MIT CLIMATE GRAND CHALLENGES

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Goals of *MIT Climate Grand Challenges*

1. Target the hard, unsolved problems

Mobilize the MIT research community to develop game-changing solutions to the most challenging unsolved problems in climate adaptation, mitigation and restoration.

2. Whole-of-MIT

Combine natural sciences, social sciences, engineering, management, and humanistic knowledge.

3. Accelerate impact

Draw on **MIT's existing innovation ecosystem** + develop **new partnerships** with companies, communities, philanthropists, social and technological entrepreneurs, & impact investors to accelerate development, field-testing, implementation and scaling.

By the Numbers

94
LETTERS OF INTEREST

27
FINALIST TEAMS

5
FLAGSHIP PROJECTS

➔The initial call for ideas in 2020 yielded nearly 100 letters of interest, representing **90 percent** of MIT departments.

➔After extensive evaluation, 27 finalist teams with members spanning **all five MIT schools and the College** were invited and funded to develop white papers.

➔A subset of finalists will be announced as multi-year flagship projects in **early April**.

Richard K. Lester

Research Themes

Building equity and fairness into climate solutions

Implementing equitable strategies that facilitate the just distribution of benefits and address the health and economic consequences of climate change on populations overburdened by environmental injustice.

Decarbonizing complex industries and processes

Replacing carbon-emitting sources with low-carbon alternatives, focusing heavily on tough-to-decarbonize sectors such as long-distance transportation, chemical refining, textile manufacturing, and the production of cement, steel, and fertilizer.

Removing, managing, and storing greenhouse gases

Utilizing methane control measures and advanced methods for carbon sequestration, utilization, and storage to achieve net-zero greenhouse gas emissions by mid-century.

Using data and science to forecast climate-related risk

Developing new scientific models for measuring, modeling, and making quantitative predictions of future climate risks at local scale to provide actionable information for climate mitigation and adaptation efforts.

27 Finalist Projects

Building equity and fairness into climate solutions

- ➔ Policy innovation and experimentation for effective and equitable climate solutions
- ➔ Protecting and enhancing natural carbon sinks – Natural Climate and Community Solutions (NCCS)
- ➔ Reducing group-based disparities in climate adaptation
- ➔ Reinventing climate change adaptation – The Climate Resilience Early Warning System (CREWSnet)
- ➔ The Deep Listening Project: Communication infrastructure for collaborative adaptation
- ➔ The Equitable Resilience Framework

