larson
MIT Media Lab
@Larson_MIT
kll@mit.edu

POP: 34580 ppl
0 visit
29520 work
0 16 Live/Work
4960 live
POPULATION
FAR: 2.420
74000 m2
570000 m2
192000 m2
288000 m2
118000 m2
LAND USE
16200 supply
5140 demand
PARKING

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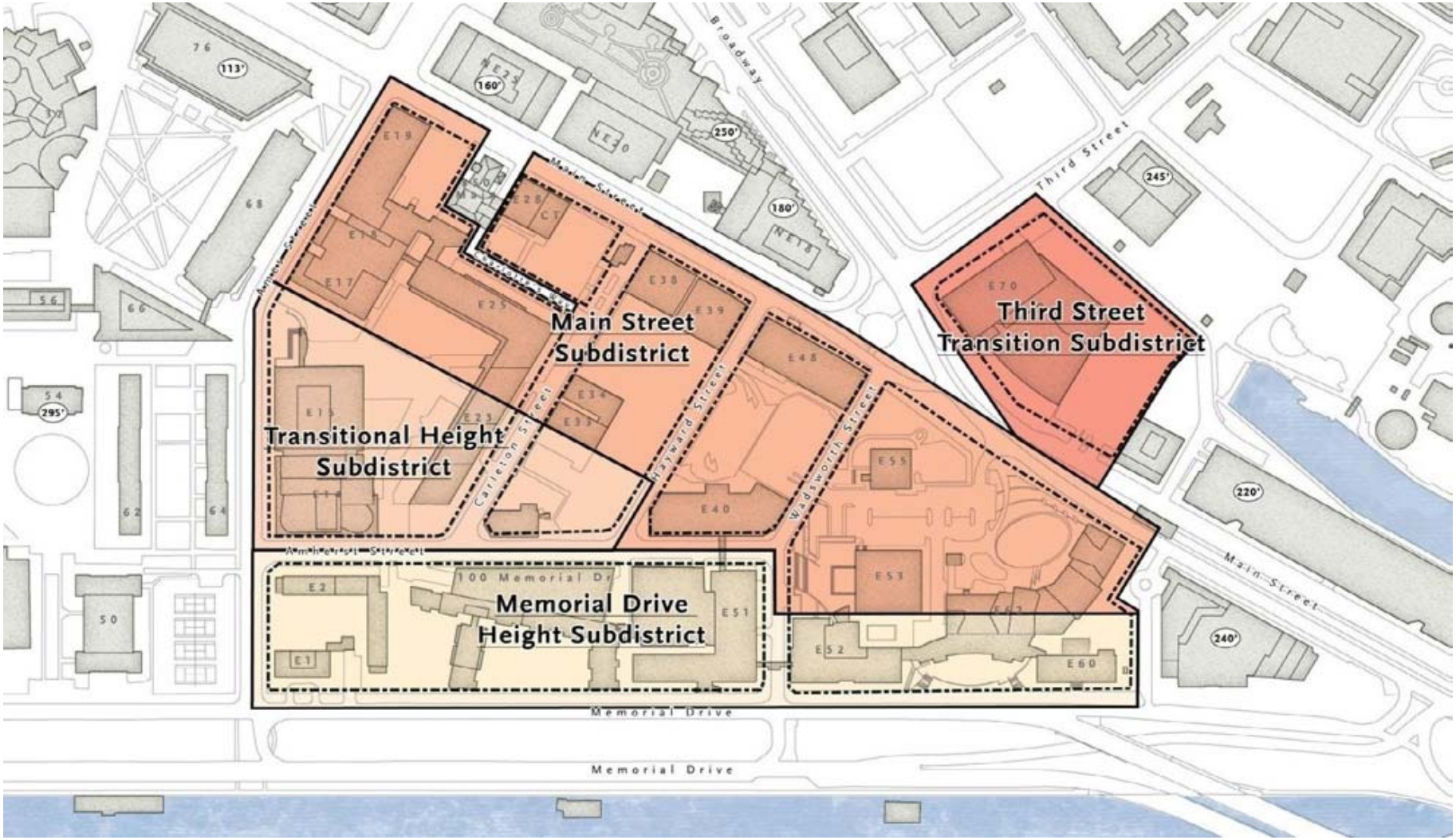
created 1:1 residential/commercial mix
created opportunity for high rent waterfront zone
created integrated greenway, bike path and recreation areas
high end waterfront residential with increased property tax
M
play fields
circulatory bike path through green spaces

Case Study

Kendall Square, MA



Case Study

Kendall Square, MA

N/E VIEW

SCHEME

Option A

Option B

Option C

LAB/OFFICE/RETAIL

ACADEMY

Traditional Design Development

Kendall Square, MA

Interactive Design Development

Kendall Square, MA

Interactive Design Development

Kendall Square, MA (Ira Winder, Ariel Noyman, Lezhi Li, Wei Lin, Shilpa Idnani)

Interactive Design Development

Kendall Square, MA (Ira Winder, Ariel Noyman, Lezhi Li, Wei Lin, Shilpa Idnani)

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Interactive Design Development

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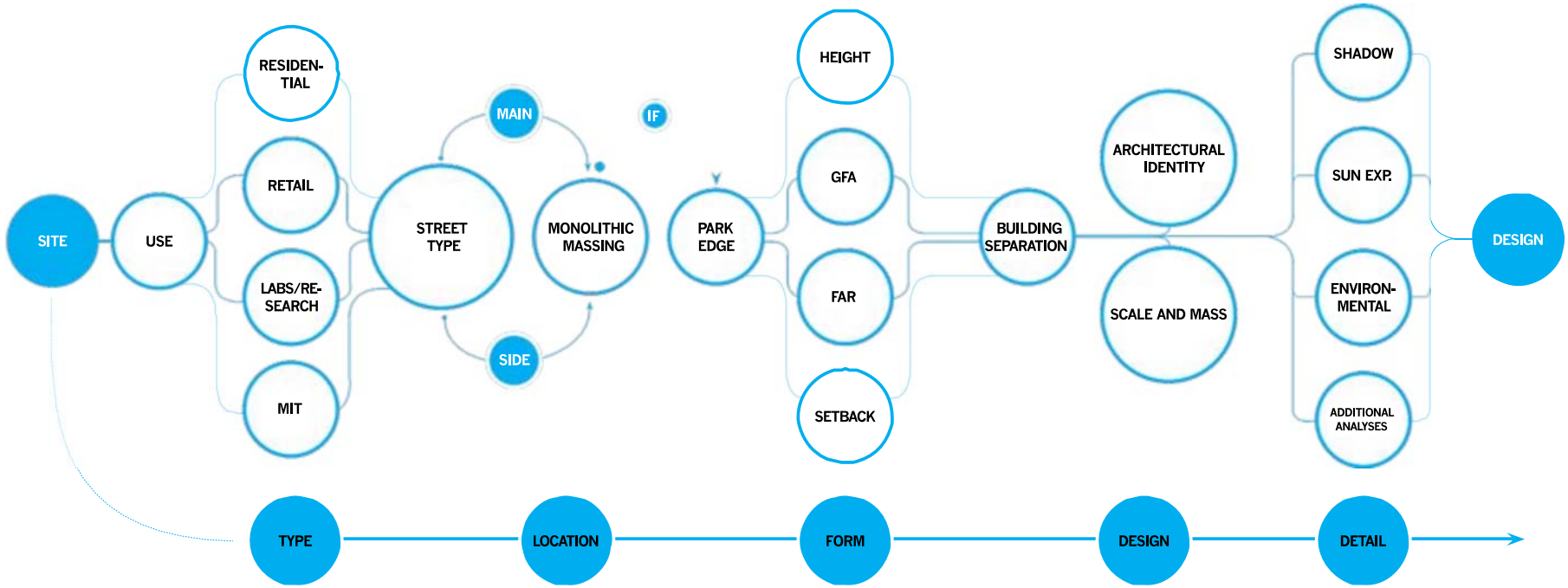


Interactive Design Development

Assisted design through algorithm of constraints (Ira Winder, Ariel Noyman, Lezhi Li, Wei Lin, Shilpa Idnani)

User Interaction Studies

CityScope: Ira Winder, Ariel Noyman, Lezhi Li, Wei Lin, Shilpa Idnani, CCES

Interactive Design Development

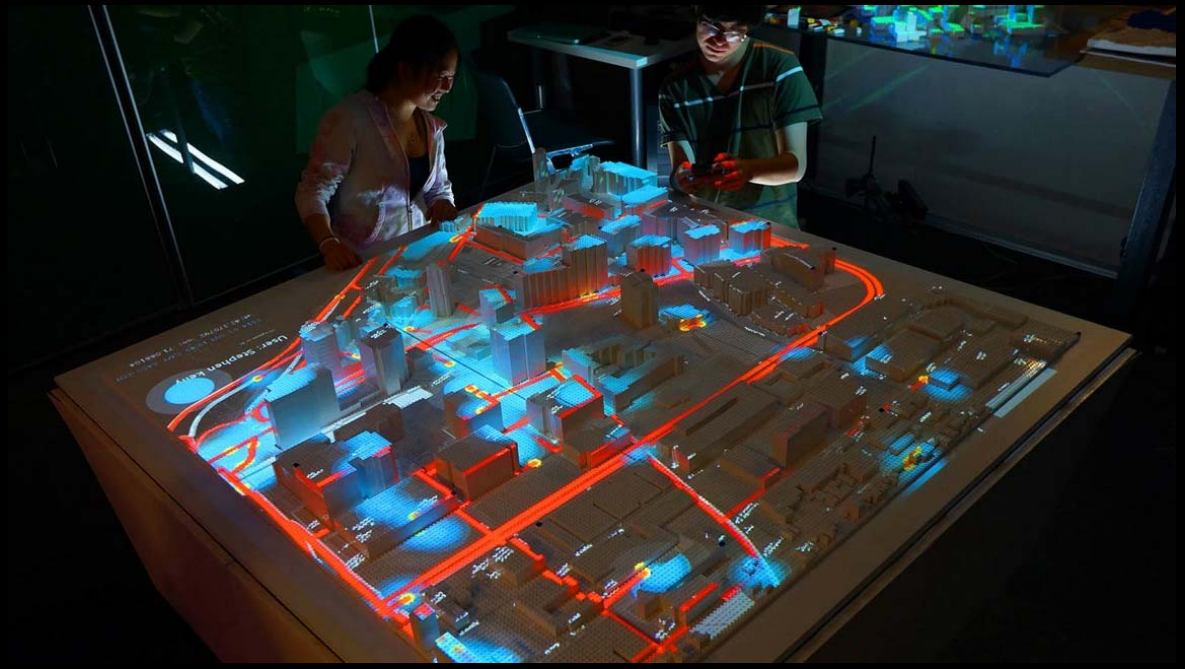
Kendall Square, MA (Ira Winder, Ariel Noyman, Lezhi Li, Wei Lin, Shilpa Idnani)

Autodesk University (Mark IV)

MIT CITYSCOPE
Augmented Reality
City Simulation
SKYJACK
SJIII 3226

MIT CITYSCOPE
Augmented Reality
City Simulation

Static Scale Model



Dynamic Scale Model

PLAYGROUND

TOWARDS TANGIBLE REGULATIONS

ARIEL NOYMAN
CHANGING PLACES GROUP
MIT MEDIA LAB

THE CITY OF CAMBRIDGE
NEIGHBORHOOD AND LONG TERM PLANNING, PUBLIC FACILITIES, ARTS AND CELEBRATIONS COMMITTEE

THE CHALLENGE

COMMUNICATING REGULATIONS

WHAT WE'VE LEARNED:

A. ZONING ARE HARD TO UNDERSTAND

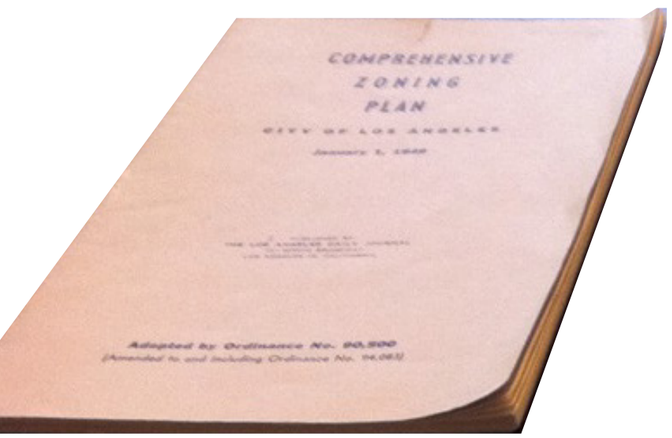
B. THE PAKISTANI NEIGHBORER IS IN DEEP TROUBLES

CHRISTO AND JEANNE-CLAUDE
THE MASTABA PROJECT, AE

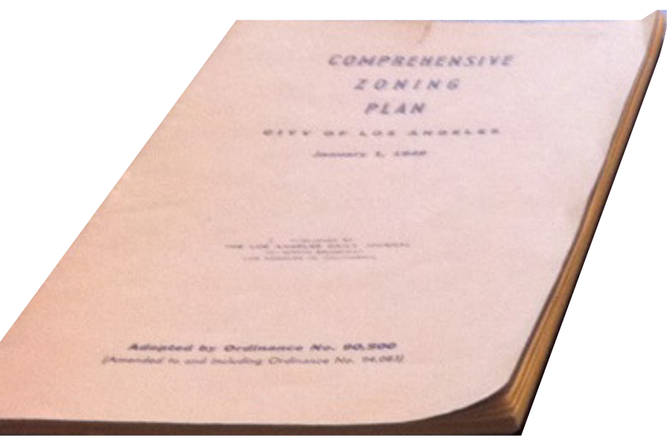
QUO VADIS, 1951

75
66

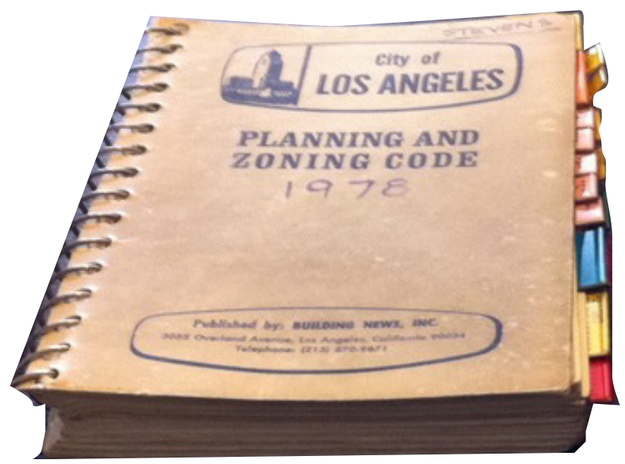
1946


COMPREHENSIVE
ZONING
PLAN
CITY OF LOS ANGELES
Adopted by Ordinance No. 90,500
(Amended to and including Ordinance No. 94,083)

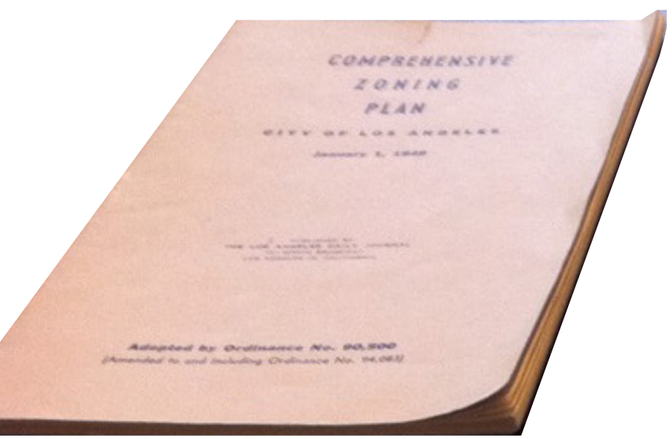
1946


COMPREHENSIVE
ZONING
PLAN
CITY OF LOS ANGELES
Adopted by Ordinance No. 90,500

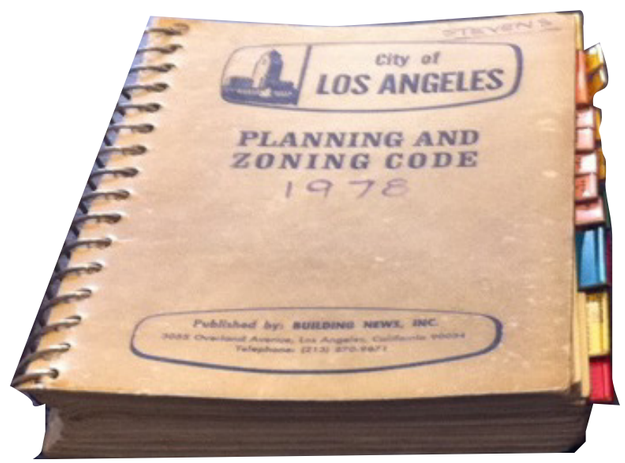
1978


City of
LOS ANGELES
PLANNING AND
ZONING CODE
1978
Published by: BUILDING NEWS, INC.

