

# BOSTON UNIVERSITY

## Institute for Global Sustainability

ANNUAL REPORT | 2024

ADVANCING A RESILIENT FUTURE

BOSTON  
UNIVERSITY



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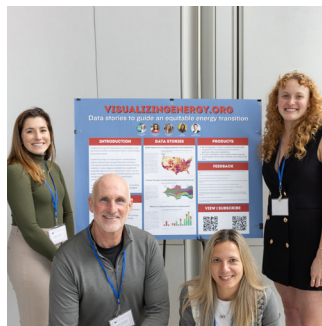
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# From the Executive Leadership

Dear IGS Community,

We're thrilled to share highlights from this second year of the Institute for Global Sustainability. We launched new projects featuring cutting-edge research as well as strategic collaborations:

- ❖ The US Department of Energy awarded IGS and partners \$2.5M for a pioneering 5-year study on energy justice in US offshore wind development.
- ❖ IGS provided faculty seed funding to researchers at the BU School of Public Health through our Sustainability Research Grant to develop a national database on the local health impacts of energy infrastructure, which was featured in *The Boston Globe* and by *WBUR*.
- ❖ Eversource Energy awarded IGS a grant to study the equity and health impacts of residential energy efficiency programs led by utilities in Massachusetts.
- ❖ IGS co-led a working group with industry and academic partners and the Massachusetts Governor's Office to accelerate state and municipal energy transitions through data analytics and workforce training.
- ❖ Engineering faculty were awarded more than \$750,000 through IGS to advance next-generation, high energy density batteries with funding from the National Science Foundation and LG Energy Solution.

Ongoing research included projects on the justice aspects of clean energy, funded by the Sloan Foundation and the Research Council of Norway. We deepened our partnership with Schneider Electric to investigate the barriers and facilitators of building decarbonization through new projects and establishment of a postdoctoral fellow. We co-led an international virtual conference on climate and health with the Boston University and Harvard public health schools in partnership with the National Institutes of Health (NIH), drawing 1,300 registrants across academia, government, and other organizations.

Engagement in national and international dialogues included the National Academies of Sciences, Engineering, and Medicine (NASEM), Sandia National Laboratories, European Research Council Executive Agency, and University Energy Institute Collaborative (UEIC).

Our Graduate Student Summer Fellows Program and Campus Climate Lab have given hundreds of students the opportunity to lead diverse research projects with guidance from IGS faculty.

The IGS research community continues to publish in top-tier journals. *Nature* featured commentary co-authored by IGS Director Benjamin Sovacool calling for the extension of the Sustainable Development Goals to 2050, with support echoed by the journal's editorial team on the issue's cover. IGS core faculty published on sustainability and climate topics in *Nature Communications*, *Science of The Total Environment*, *Nature Medicine*, *Advanced Functional Materials*, *The BMJ (British Medical Journal)*, *Sustainability*, and many others.

In the following pages you'll find more about these and other endeavors, and we look forward to hearing your feedback and ideas as we work to advance a resilient future.



Benjamin K. Sovacool  
Director, IGS  
Professor, Earth & Environment

Rebecca Pearl-Martinez  
Executive Director, IGS

Photo by Ryan Smith, Rooted in Light Media



# Highlights of 2023 – 2024

- **ONGOING PROJECTS:** Five major multi-year IGS projects, totaling more than \$8.7 million in funding to IGS faculty and partners, made important research progress in climate-health, justice in renewable energy supply chains, the sustainability aspects of data centers, the future of batteries, and building decarbonization.
- **NEW PROJECTS:** IGS and partners were awarded \$3.5 million for new research initiatives. This included federal funding from the National Science Foundation and the Department of Energy to advance projects on disaster resilience and offshore wind energy development. IGS received additional funding from Schneider Electric to continue examining building decarbonization. Funding from Eversource Energy is supporting research to advance equity in Massachusetts energy efficiency programs.
- **STAKEHOLDER ENGAGEMENT:** IGS expanded engagement with decision makers and community stakeholders. IGS's Power & People Symposium attracted close to 150 registrants, including representatives of state government, the City of Boston, community organizations, the director of the 5th US National Climate Assessment at the White House Office of Science and Technology Policy, the senior vice president of environmental health of the Natural Resources Defense Council, and the dean of the BU School of Public Health. The Clean Energy & Environment Legacy Transition (CELT) initiative, co-led by UMass Lowell and IGS, engaged partners such as Orsted, National Grid, Suffolk Construction, and HEET and built on the participation of the BU provost, Gloria Waters, in Governor Healey's first international trade mission to Ireland.
- **STUDENT FUNDING:** Under IGS's leadership, in partnership with BU Sustainability and the Office of Research, BU Campus Climate Lab awarded more than \$139,000 to student-led projects, surpassing last year's support. IGS's Graduate Student Summer Fellows program provided \$40,000 in funding to eight students working on independent research projects.
- **NEW OFFICE & INCREASED CAPACITY:** Thanks to the support of the Office of Research, IGS moved back to the Charles River Campus in 2024, greatly facilitating further collaborations in sustainability and climate research with faculty and students. IGS's overall administrative and research capacity also grew with the addition of two new full-time staff positions to expand the Institute's communications and policy impact, two postdoctoral positions, and the Institute's first visiting researcher.

