



University at Buffalo

Research and Education in eEnergy,  
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

SPRING 2024

## Message from the Director



Happy Lunar New Year! I understand that we are entering into the year of the dragon, an auspicious symbol that portends good luck and prosperity—which is fitting, given the exciting events afoot at RENEW.

On Jan. 23, we convened a day-long retreat at the Richardson Complex for RENEW Core faculty, Staff Scientists, Focus Area leads, and the RENEW Steering Committee. Research faculty gave inspiring 10-minute research update presentations, summarizing their successes and exciting projects. Then, on Feb. 15, we hosted [Rebecca Nelson](#), a MacArthur Prize winning plant geneticist from Cornell, who presented a truly “Catalyzing Conversation” about “the Circular Bionutrient Economy linking Sanitation and Agriculture.”

Looking forward, our friends and colleagues in the Department of Indigenous Studies are hosting a

Humanities Institute conference called [Landed Solidarity: Making Just Futures](#) March 5-7, which will provide an opportunity for deep learning about Indigenous Studies paradigms and engaging environmental issues across communities. We will celebrate the discovery and innovation of RENEW Core and Faculty Affiliates in our annual poster session on April 19.

Lastly, on May 8, the year's final Catalyzing Conversation will be [James Elliott](#), a prominent researcher of environmental hazards and the social production of inequities. We look forward to seeing you at these events, and to benefiting from your input and ideas.

If you'd like to nominate a speaker for next year's Catalyzing Conversations series, please do so [here](#). Learning more about the researchers and findings that animate your work is a great pleasure—and a lever to advance the kind of cross-cutting activities that our institute champions.

**Diana S. Aga, Ph.D.**

SUNY Distinguished Professor  
Henry M. Woodburn Professor of Chemistry  
Director of RENEW Institute

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## News and Updates



### **Catalyzing Conversations: Toward a Circular Bionutrient Economy Linking Sanitation and Agriculture**

**Rebecca Nelson**, from Cornell University (*Chair* - CALS - SIPS - Plant Path & Plant Microbe Bio Section) spoke on Feb. 15 about the circular bionutrient economy, mycotoxin management, disease resistance in crops (particularly maize), and agroecology and food systems. >>> [Learn more about Nelson and her work at Cornell](#)



### **RENEW's Vision Forward Retreat - Jan. 23, 2024**

RENEW faculty convened in January to share research updates and discuss opportunities for future collaborations. UB's Vice President for Research and Economic Development, **Venu Govindaraju**, also attended; he provided highlights on interdisciplinary AI research at UB and touched on Gov. Kathy Hochul's proposed AI consortium. >>> [Learn more about the AI consortium](#)



### **Ian Bradley Awarded \$2M from US DOE**

The U.S. Department of Energy Bioenergy Technologies Office awarded Ian Bradley's group \$2M to develop monitoring and process control strategies to mitigate the impact of pests in mixed algal cultures grown for wastewater treatment. >>> [Read more about the US DOE Award](#)



### **Trevor Krabbenhoft receives \$110K USFWS Grant**

Trevor Krabbenhoft won a \$110K grant from the US Fish and Wildlife Service to study the effects of genetic variation on early mortality syndrome in lake char (*Salvelinus namaycush*). >>> [Read more about Krabbenhoft's research](#)



### **EDF Awards Kang Sun \$82K**

The Environmental Defense Fund has funded the N2O remote sensing sensitivity work being performed by Kang Sun's research team. >>> [Read more about Sun's research](#)



### **\$80K Corning/CMI Collaboration with Jun Liu's Group**

The funding from Corning Inc. and Center of Excellence in Materials Informatics (CMI) Faculty-Industry Applied Research Grant studies the nanoscale electrostatic behaviors of low-dimensional Corning glass materials, which is key to various manufacturing applications such as cellphone screens. >>> [Read more about Liu's research](#)



### **Mark Swihart Honored by AIChE**

The American Institute of Chemical Engineers recognized Mark Swihart for his work developing and using nanomaterials for biological imaging, clean and renewable energy, chemical sensing, and several other applications. >>> [Read more about the AIChE award](#)