1946

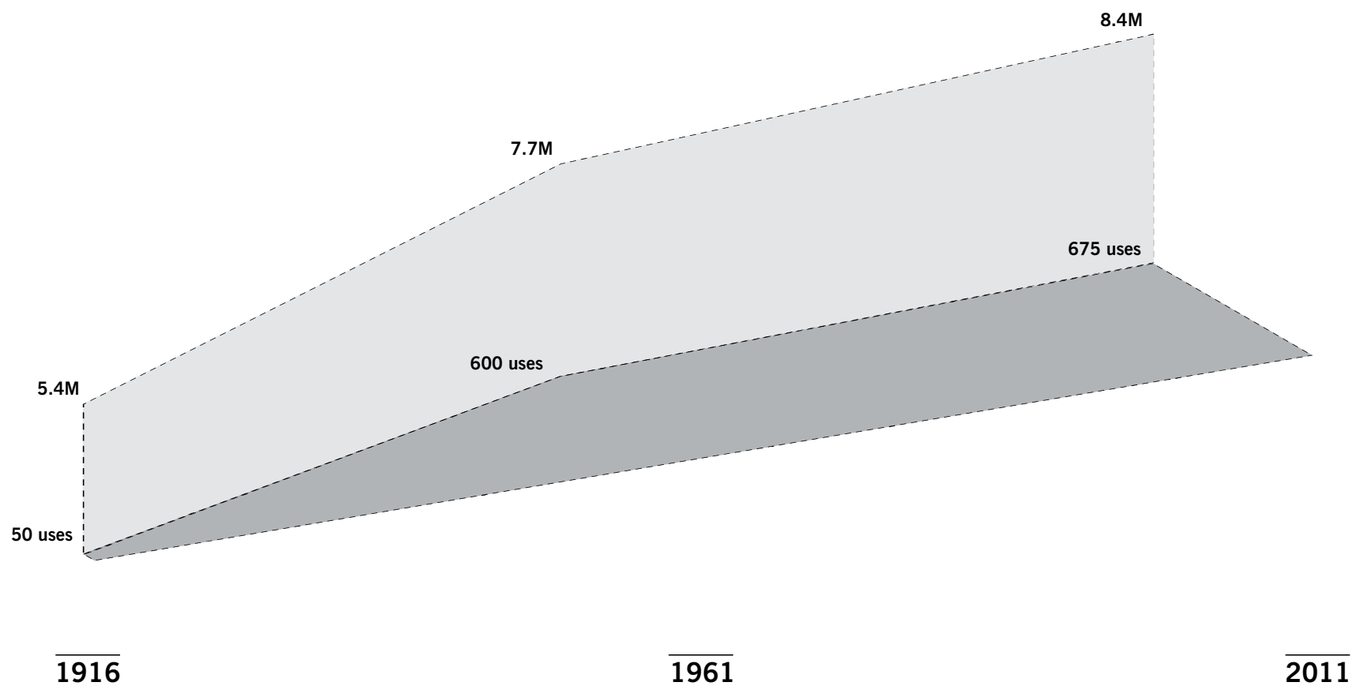


1978

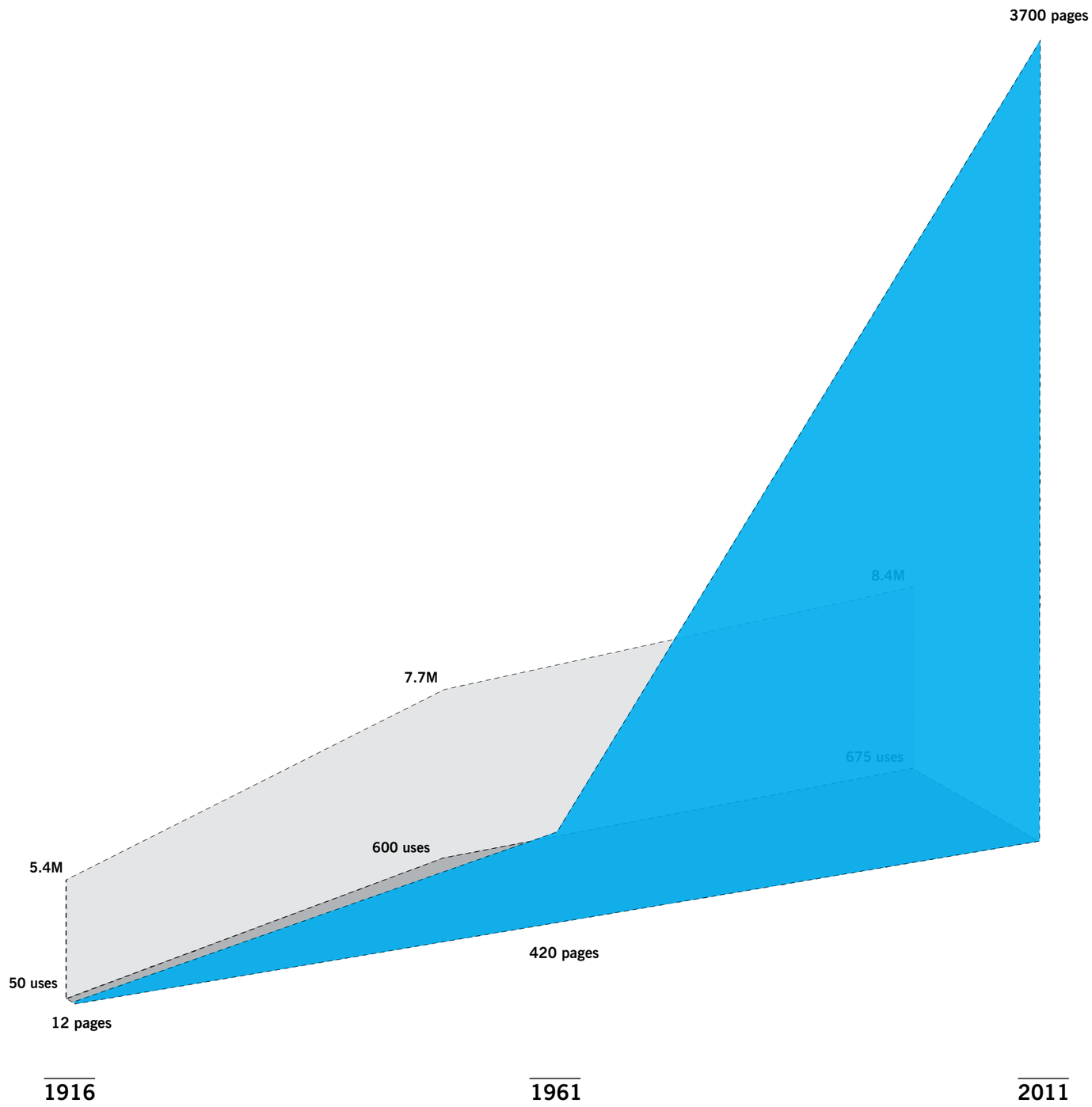


2011

ZONING DATA
EVOLUTION

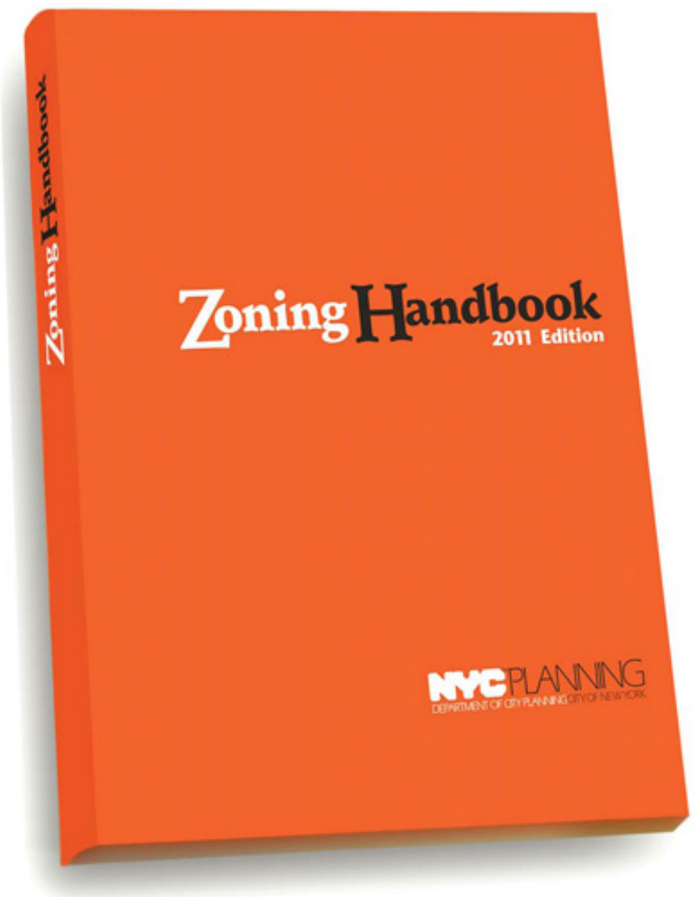


ZONING DATA
EVOLUTION

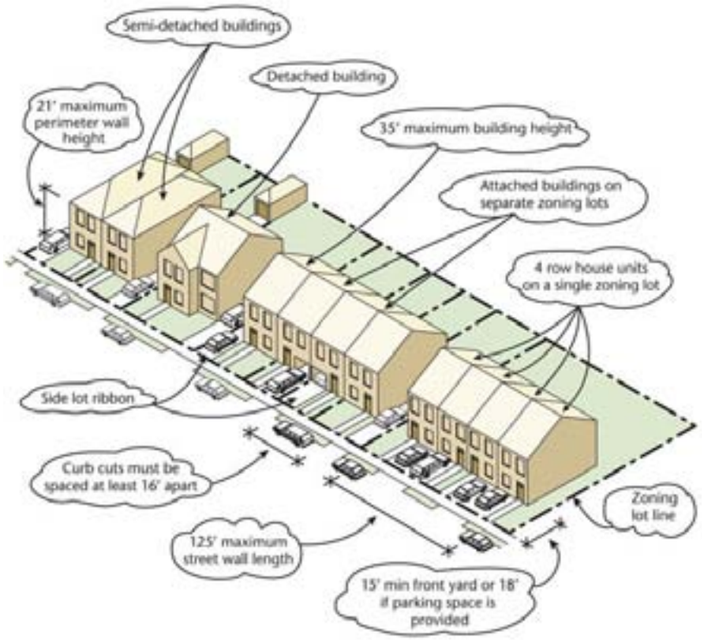


ZONING DATA
EVOLUTION

1916



2011



"The catch is that the rules can be found only in the zoning resolution, a 1,500-page tome incomprehensible to all except city officials — if it's even comprehensible to them.

Ms. Burden (Amanda Burden, head of NYC Planning Dep.) said that the tool of zoning was taken out of the hands of the public. She hopes to change that, with a new handbook ... that she said not only "demystifies zoning, but I think is entertaining — it's fun to read."

The New York Times

FRED A. BERNSTEIN
February 3, 2011

Work in Progress: Commercial
Anticipted Completion: Fall 2014
Owner: 107 EB LLC
107 East Broadway New York, NY 10002
917-913-9000
For Additional Information:
212-966-7828
General Contractor:
55C Group Inc.
212-966-7828
To Anonymously report unsafe conditions at this worksite, call 311
Para reportar condiciones peligrosas en un sitio de trabajo, llame al 311.
No tiene que dar su nombre.
NYC
Work Permit Department of Buildings
To see other permits issued on this property, visit: www.nyc.gov/buildings
NO SMOKING
CAUTION

Work in Progress: Residential
LIC Marriott and Residential Tower
Anticipated Completion : October 2015
Owners: Granite Queens Plaza LLC
214 West 39th street, suite 1200, New York NY 10018
212-921-7171
For additional Information:
212-687-1400
General Contractor:
Time Square Construction
355 Lexington Avenue, floor 17, New York, NY 10017 (212) 687-1400
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NYC
To see other permits issued

DOWNTOWN
AURA
CANADA'S TALLEST
RESIDENTIAL CONDOMINIUM
CANDEREL
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Own a piece of the sky
Tower Suites from $800,000's
Penthouses from $2.2 million to $17.5 million
Condo Retail Opportunities from $330,000's
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FENCE PEOPLE
(905) 450-0500
FENCE RENTAL SYSTEMS

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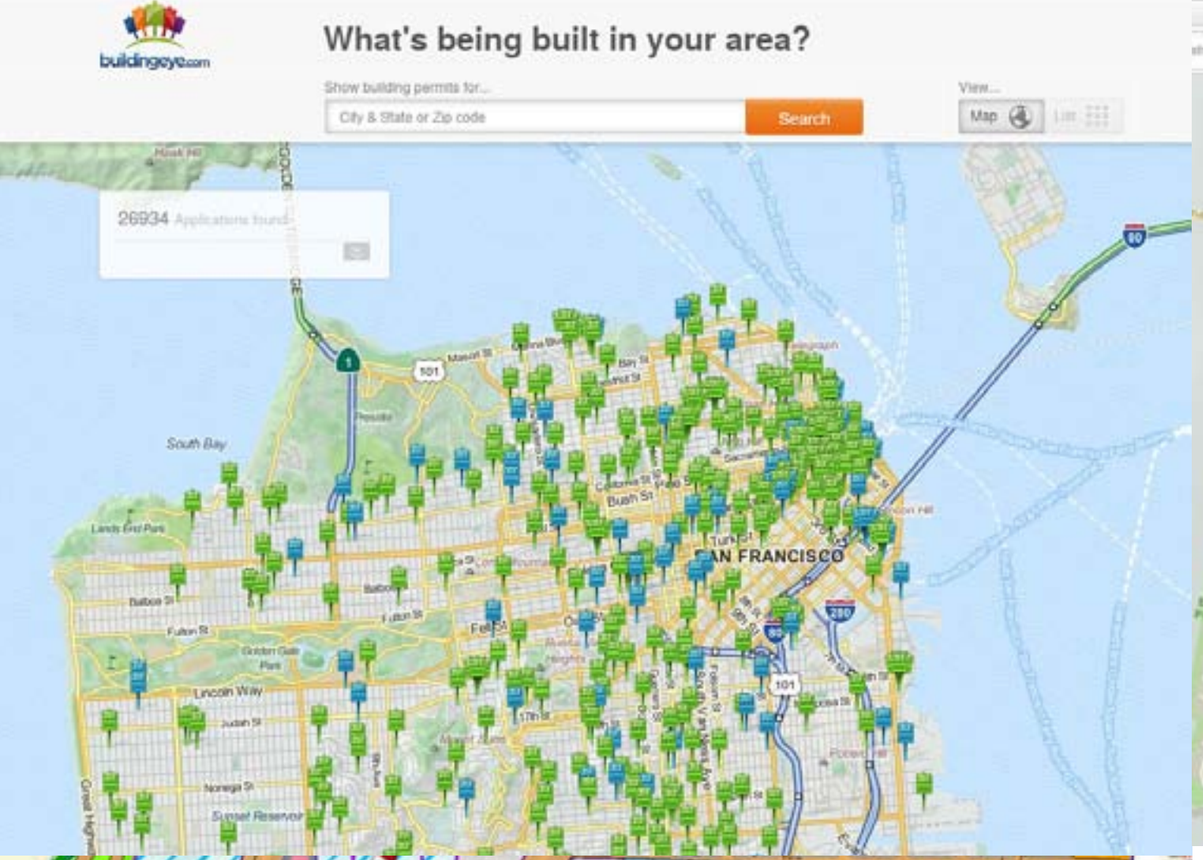
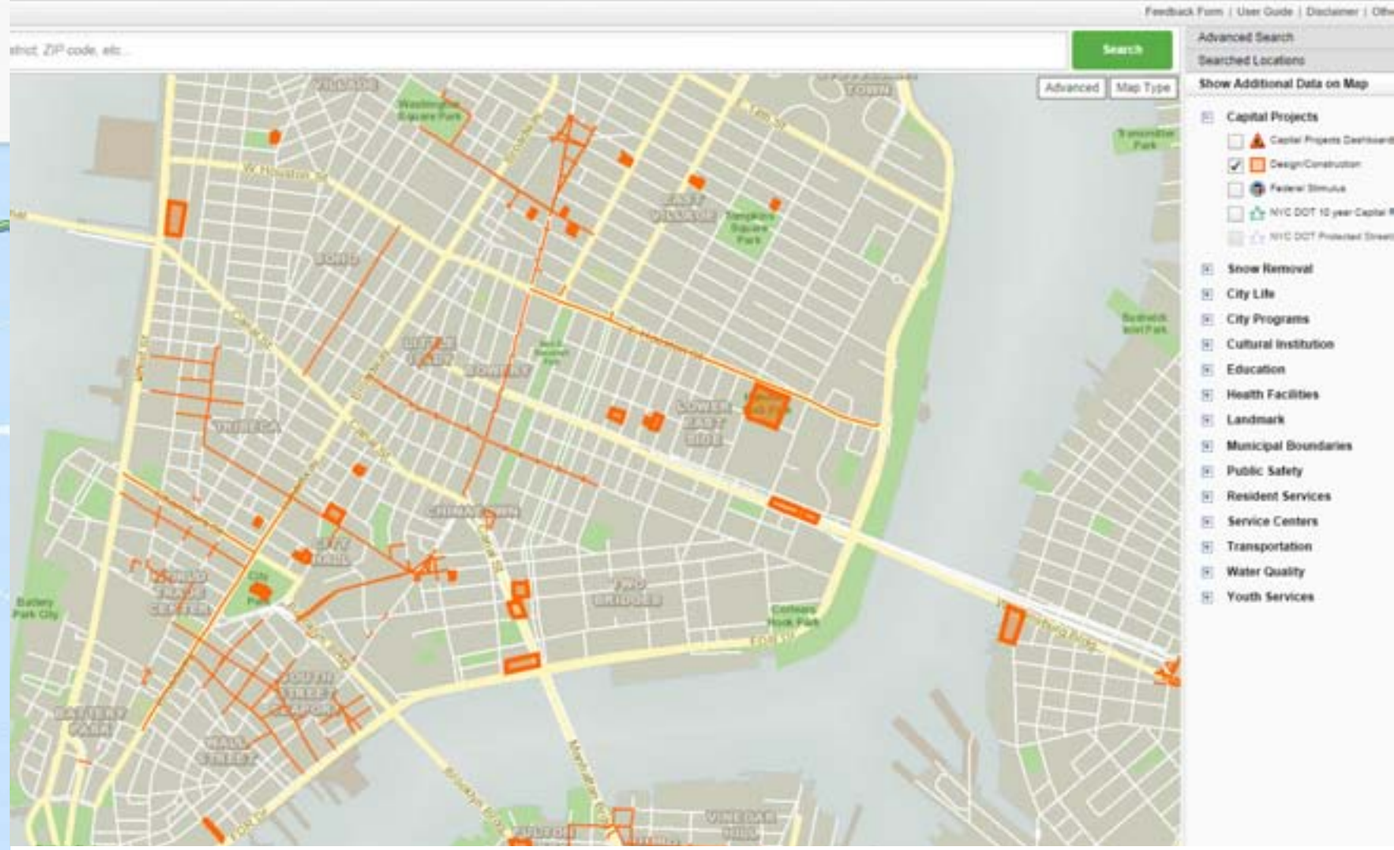
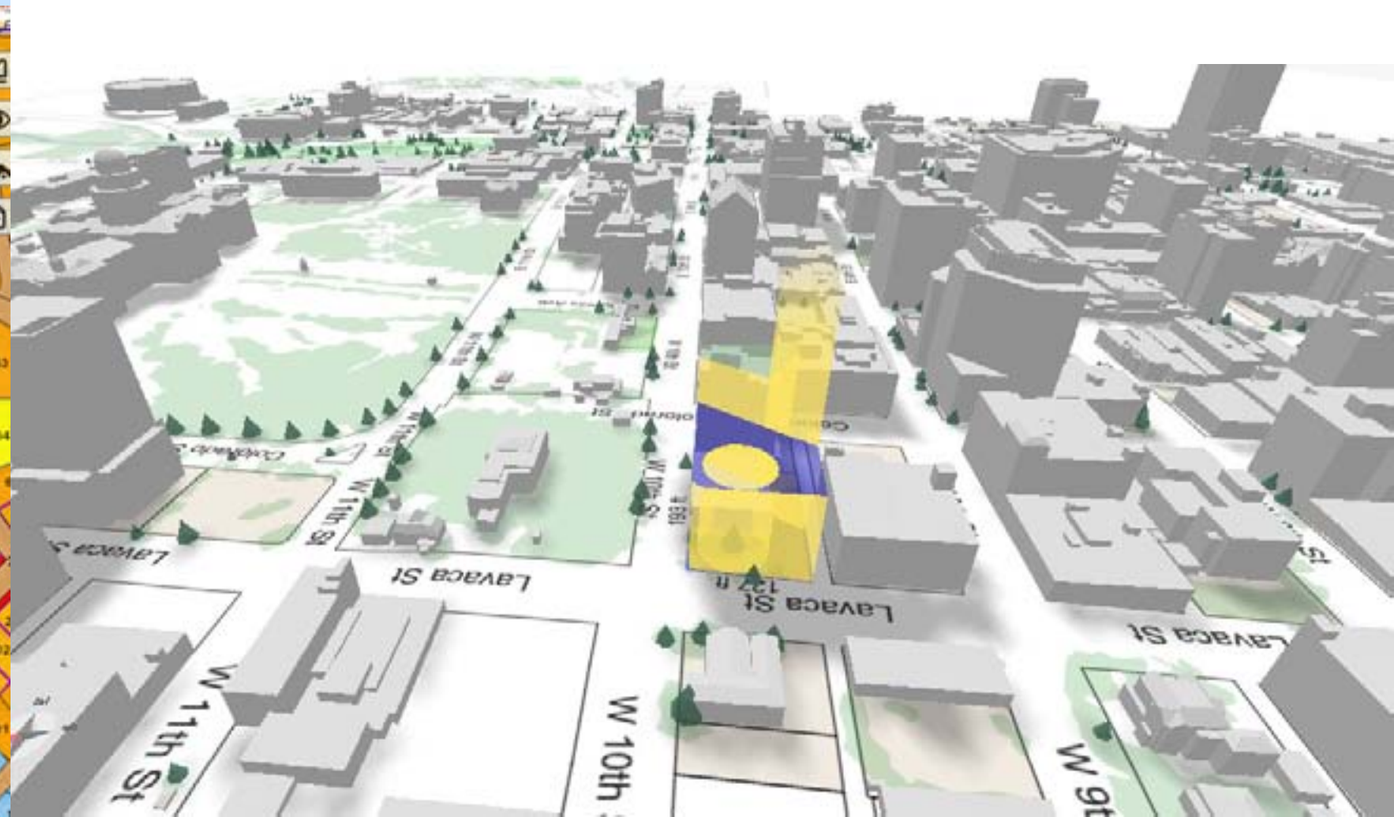
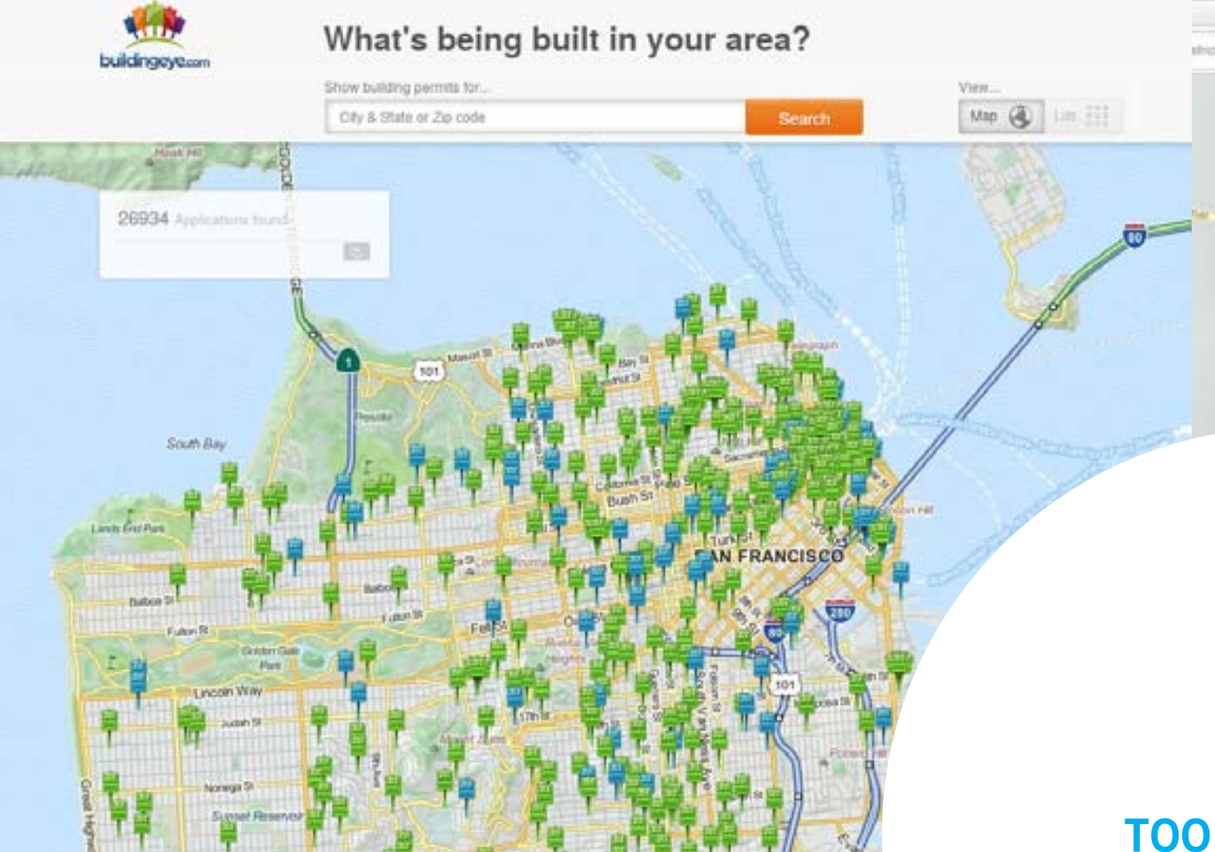
FENCE RENTAL SYSTEMS

