University at Buffalo
Research and Education in eNergy, Environment and Water (RENEW)

Currents

News, events and more from the RENEW Institute, where faculty collaborate across disciplines to solve the world's most pressing problems

WINTER 2024

Message from the Director

Photo Credit: Meredith Forrest Kulwicki

Greetings! Somehow, it is December: looking back at our community's past year of accomplishments and activities, we have much to celebrate.

Invited speakers for 2024 Catalyzing Conversations represented the breadth and depth of RENEW Core Faculty and Faculty Affiliates, the research of which encompasses both climate and environmental challenges and their related social dimensions. Rice University's Jim Elliott, a sociologist, provided a stirring lecture on "How and Why Social Inequalities Matter for Climate Resilience," and, in October, Indian Institute of Technology professor and National Academy of Engineering member Thalappil Pradeep presented an exciting overview of "Affordable Clean Water Using Advanced Materials."

Other highlights include your scholarly endeavors that are accelerating UB's Top 25 Ambition, including the prodigious research output of RENEW Core Faculty in the high impact journals enumerated below, and the award of game-changing grant funding for many of you. Case in point, Kang Sun landed an NSF CAREER award to support his research on mapping emission sources of greenhouse gases and air pollutants. Kang's methods will accelerate data collection, provide high spatial resolutions, and have global applicability. We congratulate him on this prestigious award, and look forward to his future accomplishments.

In October, it was a career highlight that the College of Arts and Sciences opted to honor me in its inaugural Spotlight Symposia – many thanks to those who were able to attend and hear lectures from some of the preeminent scientists in the U.S. The event brought home to me the extent to which environmental chemistry and engineering are collective enterprises with rich interdisciplinary dimensions. That showcase of talent -- including seven members of the National Academy of Engineering and the National Academy of Sciences -- has inspired me to host an event on **January 15, 2025**, to elevate the work of RENEW Core Faculty to the greater university community. "**Center Stage with RENEW: Bridging Disciplines, Boundless Possibilities**" will provide a forum for RENEW Core faculty to provide greater depth on their latest activities and discuss new collaborative opportunities. More information is coming soon!

In the meantime, I wish safe and happy holidays to you all.

Diana S. Aga, Ph.D.
SUNY Distinguished Professor
Henry M. Woodburn Professor of Chemistry
Director of RENEW Institute

News and Updates

Global Women's Breakfast

Last February, RENEW and the Department of Chemistry co-hosted UB's inaugural Global Women's Breakfast (GWB), coinciding with the International Day of Women and Girls in Science. Pioneered by the International Union of Pure and Applied Chemistry (IUPAC), the event promotes gender equality in science through discussions on mentorship, networking, and career advancement. >>> Get involved

Haiqing Lin Receives $1.5M DOE Grant

The U.S. Department of Energy awarded Haiqing Lin $1.5M for a two-year project to develop advanced membranes for clean hydrogen production. Lin's team is developing membranes consisting of a bundle of selectively permeable hollow fibers that separate oxygen from nitrogen, thereby producing pure oxygen at a lower cost than cryogenic-based air separation. The pure oxygen yielded by this process would, in turn, be used to produce low-cost hydrogen from biomasses or wastes at distributed locations. >>>Learn more about Haiqing Lin's DOE grant

Sophie Nowicki on Team Tapped by NASA to Advance Satellite Observation of Climate Change

Led by the University of California San Diego, the Earth Dynamics Geodetic Explorer (EDGE) team uses satellite laser altimetry for an unprecedented, real-time look at both carbon stored in forests and ice at the poles. Nowicki will be EDGE's cryosphere application lead, tasked with ice sheet modeling and community engagement. >>> Read more about this research

Shared Instrumentation Spotlight

Photo Credit: Joshua Wallace

RENEW's **Park FX40 atomic force microscopy (AFM)** system is a powerful tool for characterizing the properties of advanced materials and exploring new physical, chemical, and biological phenomena at nanoscale. Using the Park FX40 AFM, RENEW researchers have achieved a number of research milestones, including a publication in *Science* for the characterization of two-dimensional membrane materials generated using an ultrafast interfacial process for generating carbon-doped metal oxide nano films used for molecular separation (Science, 2023, 381 (6662), 1098-1104, doi: 10.1126/science.adh2404); characterization of remote-epaxial thin films (Nature, 2024, under revision); and evaluation of electrostatic charging in ionic glass materials, in collaboration with a Corning research team using density functional theory computations. Recently, the system was upgraded to include an advanced control system and new modules to enable scanning thermal microscopy, which enhance the precision and capabilities of the system.

