



# WELCOME TO EARTH




**Environmentally Applied Refrigerant Technology Hub**  
stay *fresh* on upcoming events, surveys, publications, and more!


Our Pillars

Our Directors

-  Convergent Research
-  Innovation Ecosystem
-  Engineering Workforce Development
-  Impact and Belonging



**Mark B. Shiflett**  
Center Director  
U. Kansas



**Jennifer L. Schaefer**  
Deputy Director  
U. Notre Dame

The News, Distilled

Member Achievements	New Publications	Upcoming Webinars
Meet our RETs at UMD, ND, & KU	EARTH Man Comic	 Read More!

# Member Achievements



**Prof. Yanliang Zhang** has been promoted to Advanced Materials and Manufacturing Collegiate Professor, Aerospace and Mechanical Engineering.

**Prof. Nosang Myung** has been named Fellow of The Electrochemical Society and will be recognized at the October meeting in Chicago.



**Redemption Edegbe**, Prof. William Phillip's Research Group, was recently elected as the Executive President of the Africa Graduate Club at the University of Notre Dame.

**Prof. Rui Sun** has been promoted to Full Professor at the University of Hawai'i, Mānoa. *\*Correction from June newsletter.*



**Dr. Krishnendu Mukherjee**, Prof. Yamil J. Colón's Research Group, received an award for his poster presentation at the Midwest Thermodynamics and Statistical Mechanics Conference 2025 hosted by the University of Wisconsin-Madison.

# Member Achievements



**UMD graduate research assistant Het Mevada** presented two research papers recently related to his EARTH research on solid-state cooling: "Design of Experiments Study to Evaluate Active Elastocaloric Regenerator Performance" at the ASHRAE Annual Conference in Phoenix and "Experimental Validation of Thermo-mechanical Properties for Novel Elastocaloric Material" at the 7th IIR Conference on Thermophysical Properties and Transfer Processes of Refrigerants, hosted by the University of Maryland Center for Environmental Energy Engineering in College Park, Maryland.

**Prof. Alexander Dowling** is the recipient of the 2025 AIChE CAST Division Outstanding Young Researcher Award. He also has been named Tony and Sarah Earley Collegiate Associate Professor of Energy and the Environment in the Department of Chemical and Biomolecular Engineering, a prestigious title awarded by the university and college in recognition of excellence in research, teaching and service.



**UMD Research Professor Yunho Hwang** published two papers:

Wan, H.; Zhang, J.; Hwang, Y. Enhancing building resilience in cold climates: Integrating heat pump technologies with renewable energy. *Energy Research & Social Science* **2025**, 127, 104168.

[DOI: 10.1016/j.erss.2025.104168.](https://doi.org/10.1016/j.erss.2025.104168)

Hsu, P.-C.; Gao, L.; Hwang, Y.\*; Radermacher, R. A review of the state-of-the-art data-driven modeling of building HVAC systems. *Energy and Buildings* **2025**, 342, 115881.

[DOI: 10.1016/j.enbuild.2025.115881.](https://doi.org/10.1016/j.enbuild.2025.115881)



# Member Achievements



Ph.D. student **Kevin Turner**, Prof. Mark Shiflett's Research Group, passed his preliminary exam at the University of Kansas.

**Research Project Manager Jessica Tami** published an article on Sulfonated Benzo[c]cinnolines for Alkaline Redox-Flow Batteries, which includes work from her PhD at the University of Michigan.



**Prof. Jennifer Schaefer** is celebrating 10 years of service at the University of Notre Dame.



## Upcoming Webinar

Recently inducted into the National Academy of Engineering, **Senior Principal Consultant at Chemours, Concetta La Marca**, will travel to the University of Kansas to meet with EARTH faculty and students and give a hybrid seminar on **August 26<sup>th</sup> at 2 pm Central / 3 pm Eastern**.