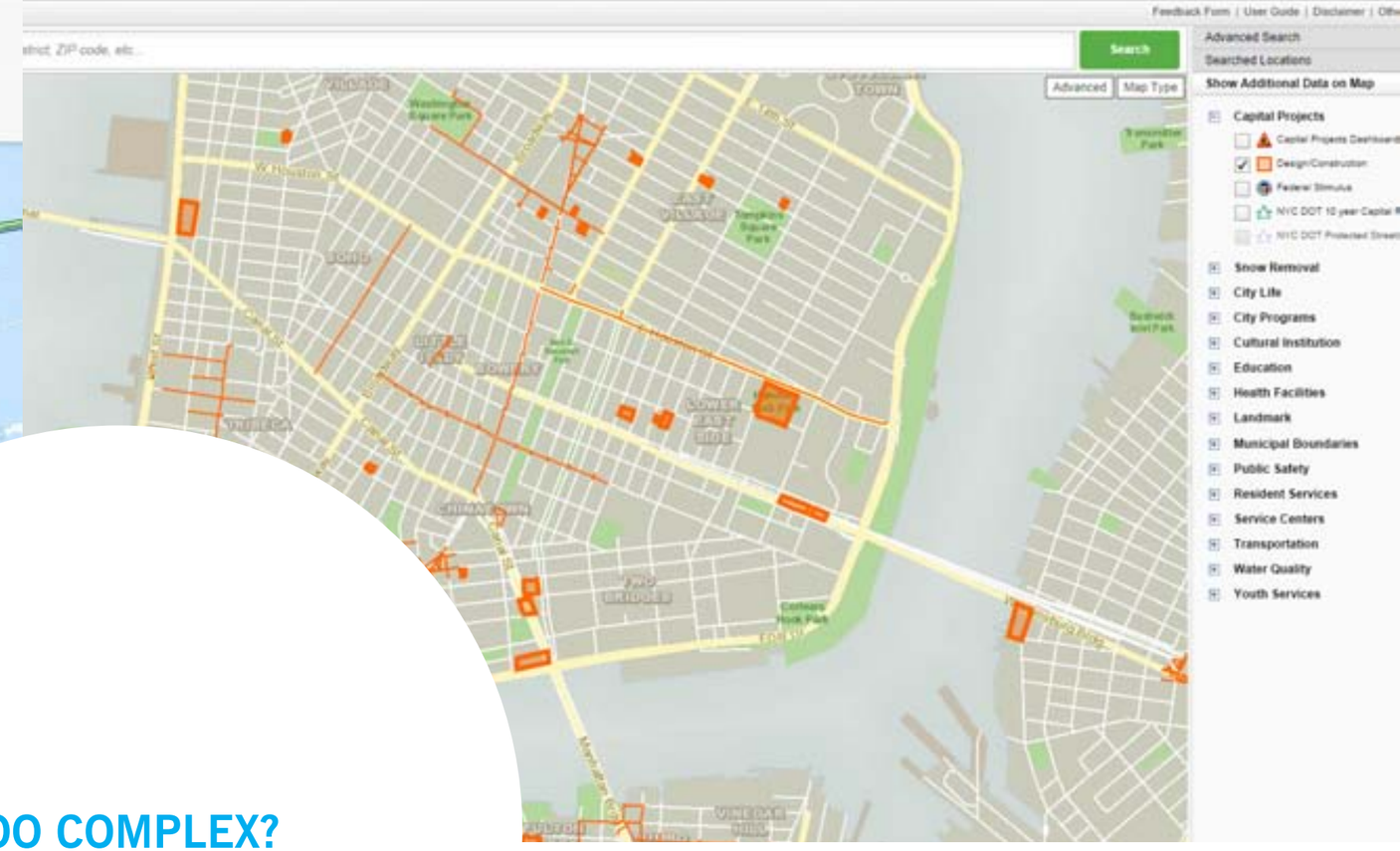
TOO LATE?


buildingeye.com
What's being built in your area?
Show building permits for...
City & State or Zip code
Search
View...
Map
26934 Applications found
South Bay
SAN FRANCISCO

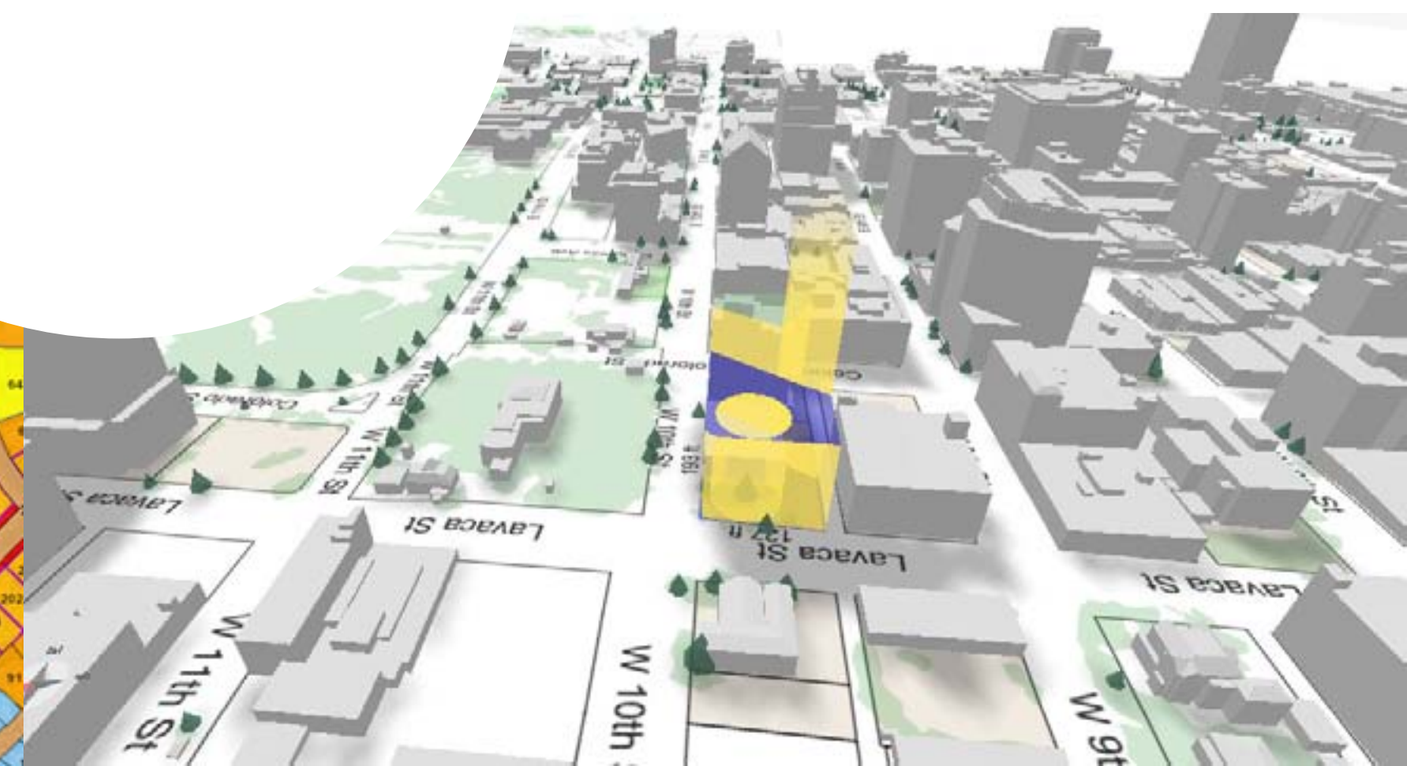

Search
Advanced Search
Searched Locations
Advanced
Map Type
Show Additional Data on Map
Capital Projects
Snow Removal
City Life
City Programs
Cultural Institution
Education
Health Facilities
Landmark
Municipal Boundaries
Public Safety
Resident Services
Service Centers
Transportation
Water Quality
Youth Services


Lavaca St
W 11th St
W 10th St
W 9th St

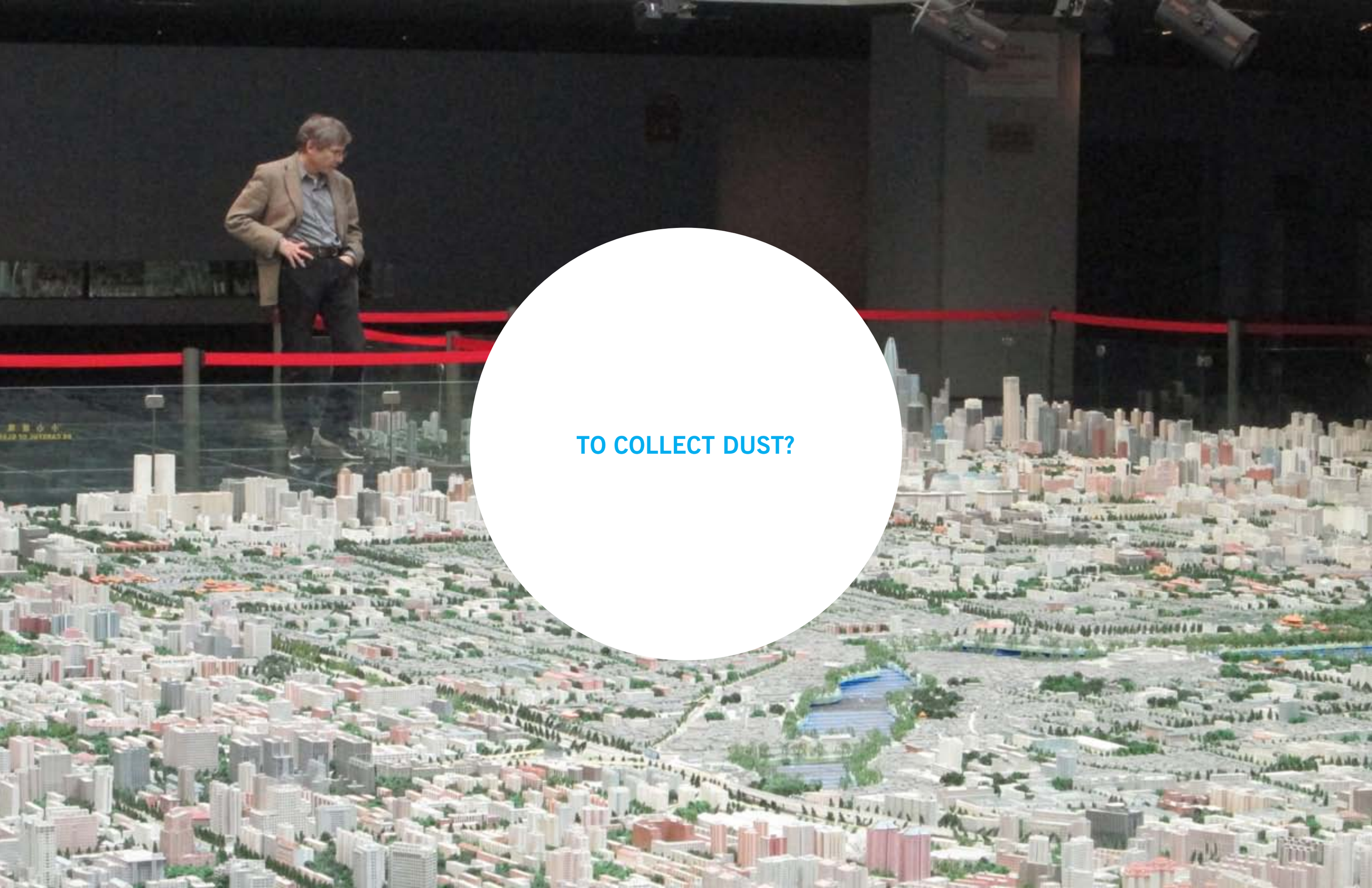

buildingeye.com
What's being built in your area?
Show building permits for...
City & State or Zip code
Search
View...
Map
26934 Applications found
SAN FRANCISCO
South Bay


Search
Advanced Search
Searched Locations
Show Additional Data on Map
Capital Projects
Snow Removal
City Life
City Programs
Cultural Institution
Education
Health Facilities
Landmark
Municipal Boundaries
Public Safety
Resident Services
Service Centers
Transportation
Water Quality
Youth Services

TOO COMPLEX?


Lavaca St
W 11th St
W 10th St

DON'T TOUCH!

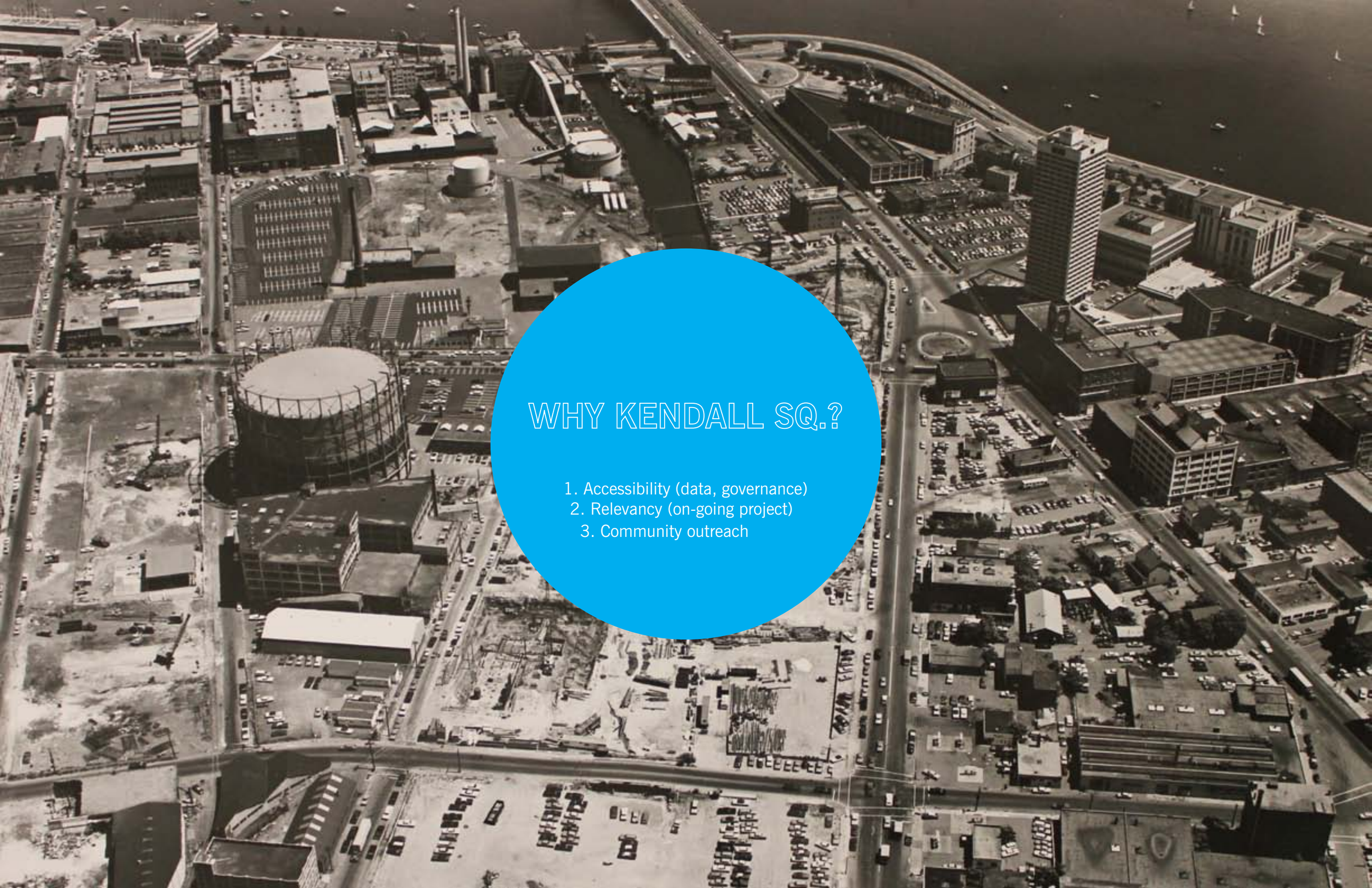


TO COLLECT DUST?

HOW COULD URBAN DATA (LAW, ZONING, REGULATIONS, DESIGN GUIDELINES) **BECOME ONCE AGAIN ACCESSIBLE AND UNAMBIGUOUS?**

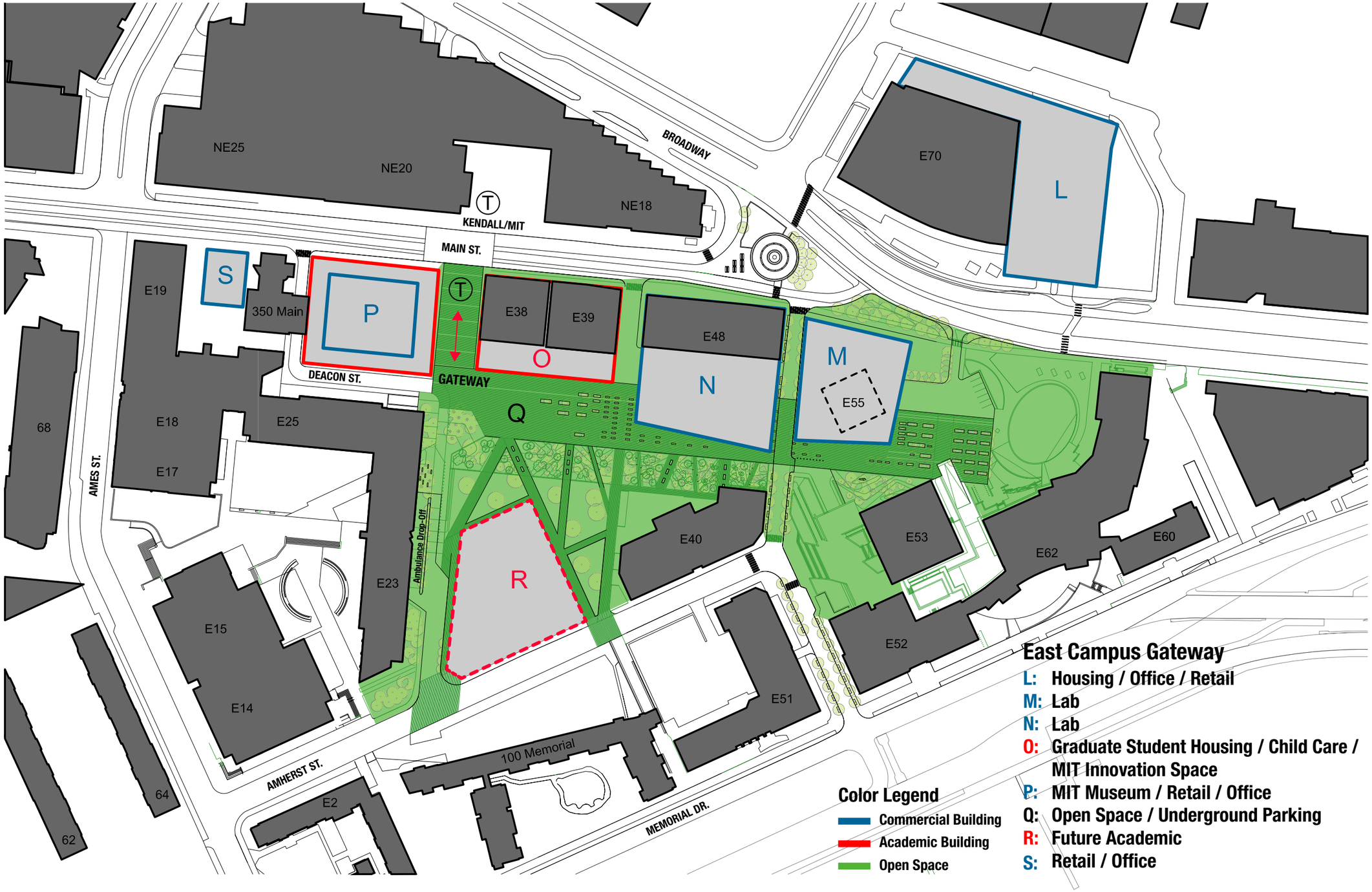
CASE STUDY

KENDALL SQ. REDEVELOPMENT



WHY KENDALL SQ.?

1. Accessibility (data, governance)
2. Relevancy (on-going project)
3. Community outreach



CURRENT PROPSAL

N/E VIEW

SCHEME

Option A

Option B

Option C

LAB/OFFICE/RETAIL

ACADEMY

MACK SCOGIN MERRILL ELAM ARCHITECTS
MICHAEL VAN VALKENBURGH ASSOCIATES INC

2010-2011

MIT News
ON CAMPUS AND AROUND THE WORLD

PROJECT STARTS

MIT explores plans for enlivening Kendall Square
Discussions begin within MIT and Cambridge communities.

May 28, 2010

MIT has initiated preliminary conversations within the Institute community, as well as with Cambridge officials and representatives of Kendall Square and the surrounding neighborhoods, to discuss early concepts for invigorating the Kendall Square area.

While no specific project has yet been proposed, MIT is considering ideas for its properties near the MBTA station that would create a more vibrant environment consistent with Kendall Square's position as an innovation cluster. The project is being led by the MIT Investment Management Company (MITIMCo), a division of the Massachusetts Institute of Technology that manages the investment of the Institute's endowment and all investment real estate.

RELATED
- MITIMCo
- Kendall Square Association

MIT News
ON CAMPUS AND AROUND THE WORLD

MIT continues outreach regarding Kendall Square redevelopment
Public meetings to be held in the fall

News Office
August 10, 2010

Preliminary ideas and planning principles for revitalizing MIT-owned parcels in Kendall Square were presented to the Cambridge Planning Board on July 20, prompting members of the board to note that the concepts were welcome and a good starting point.

MIT informed the community in late spring that it is exploring a plan for its properties near the MBTA station and has spent the past two months meeting with members of the Institute community, as well as with Cambridge officials and representatives of the surrounding area, to

RELATED
- MITIMCo
- Kendall Square Association
- ARCHIVE: "MIT explores plans for enlivening Kendall Square"

2012

MIT News
ON CAMPUS AND AROUND THE WORLD

Kendall Square, present day

Provost releases faculty task force report on Kendall Square
Supports MIT's plan to file rezoning petition; offers recommendations for path forward

News Office
October 17, 2012

Today, MIT Provost Chris Kaiser released a report of an MIT faculty task force he charged with giving advice on MIT's plans to develop property in Kendall Square. In the report, the members of the task force offer support for MIT's plans to file a new rezoning petition with the City of Cambridge – and also give strong recommendations for how MIT's efforts in Kendall Square should proceed in order to ensure the best possible outcome from MIT's efforts.

The Task Force on Community Engagement in 2030 Planning was appointed by Kaiser in

RELATED
- Read the full report (PDF)
- MIT 2030
- Office of the Provost

MIT News
ON CAMPUS AND AROUND THE WORLD

Provost Chris Kaiser updates faculty on Kendall Square
MIT to file rezoning petition; eastern gateway to the campus to be imagined collaboratively.

News Office
November 20, 2012

MIT Provost Chris Kaiser emailed the MIT faculty today about MIT's proposal around the development of Institute-owned property in Kendall square: his email, reproduced below, follows one he sent to the faculty last month about his release of the report of a faculty task force appointed to advise MIT on the Institute's approach to Kendall Square.

To Members of the Faculty:

RELATED
- Office of the Provost
- ARCHIVE: "Provost releases faculty task force report on Kendall Square"

2013

MIT News
ON CAMPUS AND AROUND THE WORLD

Cambridge Planning Board cites satisfaction with Kendall proposal
Members laud three-year effort to address issues and aspirations.

News Office
February 20, 2013

MIT officials continued their dialogue with the Cambridge Planning Board on Feb. 19 at the second public hearing on the Institute's new zoning petition, which was submitted to the City in December.