Please contact Jun Liu with questions or for training.

>>> Click here to see all of RENEW's Shared Instrumentation

Events and Outreach

Image Credit: ChatGPT

Jan. 15, 2025: Center Stage with RENEW: Bridging Disciplines, Boundless Possibilities

RENEW Core Faculty have been invited to present updates on their research and activities to the broader UB community, which will be invited to this showcase of their work.

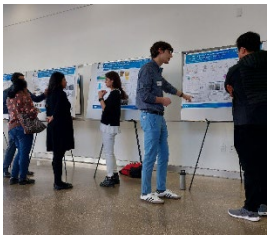
SAVE THE DATE!
Date: January 15, 2025
Time: 9:30 a.m. to 4:00 p.m., Reception to Follow
Location: NSC 220

March 10, 2025: Catalyzing Conversations with Lynn Katz

RENEW and the Department of Civil, Structural & Environmental Engineering will host **AEESP Distinguished Lecturer Lynn Katz**, Professor and Hussein M. Alharthy Centennial Chair in Civil Engineering, and director of the Center for Water and the Environment at University of Texas at Austin. Her talk title is “Water Quality in Rural Alaska: Addressing Socioeconomic Challenges from Molecular Level Insights."
SAVE THE DATE! More details to follow. >>> Learn more

April 10, 2025: Catalyzing Conversations with Nancy Grimm

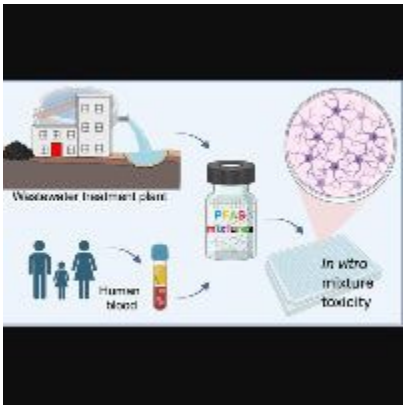
RENEW and the Department Environment and Sustainability will host **Nancy Grimm,** Regents Professor and Virginia M. Ullman Professor of Ecology in the School of Life Sciences at Arizona State University. Grimm, a member of the U.S. National Academy of Sciences, is an ecosystem ecologist who studies the interactions of climate change, human activities, resilience, and biogeochemical processes in urban and stream ecosystems.
SAVE THE DATE! More details to follow. >>> *Learn more*



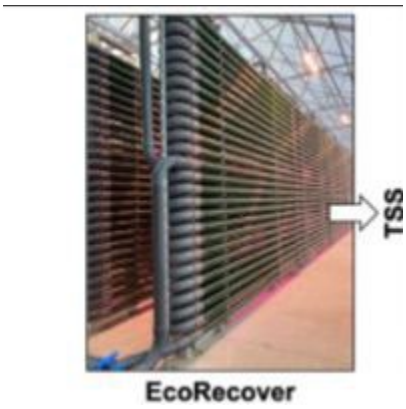
April 25, 2025: RENEW's End of Year Poster Session

Last spring, RENEW held its annual End of Year Poster Session in the Bansal Atrium on April 19, giving the students of RENEW's Core Faculty and Faculty Affiliates the opportunity to share their research with more than 100 attendees. This annual tradition will continue next spring: our next academic year-end event is scheduled for **Friday, April 25, 2025.**
SAVE THE DATE!

