

# Currents

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

SUMMER/ FALL 2022

## Message From the Director



*Vice President Kamala Harris at the UB GRoW Clean Energy Center, where she spoke with School of Architecture and Planning Dean Robert Shibley, RENEW Graduate Student Assistant Valton Barnes, and other members of UB's sustainability and research community.*

Vice President Kamala Harris' recent visit to UB was as unexpected as it was energizing. It also underscored the importance of the research and projects pursued by RENEW Core and Affiliated faculty. As the Vice President noted, mechanisms to address the climate crisis must

be grounded in both equity and environmental justice, because environmental harms and the changing climate disproportionately impact lower-income neighborhoods and communities of color. The RENEW Institute can be understood as UB's institutional response to the social and environmental challenges that the Vice President described; among other activities, RENEW scientists are:

- developing cleaner energy and better batteries so that we are no longer reliant on fossil fuels;
- learning about the fate, transport, and health effects of contaminants in air and water so that we can tackle the environmental quality challenges of the future;
- designing innovative materials that degrade pollutants, membranes that capture and store atmospheric carbon, and eco-friendly insulation that increase building energy efficiency
- projecting sea level change with large-scale ice sheet models, to better prepare at-risk communities; and,
- partnering with local community members and community-based organizations in the creation of inclusive educational and vocational opportunities, and the promotion of community wellness

It is a great pleasure to guide and advance our collective—and urgently necessary—work. I wish you all a productive and happy Fall Semester.

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

Henry M. Woodburn Professor of Chemistry  
Director of RENEW Institute

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## News and Updates



### **RENEW Director Diana Aga named ACS Fellow 2022**

Dr. Aga is in the 2022 cohort of 45 Fellows named by the American Chemical Society for outstanding achievements in and contributions to science, the profession, and ACS.

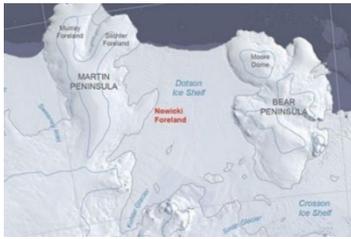
>> [Read the article](#)



### **RENEW Scientists Diana Aga, Ian Bradley and Yinyin Ye featured in article describing COVID-19 monitoring using wastewater**

A story featuring the collaborative work between Dr. Diana Aga, Dr. Bradley and Dr. Ye ran in Science Magazine, suggesting that measuring the concentrations of medicines in wastewater could add another layer to disease-monitoring efforts.

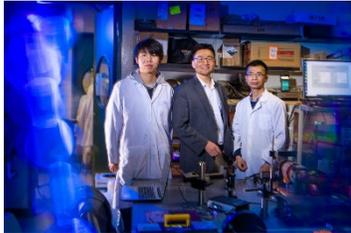
>> [Read the article](#)



## Antarctica feature named for RENEW Faculty Sophie Nowicki

A feature of West Antarctica has been named for Sophie Nowicki to honor her leadership in helping the world understand the future of sea level rise.

>> [Read the article](#)



## RENEW Faculty Shenqiang Ren leads magneto-ionics project for battery life monitoring

A new study shows how a magnetic material can be used to help monitor the amount of life left in a rechargeable battery before it needs to be recharged.

>> [Read the article](#)

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## Shared Instrumentation Spotlight



In May 2022, RENEW added a Park FX40 Automatic Atomic Force Microscope (AFM) System to its shared instrument laboratories. The FX40 is capable of high spatial resolution surface mapping and is equipped with a True Non-Contact™ mode capable of nanoscale surface analysis of topography, nanomechanics, and electrical, magnetic, and thermal properties with unparalleled sub-nanometer spatial and depth resolutions for three-dimensional sample surface imaging. This state-of-art AFM system has many features vital to materials development including liquid-phase AFM, smart lithography, and automated tip transfer and alignment. Researchers currently use the instrument to explore novel functional properties of advanced materials for improved energy efficiency. Contact [Dr. Jun Liu](#) with questions or to schedule training.

[>> Learn more about all of RENEW's instrumentation](#)

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## Events and Outreach

### Science Studies Research Workshop

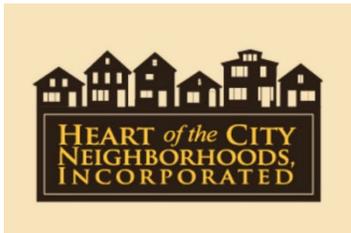
• Faculty Coordinators: [Jordan Fox Besek](#) (Department of Sociology) and [David Herzberg](#) (Department of History), with advisement by [James Bono](#) (Departments of History and Medicine) and [Carla Mazzio](#) (Department of English)

### Modeling Across Disciplines:

A conversation with an atmospheric scientist, a family sociologist, and a philosopher about how we can (and cannot) use models to better understand our world.

