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 2023

Message from the Director

Dr. Shannon Seneca presented her research as a Lightning Talk to the RENEW Institute Environmental Pollution Prevention & Human Health Implications Focus Area group. Photo Credit: Kendra Vorenkamp

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Spring 2023 semester was jumpstarted with a showcase of Lightning Talks: 3–5-minute research updates from three [RENEW Focus Areas](): *Climate Change & Renewable Energy*; *Environmental Pollution &*

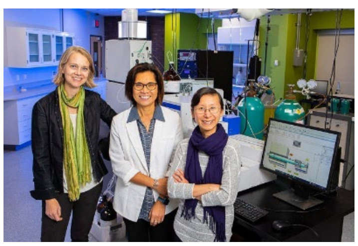
Human Health Implications; and *Sustainable Water & Engineered Systems*. By providing a forum for quick, annual snapshots of work within our Institute, we hope to spark Convergence Research in energy, environment, and water, as well as their complex societal dimensions.

Convergence Research is sometimes uncomfortable. Co-designing research with colleagues from unrelated disciplines requires learning a different “language.” Indeed, the word “convergence” itself has a range of meanings depending on one’s subject area expertise: in computer science, convergence is reached when a stable point is found after an iterative optimization algorithm; in biology, convergence occurs when unrelated species evolve with similar characteristics to adopt to similar environmental conditions; and in chemistry the term “convergent synthesis” describes an efficient strategy to create complex molecules. However, as suggested by these definitions, the process of working together across disciplinary divides stimulates creativity, innovation, and optimization, and enables identification of efficient solutions to complex environmental and societal challenges. In other words, Convergence Research provides a pathway to achieving RENEW’s mission.

We invite you to take the first steps towards Convergence Research: meet researchers outside your discipline, learn their expertise, and identify common goals. Your next opportunity to do so will be May 3, when RENEW will host Dr. David Lodge (Director of Cornell Atkinson Center for Sustainability) to reboot [RENEW’s Distinguished Speaker Series](). Hoping to see you there!

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

News and Updates

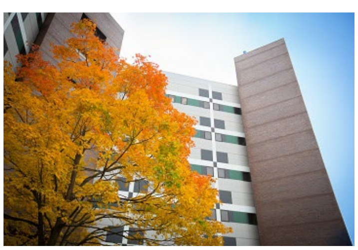


Interdisciplinary RENEW Scientists secure NSF PIRE award for “net-zero-water” buildings.

Resilient buildings that harvest water from air, disinfect storm water, and “recycle” household wastewater will be developed.
>>> Read more

RENEW Faculty Thomas Thundat receives USDA NIFA/NSF CBET SiTS funding.

Development of networked, multi-modal measurement systems for continuous monitoring of soil variables receives $400K.
>>> Review the award abstract



Fall Semester Meetings

In October, the **Environmental Pollution Prevention & Human Health Implications** (EPPHHI) and the **Climate Change & Sustainability** Focus Areas convened, discussing future collaborations, community communication and outreach, and funding opportunities. If you are interested in joining a Focus Area group, please notify RENEW staff.

Lightning Talks and Poster Sessions

In January, RENEW hosted Lightning Talks and graduate student Poster Sessions for three RENEW Focus Areas: Climate Change & Renewable Energy; Environmental Pollution & Human Health Implications; and Sustainable Water & Engineered Systems.
>>> [Read more about RENEW Focus Areas]

Shared Instrumentation Spotlight

Dr. Shenqiang Ren's student works on the MicroSense EZ7 Vibrating-sample magnetometer. Photo credit: Doug Levere.

Materials development for next-generation energy applications and sustainability is core to RENEW's focus; however, developed materials require robust characterization with state-of-the-art equipment. The MicroSense EZ7 Vibrating Sample Magnetometer (VSM) in RENEW's shared instrument spaces is an key resource for measuring the magnetic behavior of materials using Faraday's law of induction. The EZ7 can reach fields of 21.5 kilooersted (kOe) in a 4 mm sample space, and 17.5 kOe in the temperature chamber, each with low-noise performance. The VSM is capable of measuring the magnetic properties of liquid, powder, solid, bulk, and thin film samples, including samples with low magnetic moments and is able to operate at temperatures between 4.2 K and 1050 K for maximum analytical range.