In its 10th Planning Board appearance on its Kendall Square Initiative since spring 2010, MIT addressed concerns and ideas that were discussed by Board members and the public at a Jan. 18 Planning Board hearing. Topics included housing, dimensional features, open space,

RELATED
- Download the presentation (PDF)
- ARCHIVE: "Cambridge Ordinance Committee reviews MIT's Kendall Square zoning petition"

MIT News
ON CAMPUS AND AROUND THE WORLD

Image: Elkus Manfredi Architects

MIT president, senior faculty and deans ask Cambridge to approve MIT's zoning proposal
Reif thanks City Council and the people of Cambridge for valuable input.

News Office
April 2, 2013

Monday night, at the weekly meeting of the Cambridge City Council, MIT President L. Rafael Reif, accompanied by three senior faculty members, spoke during the public comment period about the Institute's proposed rezoning of 26 acres of land it owns in the Kendall Square area. The City Council is scheduled to vote on the proposal, which is known as the Kendall Square Initiative, on April 8.

In addition, the deans of all five of MIT's schools – engineering, management, science,

RELATED
- More on MIT's Kendall Square Initiative
- President L. Rafael Reif
- Download Reif's remarks to the City Council (PDF)

2014

MIT News
ON CAMPUS AND AROUND THE WORLD

East Campus/Kendall gateway study begins
Urban design team selected; MIT and Cambridge community meetings set.

News Office
October 29, 2013

MIT's East Campus Steering Committee has selected a multidisciplinary urban design team to help advance plans for the redevelopment of Institute-owned property in East Campus and Kendall Square. The team will build upon the work of Elkus Manfredi Architects, which led to the adoption of new zoning regulations in the district, as well as the work of a faculty design group led by the School of Architecture and Planning (SA+P), which recently developed design typologies for the Institute's property in the Kendall Square area.

Urban design team

RELATED
- Read more about the Kendall Square initiative
- MIT 2030
- ARCHIVE: "Kendall Square initiative moves toward design phase"

MIT News
ON CAMPUS AND AROUND THE WORLD

COMMUNITY MEETING 2

Letter: Invitation to community forums on east campus/Kendall gateway study

News Office
November 4, 2013

The following email was sent today to the Institute community by Acting Provost Marty Schmidt and Executive Vice President and Treasurer Israel Ruiz.

To Members of the MIT Community:

As recommended by the Faculty Task Force on Community Engagement in 2030 Planning, MIT has commissioned a design study to help us envision the future of our east campus and the Kendall gateway area. A critical element of the study process is the gathering of thoughts

RELATED
- MIT 2030
- ARCHIVE: "East Campus/Kendall gateway study begins"

MIT News
ON CAMPUS AND AROUND THE WORLD

COMMUNITY MEETINGS

Institute to host community brainstorming sessions on Kendall Square
Meetings designed to solicit ideas for publicly accessible space in Kendall Square

News Office
September 15, 2010

Community brainstorming sessions to explore ideas and opportunities to enliven the publicly accessible spaces in Kendall Square will be held at the end of September. Hosted by MIT as part of its planning for revitalizing MIT-owned parcels in Kendall Square, the sessions will be open to students, faculty, staff and community members.

Kendall Square is known throughout the region for its innovative, market-leading companies, start-up ventures and strong connection to MIT. Though Kendall Square serves as a gateway

RELATED
- MITIMCo
- Kendall Square Association
- ARCHIVE: "MIT continues outreach regarding Kendall Square redevelopment"

MIT News
ON CAMPUS AND AROUND THE WORLD

Image: Elkus Manfredi Architects

MIT presents Kendall Square zoning concepts to Cambridge Planning Board
Planning Board reacts positively; Institute is prepared to file rezoning petition

News Office
December 5, 2012

On Tuesday night, MIT officials presented a preview of the Institute's rezoning petition for the redevelopment of Kendall Square to members of the Cambridge Planning Board, who responded very favorably.

The meeting was attended by members of the MIT administration and faculty. Since this summer, MIT Provost Chris Kaiser has sought faculty input on MIT's Kendall Square proposal through a task force whose report Kaiser made public in October. The report recommended

RELATED
- Download the presentation (PDF)
- Office of the Provost
- MIT Investment Management Company

MIT News
ON CAMPUS AND AROUND THE WORLD

ZONING CONCEPTS

Development along north and east sides of One Broadway with active ground floor uses will further energize the Broad Canal

Image: Elkus Manfredi Architects

MIT files new Kendall Square rezoning petition
Action will launch public review process in Cambridge, further collaborative thinking on campus.

News Office
December 13, 2012

Today, MIT formally submitted its rezoning petition for a 26-acre parcel of Institute-owned property in the Kendall Square area to the City of Cambridge. The petition is expected to be referred by the City Council to the Planning Board and the Council's Ordinance Committee, each of which is charged with reviewing zoning matters. Public hearings before each body will likely begin in early 2013.

Earlier petition/Kendall Square study

RELATED
- Download the rezoning petition (PDF)
- MIT Investment Management Company
- ARCHIVE: "MIT presents Kendall Square zoning concepts to Cambridge Planning Board"

MIT News
ON CAMPUS AND AROUND THE WORLD

EARLY DESIGN

Kendall Square initiative moves toward design phase
Urban-design firm to be selected; community meetings will be set for fall.

News Office
August 21, 2013

This fall, MIT will select an urban-design firm to help it develop and complete a design plan for the redevelopment of Institute-owned property in Kendall Square.

In April, MIT's rezoning petition for its Kendall Square initiative was approved by the Cambridge City Council following a three-year, community-wide effort to align the interests of a broad group of stakeholders around the future vision for Kendall Square. The Council's approval gives MIT the ability to propose up to 1.1 million square feet of new development, which will be a combination of housing, retail, lab, commercial and open space. MIT also

RELATED
- Report (PDF): East Campus/MIT Gateway
- Read more about the Kendall Square initiative
- MIT 2030
- ARCHIVE: "City of Cambridge approves MIT's

MIT News
ON CAMPUS AND AROUND THE WORLD

Kendall Square initiative moves toward design phase
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RELATED
- Report (PDF): East Campus/MIT Gateway
- Read more about the Kendall Square initiative
- MIT 2030
- ARCHIVE: "City of Cambridge approves MIT's

MIT News
ON CAMPUS AND AROUND THE WORLD

Letter to the community on East Campus/Kendall Square design firm selection

News Office
September 23, 2014

The following email was sent today to the MIT community by Provost Martin Schmidt and Executive Vice President and Treasurer Israel Ruiz.

To the members of the MIT community:

We write to provide an update on MIT's East Campus/Kendall Square planning process. In our July 2014 communication, we reflected on several key initiatives and studies that have guided this effort over the past few years, and shared a proposed site assembly as well an outline of

RELATED
- Martin Schmidt
- Israel Ruiz
- Kendall Square Initiative

KENDALL SQ. TIMELINE

MIT Task force SA+P

K2C2

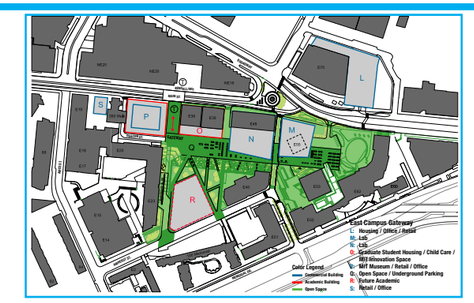
Rezoning petition

MIT2030

CBT

Urban planning

Architects selection

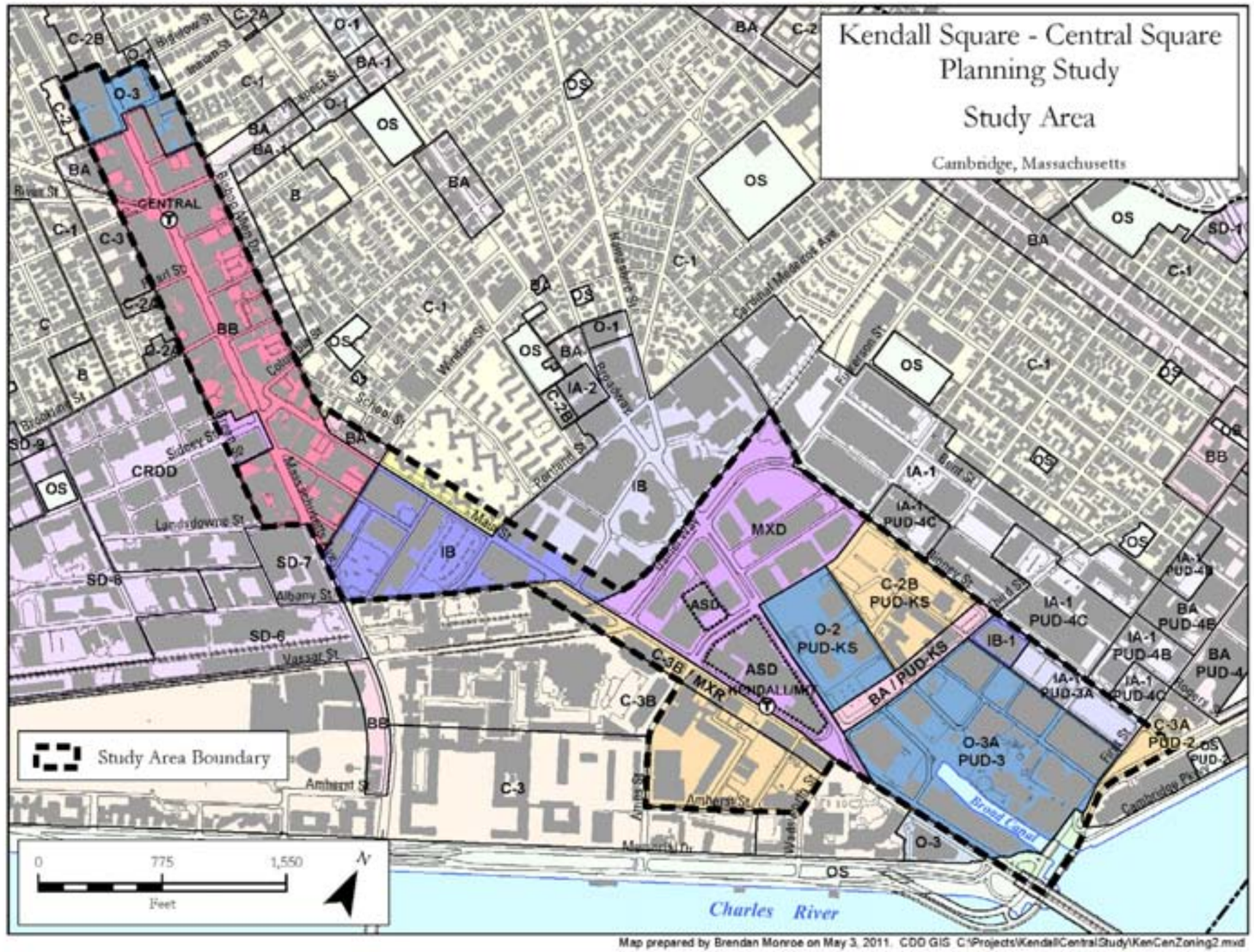


2010 | 2011 | 2012 | 2013 | 2014 | 2015

CITY OF CAMBRIDGE (CDD)

KENDALL SQUARE & CENTRAL SQUARE PLANNING STUDY (K2C2)

REGULATION & DESIGN GUIDELINES


Kendall Square - Central Square
Planning Study
Study Area
Cambridge, Massachusetts
Study Area Boundary
0
775
1,550
Feet
N
Charles River
CENTRAL
CRDD
MXD
ASD
ASD KENDALL/MIT
C-3B / MXR
BA / PUD-KS
O-2 PUD-KS
C-2B PUD-KS
IA-1 PUD-4C
IA-1 PUD-4B
IA-1 PUD-3A
BA PUD-4B
BA PUD-4
C-3A PUD-2
O-3A PUD-3
Broad Canal
Map prepared by Brendan Monroe on May 3, 2011. CDD GIS C:\Projects\KendallCentralStudy\KenCenZoning2.mxd

SCALE AND MASSING - GENERAL

GOAL

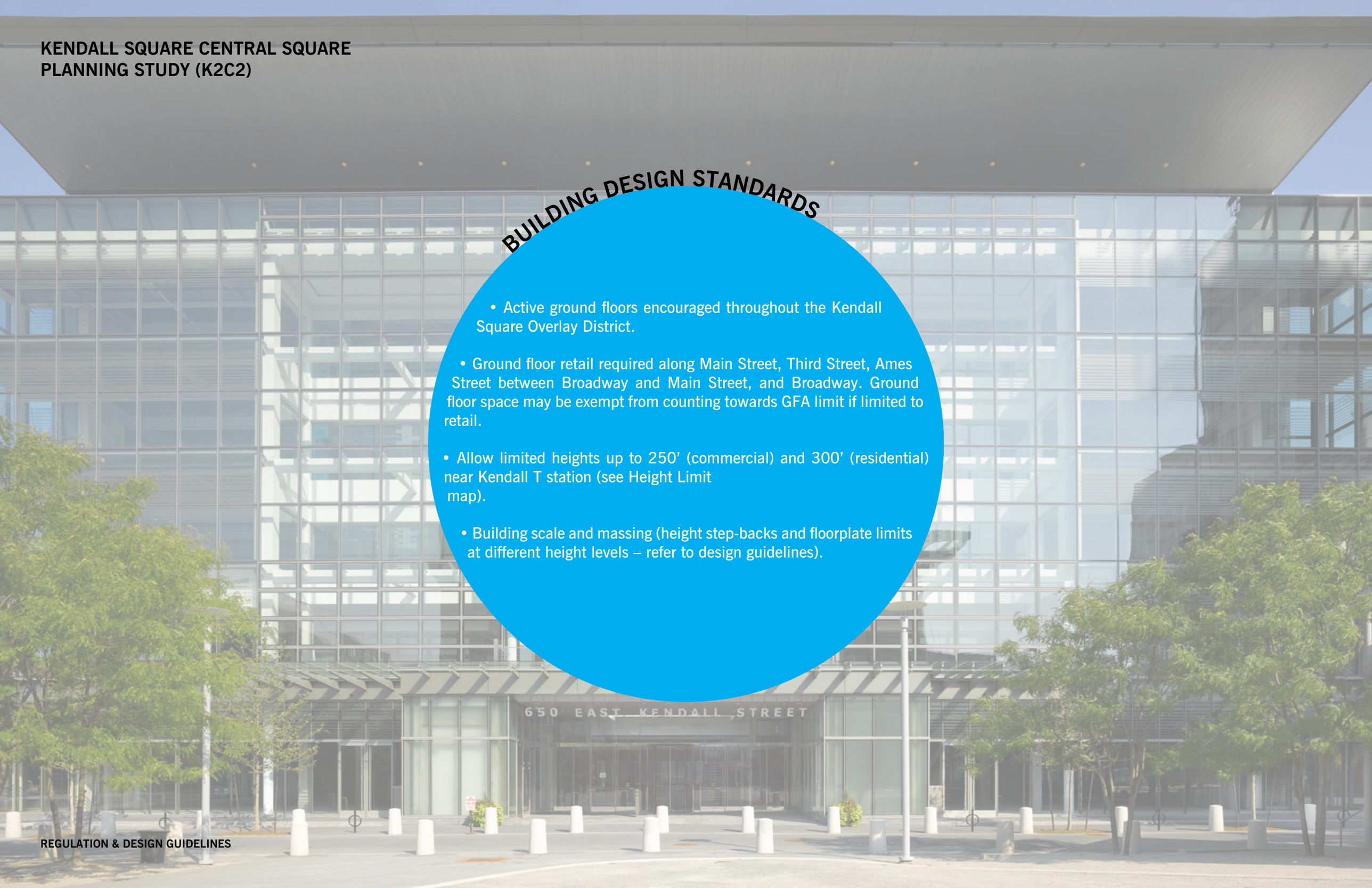
Encourage building forms and site planning that relate to the surrounding context. New buildings should create sensitive transitions to neighboring uses, especially to existing residential buildings, historical structures, and public parks

MEASURES

a. Include setbacks to create transitions to adjacent low-scale buildings

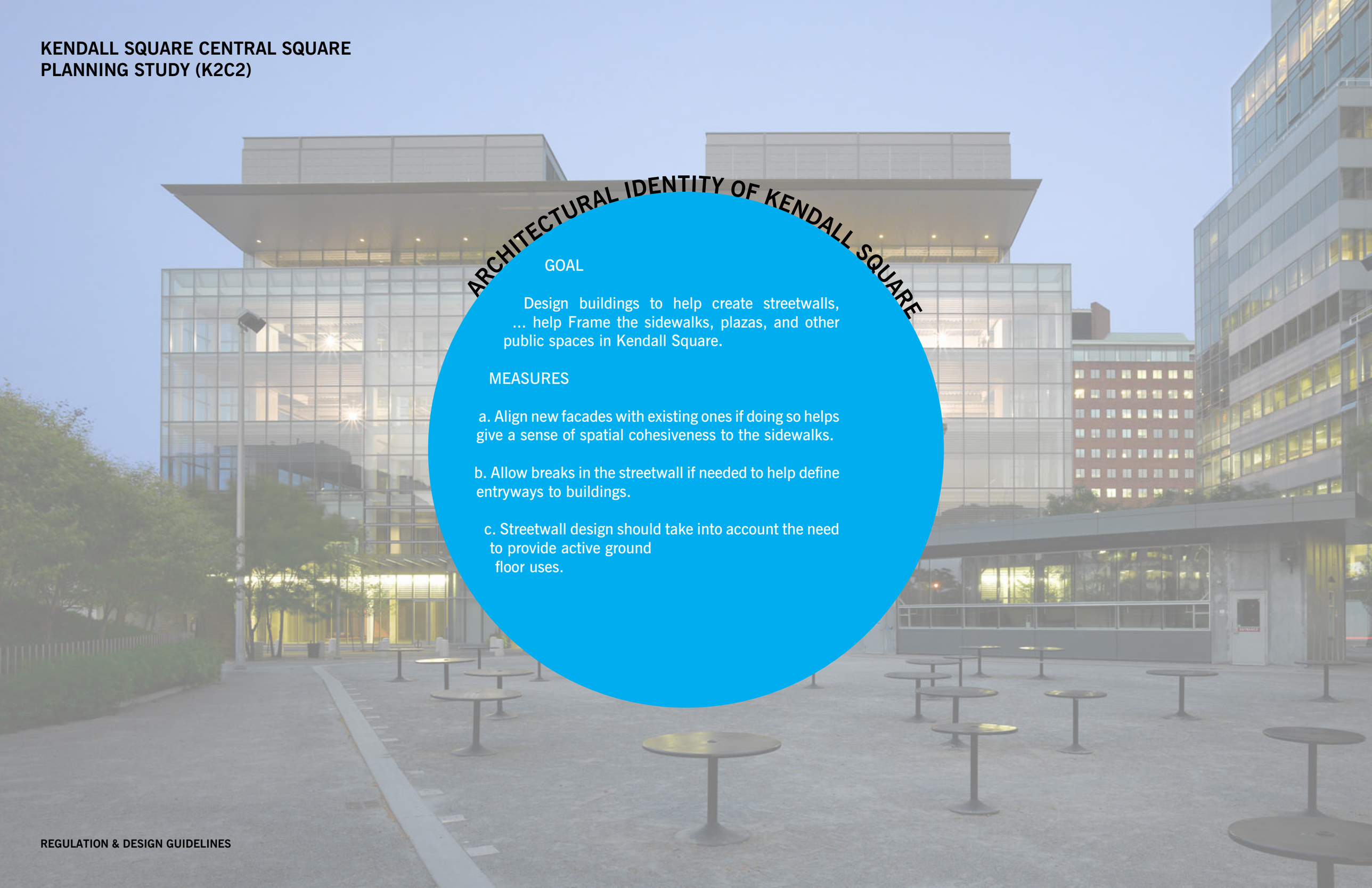
b. Design and locate public and private open space to be responsive to adjacent uses

c. Use sensitive site planning and building design to reduce impact on significant view corridors from public spaces



BUILDING DESIGN STANDARDS

- Active ground floors encouraged throughout the Kendall Square Overlay District.
- Ground floor retail required along Main Street, Third Street, Ames Street between Broadway and Main Street, and Broadway. Ground floor space may be exempt from counting towards GFA limit if limited to retail.
- Allow limited heights up to 250' (commercial) and 300' (residential) near Kendall T station (see Height Limit map).
- Building scale and massing (height step-backs and floorplate limits at different height levels – refer to design guidelines).



ARCHITECTURAL IDENTITY OF KENDALL SQUARE

GOAL

Design buildings to help create streetwalls, ... help Frame the sidewalks, plazas, and other public spaces in Kendall Square.

MEASURES

a. Align new facades with existing ones if doing so helps give a sense of spatial cohesiveness to the sidewalks.

b. Allow breaks in the streetwall if needed to help define entryways to buildings.

c. Streetwall design should take into account the need to provide active ground floor uses.