- Date: October 27, 2022
- Time: 1:00 pm - 3:00 pm ET
- Location: 474 Park Hall. UB North campus

[>> Learn more about this free event](#)



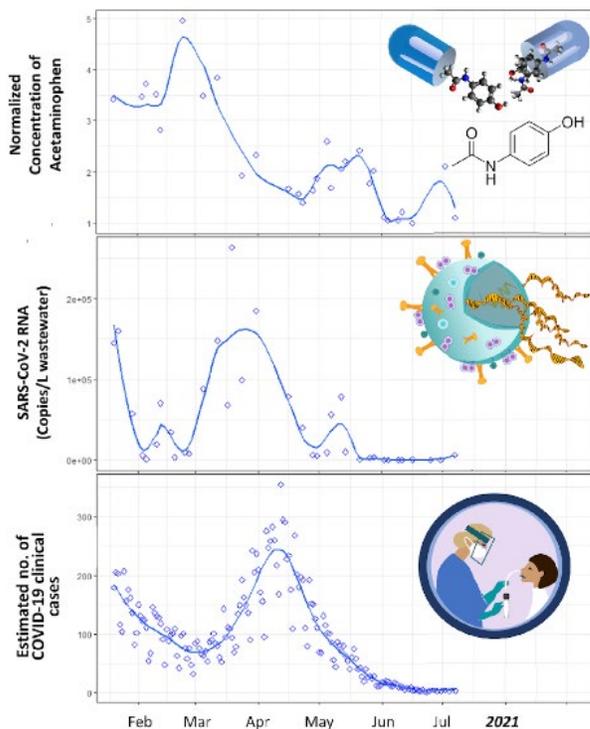
### Environmental Stewardship Program

RENEW community outreach includes partnership with a green infrastructure, job-readiness training program. Contact [Lisa Vahapoglu](#) if you are interested in presenting on a related topic.

[>> Learn more about this partner](#)

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## Recent Publications



Disease outbreaks can be anticipated by spikes in the concentration of pharmaceuticals in wastewater, as described in a paper by Diana Aga, Yinyin Ye, Ian Bradley, and other RENEW colleagues published in *Environmental Science and Technology Letters: Complementing RNA Detection with Pharmaceutical Monitoring for Early Warning of Viral Outbreaks through Wastewater-Based Epidemiology*. **Left:** Figure by ALERT Research Scientist and doctoral candidate Lahiruni Halwathura. **Right:** Photograph of RENEW scientist Ian Bradley collecting wastewater samples.

Aga, Diana

[A review of recent studies on toxicity, sequestration, and degradation of per- and polyfluoroalkyl substances \(PFAS\)](#)

*Journal of Hazardous Materials*

[Complementing RNA detection with pharmaceutical monitoring for early warning of viral outbreaks through wastewater-based epidemiology](#)

*Environmental Science & Technology Letters*

[Comprehensive assessment of chemical residues in surface and wastewater using passive sampling, chemical, biological, and fish behavioral assays](#)

*Science of The Total Environment*

	<p><a href="#">Demonstrating a comprehensive wastewater-based surveillance approach that differentiates globally sourced resistomes</a></p> <p><a href="#">Development of a liquid chromatography–mass spectrometry-based <i>in vitro</i> assay to assess changes in steroid hormones due to exposure to per- and polyfluoroalkyl substances</a></p> <p><a href="#">Efficient workflow for suspect screening analysis to characterize novel and legacy per- and polyfluoroalkyl substances (PFAS) in biosolids</a></p> <p><a href="#">Endocrine therapy-resistant breast cancer cells are more sensitive to ceramide kinase inhibition and elevated ceramide levels than therapy-sensitive breast cancer cells</a></p>	<p><i>Environmental Science &amp; Technology</i></p> <p><i>Chemical Research in Toxicology</i></p> <p><i>Analytical and Bioanalytical Chemistry</i></p> <p><i>Cancers</i></p>
<b>Bradley, Ian</b>	<p><a href="#">Complementing RNA detection with pharmaceutical monitoring for early warning of viral outbreaks through wastewater-based epidemiology</a></p>	<p><i>Environmental Science &amp; Technology Letters</i></p>
<b>Crooks, Andrew</b>	<p><a href="#">Analyzing the vaccination debate in social media data Pre-and Post-COVID-19 pandemic</a></p> <p><a href="#">Drone strikes and radicalization: an exploration utilizing agent-based modeling and data applied to Pakistan</a></p>	<p><i>International Journal of Applied Earth Observation and Geoinformation</i></p> <p><i>Computational and Mathematical Organization Theory</i></p>
<b>Evans, Stuart</b>	<p><a href="#">Decreasing trends in the Western US dust intensity with rareness of heavy dust events</a></p>	<p><i>Journal of Geophysical Research: Atmospheres</i></p>