[Please register for the event!](#)







# New Publications



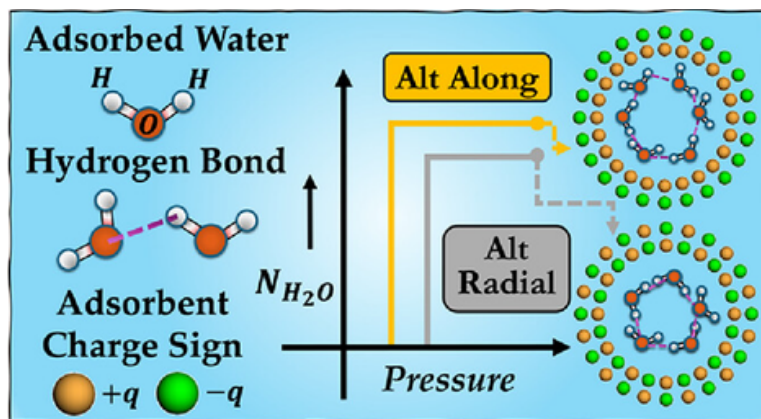
## Expanding Cluster, Enhancing Adsorption: Investigating the Role of Electrostatic Configurations on Water Vapor Adsorption

Krishnendu Mukherjee, McKayla Zastrow, and Yamil J. Colón\*

*Langmuir* **2025**, Article ASAP.



DOI: 10.1021/acs.langmuir.5c01303

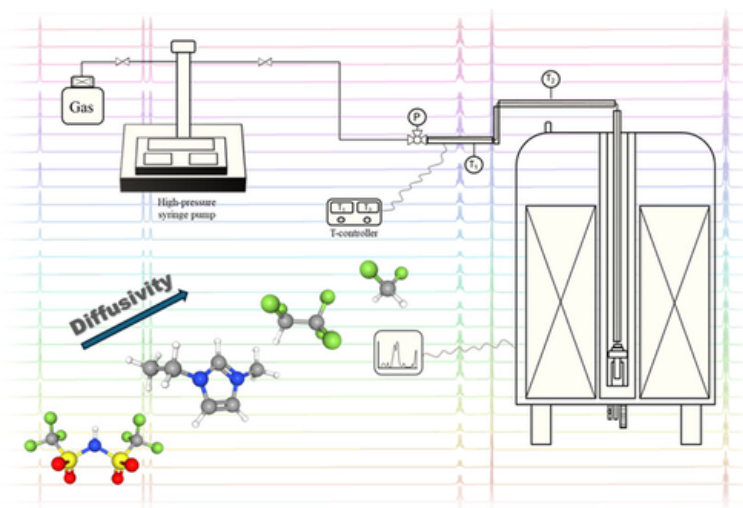


## Experimental Measurements and Molecular Dynamics Simulations of Self-Diffusivity in Mixtures of [C2C1im][Tf2N] with Difluoromethane and Pentafluoroethane

Karim S. Al-Barghouti, Rajkumar Kore, Barnabas Agbodekhe, Diego Trevisan Melfi, Eliseo Marin-Rimoldi, Mark B. Shiflett, Edward J. Maginn\*, and Aaron M. Scurto\*

*J. Phys. Chem. B* **2025**, Article ASAP.

DOI: 10.1021/acs.jpccb.5c02880



# Research Experience for Teachers

## HEART - Harnessing Educators for Advancing Refrigerant Technologies

Our inaugural program, hosted at UMD, ND, and KU, ran from June 16 to July 15.

Thank you, teachers, for all of your insight and efforts!



**Karen Bogoski** is a passionate and experienced technology educator originally from Carleton, Michigan, now living in Old Greenbelt, Maryland. With a bachelor's degree in fine arts from Eastern Michigan University and a master's in career and technology education from the University of Maryland, Eastern Shore. Karen has been teaching since 1996. She currently teaches Foundations of Technology and Engineering to ninth-graders at Eleanor Roosevelt High School in Greenbelt, Maryland, where she also coaches VEX Robotics, SeaPerch and MESA. Karen enjoys giving her students hands-on learning experiences, like soldering and using power tools. Her favorite part of teaching is hearing from former students how her class positively impacted their lives. Outside of work, she loves gardening, traveling, and spending time with family and her two cats, Julius and Frankie. Karen is working with Associate Professor Damena Agonafer, of the UMD Department of Mechanical Engineering, and graduate research assistants Mariah Randriambololona and Alexander Lyons on EARTH Thrust 3.