## Institute for Global Sustainability YEAR AT A GLANCE



94

Faculty Members



\$3.5M

New Research Funding  
to IGS and Partners



\$12.2M

Total Research Funding to IGS  
and Partners to Date



107

Peer-reviewed Publications  
(Leadership and Core Faculty)



\$454K

Total Seed Funding  
Awarded with Partners



250%

Increase in Social Media  
Engagements



20%

Increase in Website Visitors



# Mission & Research

## **THE BOSTON UNIVERSITY INSTITUTE FOR GLOBAL SUSTAINABILITY (IGS)**

pioneers research to advance a sustainable and equitable future. Our focus on planetary and environmental health, climate governance and sustainability transitions, and energy systems of the future is grounded in equity and justice, robust data science, and real-world impact.

### ■ **PLANETARY & ENVIRONMENTAL HEALTH**

Climate change, extreme heat, air pollution, and disparities in access to energy innovations pose significant challenges to both planetary health and our own well-being. IGS researchers are at the forefront of addressing these pressing issues. We are co-leading a federal initiative on climate change and health, studying communities' exposure to toxins, and employing data to tackle health inequities. Our research identifies environmental impacts as well as responsive strategies and remedies.

### ■ **CLIMATE GOVERNANCE & SUSTAINABILITY TRANSITIONS**

For transformative change, sustainability demands innovative governance approaches in land and agriculture, water management, food systems, transportation, and urban development. IGS researchers examine the complexities involved, focusing on issues such as inequities in renewable energy supply chains, offshore wind development, and access to energy efficiency services. Our research spans diverse areas including net-zero supply chains, corporate social responsibility, and a pioneering framework for energy justice that integrates feminist, antiracist, and indigenous perspectives.

### ■ **ENERGY SYSTEMS OF THE FUTURE**

Our current energy system is a potent contributor to global greenhouse gas emissions. At IGS, we are researching clean, affordable, and universally accessible energy solutions. We advise the energy industry, regulators, and policymakers on the wide-ranging changes needed to achieve ambitious climate goals worldwide. Our research includes critical areas such as advanced batteries and energy storage technologies, electric vehicles, sustainable manufacturing practices, and geoengineering strategies. Science communication on energy-related topics is also paramount in our work.

*Photo by shuttertim82/Shutterstock.com*



# Planetary & Environmental Health

## New Database Reveals Inequities in Exposure to Energy Infrastructure

*A team of BU School of Public Health researchers supported by IGS is uncovering energy exposure hotspots and setting the stage for a more just energy transition.*

While a doctor may wish to prescribe a patient cleaner air or water, they cannot. Public policy and historical inequities largely influence a person's exposure to the structural and environmental factors that affect their health. Preliminary analyses from a [new database](#) at Boston University indicate that 91% of United States census tracts are within a health-relevant distance of a piece of energy infrastructure, much of it fossil fuel-based, and that energy infrastructure is more densely concentrated in majority non-white census tracts.

Researchers from the BU School of Public Health (SPH), supported by IGS, developed the database to equip policymakers, academics, community groups, and environmental justice organizations with information to understand who is most burdened by fossil fuel hazards and to advance equitable policies that minimize harmful exposures. Currently, the team is working to map existing energy infrastructure and the populations who live nearby across the United States. They ultimately intend to link this repository to data about population-level health outcomes and make the tool freely available online through the Harvard Dataverse Repository.

Co-Principal Investigators Jonathan Buonocore and Mary Willis, both of whom are core faculty at IGS and assistant professors at SPH, unveiled the Energy Infrastructure Exposure Intensity and Equity Indices (EI3) Database at the May 7 Power & People Symposium hosted at BU. Their work was funded through IGS's year-long Sustainability Research Grant, in partnership with SPH, to advance research at the nexus of sustainability, health, and equity.

"In my experience, the most compelling thing, the thing that cuts through the noise more quickly and sharply than anything, is data," said Matthew Tejada, senior vice president of environmental health at the Natural Resources Defense Council, in his keynote address at the symposium.

"We are in the beginning stages of a revolution, in our country and globally, in terms of how we make energy, where we make energy, how we use that energy," Tejada said. "The fact that we're just now getting in touch with our legacy energy system and the impact it has had on communities over time to today is incredibly important because that sort of data can cut through the noise. It can help communities understand where they are and where they might be going. And it allows advocates, decision-makers, and academicians to engage in a conversation grounded in the realities that communities are experiencing."

### The connection between energy and health

Many research teams have examined the relationships between particular pieces of energy infrastructure and discrete health outcomes, like the effects of natural gas flaring on asthma, oil extraction on preterm births, or power plants on mortality. A study published last year by Buonocore and colleagues found that regional air pollution from oil and gas production causes approximately 7,500 deaths and \$77 billion in health impacts in the United States annually.