MINIMIZE MONOLITHIC MASSING

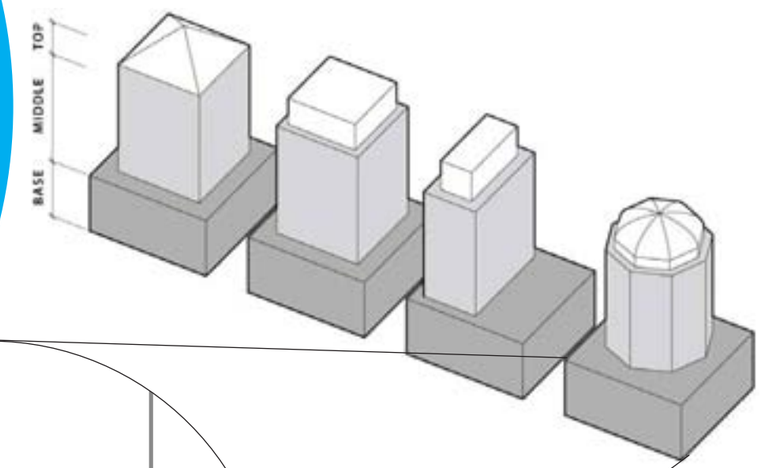
GOAL

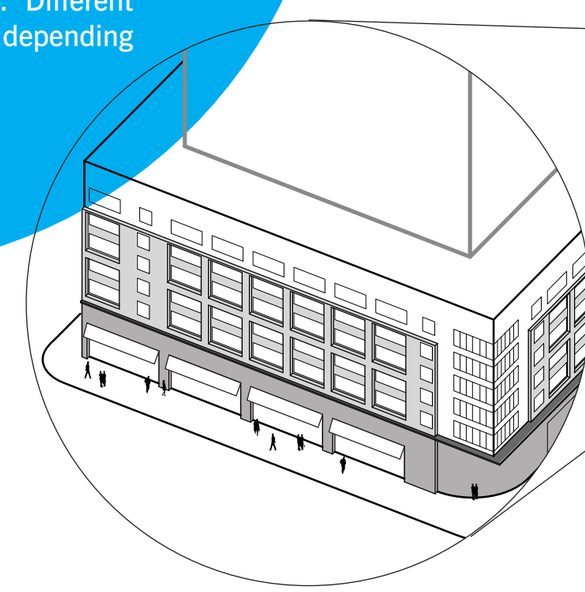
Design buildings to minimize monolithic massing and break down the scale of large buildings

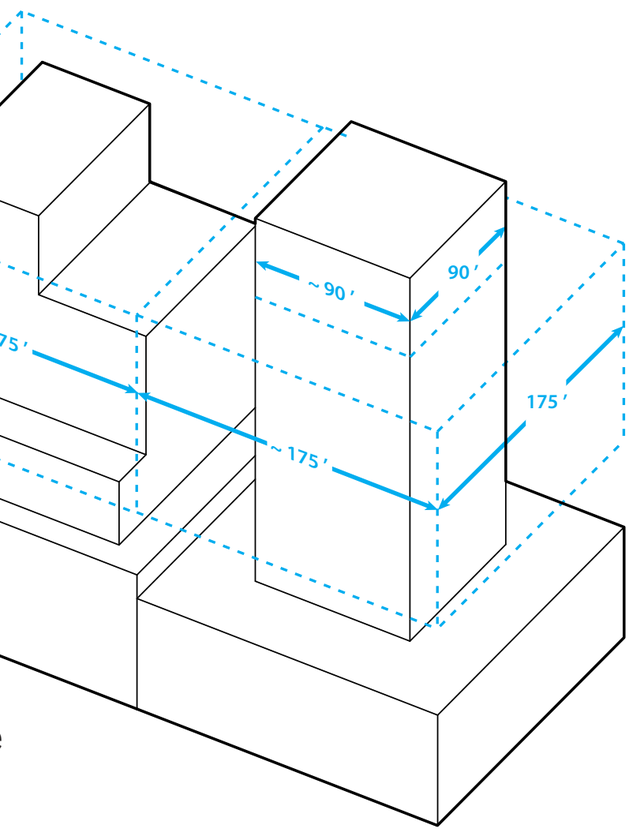
MEASURES

a. Generally, buildings should have a clearly expressed base, middle, and top. This division should be expressed within the streetwall height zone as well as for buildings exceeding streetwall height.

b. Pay special attention to the first floors (bottom 20 feet) of buildings, where buildings relate the most to the street and pedestrians. Different design guidelines may be applicable depending on location and uses of buildings.



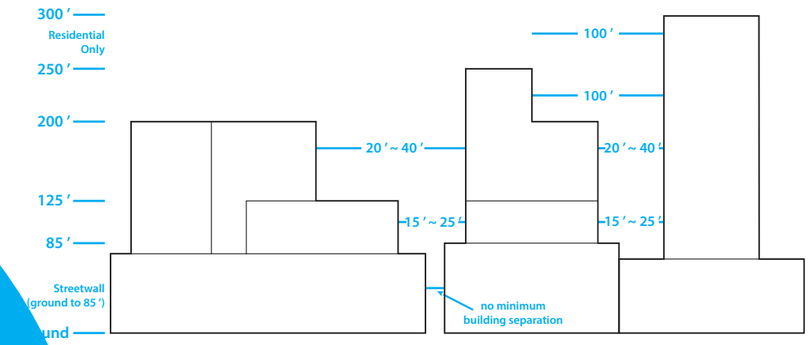




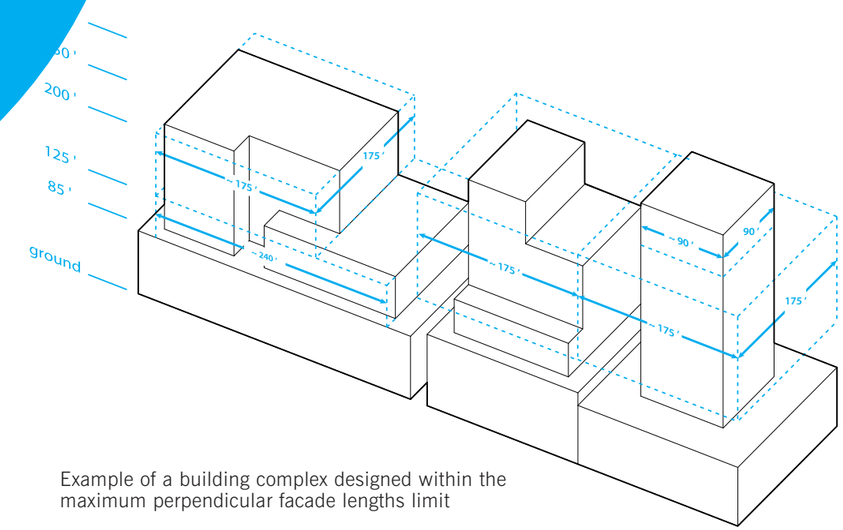
BUILDING SEPARATION

The following maximum façade lengths and minimum building separation are suggested to limit the impact of tall buildings both at the street level within the district and from nearby areas.

Height Range (feet)	Minimum building separation	Maximum length of plan dimension
251' to 300' (for residential use only)	100'	160' x 65' or 90' x 90'
201' to 250'	100'	175' x 175'
126' to 200'	20-40'	175' x 175'
85' to 125'	15-25'	240' x 175'
Streetwall (ground to 85')	None	None



Example of a building complex with appropriate building separation



Example of a building complex designed within the maximum perpendicular facade lengths limit

MAJOR PUBLIC STREETS

GOAL

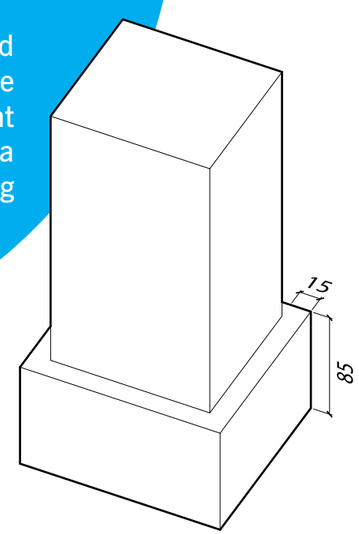
Create a strong datum by setting back the building at upper floors to create a strong edge to the street and to limit the sense of height at street level.

MEASURES

a. Set back approximately two-thirds of the building façade above 85 feet from the principal façade by a depth of about 15 feet; flexibility will be considered when street/ground floor setback is provided.

b. Façade areas without setback may be appropriate at corners or in specific locations to create architectural variety.

c. In instances of infill development on constrained sites, provide distinct horizontal articulation at the datum height that relates to the façade of adjacent or facing buildings through means other than a setback (significant change in material, projecting cornice/fin/shade etc.)



SECONDARY STREETS

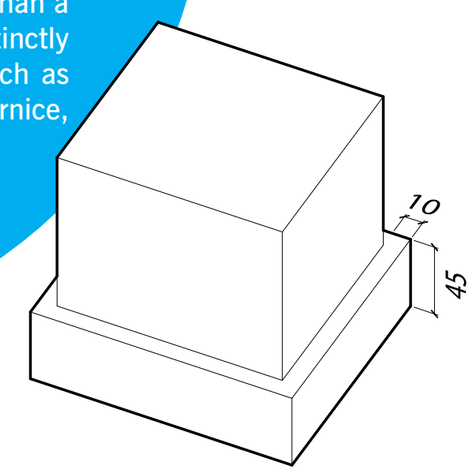
GOAL

Create a strong datum by setting back the building at upper floors to create a strong edge to the street and to limit the sense of height at street level.

MEASURES

a. Set back any portion of the building above 45 feet by approximately 10 feet from the principal façade. Where appropriate, design these setbacks to include balconies and rooftop terraces.

b. Create a strong horizontal definition line on the façade at a height of 45' through means other than a step-back if it successfully expresses a scale distinctly more intimate than a major public street (such as significant change in material; projecting cornice, fin or shade etc.).



PARK EDGES

GOAL

Development around parks and plazas should support an environment thatis active, safe, and welcoming to a wide spectrum of users throughout the day, week and year.

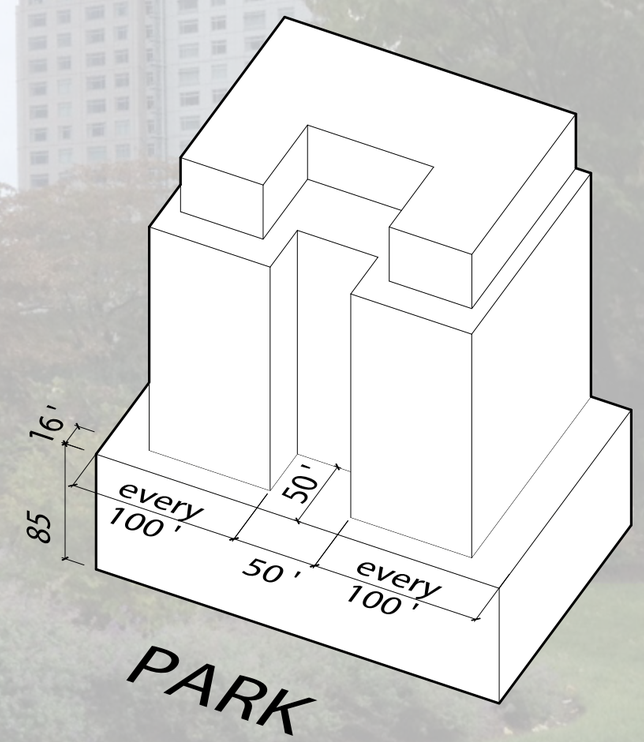
MEASURES

a. Pay special attention to scale and shadows of buildings along park edges.

b. Set back about two-thirds of the building façade above 85 feet from the principal façade depth of approximately 15 feet

c. Create vertical breaks for building volumes above 120' in height facing the park -- façades facing the park exceeding 100' in width should be separated from adjacent façades by a gap of approximately 50 feet, extending back 50 feet from the ground level façade. Residential balconies may project up to 4 feet into setbacks and gaps.

d. Façade areas without setback may be appropriate at corners or in specific locations to create architectural variety.



KENDALL SQUARE CENTRAL SQUARE PLANNING STUDY (K2C2)

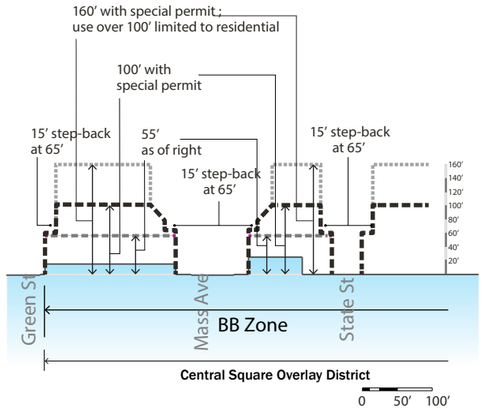
a. Varied height and architectural elements create interesting

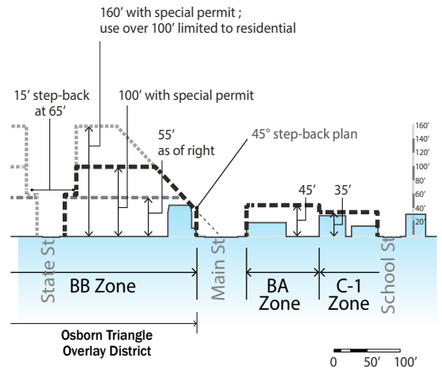
b. Articulated bays and balconies help to avoid flat facades

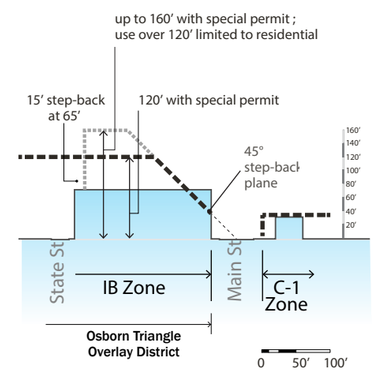
c. Articulated materials, fenestration, and architectural detailing break down the scale of large buildings and create visual interest

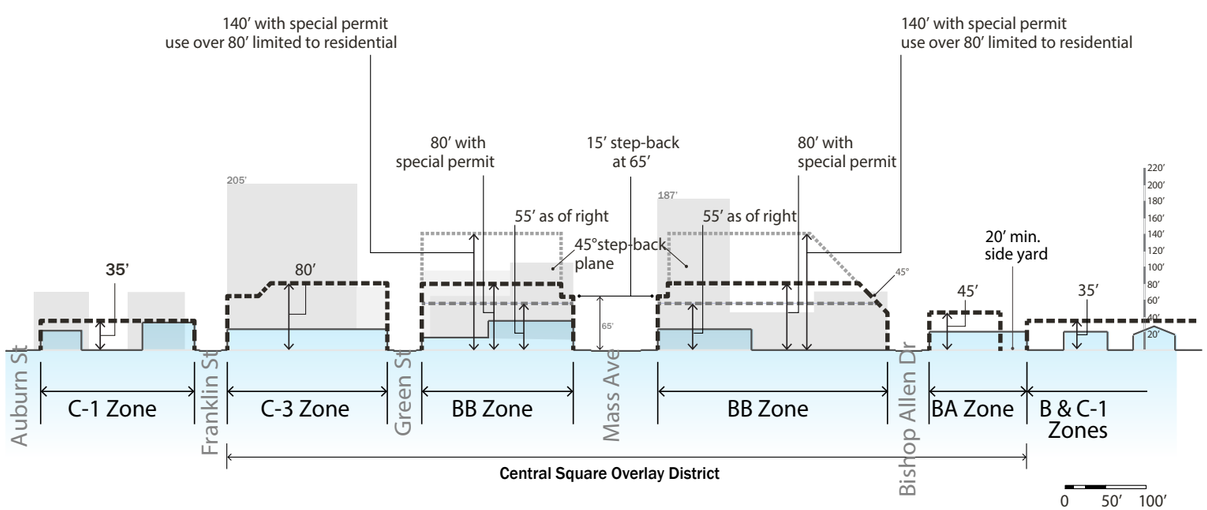
d. Building setback and podium rooftop can be used as a roof garden

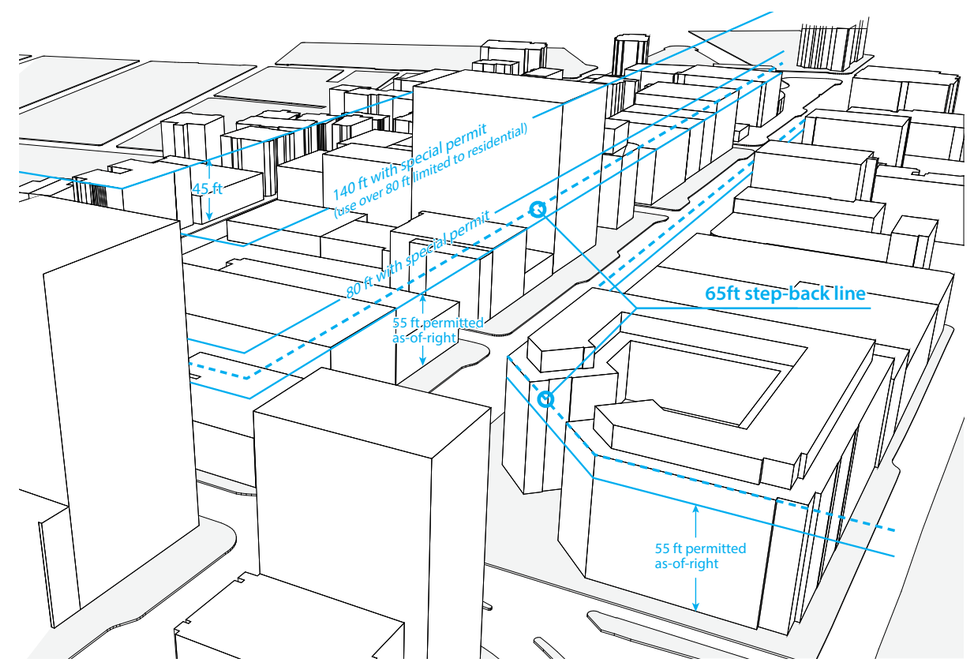
e. Recessed or projected entryways, canopies, awnings and other archit elements enhance the pedestrian e











REGULATION & DESIGN GUIDELINES

MIT Task force SA+P

K2C2

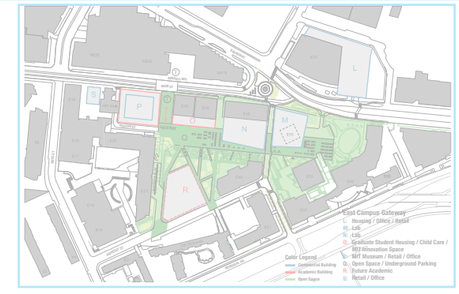
Rezoning petition

MIT2030

CBT

Urban planning

Architects selection



HOW COULD WE TEST, EVALUATE OR DISCUSS REGULATIONS (LIKE WE DO WITH DESIGN)**?**

PLAYGROUND

TOWARDS TANGIBLE REGULATIONS

SITE{POTENTIAL.MAX}
OFFSET {PARCEL.STREET_EDGE}=10FT
OFFSET {STRUCTURE. PERP}=20FT
IF {PLINTH=1}THEN LIMIT {STRUCTURE. HEIGHT}=85FT
LIMIT {STRUCTURE. HEIGHT}=65FT
BUILDING{ENVELOPE=1}
SITE{POTENTIAL.MAX}
SITE{POTENTIAL.MIN}
OFFSET {PARCEL.STREET_EDGE}=10FT
FSET {STRUCTURE. PERP}=50FT
{PLINTH=1}THEN LIMIT {STRUCTURE. HEIGHT}=125FT
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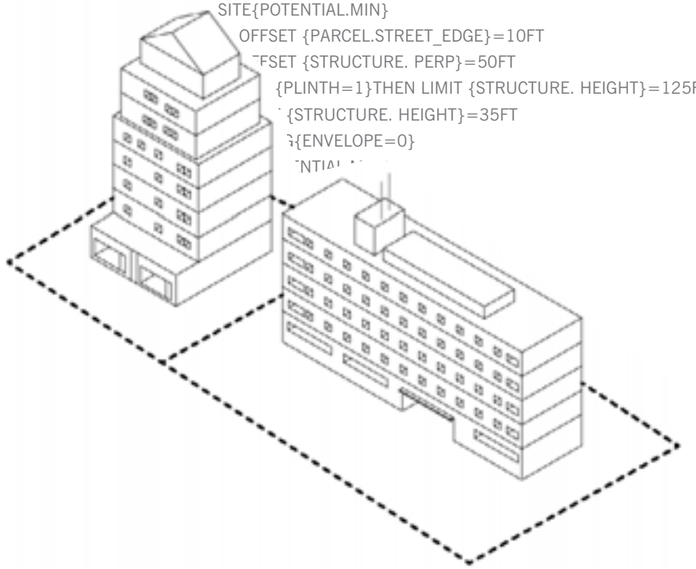
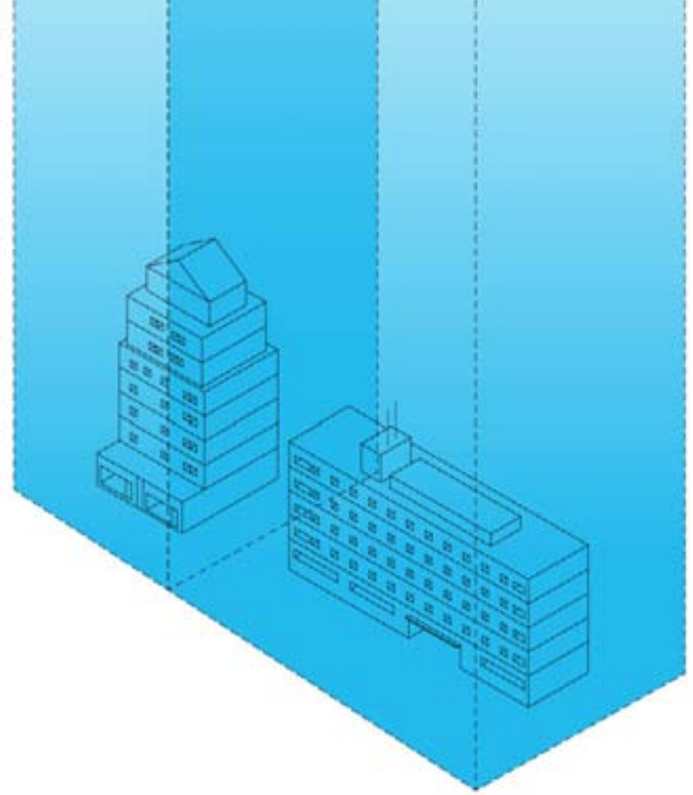
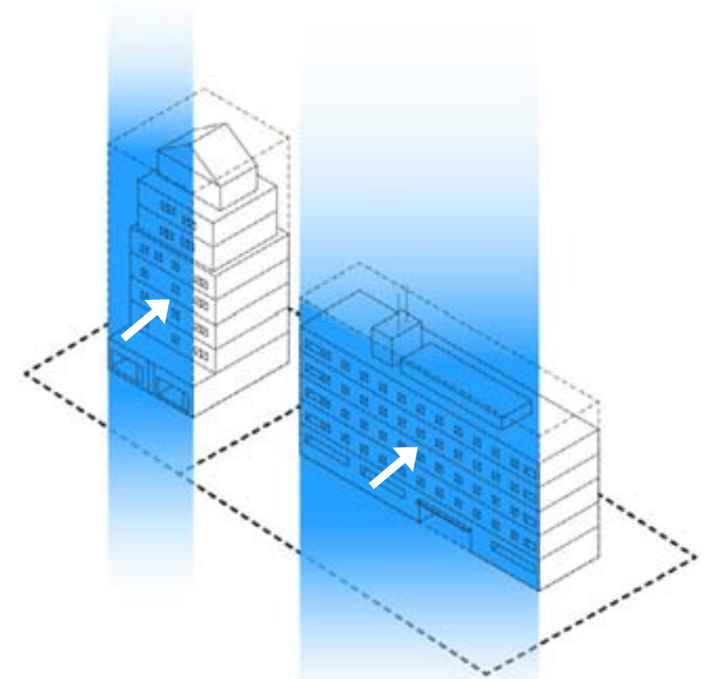
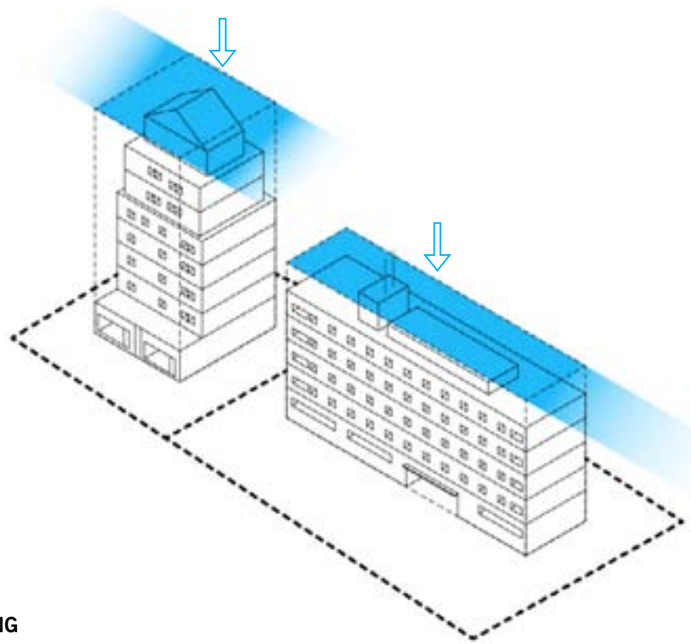
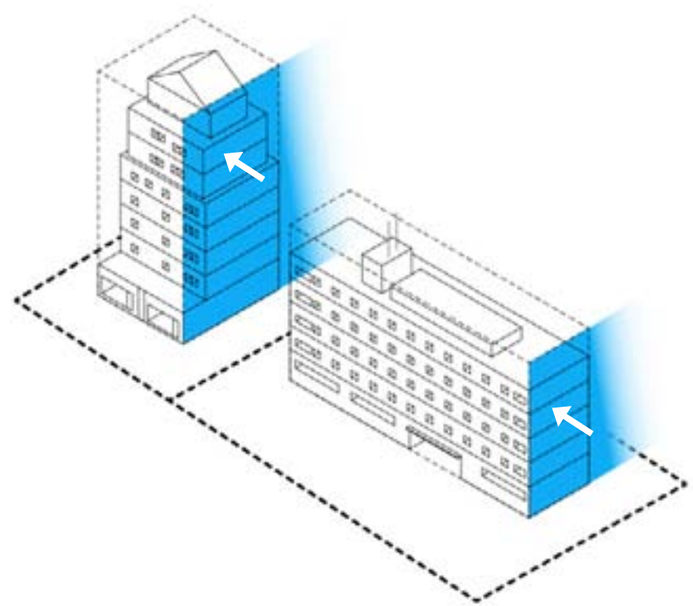
{ENVELOPE=0}

