*The 2nd Annual*
*Housing Innovation Workshop*

# Innovative Materials & Methods

## Outcomes & Ideas

*A Collaboration from:*

MIT Real Estate Innovation Lab

Boston Society of Architects

City of Boston Housing Innovation Lab


1870s
1890s
LAND
FINANCE
CONSTRUCTION

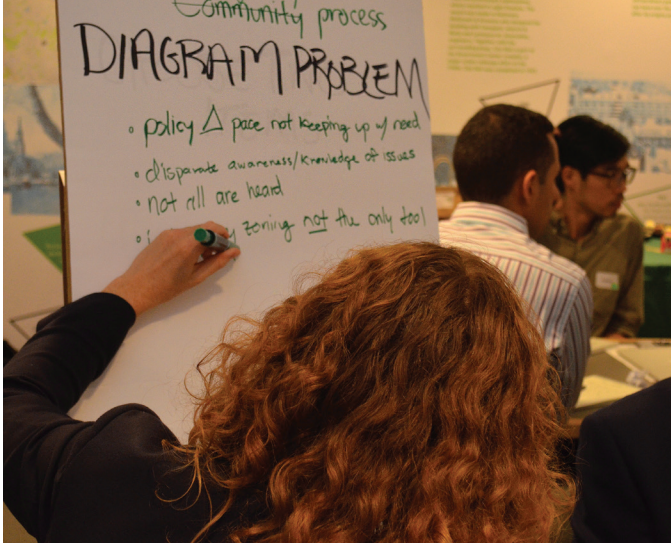


DIAGRAM PROBLEM
policy △ pace not keeping up w/ need
not all are heard


DIGGING INTO THE DEVELOPMENT PROCESS

# A Letter from the Organizers

Dear Housing Community!

A team from the City of Boston Housing Innovation Lab, the Boston Society of Architects and MIT's Real Estate Innovation Lab came together over the last two years to workshop solutions to a significant problem in our community — housing affordability.

Our goal was to empower and organize community leaders from a variety of fields and disciplinary backgrounds, to think collectively and design solutions to core issues in the supply of affordable housing for our communites. Each year over 50 people attended from 15 organization, each with with very diverse aims and intentions, but united by this single goal. They have advocated for the community, remained mindful of costs, met financial impossibilities with financial innovation and sought to bridge cultural divides across domains.

The results have been exciting! At the end of each workshop participants offered up innovative, technologically feasible and politically viable ideas. Some have spun into projects while others require more exploration, but an important process has begun — co-creating ideas that address community needs.

This outcome summary is intended to highlight the ideas that came out of the workshops: serving as a contribution or touch point for community leaders, startups, small business, and others, to keep developing, researching, or operationalize these ideas in order to increase affordable housing in Boston and beyond.

As organizers, we loved these workshops and on behalf of the members of our labs and organizations we look forward to their continued success in the years to come.

Sincerely,
Marcy Ostberg, Boston Mayor's Housing Innovation Lab
Tim Czerwienski, Boston Mayor's Housing Innovation Lab
Jennifer Effron, Boston Society of Architects
Daniel Fink, MIT Real Estate Innovation Lab
Dr. Andrea Chegut, MIT Real Estate Innovation Lab