**Karen Bogoski**

**Mildred Pates** is a dedicated and passionate high school chemistry teacher at Eleanor Roosevelt High School in Greenbelt, Maryland. She holds an M.S. in chemistry education from the University of Science and Technology in Philippines and has a strong commitment to advancing knowledge in the field of chemistry through innovative and student-centered approaches. Mildred integrates modern teaching strategies, technology and real-world applications to make complex chemical concepts accessible and engaging. Her teaching philosophy centers on fostering critical thinking, environmental awareness and scientific curiosity among students. As a lifelong learner and educator, she actively pursues professional development and contributes to curriculum enhancement. Mildred lives in Bowie, Maryland, with her spouse and 10-year-old son and enjoys gardening and fishing. Mildred is working with Professor Ichiro Takeuchi, who is chair of the UMD Department of Materials Science and Engineering, and graduate research assistants Boyang Liu and Het Mevada on EARTH Thrust 2.



**Mildred Pates**

# Research Experience for Teachers

HEART - Harnessing Educators for Advancing Refrigerant Technologies



**William (Bill) Slonaker** is the Department Chair for HVAC, Building Construction, Building Construction Management at Ivy Tech Community College, Kokomo Campus, in Indiana. He has been married for 25 years, has six children, ages 40, 39, 38, 37, 15 and 11 (the youngest two are adopted), and four cats, two rabbits and a dog. He was a non-traditional student, taking his first college course at age 35 and starting his teaching career at nearly age 50. Bill has served on many committees during his tenure at Ivy Tech, including the Indiana Commission on Higher Education (CHE) Appointment Committee, Statewide Faculty Council, Statewide HVAC Curriculum Chair, Statewide BCTI Assistant Chair, and K-14 Advisory Board. Bill is working with Ruilan Guo, Frank M. Freimann Collegiate Professor of Engineering of the Department of Chemical and Biomolecular Engineering at Notre Dame, and graduate research assistant Daniel Hardesty on EARTH Thrust 1, Project 1.1.



**William (Bill)  
Slonaker**



**Paul Downing**

**Paul Downing** serves as the Faculty Fellow of HVACR at Ivy Tech Community College's South Bend campus in Indiana. With a strong foundation in the HVACR field, he began his career as a maintenance technician and advanced through roles as a service technician and field supervisor. His passion for mentoring and developing new talent led him to transition into full-time teaching, where he now focuses on preparing the next generation of HVACR professionals. Before entering the HVACR industry, Paul worked as an Air-Mixed Gas Commercial Diver and underwater welder, bringing a unique blend of technical expertise and hands-on experience to his current role. Outside the classroom, he enjoys traveling with his wife, attending live music events, and gaming together. Paul is working with Nosang Myung, Bernard Keating-Crawford Professor of Engineering, and Rev. Bryan Paulsen, S.J., Assistant Professor, both of the Department of Chemical and Biomolecular Engineering at Notre Dame, and graduate research assistants James Magas and Max Ziesel on EARTH Thrust 3, Project 3.1.



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# Research Experience for Teachers

## HEART - Harnessing Educators for Advancing Refrigerant Technologies



**Jhonatan Vallejo**

**Jhonatan Vallejo** was born in Mexico City, Mexico. After earning his Associate of Science degree at Donnelly College, he started working at Kansas City Kansas Community College (KCKCC) in their facilities maintenance department with little to no experience in trades. He came from the restaurant industry where he gained people skills and customer service skills. He enrolled in the HVAC and Electrical programs at KCKCC, earning his Associate of Science in Technical Studies and HVAC and Electrical certificates. He spent six years both working and attending school at KCKCC. Now he teaches at Johnson County Community College (JCCC), where he is preparing to start his fourth year of teaching. Jhonatan is passionate about HVAC because there is so much to learn, and technology keeps changing and advancing. Helping his students reach their goals, taking them from point A to point B, brings so much joy to Jhonatan's life and puts a smile on his face. As of July 1, 2025, he became the HVAC department chair at JCCC. For the RET program at KU, Jhonatan is working with Kevin Turner (graduate, KU) and Nicholas Romano (undergraduate with FROST REU at KU) under the direction of EARTH Center Director Mark Shifflett, Casey Williams (EARTH Education Director), and his colleague Mike Steinmetz (fulltime professor at JCCC).