Recent Publications

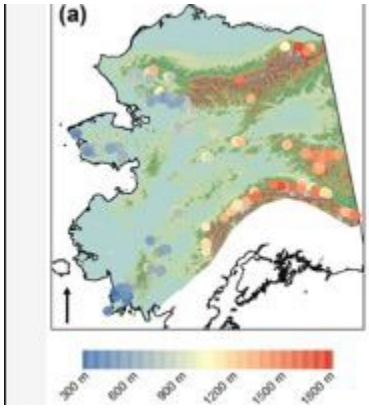


Diana Aga: Neurotoxic Effects of Mixtures of Perfluoroalkyl Substances (PFAS) at Environmental and Human Blood Concentrations. >>> Learn more

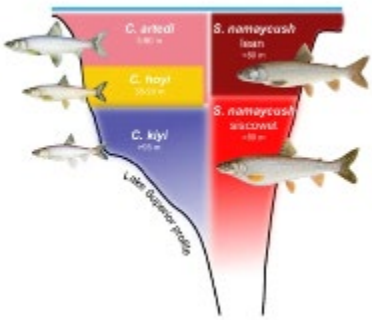


Ian Bradley: Community structure and function during periods of high performance and system upset in a full-scale mixed microalgal wastewater resource recovery facility. >>> Learn more

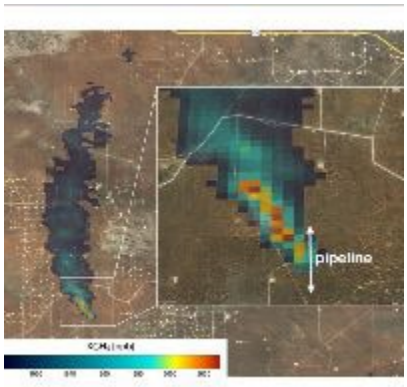
Andrew Crooks: Community resilience to wildfires: A network analysis approach by utilizing human mobility data.. >>> Learn more



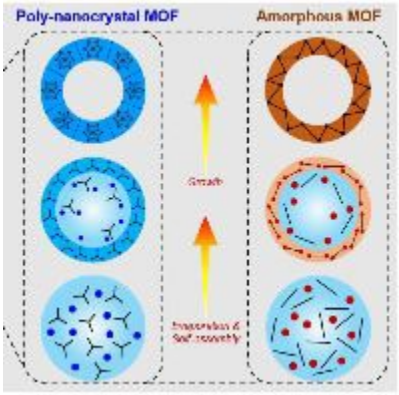
Stuart Evans and Jason Briner: Equilibrium line altitudes of alpine glaciers in Alaska suggest Last Glacial Maximum summer temperature was 2–5°C lower than during the pre-industrial. >>> Learn more



Trevor Krabbenhoff: Origin of the Laurentian Great Lakes fish fauna through upward adaptive radiation cascade prior to the Last Glacial Maximum.
>>> Learn more

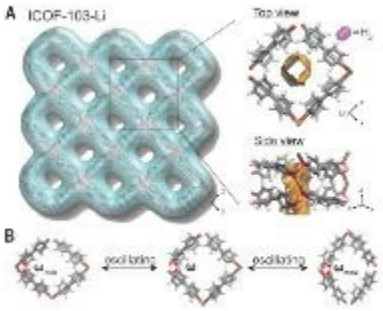


Kang Sun: Methane retrieval from MethaneAIR using the CO_2 proxy approach: a demonstration for the upcoming MethaneSAT mission
>>> Learn more



Mark Swihart and Miao Yu: A general flame aerosol route to kinetically stabilized metal-organic frameworks. **>>>** Learn more

Thomas Thundat: Rapid standoff spectroscopic characterization of plastic waste using quartz tuning fork. >>> Learn more



Miao Yu: Molecular recognition with resolution below 0.2 angstroms through thermoregulatory oscillations in covalent organic frameworks. >>> Learn more here and here.

Happy New Year!

Visit the RENEW website. Subscribe to Currents, RENEW's Newsletter.

As a valued member of the University at Buffalo community, you will receive periodic emails containing important information that support your success at UB.

Our mailing address is:
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