By examining just one exposure at a time, these studies reveal only part of the story. Communities often face several hazards simultaneously, which can cause overlapping health effects undetected by traditional, targeted studies.

"One thing that is so powerful about [the EI3] dataset is that it really makes the connection between energy policy and public health policy. They are intertwined and they have profound impacts on each other," said Andee Krasner, a volunteer at Mothers Out Front and a panelist at the symposium. "Energy policy touches every part of public health, from chronic disease to reproductive health to vector-borne diseases to pediatric health to emergency management."

### A powerful tool to promote environmental justice

Buonocore and Willis began work on the database after identifying gaps in the existing literature on the connection between energy, equity, and health. While the information underlying the database is public, it is scattered between multiple agencies and jurisdictions. Additionally, cross-state comparisons are challenging, as states are often subject to different rules for reporting. The EI3 Database represents the first time anyone has compiled all of this varied data into a harmonized national tool.

"We wanted to gain a fuller understanding of the health and environmental justice impacts of full energy systems, rather than just focusing piecemeal on different pieces of the energy infrastructure," Buonocore said. "And we wanted to expand the focus of health research to all components of the supply chain, not just focusing on the power plants and the wells, but looking

**"Energy infrastructure is a highly common exposure in the United States, yet is not necessarily one we are always thinking about, especially in the population health world."**





*Pictured are (from left): IGS Executive Director Rebecca Pearl-Martinez, Project Co-Principal Investigators Jonathan Buonocore and Mary Willis of the BU School of Public Health, and IGS Director Benjamin Sovacool at the Power & People Symposium on May 7, 2024. Photo by Molly Potter.*

at the full system. And third, we wanted to be able to compare the health and environmental justice implications across different energy types.”

The EI3 Database assesses hazards throughout the supply chain, including extraction, processing, storage, transmission, and distribution.

“Energy infrastructure is a highly common exposure in the United States, yet is not necessarily one we are always thinking about, especially in the population health world,” Willis said. “Persistently marginalized populations are disproportionately burdened with this industry, which aligns with what we know from other pieces of research.”

Early results from the database confirm that energy infrastructure is much more densely concentrated in majority non-white census tracts.

“As director of the Fifth National Climate Assessment, I understand the value of data sets and tools like the one being presented today to address these complex challenges at the intersection of climate change, energy infrastructure, human health, and environmental justice,” said Allison Crimmins, director of National Climate Assessment at the White House Office of Science and Technology Policy, at the symposium. “For a long time, these variables have been siloed into their own fields or data sets or reports.”



A version of this article, authored by Alison Gold, originally appeared on the [IGS website](#) on May 28, 2024.



# Planetary & Environmental Health

## BU-Harvard Research Coordinating Center Hosts Inaugural Climate and Health Conference

Launched last year as a joint effort between the BU School of Public Health (BUSPH) and the Harvard T.H. Chan School of Public Health (HSPH), the NIH-funded CAFÉ Research Coordinating Center welcomed both experts and newcomers from across the world to its first Climate and Health Conference, a three-day virtual event.

Throughout the inaugural BUSPH-HSPH CAFÉ [Climate and Health Conference](#), thought to be one of the largest climate and health conferences ever held with over 1,300 participants, a diverse slate of academics, policymakers, and industry representatives were urged to hold themselves accountable for ensuring the long-term wellbeing of people affected by climate change.

“Every single one of us has a role,” said keynote speaker Vanessa Kerry, the director-general special envoy for climate change and health at the World Health Organization and a critical care physician at Massachusetts General Hospital. “The climate crisis is a health crisis at the end of the day. And what we are really discovering is that there is not an aspect of human health that is not being impacted by climate change.”

The conference featured more than 70 sessions dedicated to research and practice at the nexus of climate and health, including daily keynote speakers, roundtable discussions, panels, workshops, networking, and poster presentations. Nearly 200 speakers and 80 poster presenters contributed, representing not only academia but also a range of other key stakeholders in federal, state, and municipal government agencies, community- and non-governmental organizations, and private foundations and industry. Approximately 25 percent of attendees joined from abroad.

“A driving force behind CAFÉ has always been to enable the community of practice around climate change and health, provide needed resources to new investigators in this space, and cross disciplinary silos to get folks talking with each other about creative ways to address the impacts that climate change has on health,” says Amruta Nori-Sarma, an assistant professor of environmental health and one of BUSPH-HSPH CAFÉ’s three principal investigators with Gregory Wellenius, professor of environmental health, and Harvard’s Francesca Dominici, Clarence James Gamble Professor of Biostatistics, Population, and Data Science.

As the nation’s first and only Climate Change and Health Research Coordinating Center, BUSPH-HSPH CAFÉ aims to Convene, Accelerate, Foster, and Expand a global network of emerging and established researchers equipped with the knowledge and tools to advance climate and health scholarship and deliver solutions—a community of practice. For its part, the BU Institute for Global Sustainability is taking the lead on “fostering” community engagement in support of this goal,

with Executive Director Rebecca Pearl-Martinez and Director Benjamin Sovacool providing direction.

