Upcoming Webinar

Cooling the Planet Without Warming It: From Molecules to Systems

Join us on **February 24 at 9 am CT** for the next session in our 2026 Webinar Series! Our speaker, **Dr. Lourdes F. Vega**, is a Full Professor in the Department of Chemical Engineering at Khalifa University in the United Arab Emirates (UAE). Dr. Vega will highlight cutting-edge pathways to **near-zero-emission cooling.** *Registration is required to attend the event.*

Register

Don't have time to attend? Our webinars are recorded and available on demand.

Convergent Research

New Publications

**Corresponding author(s); ASAP: As Soon As Publishable*

Development of Accurate Transferable Hydrofluorocarbon Refrigerant Force Fields Using a Machine Learning and Optimization Approach

Montana Carlozo, Ning Wang, Alexander Dowling,* and Edward Maginn*

Digital Discovery **Article ASAP**.
DOI: 10.1039/D5DD00537J

Read the Article

Effect of Composition on Martensitic Transformation Temperature, Latent Heat, and Crystalline Phase of Cu-Al-Mn Shape Memory Alloys

Kotaro Tomioka, Ryota Nakano, Akihisa Aimi, Takuro Dazai, Ichiro Takeuchi, and Kenjiro Fujimoto*

Adv. Mater. Sci. Eng. **Article ASAP**.
DOI: 10.1155/amse/5894756

Read the Article

View all EARTH peer-reviewed publications.

Member Achievements

Edward Maginn, the Keough-Hesburgh Professor of Engineering at the University of Notre Dame, has been elected to the National Academy of Engineering (NAE). One of the most prestigious and selective honors in the profession, NAE membership recognizes Maginn for pioneering molecular modeling and simulation methods that advance materials design for energy, sustainability, and environmental applications worldwide.

Congratulations to graduate student **Barnabas Agbodekhe** of the University of Notre Dame on successfully defending his dissertation, *Development and Application of Computational Methods and Insights for the Sustainable Phaseout of High Global Warming Refrigerants*, on February 12. Barnabas completed this work under the guidance of Professor Ed Maginn.

Yamil Colón, Associate Professor of Chemical and Biomolecular Engineering at the University of Notre Dame, has been selected for the National Academies' prestigious New Voices program. **One of only 20 emerging STEM leaders chosen nationwide** for the 2026–28 cohort, Colón will contribute to policy-relevant studies and advance interdisciplinary work in energy, sustainability, and AI-driven materials research.

Check out this new article by University of Maryland Professor Ichiro Takeuchi, published in *Nature Energy*. Takeuchi emphasizes that sustainable cooling will require discovering low GWP refrigerants through advances in computational chemistry and AI, and developing solid-state caloric cooling technologies that eliminate the need for chemical refrigerants. Together, these approaches could significantly cut cooling-related greenhouse gas emissions and support climate-friendly, scalable solutions.

Read the Article

University of Maryland Professors Damena Agonafer and Yunho Hwang earned top honors at the Vicinity Energy Ideation Program Finale, co-hosted by the Maryland Energy Innovation Accelerator (MEIA). Agonafer won first place for the UMD Data Centers project concept, and Hwang earned second place for the UMD Heat Pump concept. Their compelling pitches highlighted innovative pathways to advance decarbonization in district energy systems.

New EARTH Faculty

Professor Shiguang Deng joins us from the Department of Mechanical Engineering at the University of Kansas. Trained in computational mechanics and design optimization, he develops data-driven, physics-informed design intelligence for advanced material–structure systems. His research spans AI-enhanced engineering design, advanced manufacturing, material system modeling, and structural optimization.

Group Website

Google Scholar

Participate in EARTH-Relevant Symposia

Abstract submissions are now open for the symposium ***Advancing the Chemistry of Circular Refrigerant Economies***. This joint session is organized by the PMSE, FLUO, and INOR divisions at the American Chemical Society (ACS) Fall 2026 National Meeting, taking place in Chicago, IL, **August 23–27, 2026**. Abstract submission closes on **March 30**.

