

INSTITUTE FOR CLIMATE AND SUSTAINABLE GROWTH

# Center for Advanced Materials for Environmental Solutions

The Center for Advanced Materials for Environmental Solutions (CAMES) aims to accelerate the discovery of molecular-based materials that can be used to develop practical solutions to critical climate challenges.

## ABOUT US

CAMES will revolutionize the materials discovery process by using artificial intelligence (AI), machine learning (ML), and robotics to dramatically accelerate materials discovery, potentially reducing research timelines from years to months and helping to meet urgent climate deadlines. The multidisciplinary team includes experts in materials science, chemistry, computer science, science communication through artistic endeavors, and other fields. In addition to research, CAMES will serve as a global hub for education and outreach in this field.

## OUR RESEARCH

We are initially focusing on porous materials, such as metal-organic frameworks (MOFs) and covalent organic frameworks (COFs). They have the potential to address many important climate challenges due to their sponge-like capability to capture and release high concentrations of substances. These materials have begun to be used for purposes such as purifying air and water, harvesting water from desert air, producing sustainable fuel and chemicals, and extending the shelf life of produce.

Some of the Center's projects include:

- + Developing new porous materials for methane capture, gas separations, water harvesting, and catalytic reactions.
- + Creating AI-driven algorithms for rapid material discovery and optimization, significantly reducing development timelines.
- + Advancing public engagement in climate science through partnerships with artists, educators, and community leaders.

**“Finding energy solutions requires a fundamental shift in how we discover and develop materials. CAMES will accelerate this process by integrating computation, machine learning, and robotics to dramatically shorten the timeline from concept to commercialization, ensuring that breakthroughs reach the market in time to make a meaningful impact.”**

— **Laura Gagliardi**

Richard and Kathy Leventhal Professor in the Department of Chemistry, Founding Faculty Director, CAMES



THE UNIVERSITY OF CHICAGO

CENTER FOR ADVANCED MATERIALS  
FOR ENVIRONMENTAL SOLUTIONS

[advancedmaterials.climate.uchicago.edu](https://advancedmaterials.climate.uchicago.edu)

[advancedmaterials@uchicago.edu](mailto:advancedmaterials@uchicago.edu)

## SUMMER UNDERGRADUATE RESEARCH FELLOWSHIP

The **Summer Undergraduate Research Fellowship in Catalysts and Advanced Materials for Environmental Solutions (SURF-CAMES)** is a unique summer internship for undergraduate students eager to contribute to transformative research in sustainable energy and decarbonization. Under the mentorship of a Principal Investigator at the University of Chicago, students will engage in hands-on research.

Students in disciplines such as Chemistry, Chemical Engineering, Materials Science, Environmental Science, Physics, Data Science, Mechanical Engineering, and Biochemistry will find this internship particularly valuable. Focusing on critical areas like highly polarizable catalysts, electrocatalysis, hydrogen storage and sustainable fuels, theory computation with active learning, and advanced material characterization, students will help advance the development of metal-organic frameworks (MOFs) for decarbonizing chemical and energy industries.

- + Open to all University of Chicago undergraduate students
- + Provides a full-time appointment for a ten-week period between June and August
- + Computational and experimental projects available in all areas of climate chemistry
- + Includes professional development opportunities and cultural activities
- + Participants will present their research at a summer mini-symposium and be invited to participate in a college-wide poster exposition

### CO-DIRECTORS



**Laura Gagliardi**

Richard and Kathy Leventhal Professor, Department of Chemistry, Pritzker School of Molecular Engineering, and James Franck Institute



**Doug Weinberg**

Entrepreneur

### SCHOLARS



**John Anderson**

Associate Professor of Chemistry



**Giulia Galli**

Liew Family Professor of Electronic Structure and Simulations, Pritzker School of Molecular Engineering and Department of Chemistry



**Max Delferro**

Senior Scientist, Pritzker School of Molecular Engineering

Group Leader, Catalysis Science Program, Chemical Sciences and Engineering Division, Argonne National Laboratory



**Eliu Huerta**

CASE Senior Scientist, Department of Computer Science

Lead, Translational AI and Computer Science, Data Science and Learning Division, Argonne National Laboratory



**Ian Foster**

Arthur Holly Compton Distinguished Service Professor of Computer Science

Director, Data Science and Learning Division, Argonne National Laboratory



**Laura Rico-Beck**

Assistant Dean of Education and Outreach, Pritzker School of Molecular Engineering



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