During the opening keynote address, Rick Woychik, the director of the National Institute of Environmental Health Sciences and chair of the NIH Climate and Health Initiative executive committee, emphasized that meeting the complex threats to health posed by climate change will require unprecedented interdisciplinary collaboration.

María Belén Power, undersecretary of environmental justice & equity in Governor Maura Healey’s administration and the conference’s final keynote speaker, joined Woychik, Kerry, and other speakers in highlighting that the people and countries with the smallest carbon footprints, who have contributed the least to climate change, are the most likely to suffer its health consequences. In several questions posed to conference speakers, attendees themselves acknowledged the devastating and disproportionate effects of climate change on the Global South and other historically marginalized populations. A handful of panels were dedicated to discussions concerning these groups, such as a session on climate preparedness for medically vulnerable populations with Nori-Sarma.

“I think we achieved and even surpassed what we planned on doing,” said Nori-Sarma, reflecting on the event.



A version of this article, authored by Megan Jones, originally appeared on the School of Public Health [website](#) on February 16, 2024.



*Pictured are (from left): Vanessa Kerry, WHO director-general special envoy for climate change and health, SPH’s Amruta Nori-Sarma, Mary B. Rice, director of the BIDMC Institute for Lung Health, SPH’s Gregory Wellenius, and CAFÉ’s Francesca Dominici. Photo by Hannah Kim.*



# Planetary & Environmental Health

## ■ PARTNERSHIPS TO MONITOR EXTREME HEAT & IMPROVE CLASSROOM AIR QUALITY

Boston, like many other cities, doesn't swelter equally. The heat island effect means some parts of the city warm up more than others when summer temperatures soar. Despite its diversity of environments, Boston decides whether it's in a heat wave from temperature readings at just one site: Boston Logan International Airport.

A team of BU researchers is trying to change that. They're part of a yearlong initiative, in collaboration with the city of Boston's Environment Department and local nonprofits A Better City and The Boston Foundation, to pilot a more equitable mechanism for declaring heat emergencies.

"Heat is increasing in intensity and frequency across the globe due to climate change, and every day, more connections are made between extreme heat and adverse health, including mental health," says Patricia Fabian, a BU School of Public Health associate professor of environmental health and an associate director at IGS. She's one of the pilot project leads.

Fabian and the team aim to eventually launch a permanent sensor network with the city of Boston and make neighborhood temperature data publicly accessible online via a platform similar to the Boston Public Schools' dashboard for monitoring indoor air quality in classrooms, a **project** Fabian has collaborated on.



Condensed from an article, authored by Megan Jones, that originally appeared in **The Brink** on July 1, 2024.

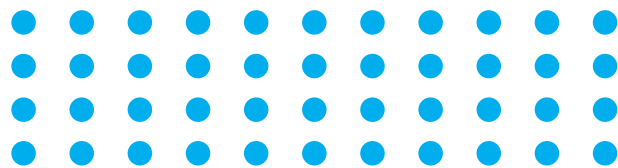
"Heat is increasing in intensity and frequency across the globe due to climate change, and every day, more connections are made between extreme heat and adverse health, including mental health."

## ■ EXPANDING CROSS-CAMPUS COLLABORATION ON CLIMATE AND HEALTH RESEARCH

IGS is co-sponsoring an ongoing Focused Research Program on health equity with the Rafik B. Hariri Institute for Computing and Computational Science & Engineering. This initiative is called Health Equity in the Wake of Continued Climate Change: Leveraging Big Data to Inform Action. The project aims to further BU's leadership in climate and health research, driving solutions and championing equity. An interdisciplinary project team is developing the infrastructure and shared resources for researchers across BU to access state-of-the-art climate data, visualize and quantify vulnerability to climate hazards and health risks, and model the health benefits of heat adaptation strategies. This effort is led by IGS core faculty Gregory Wellenius, a professor of environmental health and director of the Center for Climate & Health, and IGS core faculty Lucy Hutyra, distinguished professor of earth and environment.

## ■ IMPROVING DISASTER RESILIENCE

As catastrophic flooding, prolonged droughts, and other extreme events are more frequent with climate change, a \$1 million US-Japan research collaboration is creating a virtual disaster city to improve community resilience in the real world. IGS core faculty Magaly Koch, a research associate professor at BU's Center for Remote Sensing, is teaming up with researchers from the University of California, Irvine and Tohoku University to simulate disasters and their impacts on older, vulnerable populations. Their goal is to develop a framework and tools for response decision-making and policies using human-centered data and predictive modeling. The resulting "digital twin" could potentially be used for a broad range of natural disaster scenarios. The project is partly funded by the National Science Foundation through IGS.



# Climate Governance & Sustainability Transitions

## ■ VISUALIZING ENERGY

IGS's flagship science communication project, [Visualizing Energy](#), celebrated its first anniversary in 2024. The project, led by IGS Associate Director Cutler Cleveland, aims to increase actionable knowledge about a sustainable and just energy transition. It uses engaging visualizations with accessible data stories that are clear and concise with jargon-free language.