### **Miao Yu Honored as a 2023 SUNY TAF Awardee**

Technology Accelerator Fund (TAF) helps faculty inventors and scientists turn their research into market-ready technologies. Miao Yu's award will scale membrane technology for CO2 capture from point sources. >>> [Click here for more about Yu's research](#)

>>> [Click here for more RENEW Faculty news](#)

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## Shared Instrumentation Spotlight



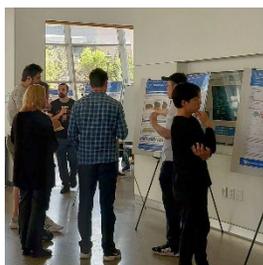
Photo Credit: Tristan Vick

The newest addition to the RENEW Shared Instrument facilities is a handheld **ThermoScientific Niton™ XL3t X-Ray Fluorescence (XRF) Analyzer** for rapid metal analysis. The “point-and-analyze” instrument non-destructively detects and quantifies more than 25 chemical elements, including heavy metals such as arsenic and lead, in a variety of sample types at levels in the mid- to low ppm range (3-700 ppm). Researchers are currently deploying the XRF instrument to evaluate the occurrence and levels of lead in Buffalo’s soils and aging infrastructure, including lead pipes and lead-containing paints, for epidemiological analysis. Relative elemental compositions and reportable concentrations (ppm or %) are provided in real-time to enable high throughput and rapid repeat sampling. Sample results can be screened through on-board databases for alloy identification and soil composition analyses or exported via for further data processing. A collapsible sampling stand is available for field-based applications. Contact RENEW Laboratory Director [Joshua Wallace](#) for training and analytical planning.

>>> [Click here to see all of RENEW's Shared Instrumentation](#)

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## Events and Outreach



### April 19: End-of-Year Celebration and Poster Session

Our year end showcase of the graduate students who work with RENEW faculty returns!

**Date:** April 19, 2024

**Time:** 3:30 p.m. to 5:30 p.m.

**Location:** Bansal Atrium, Davis Hall, UB North campus



## May 8: Catalyzing Conversations: James R. Elliott

RENEW and the Department of Sociology will host **James Elliott**, chair of the Sociology Department at Rice University. He is a Faculty Affiliate of the Kinder Institute for Urban Research and former advisor to the National Science Foundation's program in Sociology.

**Date:** May 8, 2024

**Time:** Noon to 1:00 p.m., Reception to Follow

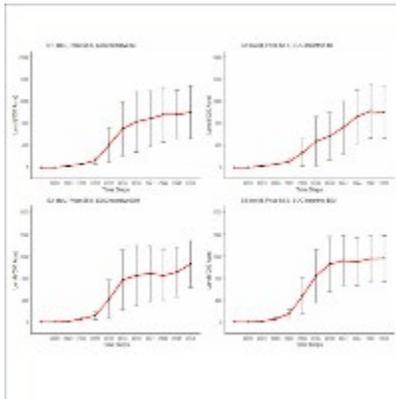
**Location:** 509 O'Brian Hall, UB North campus

Elliott's talk will be informed by his expertise on the social production of inequalities and environmental hazards, specifically on social inequities revealed and exacerbated by natural hazards and government-led recoveries as well as the historical accumulation and systemic spread of industrial hazards. >>> [Learn more about the event](#)

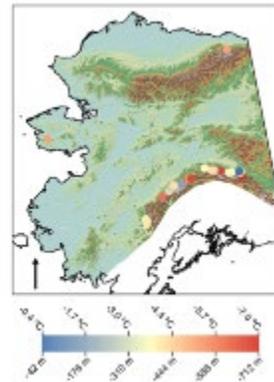
>>> [Click here for more RENEW Event information](#)

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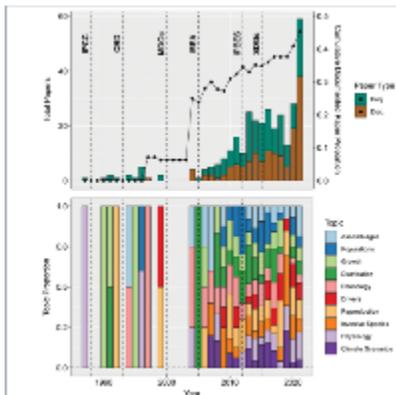
## Recent Publications