Professor Ren's group is using the VSM to investigate the magnetic properties of novel earth-abundant nanomaterials for green energy and energy-critical applications and exploring new materials for deployment in extreme conditions. Contact [Dr. Shenqiang Ren] with questions or to schedule training.

Events and Outreach

RENEW Distinguished Lecture Series presents:

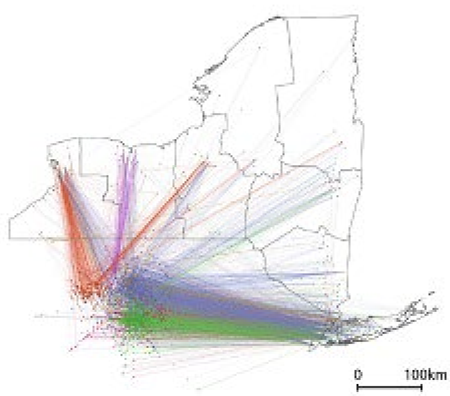
Bringing University-based Knowledge to Impact on Sustainability Challenges

Dr. David Lodge, Director of Cornell Atkinson Center for Sustainability

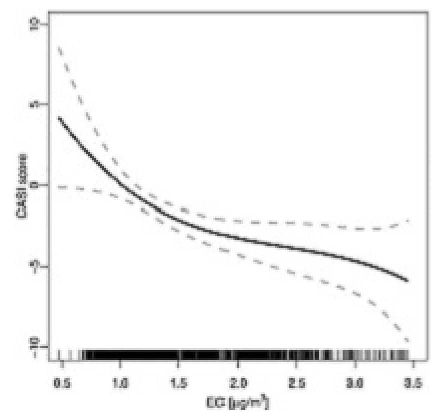
Date: May 3, 2023
Time: 3:00 pm - 4:00 pm
Location: SU 106/201, Student Union Theater, UB North campus

Dr. Lodge’s talk will be informed by his expertise in ecological forecasting, policy development, and natural resource management.
>>> Learn more about Dr. Lodge's work

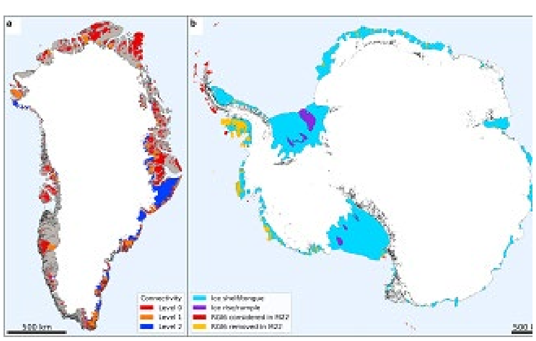
Recent Publications



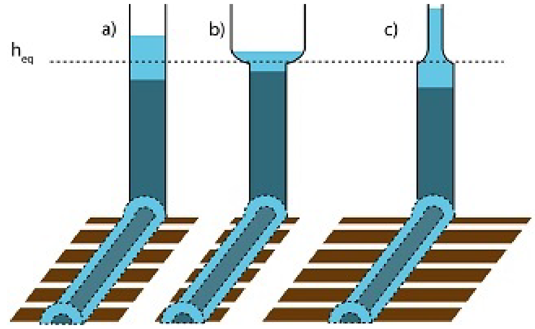
Andrew Crooks: COVID vaccination debates analyzed through information propagation.
>>> Learn more



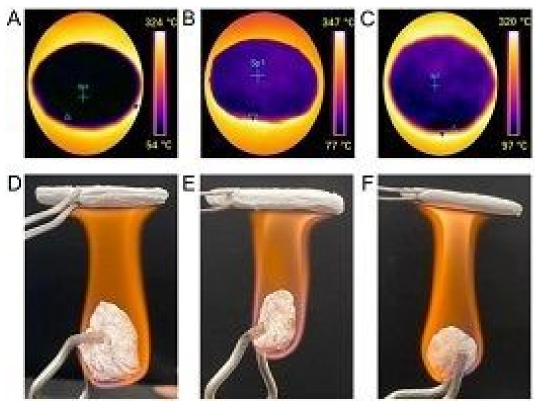
Meng Wang: Elderly cognitive function lowers with higher exposure to traffic-related pollution.
>>> Learn more