## About the day:

**Location:**

BSA Space
290 Congress St, Suite 200
Boston, MA 02210

**Guests:**

52

**Organizations Represented:**

15

## Participant Expertise:

Land Owners & Managers,

Financies,

Brokers

Builders & Contractors,

Real Estate Developers

Community Experts,

Lawyers,

Communications & Media

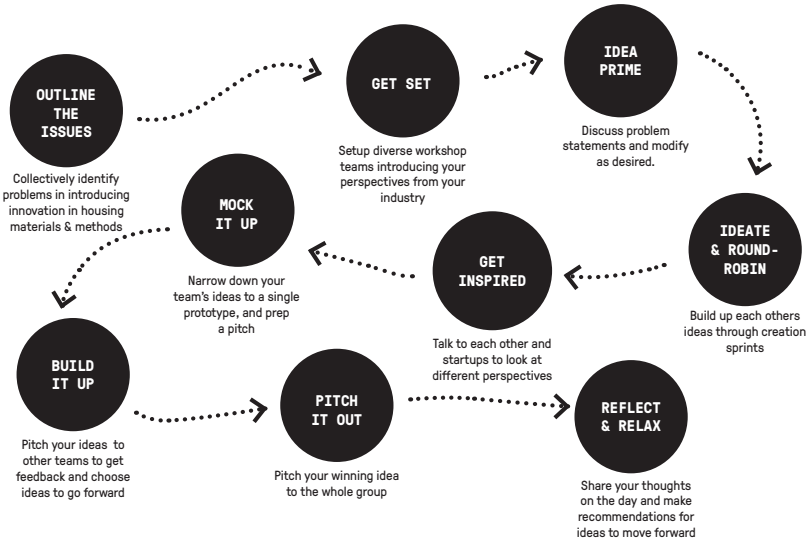
Educators & Researchers,

Tech Evangelists

Designers & Architects,

City Planners

## Workshop Flow:



# The Housing Innovation Workshop

The Housing Innovation Workshop is an annual event that brings together a variety of stakeholders to discuss, ideate, and envision new futures for housing. Its vision is to create a community of innovators and practitioners through curating a dialogue on housing innovation, and broadcast its findings and results to the wider housing and real estate industries.

Each Workshop adheres to a suite of principles to encourage inter-disciplinary and inter-organizational collaboration: being open to spontaneous connections; questioning the obvious; listening to others and volunteering your experience; and witholding judgement on new (and old!) ideas. We strive to remain mindful of social equity with respect to innovation adoption by questioning the following:  who may be benefitting, how may wealth distribution be impacted, or whether employment and neighborhood communities are affected when we propose new technologies and processes.

Through an engaging and inspiring method, the workshop enables participants to invent dozens of ideas and then refine them into a handful of built-out mock-ups that are pitched to each other. Alongside invited guests and startups showcasing their work, the workshops create a voice for progress in housing issues, and provide a platform to gain national attention to the conversation.

## Startups & Initiatives Gallery:

Every year startups and non-profits present new solutions to impact the supply of affordable housing:

BOSTON UJIMA PROJECT

The Boston Ujima Project is a movement organizing neighbors, workers, business owners and investors to create a community-controlled economy in Greater Boston.

Placeful

Placeful Technologies is a tech-enabled real estate developer, building the software and construction pipeline for the next generation of urban housing.

SUPER-NORMAL

Supernormal is a multidisciplinary design, research, and planning company, that designs buildings, builds software, and collaborates across scales of the built environment to transform our urban places.

People's Architecture Office

Beijing-based People's Architecture Office (PAO) is a multi-disciplinary team of architects, engineers, product designers and urbanists. With the belief that design is for the masses, the studio focuses on social impact through design.

greenSTAXX

Greenstaxx is a technology company focused on applying the principles of mass production, standardization and repetition to the modular design-build process, and provides a patented system based on a digital library of pre-designed and pre-engineered units.

JOBSITE STEEL MANUFACTURING

Jobsite Steel provides an end-to-end system for the design, pre-construction, planning, fabrication, logistics, delivery, and installation of light-gauge wall panels, framing materials, and metal trusses.

Northeastern Associate Professor Ivan Rupnik presenting MOD-X: a workshop focused on volumetric modular construction.

# The Opportunities for Innovation in Housing

*Ideas from the 2nd annual workshop*

Affordable and middle-market housing is critical to urban areas — and in short supply. That's why the City of Boston Housing Innovation Lab, MIT's Real Estate Innovation Lab and the Boston Society of Architects teamed up to engage the Boston community to workshop ways to increase the supply of housing through innovative materials & methods. Fifty participants across twelve different disciplines joined us on November 2nd, 2018 at the BSA.

Participants were optimistic about the dozens of innovations in housing that are within reach across the US. Virtual and augmented reality systems promise more accurate planning, better communication among stakeholders, and a reduction in expensive construction delays and surprises. Technological changes like smart homes, 3D printing and offsite component construction are inching into the marketplace. Perhaps most dramatic of all, new ways of living and thinking, such as the Ori robotic furniture system or the Nesterly intergenerational co-housing project, promise changes in the way we think about and use the spaces around us. But what are the strategies for the Boston community? And are there any ideas that are latent for innovative approaches to materials & methods in housing?