Decarbonizing complex industries and processes

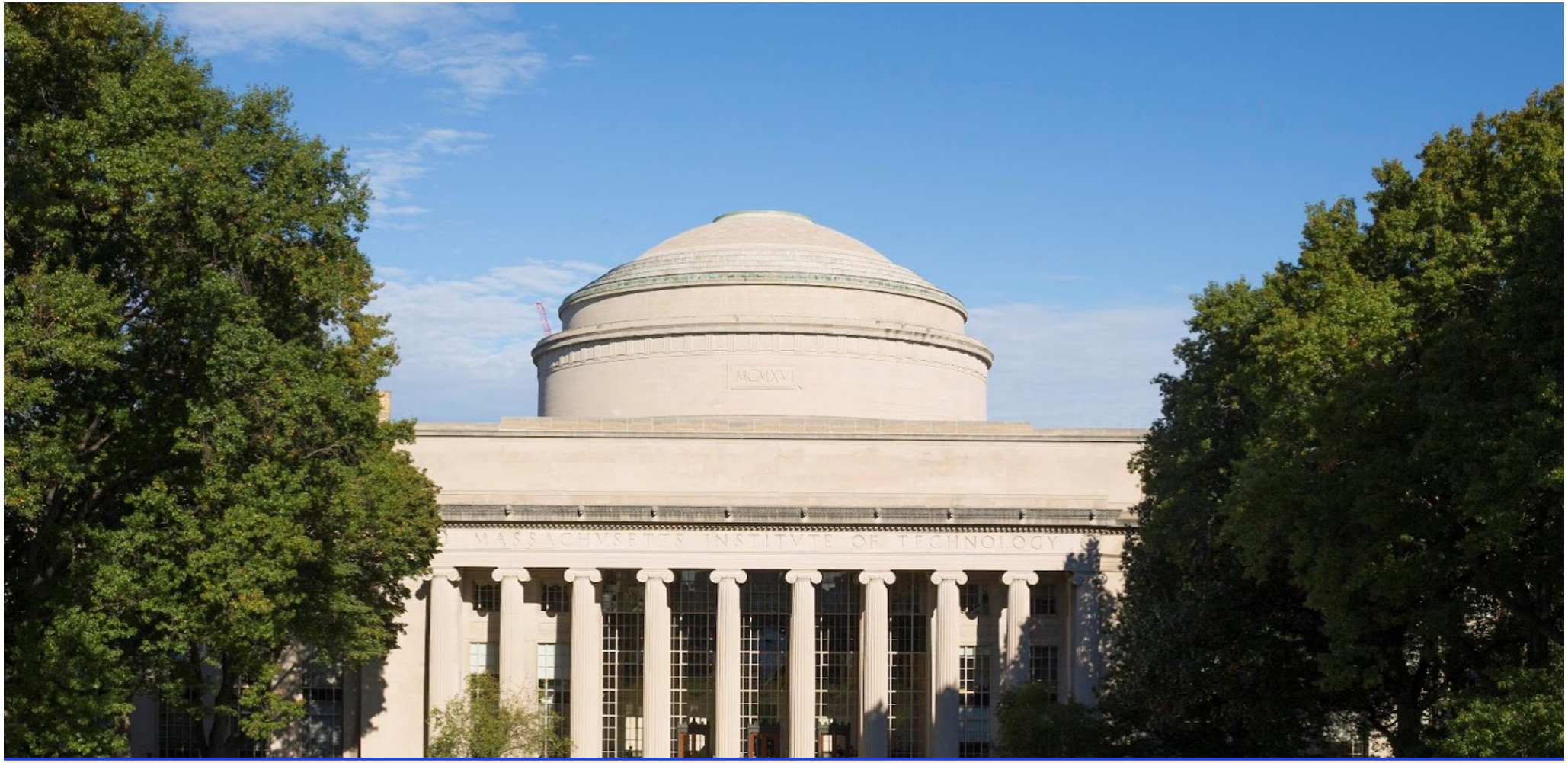
- ➔ Carbon>Building
- ➔ Center for Electrification and Decarbonization of Industry
- ➔ Decarbonizing and strengthening the global energy infrastructure using nuclear batteries
- ➔ Emissions reduction through innovation in the textile industry
- ➔ Rapid decarbonization of freight mobility
- ➔ Revolutionizing agriculture with low-emissions, resilient crops
- ➔ Solar fuels as a vector for climate change mitigation
- ➔ The MIT Low-Carbon Co-Design Institute
- ➔ Tough to Decarbonize Transportation

Removing, managing, and storing greenhouse gases

- ➔ Demonstrating safe, globally distributed geological CO2 storage at scale
- ➔ Deploying versatile carbon capture technologies and storage at scale
- ➔ Directed Evolution of Biological Carbon Fixation Working Group at MIT (DEBC-MIT)
- ➔ Managing sources and sinks of carbon in terrestrial and coastal ecosystems
- ➔ Strategies to Reduce Atmospheric Methane
- ➔ The Advanced Carbon Mineralization Initiative

Using data and science to forecast climate-related risk

- ➔ Bringing computation to the climate challenge
- ➔ Ocean vital signs
- ➔ Preparing for a new world of weather and climate extremes
- ➔ Quantifying and managing the risks of sea-level rise
- ➔ Stratospheric Airborne Climate Observatory System to initiate a climate risk forecasting revolution
- ➔ The future of coasts – Changing flood risk for coastal communities in the developing world



Thank you.