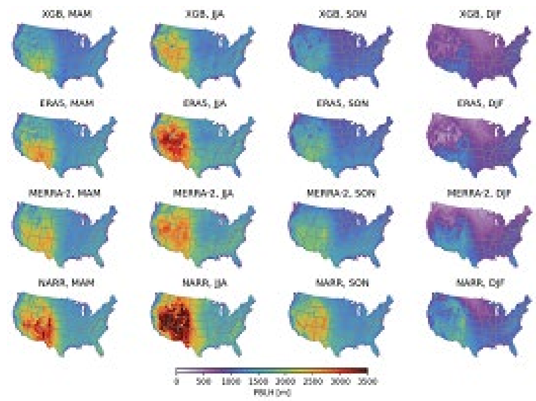
Sophie Nowicki calls for better standards and protocols for ice-sheet and glacier modeling.
>>> [Learn more]



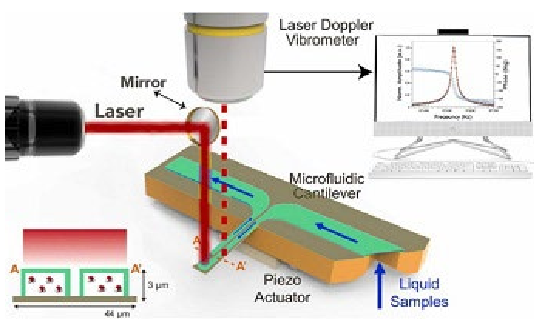
Kristin Poinar: How do the size and shape of glacier waterfalls affect ice flow?
>>> [Learn more]



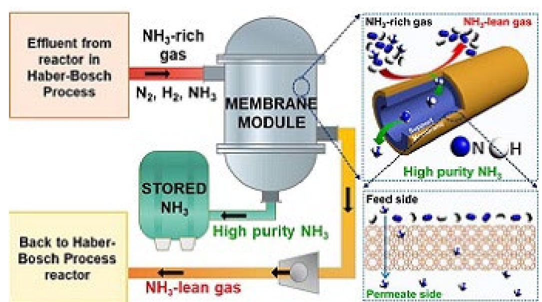
Shenqiang Ren and Mark Swihart: Low-cost and energy-saving potential from soft ceramic thermal insulation.
>>> [Learn more]



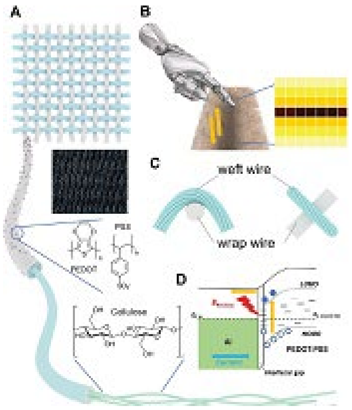
Kang Sun: Spatially complete planetary boundary layer height product over the contiguous United States.
>>> [Learn more]



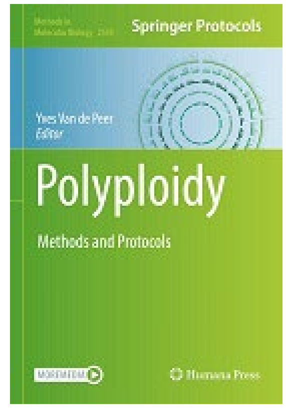
Thomas Thundat: Nanoscale thermal properties of fluids analyzed using lasers.
>>> [Learn more]



Miao Yu: Recovering ammonia using less energy.
>>> [Learn more]

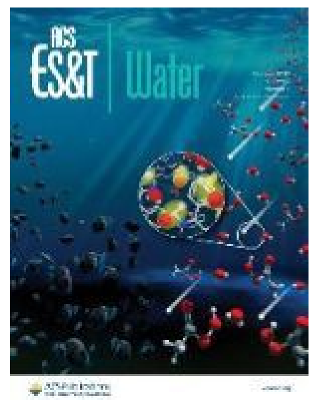


Jun Liu: Cellulose shows promise as a sustainable, self-powered, smart textile.
>>> [Learn more]



Trevor Krabbenhoft: New analysis tools for genomic research on plant and animal whole-genome multiplication—polyploidy.
>>> [Learn more]

Martin Trebbin: Aerosol device creates steady-state whipping jet without electricity.
>>> [Learn more]



Diana Aga: Effectiveness of novel wastewater treatment measured by water fleas.
>>> [Learn more]

>>> [Read more recent publications from RENEW Faculty]

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