In an era of disinformation about energy and climate change, Visualizing Energy has quickly established its reputation as a trusted and transparent source. Website traffic, newsletter signups, and social media followers reveal a strong uptake in higher education, where instructors use data stories to enhance learning outcomes. Interest from the private sector, government agencies, and research institutes is also growing. Data stories from Visualizing Energy are now cataloged in authoritative, open-access educational repositories such as the OER Commons.

Over 100 data stories have been published so far, featuring more than 400 visualizations. The stories in Visualizing

Energy describe the barriers and potential for accelerating the transition to a low-carbon energy future where everyone has access to affordable clean energy services. Among the broad range of topics, the stories highlight the connection between energy systems and human well-being, energy justice for vulnerable populations, how different sources of energy stack up, and the transformative history of energy.

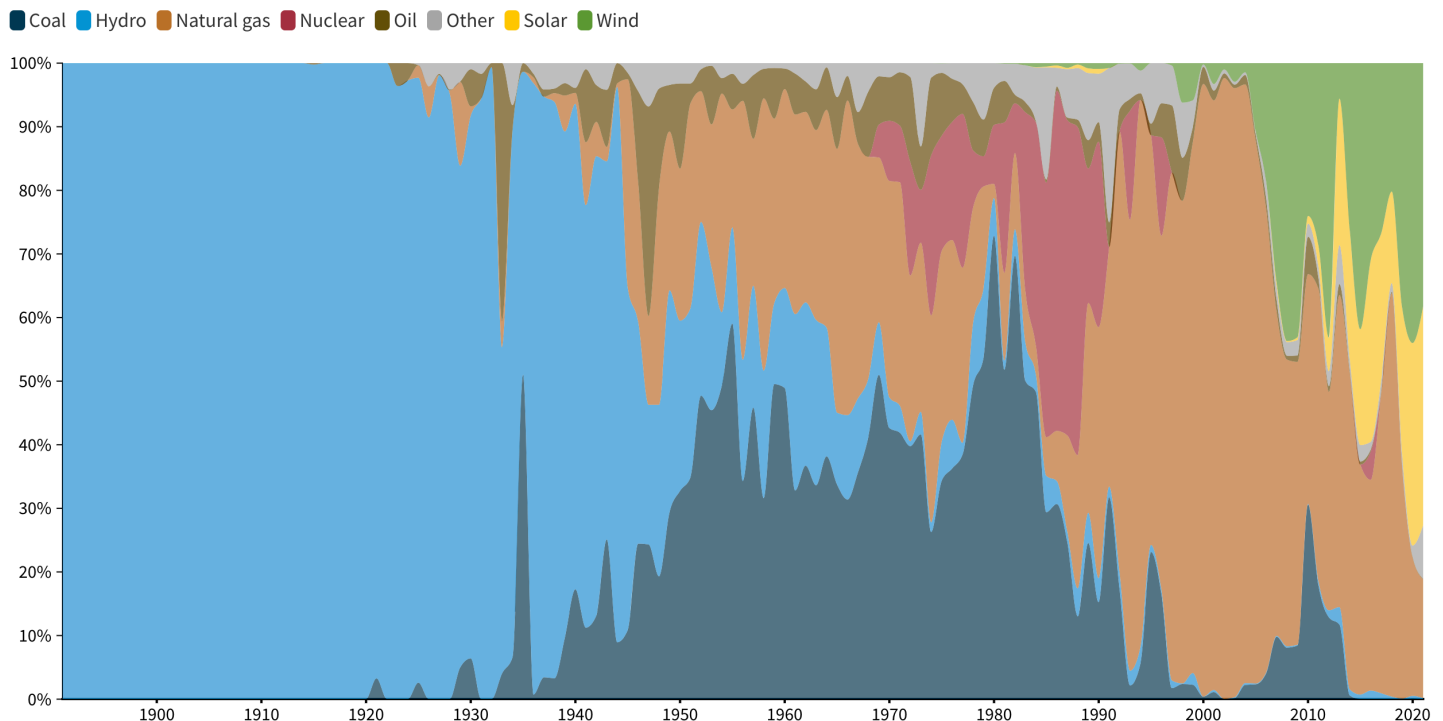
Visualizing Energy is powered by the work of undergraduate and graduate students from across the university. Students from Arts & Sciences, Computing & Data Sciences, and the Questrom School of Business apply their data science skills to collect, clean, and visualize important data sets. Students from the College of Communication and the Department of Earth & Environment develop their interests in communication through audience engagement efforts.

### Most-read Visualizing Energy stories (2023–2024)

- ❖ [Power plant efficiency since 1900](#)
- ❖ [Does more energy use increase the level of human development?](#)
- ❖ [United States electricity history in four charts](#)

## Transitions in electric generation capacity in the United States 1891-2021

Energy source shares are calculated as the percent of all new capacity additions in a year.



Source: U.S. Energy Information Administration  
Boston University Institute for Global Sustainability | [visualizingenergy.org](#) | CC BY 4.0

visualizingEnergy

Sourced from the Visualizing Energy data story, [United States electricity history in four charts](#).



