Imagine the Greater Boston Region in 2050

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The Climate Changed Ideas Competition is the first in a series of events exploring the agency of models in climate-responsive design to be held at MIT in spring 2018...

1. IDEAS COMPETITION

2. EXHIBITION
   APRIL 2–30, 2018

3. SYMPOSIUM
   APRIL 20–21, 2018
HOW DO WE MODEL AND DESIGN IN A CLIMATE CHANGED?

CAN WE UNEARTH A MODEL FOR 2050?
Imagine the Greater Boston Region in 2050

www.climatechangedmit.com

COMPETITION OBJECTIVES

Use MODELS + DATA to...

- Analyze the site and identify its climate-related vulnerabilities
- Imagine a future for the Greater Boston area in a climate changed
- Develop a climate-responsive intervention for the site
MODELING

We understand the world through models. It is through models that we explore the natural environment, track a changing climate, predict human development and project societal changes. For this ideas competition, we ask teams to consider how the information derived from environmental models is translated to inform climate-responsive design solutions. At the same time, consider how design-thinking can better communicate modeled natural principles and phenomena. How do models, climate change predictions, and design work together?

A model is the representation of a system, process, or concept that serves to demonstrate, analyze, test, or imagine an idea. It can be constructed from various media and methods, and operate at diverse spatial and temporal scales; it may be computational, mathematical, statistical, a visualization, simulation, map or physical object.

In this competition, we consider two types of models, the scientific model and the design model. A scientific model provides the analytical basis for making informed design decisions. A design model envisions futures that call for scientific inquiry and discovery. In both cases, models have the power to motivate the proliferation of pathways that can lead toward a more sustainable, humane, and climate resilient future.

TEAMS ARE REQUIRED TO UTILIZE AT LEAST ONE METHOD OF MODELING—BUILDING THEIR OWN MODEL OR EMPLOYING AN EXISTING MODEL—in the development of their idea proposal. Consider how the model conveys information and what information the model uses, how information and data is translated across scales, what is potentially lost in translation, and where the model is limited.

The aim of the competition is two fold: first, to explore how design can inform the communication of scientific modeling and natural phenomena; and second, to explore how scientific models inform the development of design solutions. This competition is meant as an opportunity for scientists, researchers, students and others to consider the ways in which models can effectively communicate scientific principles, in addition to leading to design solutions. As such, the model employed is just as important as the site-specific intervention proposed.
MODELS SERVE TO...

- REPRESENT
- QUESTION
- PROJECT
- IMAGINE
- ARTICULATE
- EXPOSE
- PREDICT
- INTERVENE

- Lewis Fry Richardson’s Weather Forecast Factory, 1902. Image © The Irish Times.
- Lawerence Livermore National Laboratory, Global Climate Model, 1960s. Image © LLNL.
- Buckminster Fuller’s Geoscope, 1962. Image © Think Big.
- Lawerence Livermore National Laboratory, Global Climate Model, 1960s. Image © LLNL.
- Buckminster Fuller’s Geoscope, 1962. Image © Think Big.
Imagine the Greater Boston region in 2050. The local sea levels will have risen by as much as 1.5 meters. King tides, caused by the gravitational interactions of the earth, sun, and moon will flood low-lying areas with every new and full moon. Coastal storm events, like hurricanes, will occur more often and with greater force. Due to rising temperatures, the New England summer will look more like that of Washington D.C. Heat waves will be hotter and longer, tripling the heat-induced mortality rate. The Northeast will see a continual increase in extreme storm events. This will disrupt transportation and cause flash flooding in built-up urban areas (Climate Ready Boston 2016).

These projections are alarming. Yet, we believe there are ways to mitigate climate impacts and prepare our communities for a climate changed. In this competition we explore the power of models: to illustrate large and small scale shifts, to calculate uncertainty, to communicate predictions, and to show the community how events will unfold. With this in mind, we ask you to “model” an intervention on one of three Greater Boston sites that addresses at least one climate hazard, and show how modeling can help transform the site in a climate changed. Teams are asked to select one of the three sites (the MIT campus and its surroundings, East Boston Greenway, or the Fresh Pond & Alewife areas) and address the two objectives listed below.

1. **EXPLORE THE AGENCY OF MODELS TO DEVELOP NEW WAYS OF SEEING THE SITE AND TO DESIGN AN INTERVENTION.**

Analyze the site and the local impacts using at least one modeling method. The definition of a model is broad. It includes anything from the worldwide general circulation model to an urban system dynamics simulation or an individual building energy model. While the potential methods are diverse—mathematical models, physical and digital simulations (dynamic and static, temporal and spatial), and visualizations—we ask that you carefully consider how your model is used and what the particular data translates into your intervention idea. Document your process to illustrate how the information and modeling inform your idea development.