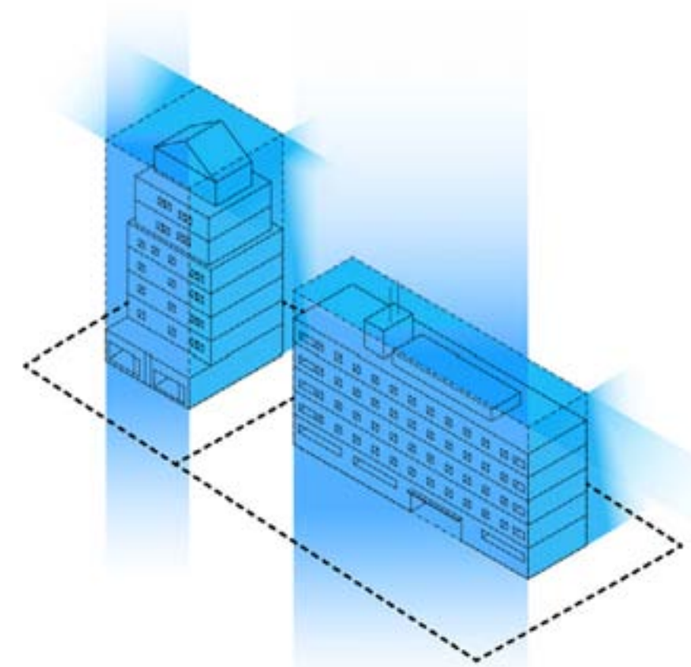








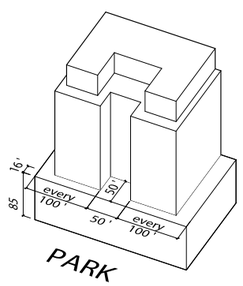




DECODING

PARK EDGES

a. Pay special attention to scale and shadows of buildings along park edges.
b. Set back about two-thirds of the building façade above 85 feet from the principal façade depth of approximately 15 feet
c. Create vertical breaks for building volumes above 120' in height facing the park -- façades facing the park exceeding 100' in width should be separated from adjacent façades by a gap of approximately 50 feet, extending back 50 feet from the ground level façade. Residential balconies may project up to 4 feet into setbacks and gaps.
d. Façade areas without setback may be appropriate at corners or in specific locations to create architectural variety.

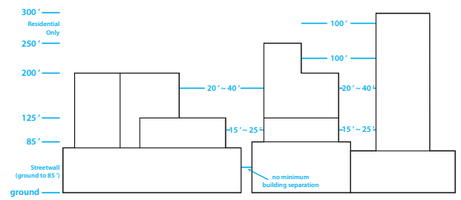


Example of a building massing located at park edges

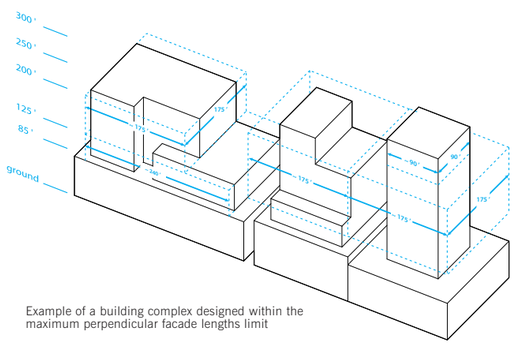
BUILDING SEPARATION

The following maximum façade lengths and minimum building separation are suggested to limit the impact of tall buildings both at the street level within the district and from nearby areas.

Height Range (feet)	Minimum building separation	Maximum length of plan dimension
251' to 300' (for residential use only)	100'	160' x 65' or 90' x 90'
201' to 250'	100'	175' x 175'
126' to 200'	20-40'	175' x 175'
85' to 125'	15-25'	240' x 175'
Streetwall (ground to 85')	None	None



Example of a building complex with appropriate building separation



Example of a building complex designed within the maximum perpendicular facade lengths limit

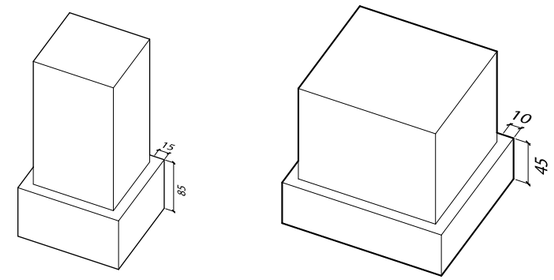
MAJOR PUBLIC STREETS

a. Setback approximately two-thirds of the building facade above 85 feet from the principal facade by a depth of about 15 feet; flexibility will be considered when street/ground floor setback is provided.
b. Facade areas without setback may be appropriate at corners or in specific locations to create architectural variety.
c. In instances of infill development on constrained sites, provide distinct horizontal articulation at the datum height that relates to the facade of adjacent or facing buildings through means other than a setback (significant change in material, projecting cornice/fin/shade etc.)

SECONDARY STREETS

a. Set back any portion of the building above 45 feet by approximately 10 feet from the principal facade. Where appropriate, design these setbacks to include balconies and rooftop terraces.

b. Create a strong horizontal definition line on the facade at a height of 45' through means other than a step-back if it successfully expresses a scale distinctly more intimate than a major public street (such as significant change in material; projecting cornice, fin or shade etc.).



ARCHITECTURAL IDENTITY

a. Align new facades with existing ones if doing so helps give a sense of spatial cohesiveness to the sidewalks.
b. Allow breaks in the streetwall if needed to help define entryways to buildings.

SCALE AND MASSING

New buildings should create sensitive transitions to neighboring uses, especially to existing residential buildings, historical structures, and public parks.

PARCEL SIZE AND SETBACKS

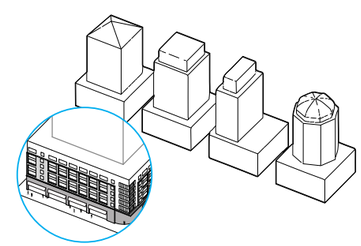
- Minimum size for development parcel is 25,000 sf
- Setback 16' at and above 85' in height along Main Street, Third Street and Broadway
- Pedestrian bridges are allowed, with City Council approval when over public land

HEIGHT LIMITS

- One new building in the Main Street Subdistrict and another in the Third Street Transition Subdistrict is allowed to a height of 300' if the use above 250' is residential
- Additional residential square footage above 250' is subject to a moderate income housing requirement

MINIMIZE MONOLITHIC MASSING

Buildings should have a clearly expressed base, middle, and top. This division should be expressed within the streetwall height zone as well as for buildings exceeding streetwall height.

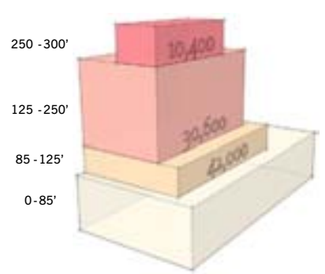


AREA-WIDE REGULATIONS

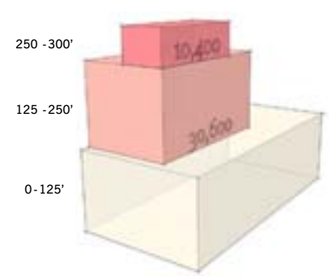
1. Establish common regulations for all Kendall Square PUD subdistricts (PUD-KS1, KS2, KS3, KS4), except where more stringent regulations are created within the PUD language.
2. Allow limited heights up to 250' (commercial) and 300' (residential) near Kendall T station
3. Building scale and massing.

GFA LIMITATIONS

- No more than 980,000 sf of new commercial
- Floor plates aligned with K2 recommendations
- More flexibility for institutional floor plates



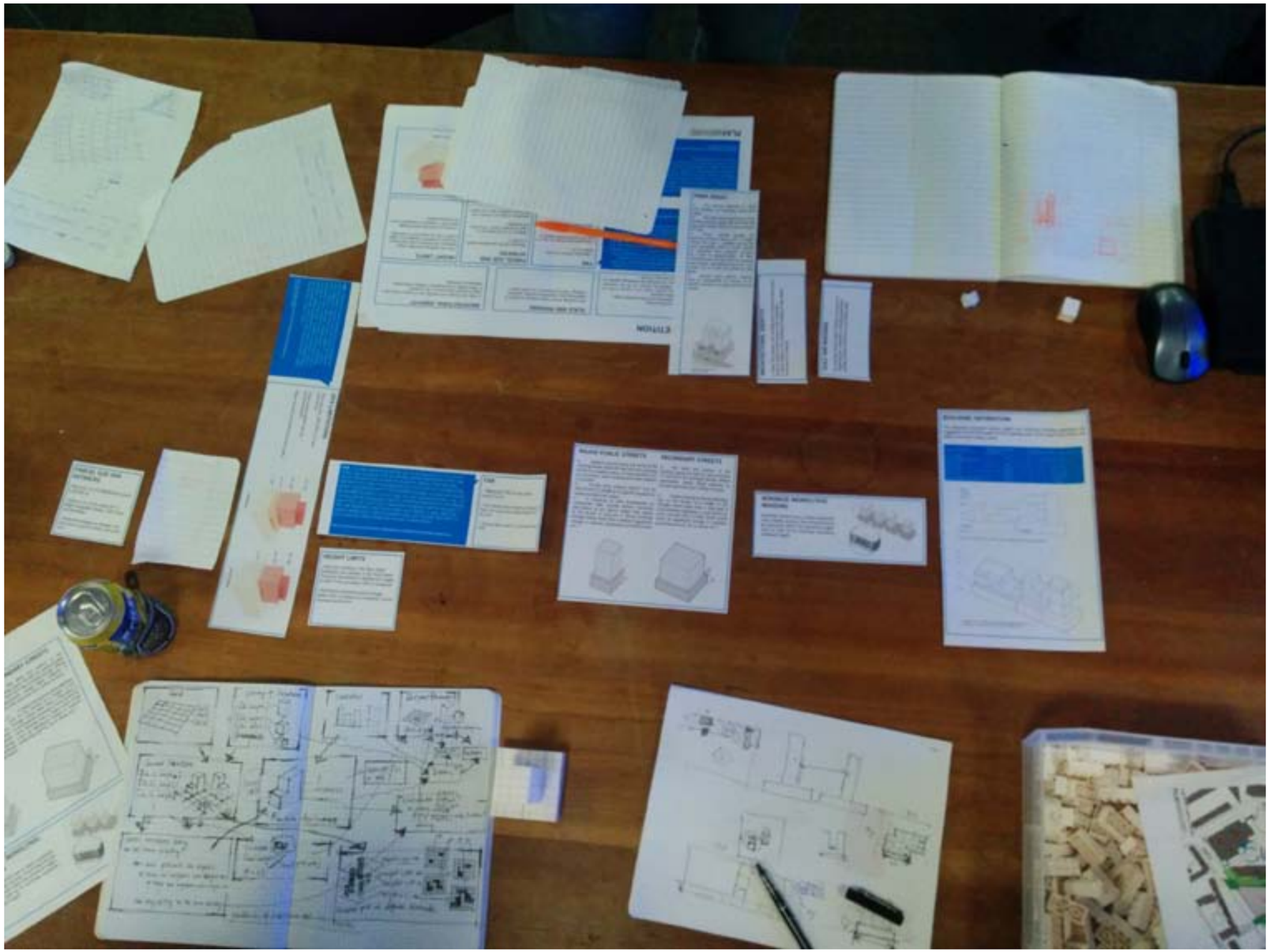
COMMERCIAL



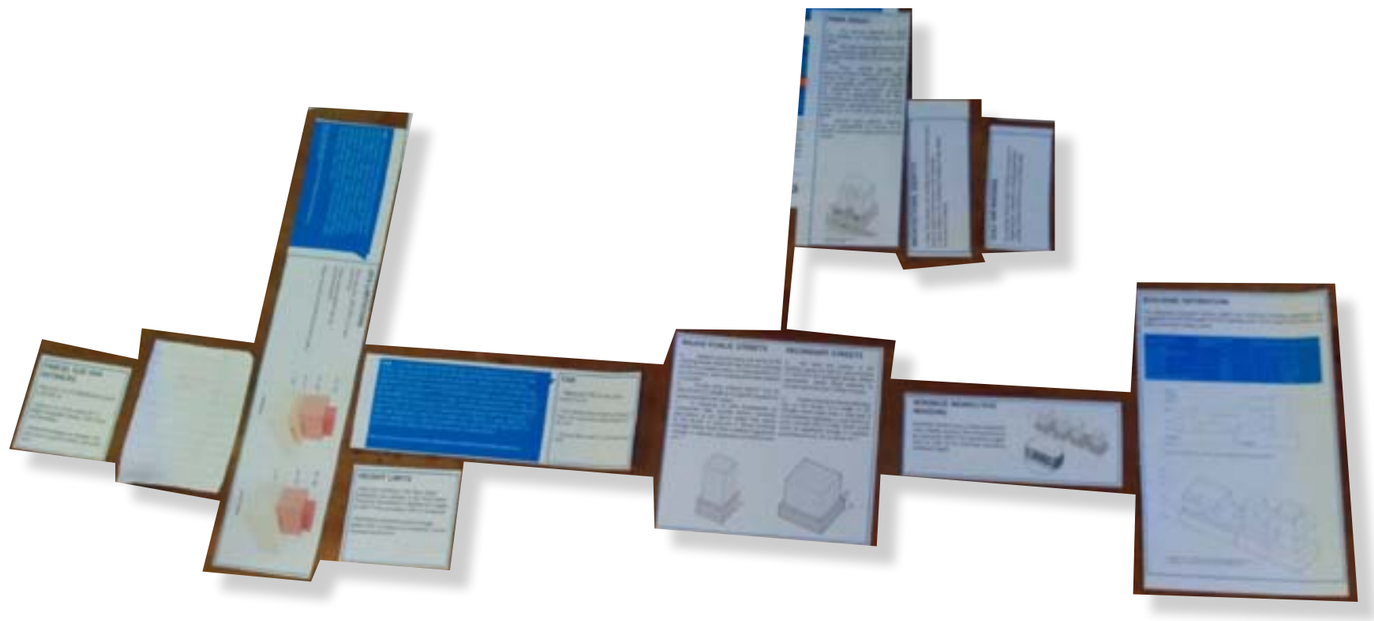
INSTITUTIONAL

FAR

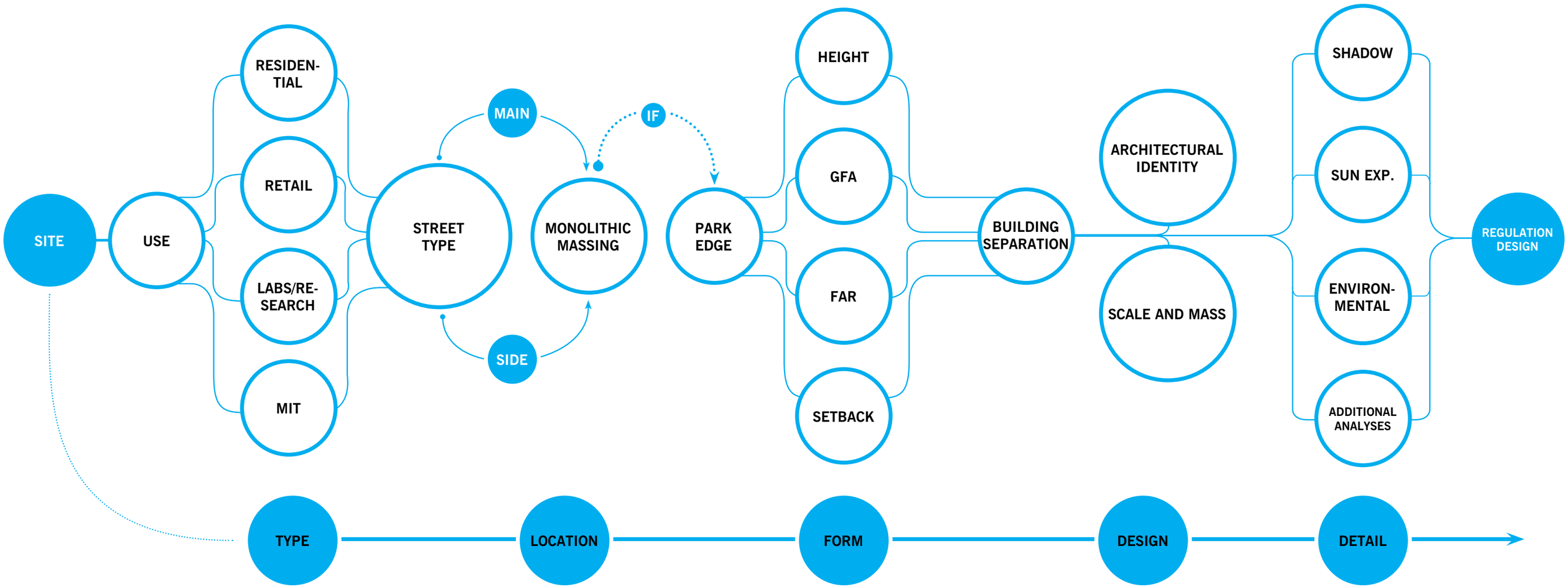
- Maximum FAR for the entire district is 3.9
- Any parcel can exceed as long as it does not cause the entire district to be over
- Ground floor retail is excluded from FAR