# Climate Governance & Sustainability Transitions

## ■ IMPACT MEASUREMENT & ALLOCATION PROGRAM

Sustainable investing demands improved Environmental, Social, and Governance (ESG) metrics that are accurate and reliable. **BU's Impact Measurement & Allocation Program** (IMAP) brings together academic researchers and financial

asset managers to address this challenge by developing measures of corporate environmental and social impacts and evaluating how to allocate these impacts to those responsible. Since 2021, IMAP has seed funded 13 research projects involving 18 faculty and 22 student researchers from diverse fields. The program is affiliated with IGS and sponsored by the new Mehrotra Institute for Business, Markets, & Society (MIBMS) at BU's Questrom School of Business.



Attendees network and view posters during the IMAP Corporate Disclosure Fall Workshop. Photo by Mara Lynch.

### ❖ Corporate Disclosure Fall Workshop

As corporate ESG disclosures evolve, leading academic and financial experts at IMAP's second annual fall workshop called for regulations and uniform standards in how companies report their sustainability practices and impacts. Panelists included: Geeta Aiyer, president and founder of Boston Common Asset Management; Faten Freiha, vice president of investor relations at McCormick & Company; Eric Pedersen, leader of Nordea Asset Management's Responsible Investments Team; and Eddie Riedl, John F. Smith Professor of Management and professor of accounting at Questrom.

### ❖ Is Business Broken? Podcast

IMAP developed four ESG-focused episodes of the new *Is Business Broken?* **podcast series** produced by WBUR for the Mehrotra Institute. These episodes explore the history, prospects, and capabilities of ESG, and provide insights from business leaders.

### ❖ Academic and Industry Lunch Seminars

IMAP's popular seminar series continues to grow, regularly convening academic researchers and industry professionals to discuss topics that have included assessing if utilities will meet their climate targets, determining shareholder preferences, managing firms' sociopolitical risks, measuring methane emissions, and allocating shipping emissions.

## ■ CLEAN ENERGY & ENVIRONMENT LEGACY TRANSITION

Through a new initiative, IGS is collaborating with Governor Healey's administration in Massachusetts to help accelerate the state's energy transition and to center equity within that transition. Gloria Waters, BU provost, participated in Governor Healey's first international trade mission to Ireland in June 2023. As a follow-up to the trade mission, UMass Lowell and IGS established the Clean Energy & Environment Legacy Transition (CELT) initiative, a collaborative resource center across university, industry, and community partners. CELT is designed to prioritize equity within the implementation of the state's comprehensive portfolio of initiatives, including the Massachusetts Clean Energy and Climate Plan.



BU Provost Gloria Waters in Ireland as part of an international trade mission. Photo courtesy of the Healey administration.

# Energy Systems of the Future

## The Race to a Battery-Powered Future

*Engineers at BU are figuring out how to make better, more sustainable batteries—a technology that is essential for clean energy.*

We know that to have a green future, the entire world needs to shift from fossil fuel-generated power to renewable energy. And as countries agree on tripling solar and wind capacity, there are still major hurdles in the plan: one is that existing batteries aren't good enough.

### Reinventing battery architecture

Whether it's in a phone, a plastic toy, or connected to a giant solar array, every battery's purpose remains the same: store electricity until it's ready to be used. And in all batteries, no matter the size or strength, there's a delicate combination of chemistry and electrical engineering at play. Emily Ryan, a BU College of Engineering (ENG) associate professor of mechanical engineering, and others at BU are figuring out how to improve the design of current batteries—for instance by swapping out the active layers of metal and adding different elements to make an old idea new again.

In her lab, Ryan uses complex computer models to test alternative battery materials, like lithium metal instead of lithium ion. According to Ryan, lithium-metal batteries, which use solid lithium metal as the anode (positive side), could have substantially higher energy density than lithium-ion batteries, which use a graphite anode. So, you can store more energy in the same size battery.

"If we started using lithium-metal batteries in your cell phone, instead of charging it every day, you would charge it once a week. Or in a car with the same size battery as we have now, you might get 600 miles instead of 300 miles," says Ryan, an associate director of BU's Institute for Global Sustainability. That also means a much smaller battery could be used to provide the same capacity as we have today (about a 300-mile range), so less materials would have to be sourced.

But lithium metal is far from perfect. It's highly reactive and unstable, causing tree-like structures, called dendrites, to form as the battery goes through charging and discharging cycles. (All batteries get dendrites, but they're more common in lithium metal.) Dendrites degrade the battery life and cause it to short-circuit. Ryan and her team, along with researchers at the Hebrew University of Jerusalem in Israel, are researching the root cause of dendrites by analyzing the interfaces of the material and the chemistry at play. Through a joint National Science Foundation-Israel Binational Science Foundation grant, they're studying the chemical-physical processes occurring during battery operation with the aim of making things more stable. Ryan also tests other

materials to figure out how to make batteries nonflammable, since fires are an all-too-common issue for e-scooters and other battery-powered devices.

"We know right now we are not on a sustainable path, so I think it's on us to try and come up with solutions to help us get to a more sustainable energy generation and energy use," Ryan says.