Our strategy identified four areas where roadblocks can arise in the affordable housing development process: construction; regulation; technology; and finance. Workshop participants formed interdisciplinary teams to ideate problems, curate solutions and prototype emerging ideas to build up in our pitch pit. At the end, teams competed to present four emerging ideas that we want to move forward to develop differently.

Idea 1:

# Innovations in Construction:

*new materials & techniques*

**CHALLENGE STATEMENT:**

Aspects of conventional construction are tightly constrained and interconnected, making cost savings difficult. Innovative construction materials, structures, and techniques could create faster, more affordable, and more sustainable buildings. How can we bring these innovations to market and spread them through the industry?

**PRECEDENTS:**

**Cross-Laminated Timber**
*Featured: Mithun + Katerra, CLT Student Housing Prototype*

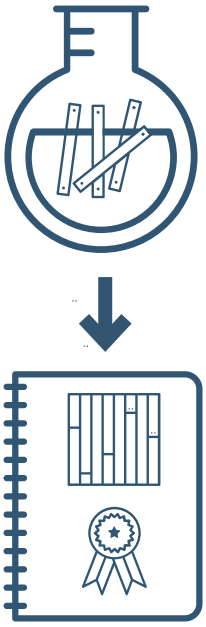
**Volumetric Modular**
*Featured: Kasita, Stackable modular housing prototype*

**3D-Printed Housing**
*Featured: ICON, Collaboration with New Story low-cost housing prototype*

**THE OPPORTUNITY:**

## *A Dynamic Building Code*

Just as key medications are fast-tracked to approval or permitted in experimental review, our building code could adapt more readily to innovations in construction technology. For example, cross-laminated timber is widely accepted in Europe, but will not be available to US builders until at least 2021. A more dynamic code would have made it available at least on a pilot or "clinical trial" basis. In addition, once an experimental construction component is approved, it could be made available as a pre-approved module, creating a library of approved modules, in the same way that software developers reuse reliable and proven software components.



**BUILDING SYSTEM CLINICAL TRIAL**

**PRE-APPROVED CODE MODULE FOR INNOVATIVE BUILDING SYSTEM**

Idea 2:

# Innovations in Process:

## *new regulations & procedures*

**CHALLENGE STATEMENT:**

Outdated zoning and built environment regulations inhibit innovation and block the creation of badly needed housing, and the community engagement process is hindered by mistrust and frustration on all sides. How can we improve the relationship between communities, regulators, and industry and update regulations to create housing for a growing population?

**PRECEDENTS:**

**Accessory Dwelling Units**

*Featured: People's Architecture Office, Plug-in House*

**Co-Living**

*Featured: Nesterly, Platform for intergenerational homesharing*

**Digital Permitting**

*Featured: Open Systems Lab, PlanX, digitized permitting guidance and compliance system*

**THE OPPORTUNITY:**

### *Aligning Incentives with YIMBYhoods*

Creating Yes-In-My-BackYard neighborhoods requires thinking through stakeholder incentives: Antagonism among stakeholders slows construction, but many have closely-aligned interests. Before development begins, developers and communities need to come together to ensure project viability and reduce opposition. For example, labor groups support development where it brings good jobs, while their members live in areas where supporting these projects can be part of the community engagement process. Investments from union pension funds and crowdfunding can create neighborhood and labor alignment. In addition, efforts to increase the representation of women and minorities in the trades should also expand the range of stakeholders in favor of a project; inviting government and community support for accelerated permitting processes.

Idea 3:

# Innovations in Technology:

*new products & services*

**CHALLENGE STATEMENT:**

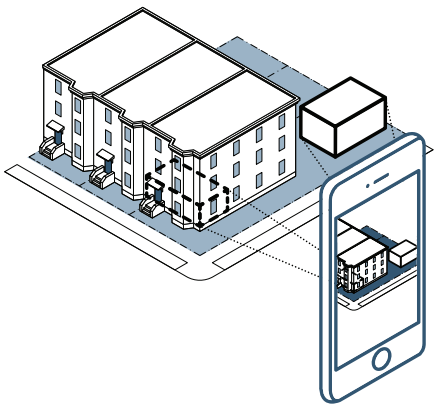
Risk and inertia slow the adoption of new technologies, and numerous stakeholders fail to account for innovations in other sectors. Parking regulations, for example, do not account for the current booms in ride-hailing and package delivery, much less the anticipated arrival of autonomous vehicles. Virtual and augmented reality systems are only beginning to appear in the planning and development process. Which technologies show promise for the housing industry, and how can they be leveraged to produce beneficial outcomes?