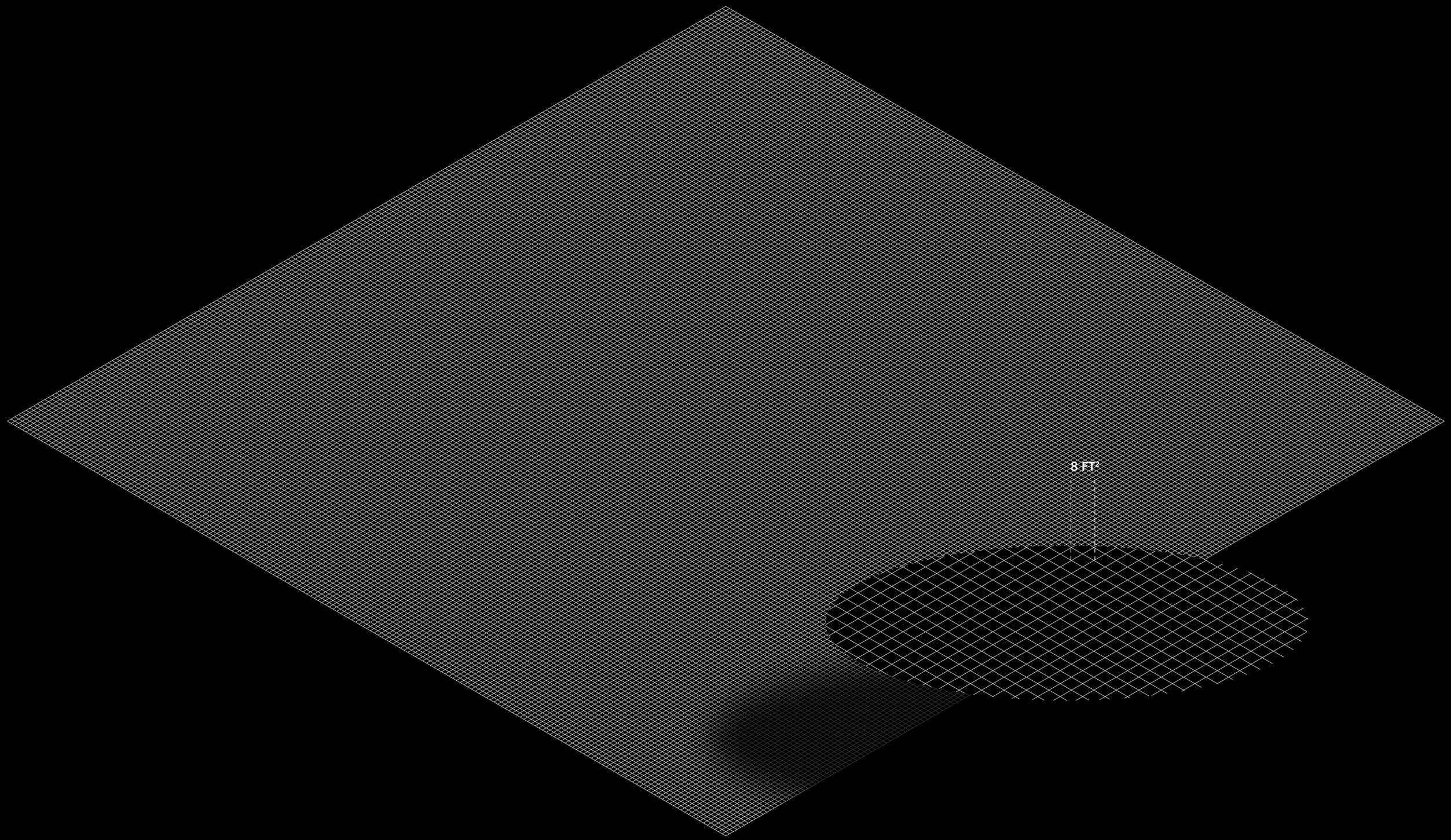
SITE



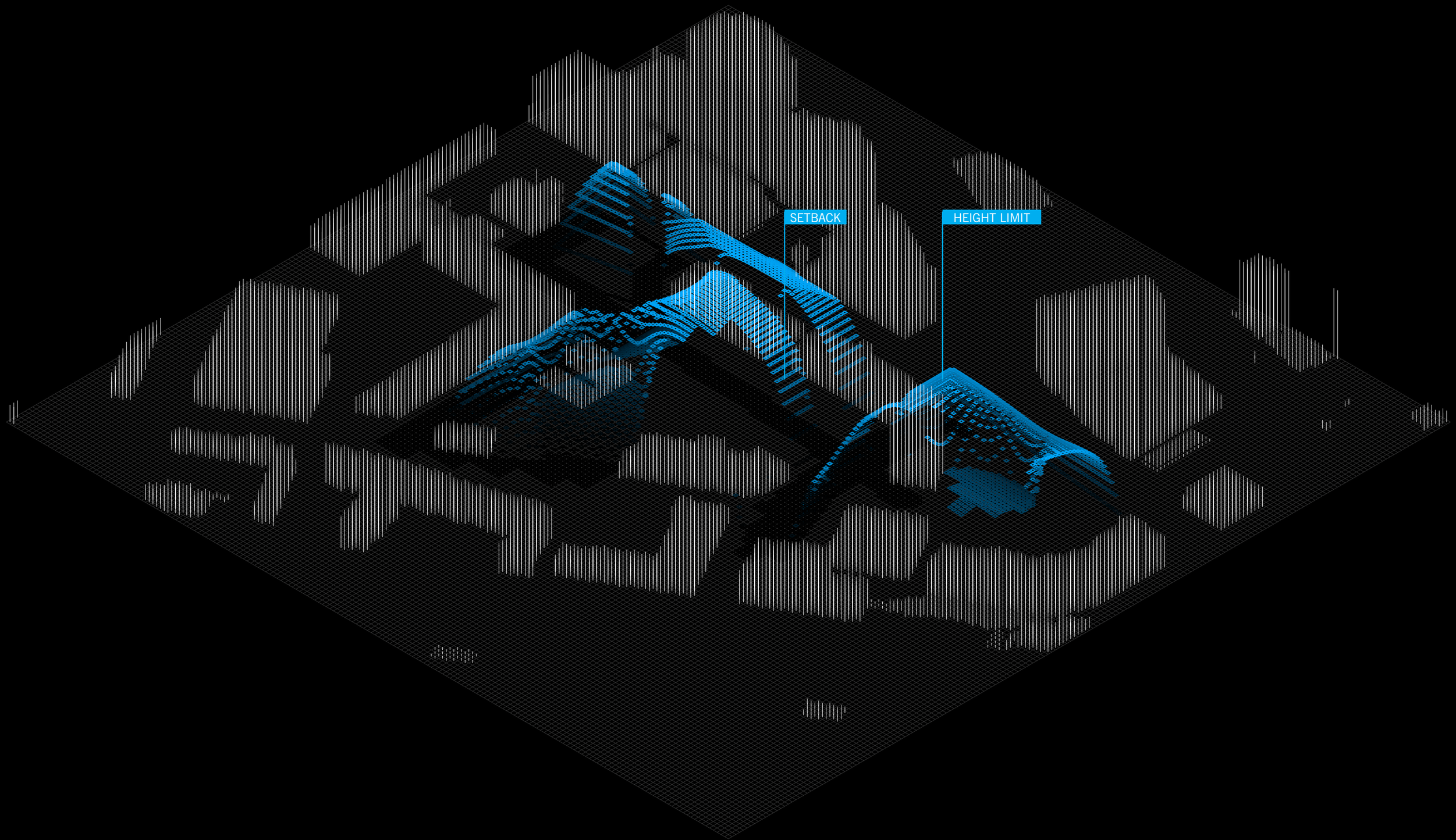
REGULATION DESIGN



ALGORITHMIC REGULATION CONCEPT



REGULATION ASSESSMENT UNITS



REGULATION ASSESSMENT UNITS

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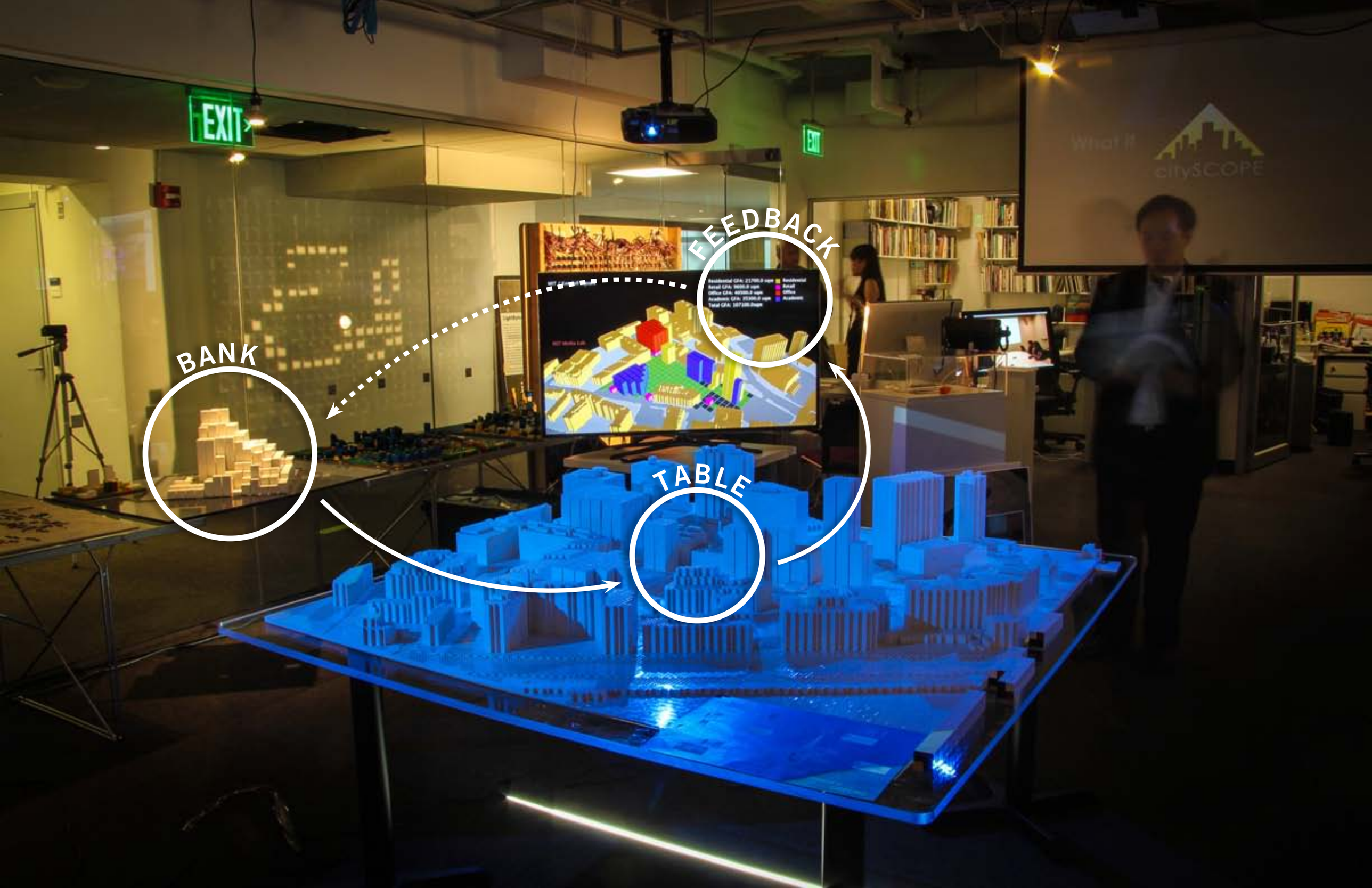
EXIT
What If
citySCOPE


EXIT
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What If
citySCOPE
FEEDBACK
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TABLE

EXIT
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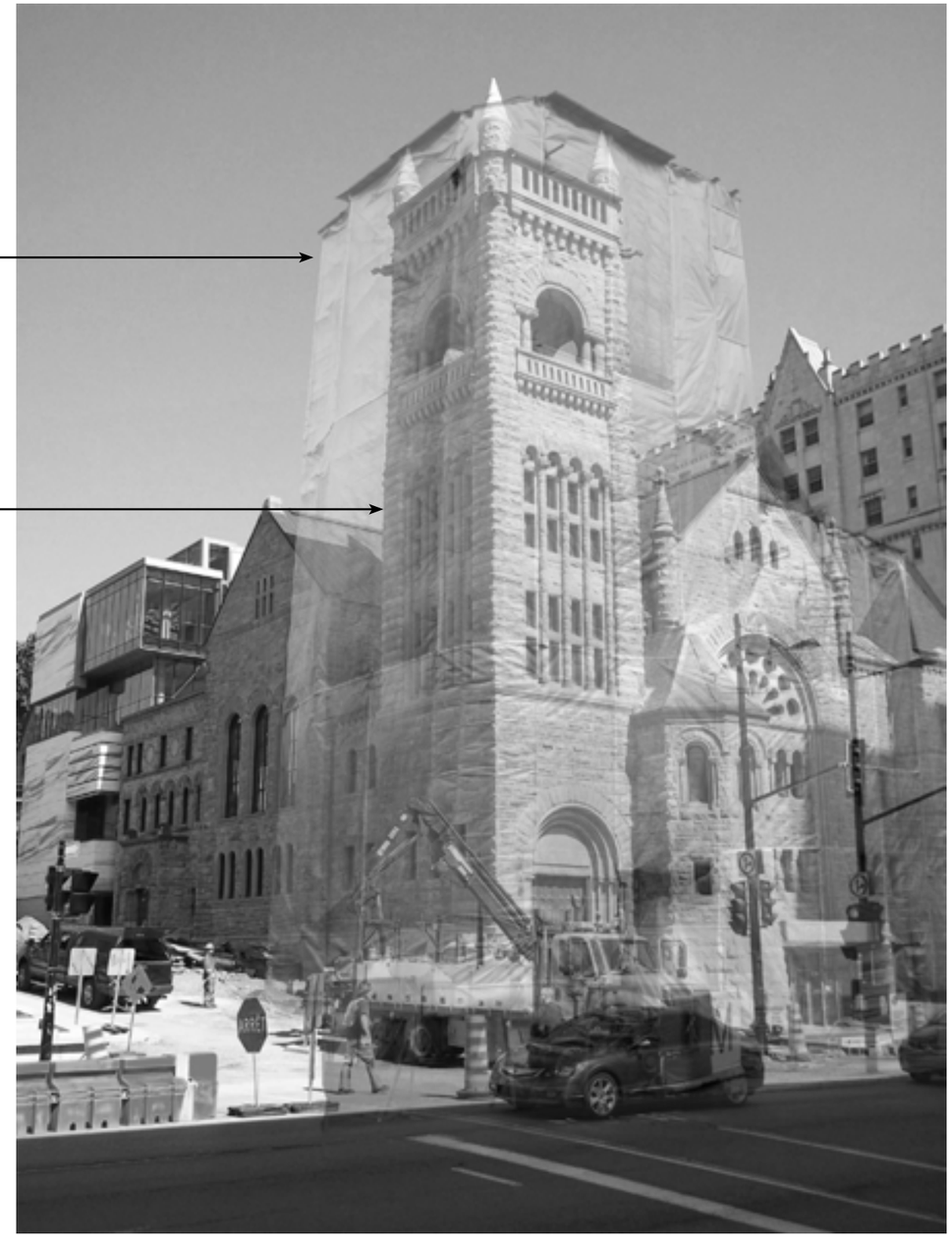
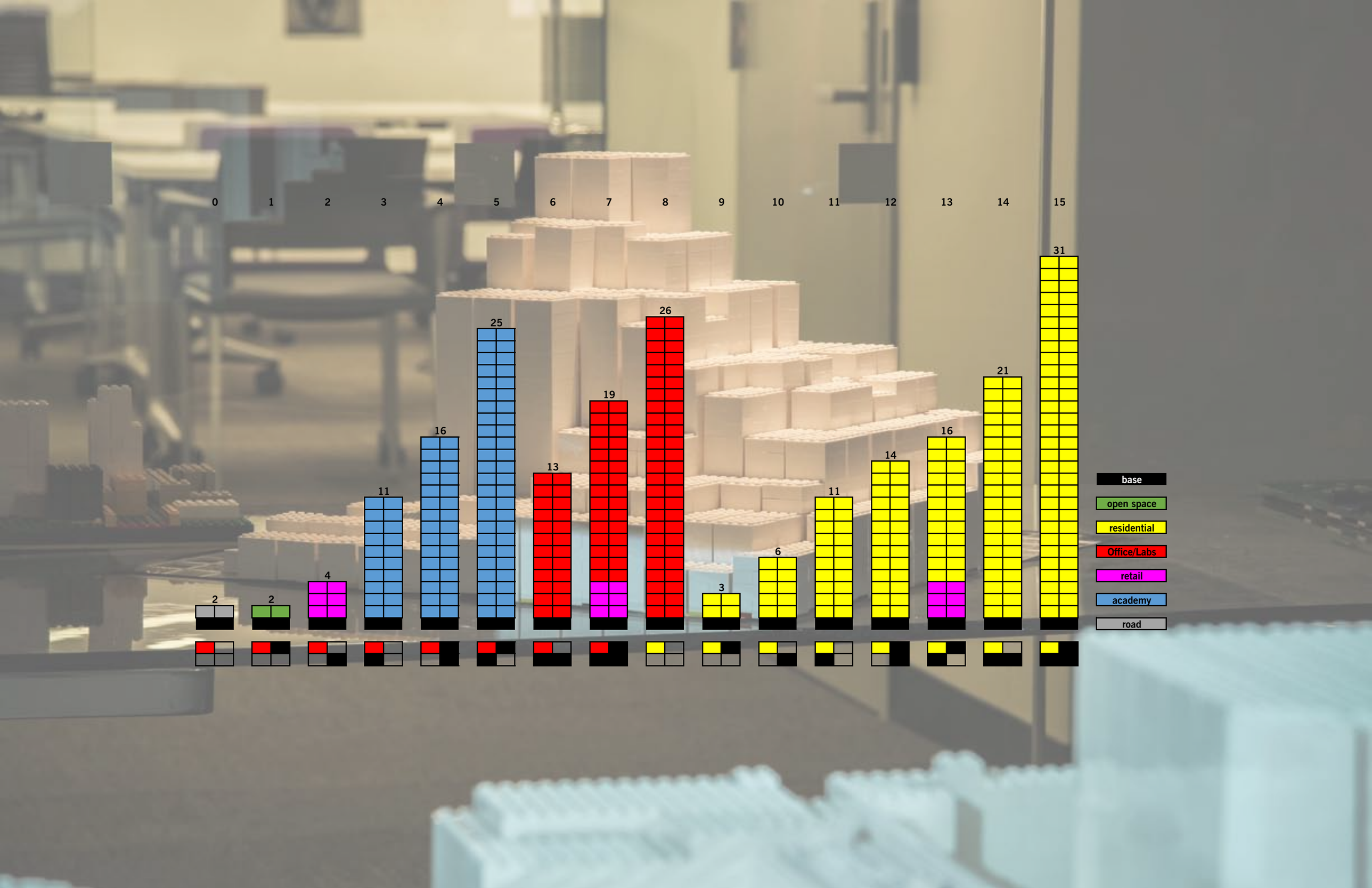
What If
citySCOPE

Zoning
Regulation
Code

PLAYGROUND

Architecture
Design
Development

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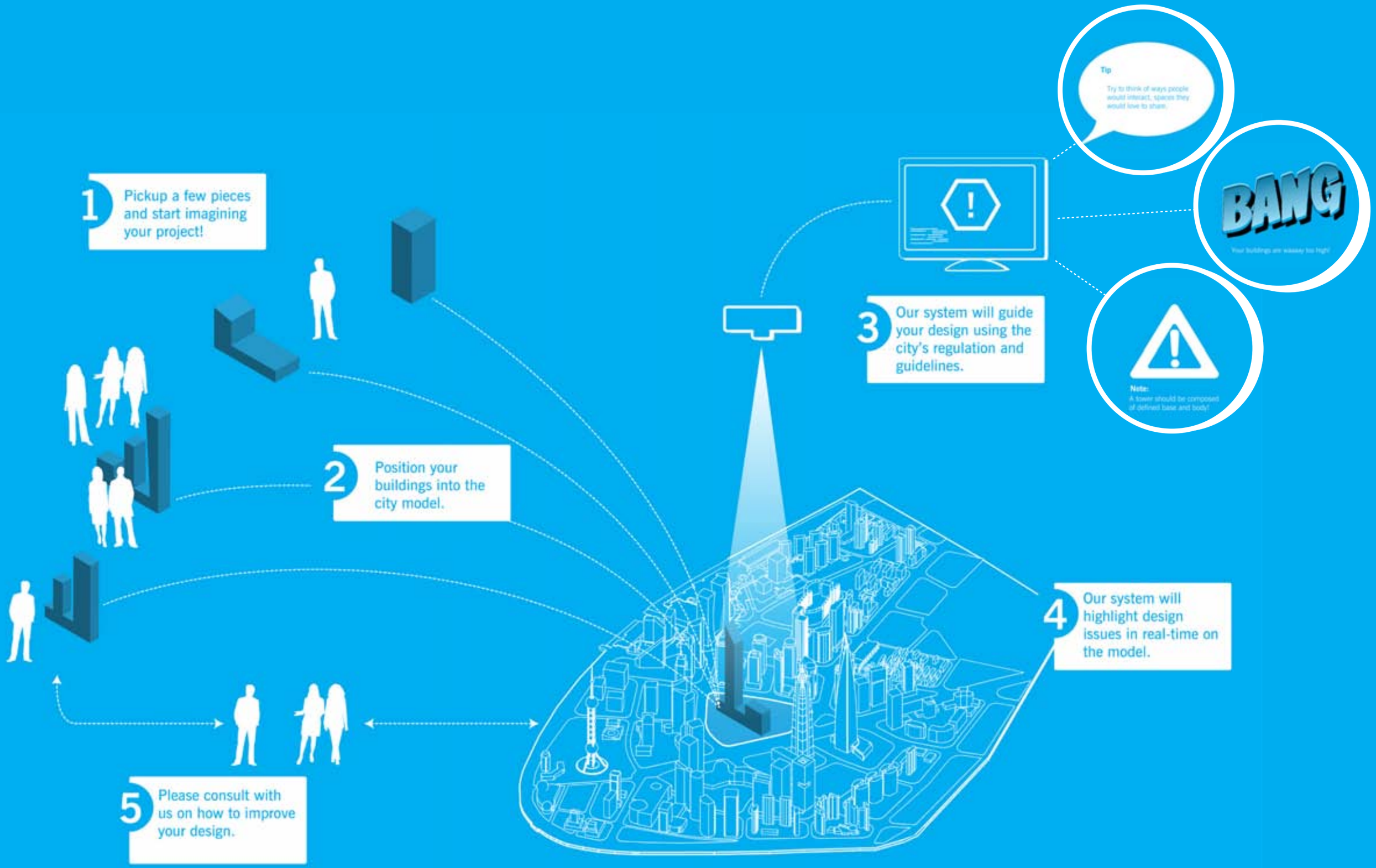
31
base
open space
residential
Office/Labs
retail
academy
road

BANK PIECES
SITE MODEL

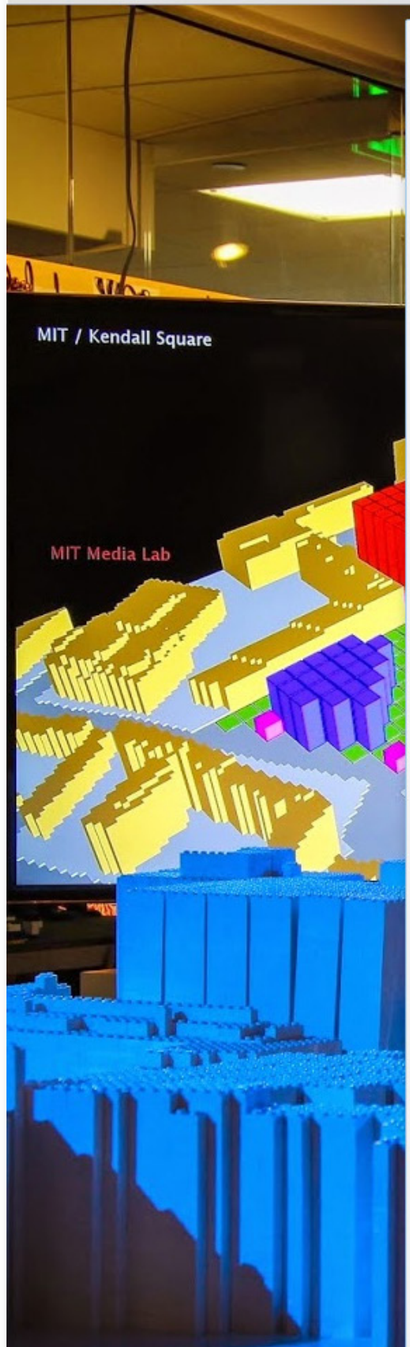

1 Pickup a few pieces and start imagining your project!
2 Position your buildings into the city model.
3 Our system will guide your design using the city's regulation and guidelines.
4 Our system will highlight design issues in real-time on the model.
5 Please consult with us on how to improve your design.
Tip
Try to think of ways people would interact, spaces they would love to share.
BANG
Your buildings are waaaay too high!
Note:
A tower should be composed of defined base and body!