Proposals will be judged based on how well modeling, climate change predictions, and data are used to communicate relevant risks and to develop an intervention for the site.

2. **DEVELOP AN INTERVENTION TO ADDRESS SITE-SPECIFIC CLIMATE RISKS BASED ON YOUR MODEL. SHOW HOW YOUR PROPOSAL WILL BETTER THE SITE AND COMMUNITY IN QUESTION.**

Propose a science-based idea intervention that addresses climate hazards and societal impacts on your site in the year 2050. The idea must be a physical intervention or contribute to physical change in the built environment, though it may incorporate policy measures, technological features or community-based engagement strategies as well. The intervention should include elements that both mitigate greenhouse gas emissions and adapt the site to consequences of climate change.

The proposal should present a strong relationship between the modeling, data/information/research, climate change predictions, and the idea strategy.
THE SITES

Teams will select one of the three sites to address in their proposal: the MIT campus and its surroundings, East Boston Greenway, or Fresh Pond & Alewife areas. The three sites were identified as the focus of the competition because of each one's unique urban conditions, particular vulnerability to the effects of climate change, and because each has been the subject of previous climate-related analyses (to varying degrees). In some cases there is a wealth of data, in others there is limited information. The data availability in each situation presents a unique opportunity for innovative modeling and design thinking.

Teams will determine the spatial extent and scale of their intervention in the site. While teams are asked to choose one of the pre-selected sites, they should consider the wider applicability of their intervention to areas throughout Greater Boston and beyond.

SITE 1: MIT CAMPUS AND ITS SURROUNDINGS

The 150-year-old MIT campus is built on infill land adjacent to the Charles River. The Institute is currently developing the MIT Climate Resiliency Framework to address the campus’ near-, mid- and long-term climate vulnerabilities. The school has identified heat stress and precipitation-related flooding to be the immediate and mid-term risks; and in the longer term, sea level rise and storm surge are the primary risks. While the campus operates autonomously in some respects, it is tied into the larger infrastructure network of the City of Cambridge. Consider how interventions on and around the MIT campus benefit or mitigate risks for both the Institute and its neighbors near and far.

SITE 2: EAST BOSTON GREENWAY

The East Boston Greenway is a linear park built on the former Consolidated Rail Corporation line. The park is designed to link multiple parks and natural areas in East Boston and is being constructed in phases. The existing portion stretches from East Boston Piers to Bremen Street Park. Once fully complete, it will run 3.3 miles long. At present, a 1% annual chance flood can render the Greenway unusable and spill over to flood the surrounding buildings. The City of Boston has done extensive analysis of the climate-related vulnerabilities of East Boston. The latest Climate Ready Boston report (Oct 2017) presents a near- and long-term resiliency proposal for the area. Consider the existing proposal as you develop your intervention in the site.

SITE 3: FRESH POND & ALEWIFE AREAS

Fresh Pond Reservoir is a critical source of Cambridge's water supply. The 155 acre lake is surrounded by 162 acres of park land. Fresh Pond Reservoir is at risk of precipitation-related flooding based on the 2030 and 2070 climate change models (CCVA Part 2). The flooding is expected to run over into the adjacent residential areas. The area is rapidly developing with the new construction boom around the Alewife T station. Consider the community's growing infrastructure and ecological needs as it increases in density and faces impending climate-related risks.
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THE COMPETITION SITES

SITE 1
MIT CAMPUS AND ITS SURROUNDINGS

SITE 2
EAST BOSTON GREENWAY

SITE 3
FRESH POND & ALEWIFE AREAS
EVALUATION CRITERIA

They will be judged based on the following criteria:

Clarity of concept and scope: The proposal clearly identifies a climate-related risk, or set of risks, specific to the selected site and presents a thoughtful intervention that addresses the problem(s) at hand.

Modeling innovation and creativity: The submission embraces the agency of scientific models to communicate complex phenomena and elucidates fundamental scientific principles in the design and development of an original intervention in the selected site.

Design innovation and creativity: The idea is original and imaginative. It mitigates the drivers of climate change and measurably betters the conditions for people in the area.

Impact and feasibility: The proposed idea intervention has the potential to meaningfully impact the people, places and systems that it is addressing. It is flexible, scalable, and sustainable. The intended impacts are measurable.