**Mike Steinmetz** has been teaching in the trades with a focus in HVAC for 15 years. He is currently in his fifth year full-time at Johnson County Community college where he was adjunct for 9 years prior. He started as an apprentice within his family's business at 14 years old and has continued to grow through the classroom and field experience. He has always had a knack and interest in fixing things. What started with simple circuits, progressed to TVs and radios at a young age with a natural progression into HVAC. Mike understands the value of practical knowledge in HVAC and focuses much of his class time on lab work to develop students' skills that transfer to gainful employment. Seeing his students be successful techs and people are the highlight of his job. Outside of work, Mike focuses on his family. Spending time with his wife and three children at their sporting events is typically where you would find him. Whether it's a softball field, a wrestling gym, or gymnastic mats, he is there supporting his kids. Mike is working with Kevin Turner (graduate, KU) and Nicholas Romano (undergraduate with FROST REU at KU) under the direction of EARTH Center Director Mark Shifflett and with his colleague Jhonatan Vallejo on EARTH Thrusts 2 and 3.



**Mike Steinmetz**



# Council of Students (CoS) Spotlight

The Student Leadership Council (SLC) is working on planning and executing a cohort trip for approximately 20 students hosted by the Notre Dame Office of Research Advancement in Washington D.C. This trip will include a tour of the U.S. Capitol building and four 45-minute discussions with people involved in science policy. This professional development opportunity includes a tutorial on writing a policy brief, which will guide the cohort in creating a mock policy brief based on EARTH goals and CoS research efforts.

Additionally, at the October NSF site visit at KU, the CoS will host a poster session, which will feature awards for the top three posters. *Solicitations for posters and judges will be tentatively announced in late July or early August.*



## Member Updates

**Prof. John Onyango**, formerly at the University of Notre Dame, accepted the role of Chair of Architecture at Howard University.



HOWARD  
UNIVERSITY



**Dr. Krishnendu Mukherjee**, Yamil J. Colón's Research Group, graduated in May and will be leaving the University of Notre Dame at the end of July. He is currently looking for postdoctoral positions.

**Prof. Xu Han**, formerly at the University of Kansas, is joining the faculty in the School of Architecture at the University of Notre Dame as an assistant professor this fall.



# Engineering Workforce Development

The Environmentally Applied Refrigerant Technology Hub (EARTH) is partnering with **Pennsylvania College of Technology** to bring the College's B.S. in Heating, Ventilation & Air Conditioning Engineering Technology fully online by Fall 2026. This HVACR Technician-to-Engineer pathway will enable working technicians, EARTH-affiliated members, and other stakeholders to turn field experience into an engineering degree without relocating or pausing their careers.

A formal announcement is planned for EARTH's Fall 2025 meeting at University of Kansas (Oct 20-22). Afterward, Penn Tech will adapt its core upper-division HVACR courses for high-quality online delivery and open enrollment to both recent graduates and seasoned professionals. The first online cohort will begin in Fall 2026, and EARTH's inaugural graduates from the program are expected in Spring 2028. Flexible credit options, including transfer credit, licensure-based credit, and recognition of prior work experience, will let technicians build on what they already know while advancing toward engineering leadership in the rapidly evolving HVACR industry.



**Pennsylvania  
College of Technology**  
A Penn State Affiliate



Thank you to our fantastic artist, [Chamisa Kellogg!](#)

# REU Students Will Attend IMECE



**Kirshaun McGhee**  
Delaware State U.



**Mike Nasseri**  
Northern Illinois U.

EARTH is funding the travel and registration costs of two of our FROST REU students, Kirshaun and Mike, to attend to the International Mechanical Engineering Congress & Exposition! The conference will take place in Memphis, TN this November.  
*We look forward to seeing you later this year!*

**AWESOME!**

## Funding Opportunities

Office of Naval Research Young Investigator Program: Applicants must be in their first or second full-time tenure-track or tenure-track-equivalent academic appointment and have received their PhD or equivalent degree on or after January 1, 2018. The deadline to submit a full proposal is on **August 1** at 5 pm EST.

Army Research Laboratory Advanced Energy Materials Program: Topics that may be of interest to EARTH faculty include entropically-stabilized catalytic materials and redox-responsive electrode materials for multivalent energy storage. The closing date is on **November 19, 2027**.

Do you have news or an accomplishment you'd like to share?  
Email Jessica Tami ([jltami@ku.edu](mailto:jltami@ku.edu)) to be featured in the next newsletter!

Please use the following statement in your publication acknowledgements if your research was funded by EARTH.

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



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