Dendrites and fires are only some of the consequences of design flaws in batteries. For a battery to have a lot of energy storage, it needs large electrodes—the anode and cathode on either end that the ions and electrons move between. But for a battery to charge quickly, the active materials need to be the opposite—they should be in a small layer, so the ions don't have to travel as far from one side to the other.

"It's really a conundrum in batteries, this idea of having as much energy as possible, but also being able to charge it quickly," says Joerg Werner, an ENG assistant professor of mechanical engineering who studies what's happening inside a battery cell, called the architecture of the battery. Werner has set out to solve that problem by focusing on how to make the layers of materials inside the battery as thin as possible, and interdigitated, like two interlacing hands. This shortens the distance between the negative and positive layers, allowing ions to move faster while making sure the positive and negative sides don't touch, which would short circuit the battery.

"That structure would allow us to have a very large fraction of active material, the material that stores all that energy within our battery cell, but at the same time we can have very short distances between the negative and positive active material to give us very fast charging," he says. A design like this could help fuel the charge (no pun intended) of people adopting electric vehicles, since batteries would charge significantly quicker than current models.

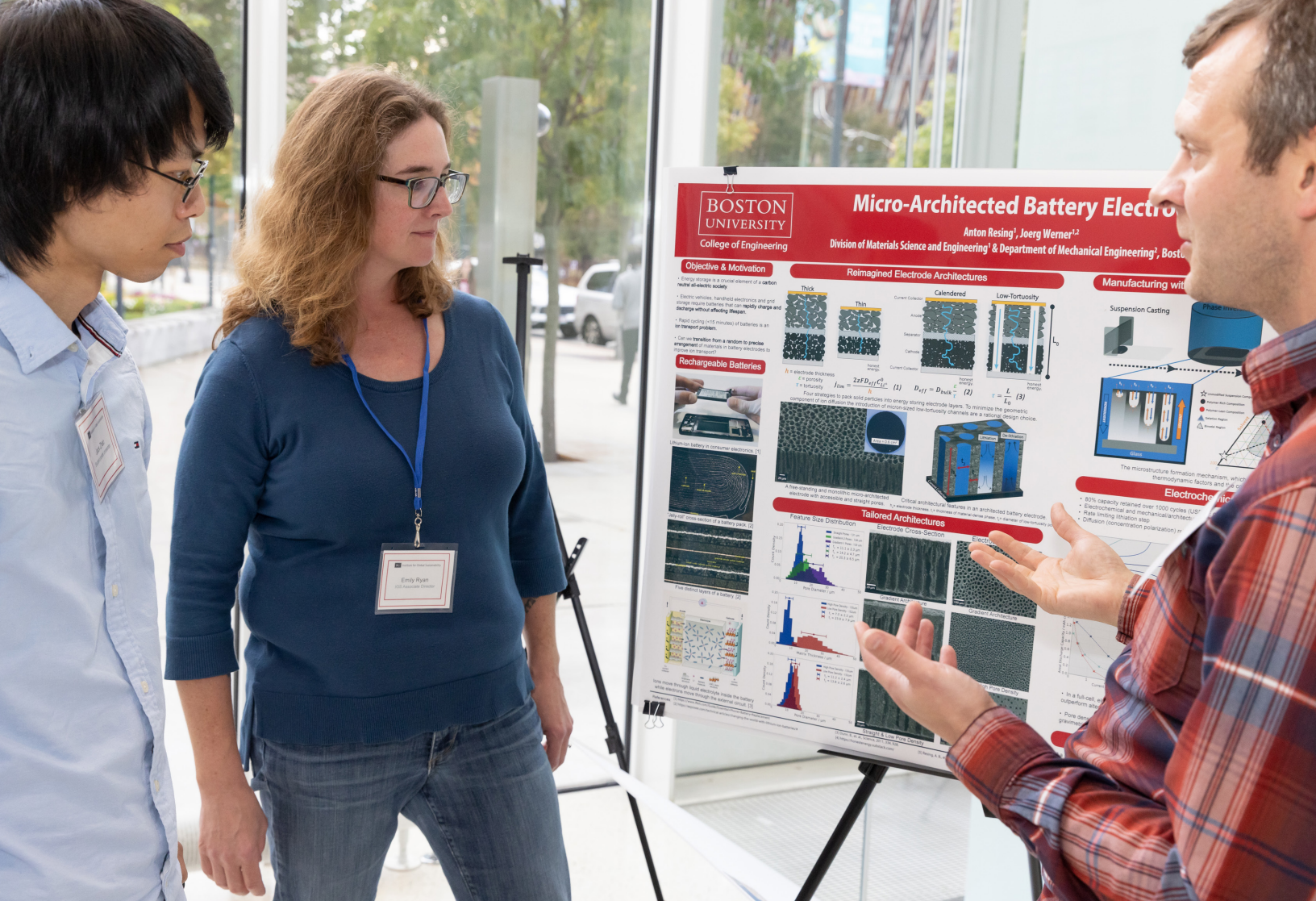
The problem is actually making this new battery. Werner is working with Keith Brown, an ENG associate professor of mechanical engineering, to speed up the process of testing thousands of separator materials—the permeable membrane between the anode and cathode that prevents electronic short-circuits—using an autonomous system. They plan to test thousands of thin polymer separators, and Werner hopes to build a more advanced prototype in the near future.

