LEAP
LEARNING THE EARTH WITH
ARTIFICIAL INTELLIGENCE & PHYSICS

A Hackathon to Improve Climate Change Modeling and its Broad Utility

OPEN CALL FOR APPLICATIONS

OVERVIEW

The National Science Foundation-funded Learning the Earth with Artificial intelligence and Physics (LEAP) Science and Technology Center (STC), a large multi-institutional center effort working to improve climate projections using novel artificial intelligence (AI) for better climate adaptation, and Amazon Web Services (AWS), invites applications to participate in the **"A Hackathon to Improve Climate Change Modeling and its Broad Utility" on June 20-21, 2024.**

We particularly encourage people from the global South or other areas of the world that are disproportionately impacted by the climate crisis to register. We welcome people from all disciplines and levels of data science familiarity to attend, as a central goal of this event is to broaden access to the climate data science field. This includes community members who are interested in learning more about data and climate adaptation to climate and data scientists who work closely with climate data and AI.

BACKGROUND

High-resolution estimates are critical to better understand the impact of climate change and to help us better adapt to more intense storms. Models using satellite data are too coarse (>100 kilometers), meaning they are not sharp enough to convey climate change impact on smaller geographic areas (e.g., neighborhoods). **Given these challenges, this hackathon will focus on improving, in a realistic fashion, the sharpness (or resolution) of climate models while learning in real-time from stakeholders how the models can be most useful in various scenarios.**

Investigating models for super-resolution (a process also known as "downscaling," in which scientists use global climate data to create climate models on a smaller, more local scale) will result in data that is higher resolution. Most of the data used to train the model, and teach it to make

predictions based on the data it receives, will only be indirect (as we do not directly measure precipitation but only the microwave signals, which are used for transmitting data over large distances, from satellite observations or from radar information), with only sparse direct observations.

This hackathon is unique in that we would value input from a broad range of participants, including those who a) study climate science and/or data science, b) can help us understand diverse needs or applications for using downscaled data, and c) anyone who is interested in learning more about how data can support climate adaptation!

For those with research backgrounds, the following articles provide additional background:

- "Residual Diffusion Modeling for Km-scale Atmospheric Downscaling"
- "Generative Emulation of Weather Forecast Ensembles with Diffusion Models"

For those coming from other disciplines, the following links provide additional definitions and background:

- *Why are accurate climate models important to adapting to climate change?*
- *What is downscaling?*
- *What is climate data downscaling?*

HACKATHON GOAL

Jointly organized by the National Science Foundation-funded Learning the Earth through Artificial Intelligence and Physics (LEAP) Science and Technology Center (STC) and Amazon Web Services (AWS), **this hackathon aims to engage a broad range of participants to evaluate new algorithms to downscale (super-resolve) climate model outputs to make them more directly useful to a broad range of stakeholders,** as they need high spatial resolution (at least 5 kilometers as opposed to more than 100 kilometers for climate models).

ELIGIBILITY

This hackathon is open to participants at all skill levels, and from a range of disciplines and data needs, as well as from all geographic areas, in support of LEAP's commitment to broadening participation in climate data science and making LEAP data and code broadly accessible. We particularly encourage people from the global South and areas most gravely impacted by the climate crisis to participate.

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DATE + LOCATION

This hackathon will be a **hybrid event held on Thursday, June 20 and Friday, June 21, 2024**. Participants are welcome to join in-person at the Columbia University Innovation Hub, located at 2276 12th Ave., New York, NY, or via Zoom (link to be shared after registration).

REGISTRATION

To participate in this hackathon, please register HERE.
If you have questions, please email Molly Lopez, LEAP's Managing Director.