Krabbenhoft, Trevor	<a href="#">Concordant patterns of morphological, stable isotope, and genetic variation in a recent ecological radiation (<i>Salmonidae</i>: <i>Coregonus</i> spp.)</a>	<i>Molecular Ecology</i>
	<a href="#">Fine-scale morphological, genomic, reproductive, and symbiont differences delimit the Caribbean octocorals <i>Plexaura homomalla</i> and <i>P. kükenthali</i></a>	<i>Coral Reefs</i>
	<a href="#">Reducing uncertainty in climate change responses of inland fishes: A decision-path approach</a>	<i>Conservation Science and Practice</i>
Liu, Jun	<a href="#">A mechanically tunable electromagnetic wave harvester and dual-modal detector based on quasi-static Van der Waals heterojunction</a>	<i>Nano Energy</i>
	<a href="#">Non-adiabatic quantum dynamics of tribovoltaic effects at sliding metal–semiconductor interfaces</a>	<i>Nano Energy</i>
Nowicki, Sophie	<a href="#">Communicating projection uncertainty and ambiguity in sea-level assessment</a>	<i>Earth and Space Science Open Archive</i>
	<a href="#">The pre-industrial digital elevation model of the Greenland Ice Sheet from the 17th and 18th Centuries</a>	<i>EGU General Assembly 2022, Vienna, Austria</i>
Poinar, Kristin	<a href="#">Controls on Greenland moulin geometry and evolution from the Moulin Shape model</a>	<i>The Cryosphere</i>
Ren, Shenqiang	<a href="#">Lithiating magneto-ionics in a rechargeable battery</a>	<i>Proceedings of the National Academy of Sciences</i>
	<a href="#">Switching charge states in quasi-2D molecular conductors</a>	<i>Proceedings of the National Academy of Sciences Nexus</i>

	<a href="#">Tailoring thermal insulation architectures from additive manufacturing</a>	<i>Nature Communications</i>
	<a href="#">Molecular copper decomposition ink for printable electronics</a>	<i>Chemical Communications</i>
Sun, Kang	<a href="#">Direct retrieval of NO<sub>2</sub> vertical columns from UV-Vis (390-495 nm) spectral radiances using a neural network</a>	<i>Journal of Remote Sensing</i>
	<a href="#">On-orbit characterization of TanSat instrument line shape using observed solar spectra</a>	<i>Journal of Remote Sensing</i>
Swihart, Mark	<a href="#">A general route to flame aerosol synthesis and <i>in situ</i> functionalization of mesoporous silica</a>	<i>Angewandte Chemie International Edition</i>
	<a href="#">Functional spinel oxide nanomaterials: tailored synthesis and applications</a>	<i>Tailored Functional Oxide Nanomaterials: From Design to Multi-Purpose Applications</i>
	<a href="#">Producing ultrastable Ni-ZrO<sub>2</sub> nanoshell catalysts for dry reforming of methane by flame synthesis and Ni exsolution</a>	<i>Chem Catalysis</i>
	<a href="#">Review of recent progress in electrospinning-derived freestanding and binder-free electrodes for supercapacitors</a>	<i>Coordination Chemistry Reviews</i>
	<a href="#">Supramolecular polymer networks of ion-coordinated polybenzimidazole with simultaneously improved H<sub>2</sub> permeability and H<sub>2</sub>/CO<sub>2</sub> selectivity</a>	<i>Macromolecules</i>
Thundat, Thomas	<a href="#">Localized anisotropic stress in the sodiation of antimony anode</a>	<i>Nano Energy</i>

	<a href="#">Power generation on chips: harvesting energy from the sun and cold space</a>	<i>Advanced Materials Technologies</i>
Trebbin, Martin	<a href="#">Complementarity of neutron, XFEL and synchrotron crystallography for defining the structures of metalloenzymes at room temperature</a>	<i>International Union of Crystallography Journal</i>
Wang, Meng	<a href="#">A review of road traffic-derived non-exhaust particles: emissions, physicochemical characteristics, health risks, and mitigation measures</a>	<i>Environmental Science &amp; Technology</i>
	<a href="#">Time-varying association between fetal death and gestational exposure to ambient fine particles: a nationwide epidemiological study of 49 million fetuses in the contiguous US from 1989 to 2004</a>	<i>International Journal of Epidemiology</i>
Yu, Miao	<a href="#">Polystyrene sulfonate (PSS) stabilized polyethylenimine (PEI) membranes fabricated by spray coating for highly effective CO<sub>2</sub>/N<sub>2</sub> separation</a>	<i>Journal of Membrane Science</i>

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