PlayGround: Designing th

https://docs.google.com/Ho-1PLQ-kBF5JPr0/viewform

Other bookmarks

Edit this form



Designing the MIT Campus using LEGOs (plus a free lunch!)

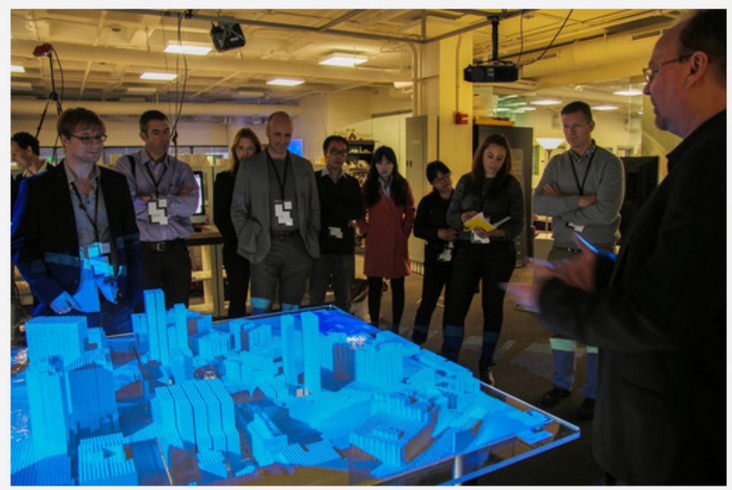
* Required

What is PlayGround?

PlayGround is a platform for urban decision making and community engagement. Using real-time feedback and analysis, PlayGround offers a common ground for discussion between municipalities, developers and the general public. During this event, members of the MIT community will be asked to respond to real-life planning and design challenges. Please join us in rethinking urban decision making.

We would love to hear your feedback!

Read more: http://architecture.mit.edu/architectural-design/project/playground



When & Where

This event is free and open to all members of MIT community!
We only have around 30 spots, so please register in advance.

--- Monday, Nov 17, 2014, 12:30 - 2:00 pm ---

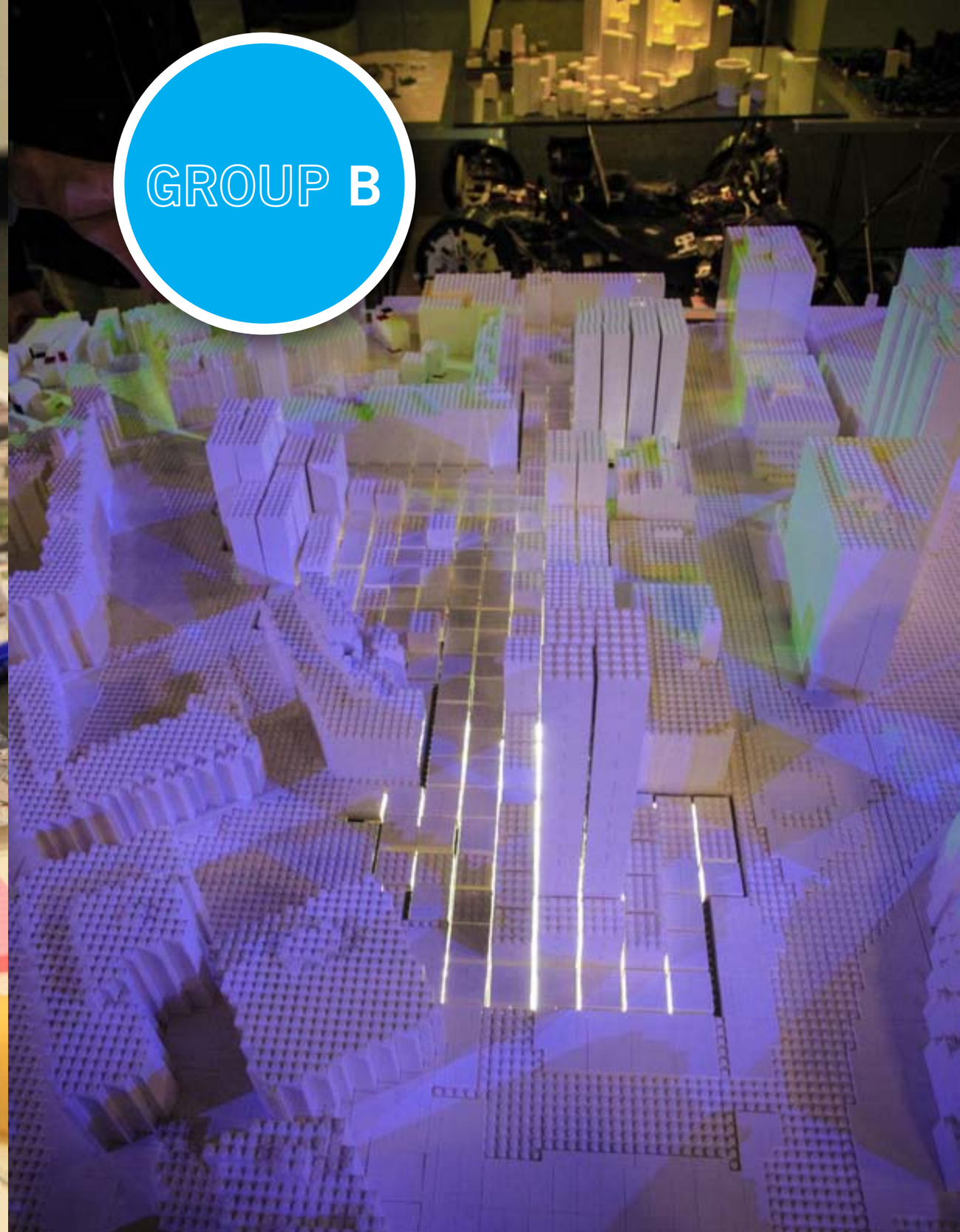
PlayGround event will take place at Changing Places Lab at MIT Media Lab Building E15-368 (3rd floor, room 368) 75 Amherst Street, Cambridge MA 02139. We'll kick-off at 12:30 and should be done by 2pm (including lunch) Please be there on time!

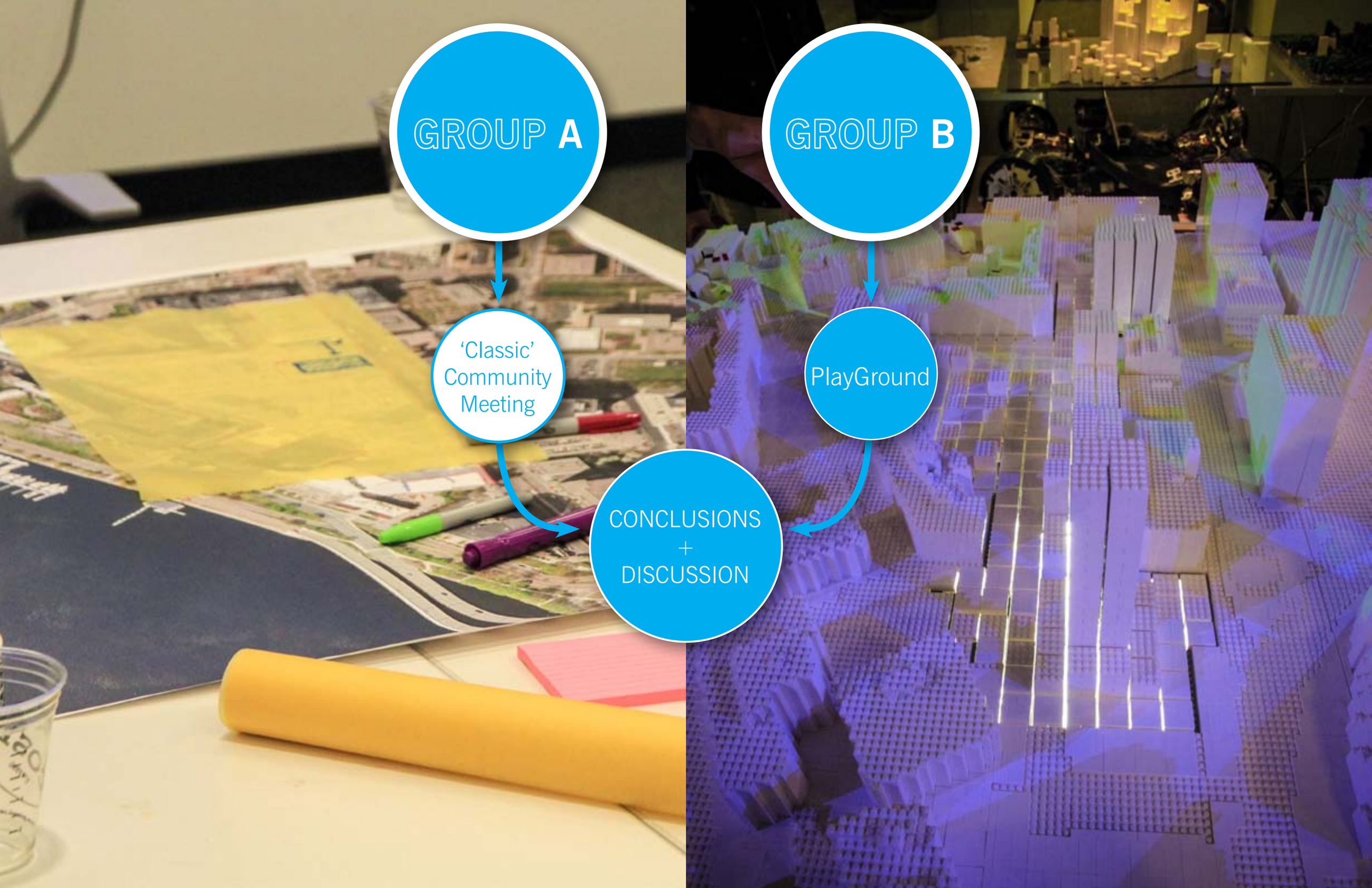
PlayGround: Designi...

EN

4:00 PM

GROUP A


GROUP B


GROUP A
'Classic' Community Meeting
GROUP B
PlayGround
CONCLUSIONS + DISCUSSION

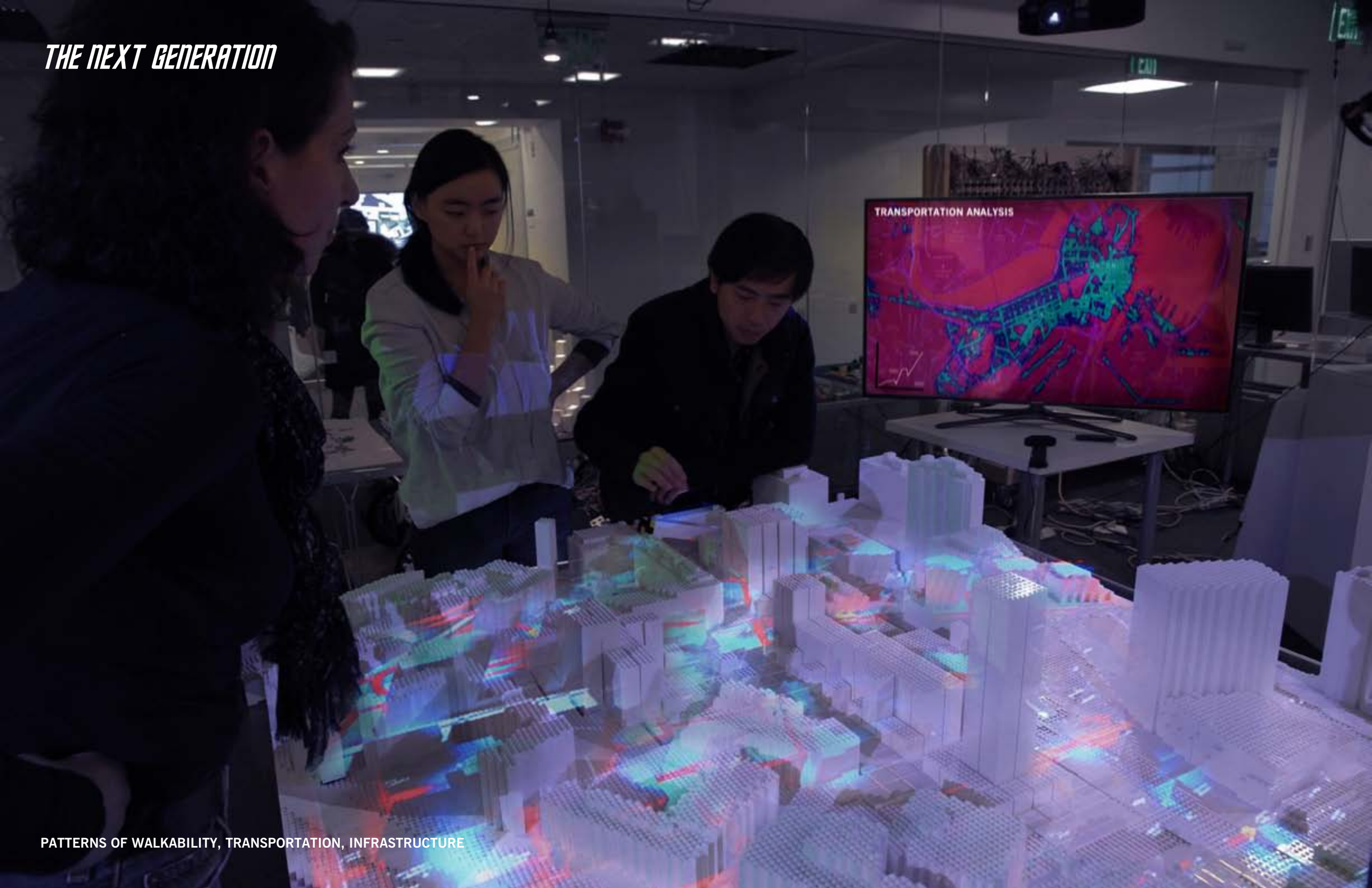
1. DEGREE OF ENGAGEMENT

2. CONCRETE INPUTS

PLAYGROUND
THE NEXT GENERATION

DYNAMIC ZONING LAWS

ENHANCED TANGIBILITY | VISUALIZATION OF FACADES, STRUCTURES, MATERIALS


TRANSPORTATION ANALYSIS

ENHANCED TANGIBILITY | LANDSCAPE DESIGN, OPEN SPACE ASSIGNMENT

THE NEXT GENERATION

ADVANCED ANALYSIS | FINANCIAL, VISIBILITY, ENERGY, SOLAR & SHADES

THE NEXT GENERATION

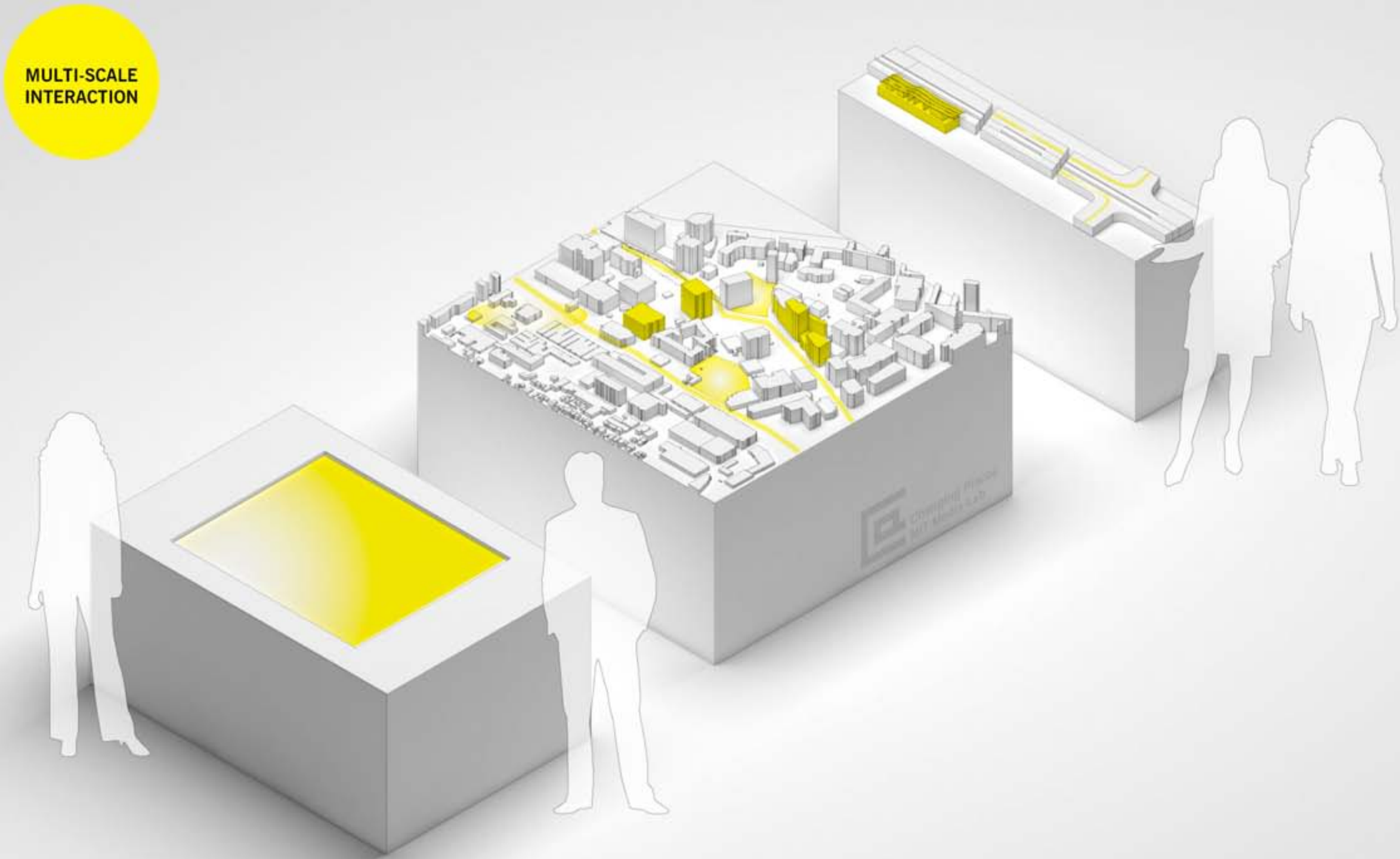
PLAYGROUND
THE NEXT NEXT GENERATION

BOSTONBRT

CITY/SCOPE DESIGN CONCEPT

Changing Places
MIT Media Lab

BARR
FOUNDATION


MULTI-SCALE
INTERACTION

GENERIC BRT DEMO

SCALE D

CORRIDOR ALIGNMENT

SCALE A/B

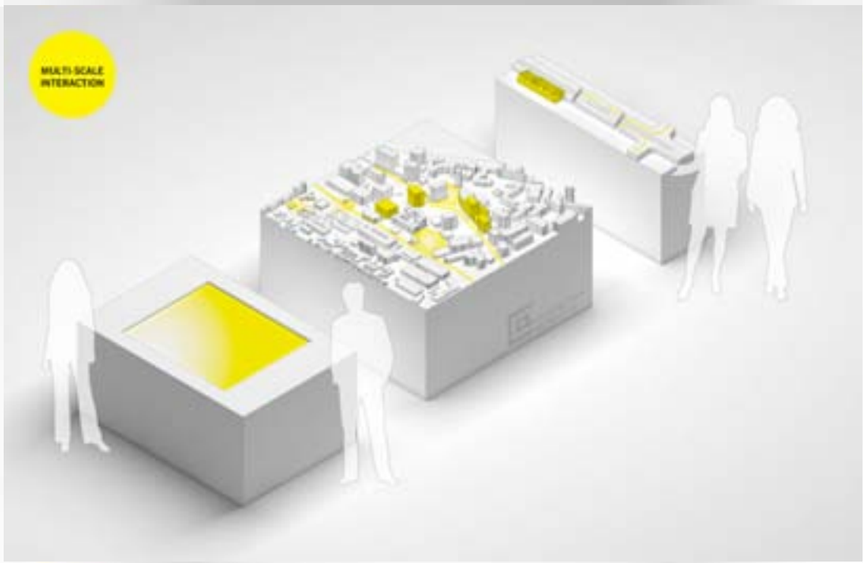
LOCAL & NEIGHBORHOOD SCALE

SCALE B/C

MULTI-SCALE INTERACTION

SCALE D

MULTI-SCALE INTERACTION



MULTI-SCALE INTERACTION

SCALE A/B

STATION LOCATION

SCALE A/B

LOCAL & NEIGHBORHOOD SCALE

SCALE B/C

P.O.I ALONG ROUTE

SCALE B/C

PLAYGROUND
TOWARDS TANGIBLE REGULATIONS

mit media lab

ARIEL NOYMAN

CHANGING PLACES GROUP

MIT MEDIA LAB

THE CITY OF CAMBRIDGE

NEIGHBORHOOD AND LONG TERM PLANNING, PUBLIC FACILITIES, ARTS AND CELEBRATIONS COMMITTEE