**PRECEDENTS:**

**Automated & Electric Vehicles**
*Impacts on housing choice, location, and parking*

**District Energy**
*Featured: ENGIE, District heating and cooling systems*

**Robotic Furniture**
*Featured: Ori, Transformable furniture for high-density urban living*



**THE OPPORTUNITY:**

## *Virtual & Augmented Reality Visualizing More Efficient Use of Space*

One obstacle to moderating home prices is inefficient use of space and user demand for over-sized houses. Empty nesters, in particular, are over-housed, but reluctant to part with space. One team proposed apps to help visualize and quantify downsizing and more efficient use of space. For example, the app could show how a single-family home would look with an accessory dwelling unit, or show the ongoing cost of an unused spare room. These visualization tools could help more people imagine, understand, and find the right size homes for their families.

Idea 4:

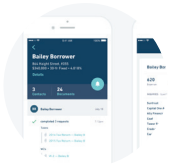
# Innovations in Finance:

## *new underwriting & sources*

**PRECEDENTS:**

**Co-Ownership & Co-Operative Development**
*Featured: Nightingale Housing 1.0; 20 Apartments in Brunswick, Melbourne*

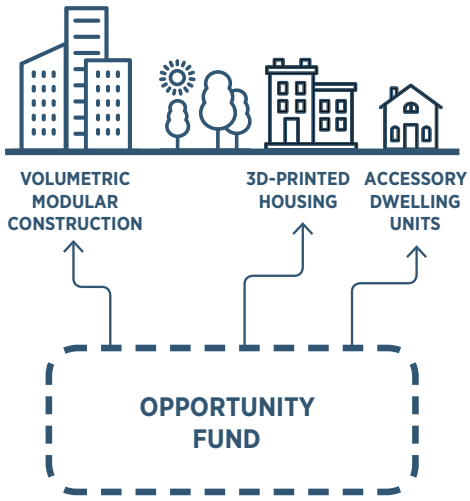
**Digital Mortgages**
*Featured: Blend: Frictionless, compliant, and more accessible lending*



**Crowd-Funding**
*Featured: Fundrise, Online syndicated real estate investment platform.*

**CHALLENGE STATEMENT:**

Today's financial underwriting of housing development is a blunt instrument that undervalues innovations in construction, process, and technology. In addition, it fails to adequately account for less-tangible amenities that are nonetheless valued by eventual occupants of the housing being built. How can we foster closer relationships between investors and the people who will be living in the products of their investments? Which ownership, tenancy, or organizational vehicles can spur the adoption of innovations in construction, materials, and products?




**THE OPPORTUNITY:**

### *An Innovation Opportunity Fund*

Existing tax credits don't create enough affordable housing, and there's still a lot of capital on the sidelines. An innovation-focused opportunity fund aimed at double-bottom-line housing investments could help. To fund it, teams proposed using risk-priced tax credits to nudge capital off the sidelines and make investments that would be more effective than existing housing subsidies.

# Opportunity Next Steps:

## Construction

**A Dynamic Building Code:**

- Investigate data infrastructure that could record and broadcast innovative materials & methods in construction.
- Look into a 'clinical trial' system within the planning authority to track and test new building systems and their cost.

## Process

**Aligning Incentives with YIMBYhoods:**

- Identify stakeholders interested in aligning YIMBYhoods.
- Inquire into digital platforms that could enable aligned stakeholders to come together.

## Technology

**Virtual & Augmented Reality Visualizing More Efficient Use of Space:**

- Look into an alignment between new zoning regulations and ADUs.
- Propose an AR/VR app that can guide homeowners towards extended uses of single family spaces.

## Finance

**An Innovation Opportunity Fund:**

- Create a catalog of innovative products and processes that impact the development of affordable housing.
- Workshop what an 'Innovation Opportunity Fund' could look like with relevant stakeholders.