Symposium topics include:

- Fabrication of membranes for separations, electrochemical systems, sensing, and dehumidification
- Advances in fluorine chemistry for refrigerant repurposing technologies
- Materials for refrigerant separation and sensing, solid-state cooling, and water adsorption

Submit an Abstract to PMSE | Submit an Abstract to FLUO | Submit an Abstract to INOR

Abstract submissions are now open for the topical conference ***Advancements in the Development of Novel Refrigerant Separation Processes, Design of New Refrigerants, and Energy-Efficient Cooling Systems*** at the 2026 AIChE - American Institute of Chemical Engineers Annual Meeting in Minneapolis, MN, **November 8-12, 2026**.

Abstracts are due on **April 8**. **Submissions should be focused on:**

- Energy-Efficient Refrigeration Systems
- Novel and Safe Refrigerants
- Thermophysical Properties and Phase Equilibria
- Refrigerant Reclamation and Repurposing

Submit an Abstract

Funding Opportunities

The Coupling, Energetics, and Dynamics of Atmospheric Regions (CEDAR) program supports research that **advances understanding of upper-atmospheric behavior** from the middle atmosphere through the thermosphere and ionosphere into the exosphere. Projects examine **coupling, energetics, chemistry, and dynamics across regional and global scales** to understand how the upper atmosphere responds to both lower-atmospheric perturbations and solar inputs from above. The program supports ground-based and space-based observations, as well as **theory and modeling**, and encourages the use of **AI/ML tools** and open-science practices. A full proposal is due on **March 4**, 2026.

The EPA's 2026 Wildfire Smoke Preparedness Grant Program funds projects that **improve indoor air quality** and **HVAC performance** in community-serving buildings to protect occupants during wildfire smoke events. Applications are due on **April 15**, 2026.

External Webinar Opportunity

Argonne NATIONAL LABORATORY

Argonne National Laboratory's first **OutLoud event of 2026** will showcase how its six DOE-funded user facilities drive scientific breakthroughs and everyday innovations. The lecture will highlight how more than 8,000 visiting researchers each year use these tools to accelerate discoveries in fields from cybersecurity to modern medicine. This special session, part of Argonne's 80th-anniversary OutLoud Public Lecture Series, takes place on **Thursday, March 5, 2026, from 6:00–7:15 pm CT**.

Register

Education and Outreach

Cooling Science in Action

Notre Dame graduate students and faculty put **Cooling Science in Action!** at the Science Alive outreach event on Saturday, February 7, in the St. Joseph County Public Library located in downtown South Bend. Led by **Emmanuel Afreh** (Schaefer Lab), **Montana Carlozo** (Maginn Lab), **James Magas** (Myung Lab), **Bamaiyi Kamji** (Guo Lab), and **Profs. Jen Schaefer** and **Ed Maginn** engaged with over 400 families, demonstrating evaporative cooling by using misting fans to show how the body sweats to cool yourself down, and an endothermic chemical reaction, using baking soda, vinegar and water to create mini ice packs.

Thanks to the ND EARTH Team for making a meaningful impact on students and families through these hands-on demonstrations and thoughtful conversations. Because of their collective efforts and commitment to outreach and science education, EARTH's mission was front and center throughout the entire day. Learn how to make a cold pack!

The Adventures of EARTH Man

Explore this month's comic and catch up on past adventures that bring sustainability and engineering to life!

Announcements and Reminders

Please use the following statement in your publication acknowledgements:

"This research is based upon work supported by the National Science Foundation under award number **EEC-2330175** for the Engineering Research Center EARTH."

Did you know that an EARTH Convergent Research (CR) Meeting Calendar is maintained in the shared Google folder? View the 2026 calendar.

Upcoming Meetings

February 12: Convergent Research Leadership Meeting (3 pm ET)
February 19: Thrust 1 Meeting (3 pm ET); Crosscut 2 Meeting (4:30 pm ET)
February 26: Thrust 2 Meeting (3 pm ET)
March 5: Thrust 3 Meeting (3 pm ET)
***March 11–13*: 2026 ERC EARTH Spring Summit at University of Notre Dame**
March 19: Convergent Research Leadership Meeting (3 pm ET)
March 26: Thrust 1 Meeting (3 pm ET); Crosscut 2 Meeting (4:30 pm ET)

Connect with EARTH on Social Media

The Environmentally Applied Refrigerant Technology Hub (EARTH) is working to create sustainable, accessible refrigeration and air conditioning innovations that will improve the quality of life for all Americans and secure U.S. leadership in workforce development and manufacturing.