Interdisciplinary collaboration: The proposal illustrates a strong interdisciplinary collaboration, merging science, technology, design and planning. The model and the proposed idea intervention reflect and respond to one another.

Quality of presentation: The submission materials effectively communicate the model and the proposed idea intervention to a general audience.

AWARDS

In total $15,000 will be distributed amongst the finalist teams.

Select submissions will be included in the Climate Changed exhibition in the spring of 2018. All participating teams will be invited to attend the Climate Changed symposium to take place on April 20-21, 2018 at MIT.
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SUBMISSION REQUIREMENT

Submissions are due on February 2, 2018 at 11:59pm EST. Submissions will be accepted electronically. Submission instructions will be! provided to registered teams in December.

1. Idea Proposal Video: A two-minute video describing the proposed intervention and model used to develop the intervention.

2. Model Representation: A physical or digital representation of the model used in the idea development process. This may either be the model itself, a visualization, or schematic that illustrates how the model is constructed, what it aims to do, and how it is used.

3. Modeling Narrative: 300-500 word description of your modeling methodology, parameters, data sources, and any other information helpful to explain the model and climate-related phenomena you are addressing. The narrative should clearly communicate the concepts to a general non-technical audience.

4. Proposal Narrative: 300–500 word description of the site-specific idea proposal and how it will better the site and community in question.

5. Three Proposal Images: Still images conveying the proposed intervention. All images should be 300 DPI, any orientation in either .jpeg or .png format.

6. Team Summary: List of all team members, expertise, MIT-affiliation, date of birth, and individual contributions to the project. In 100 words or less describe the interdisciplinary nature of your group.

ELIGIBILITY & RULES

The competition is open to students, emerging scholars, researchers and practitioners. Emerging scholars, researchers, and practitioners must be under the age of 40. Teams must have at least one MIT-affiliated member; the MIT-affiliate may be a student, alumnus, researcher, or staff member of the Institute.

Teams shall be comprised of two to six individuals, and must include members from different disciplines. Teams will be asked to describe the interdisciplinary nature of their group in their proposal submission. Individuals may be on only one team registered in the competition.

By submitting a proposal, teams agree to allow material to be published as part of the Climate Changed exhibition and for promotion of the Climate Changed event. All published material will be attributed to authors.
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COMPETITION SCHEDULE

INFORMATION SESSION & MEET-AND-GREET: NOVEMBER 15, 2017
Informational session to review the competition details and meet others interested in participating.

REGISTRATION PERIOD: NOVEMBER 20-DECEMBER 31, 2017
Registration is free for eligible teams. No late registration will be accepted.

DEADLINE FOR ENTRIES: FEBRUARY 2, 2018, 11:59PM EST
All submissions will be accepted electronically. No late submissions will be accepted.

CLIMATE CHANGED EXHIBITION: APRIL 2-30, 2018
Select competition submissions will be included in the Climate Changed exhibition to be held in the MIT Keller Gallery from April 2-30, 2018.

WINNERS ANNOUNCED: APRIL 21, 2018
All competition teams will be invited to attend the two-day Climate Changed symposium on April 20-21, 2018. Winners of the competition will be announced during a ceremony on the second day of the symposium.

JURY

JOHN BOLDUC
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GEDIMINAS URBONAS
Associate Professor and Director of the MIT Program in Art, Culture, and Technology
MORE INFORMATION

All competition-related questions and clarifications will be added to the FAQ section of the Climate Changed website on a rolling basis. Send competition related questions to CLIMATECHANGEDCOMPETITION@MIT.EDU.

REFERENCES

CITY OF BOSTON
Climate Ready Boston Final Report (2016)
Coastal Resilience Solutions for East Boston and Charlestown (2017)
Boston's Resiliency Challenge, 100 Resilient Cities (ongoing)
Boston Living with Water, international design competition (2014)
Sea Change: Boston research initiative and interactive map, Sasaki (2014)

CITY OF CAMBRIDGE
Climate Change Preparedness & Resilience Plan, Alewife Public Meeting (2017)

REGIONAL AND STATE
Climate Smart Cities Mapping Tool, Boston Metro Mayors Coalition and the Trust for Public Land (ongoing)
Thriving Earth Exchange: Boston Projects (ongoing)
As seas rise, city mulls a massive sea barrier across Boston Harbor, Boston Globe (Feb 18 2017)

CREDITS

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The Climate Changed event series is co-sponsored by the MIT Environmental Solutions Initiative and the MIT School of Architecture and Planning.