# Ideas From the 1st Annual Workshop:

## *Ways to Develop Differently:*

### *Get The 211*

An educational and engagement platform that focuses on showing the community new housing strategies proposed via a Mobile Housing Innovation Lab, using a combination of in-person engagements, social media tools, augmented reality applications and a 211-hotline that listens to community participants.

### *Community Equity*

An equity ownership stake by the community in their community's development projects. This helps connect capital to community activity, decrease the impacts of gentrification and gives residents a voice in the community shared capital decisions. Renters and Owners can take part in the fund so that everyone can take part in capital appreciation.

### *Development Overlay Plan*

This is a plan to mobilize non-adjacent vacant land parcels towards an overlay district. This enables a coordinated strategy around design, planning, development and enable 'Community Equity' to take a stake in all property in the community plan. Parcels are no longer isolated and contribute value to a larger strategy.

### *Free The Land*

Working with land owners to free up vacant land. Land sits vacant for numerous reasons, but an activation strategy that connects community benefits to land can impact affordable housing. Tools proposed are improved taxation policy, a free-the-land digital app and new land zoning strategies.

# Outcomes:

Workshop participants left inspired to collaborate across industries and disciplines to solve complex problems in housing with a community of interested parties and experts. Labor and management, finance and construction, all came together to find projects that create benefits for all stakeholders, including the communities in which they exist. As one enthusiastic participant said, "This is what happens when you start asking yourself what can go right."

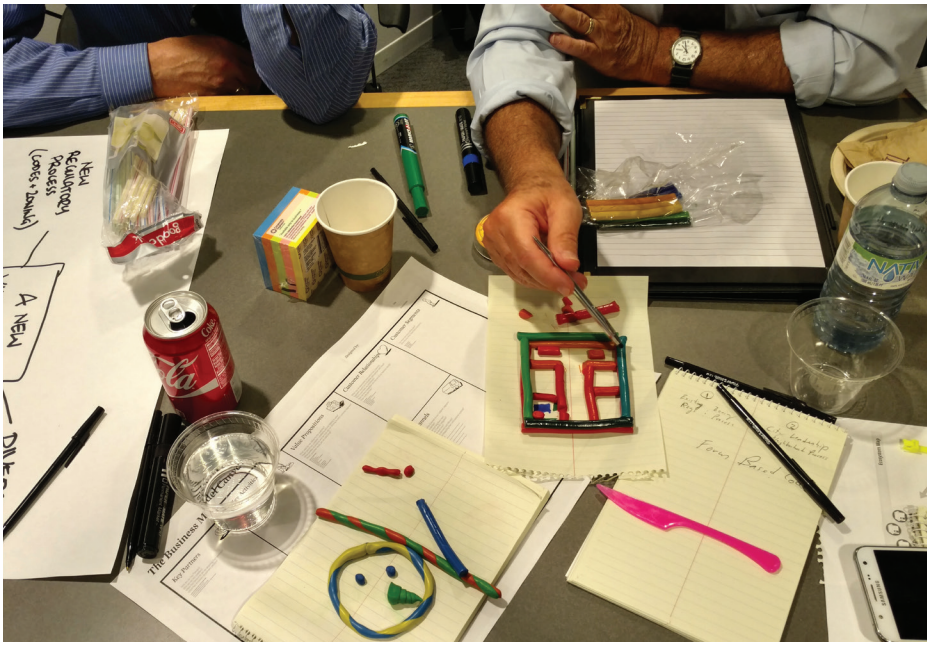
*"Let's start something really special in 2019."*

*– Vincent Scalisi, Senior Organier, NERCC"*

This workshop created fresh new ideas to feed into the Housing Innovation Lab's pipeline. Next, the Housing Innovation Lab, the MIT Real Estate Innovation Lab, the BSA, and their collaborators will test and prototype the new ideas, preparing to turn the best ones into programs, research, or policy.


Ideas/Solution
-Guidelines for


1965
Active US combat units are introduced in Vietnam; Malcom X is assassinated
1963
Metropolitan Area Planning Council is established
Carpenter Center For The Visual Arts, Harvard
Holyoke Center, Harvard
1966
BSA moves to new BAC Building at 320 Newbury Street
1963
Film and panel on "Ugliness in Our Environment"
1960
1962
The Royal Barry Wills Memorial Fund established


NEW REGULATORY PROCESS (LOOPS + TOWER)
A NEW