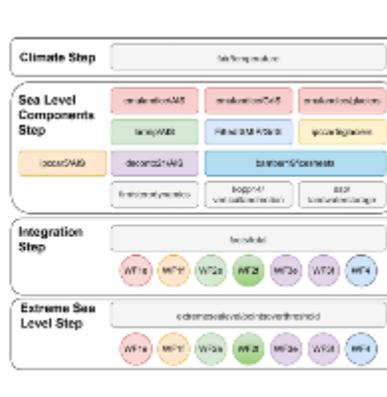
**Andrew Crooks:** Evaluating the incentive for soil organic carbon sequestration from carinata production in the Southeast United States through agent-based modeling. >>> [Learn more](#)



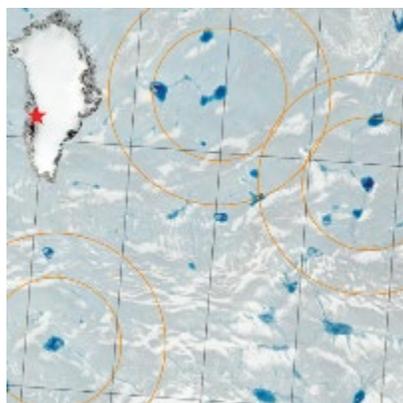
**Stuart Evans:** Equilibrium line altitudes of alpine glaciers in Alaska suggest Last Glacial Maximum summer temperature was 2–5 °C lower than during the pre-industrial. >>> [Learn more](#)



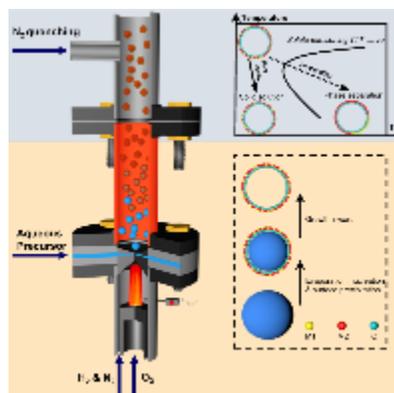
**Trevor Krabbenhoft:** Evaluating temporal shifts in research on how fish respond to climate change using the [Fish and Climate Change Database](#). >>> [Learn more](#)



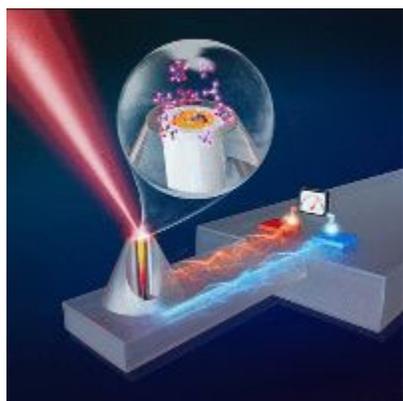
**Sophie Nowicki:** The Framework for Assessing Changes To Sea-level (FACTS): a platform for characterizing parametric and structural uncertainty in future global, relative, and extreme sea-level change. >>> [Learn more](#)



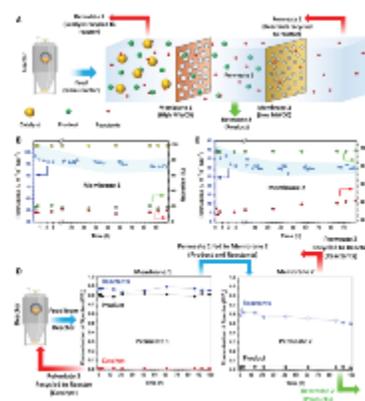
**Kristin Poinar:** Small lakes could destabilize Earth's ice sheets. In Greenland and Antarctica, pools of meltwater are one of many threats to the ice sheets' longevity. >>> [Learn more](#)



**Mark Swihart:** Challenging thermodynamics: combining immiscible elements in a single-phase nano-ceramic. >>> [Learn more](#)



**Thomas Thundat:** Ultrasensitive Photothermal Spectroscopy: Harnessing the Seebeck Effect for Attogram-Level Detection. >>> [Learn more](#)



**Miao Yu and Jun Liu :** Carbon-doped metal oxide interfacial nanofilms for ultrafast and precise separation of molecules. >>> [Learn more](#)

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