"The architecture of the battery cell and all of its components have a huge impact on the performance of the battery that we as consumers actually care about," Werner says.

### Heat as energy storage

Large-scale battery storage capacity is expected to skyrocket over the next three years. And start-ups abound with long-shot battery solutions, like storing energy in cement to charge electric cars and converting iron to rust, and back again, as a method of storing and releasing energy.





Pictured (right) IGS core faculty Joerg Werner (College of Engineering) discussed research on micro-architected battery electrodes with Materials Science & Engineering student Anton Resing (left), who participated in a poster session on this topic at IGS's annual gathering, and IGS Associate Director Emily Ryan (center), also faculty in the College of Engineering. Photo by Ryan Smith, Rooted in Light Media.

"The bottleneck of going fully renewable is not a lack of technologies to harvest that energy," says Sean Lubner, an ENG assistant professor of mechanical engineering. "One of the biggest technological barriers right now is energy storage."

Imagine if the electricity powering your home was coming in from giant batteries charged with solar and wind energy, instead of from oil or gas, which account for the majority of the world's greenhouse gas emissions. Lubner is researching how to use heat energy as a reliable and cheaper large-scale energy storage solution, as opposed to building expensive lithium-ion batteries. He's developing an inexpensive, ceramic-based material that can safely store and conduct electricity even as it heats up to more than 1,200 degrees Celsius.

"The heat itself is the form of energy you're using for storage," he says. "Then later that energy can be converted back into electricity, or be released as heat."

The idea is that electricity generated from wind and solar would be captured and converted into high-temperature heat. The heat can be stored for hundreds of hours until it's needed, then used in different types of industrial processes or converted

into electricity by a heat engine. In a [recent paper](#), Lubner investigated the promising potential of thermal energy storage, describing how these systems would offer a cheaper alternative to lithium-ion batteries.

He and his team have shown that it's possible to charge and discharge the material over 700 times, with the material able to withstand temperatures ranging from about 500 degrees Celsius to about 1,600 degrees Celsius. Even after such heavy use, "we saw negligible degradation to the properties, which is not typical of most materials," Lubner says. "It will be necessary to make sure these materials have a long life, but I'd say it's very reasonable to expect these to last 20 or 30 years with appropriate engineering."



A version of this article, authored by Jessica Colarossi, originally appeared in [The Brink](#) on January 18, 2024.



# Energy Systems of the Future

## ■ SUSTAINABLE DIGITAL TRANSFORMATION

Since kicking off last summer, the [Limits to Digitalization](#) (L2D) project, a \$1.1 million international research collaboration between NTNU Social Research and BU, has made notable strides. L2D is looking at the sustainability aspects of data centers in Norway's clean energy transition to identify the socio-environmental impacts of digital transformation. Leading BU's efforts are Ayşe Coşkun, a professor of electrical and computer engineering and director of the BU Center for Information & Systems Engineering, and Benjamin Sovacool, a professor of earth and environment and director of IGS. They are investigating the whole-systems justice issues around data center development, examining the use of data centers as resources in diverse energy markets, and designing optimization models to improve data center efficiency. This year, the team welcomed Can Hankendi, a sustainable computing postdoctoral researcher. They also engaged key national and global audiences, presenting their progress at the National Science Foundation's Workshop on Sustainable Computing for Sustainability in Washington, D.C., and the Design Automation and Test in Europe Conference in Valencia, Spain. The project is funded by the Research Council of Norway.



IGS core faculty Ayşe Coşkun (College of Engineering) gave a keynote at the Design Automation and Test in Europe Conference in Valencia, Spain. Photo source: DATE 2019 - DATE 2024 | copyright: EDAA vzw.

## ■ JUSTICE IN RENEWABLE ENERGY SUPPLY CHAINS

With the support of a \$500,000 grant from the Sloan Foundation, Benjamin Sovacool, director of IGS and a professor of earth and environment, and Xander Dunlap, postdoctoral scientist at IGS, are examining the embedded injustices associated with solar and wind energy transitions across their supply chains in the United States. The research team has already visited three different sites to explore community vulnerabilities: the Genesis Solar Energy Project in the Californian desert, the Rio Tinto Kennecott mine in Utah, and manufacturing facilities from First Solar in Ohio. They will visit a fourth electronic waste site in fall 2024. The information collected from these sites is explored through the lens of theories and approaches spanning green extractivism, dispossession, Indigenous energy justice, and political ecology. The final phase of the project will offer policy recommendations to help steer renewable energy transitions onto more just and equitable paths.



Kennecott Solar Project near the Rio Tinto Kennecott Mine in Utah. Photo by Benjamin Sovacool.



# Energy Systems of the Future

## ■ EQUITY IN ENERGY EFFICIENCY PROGRAMS

Research efforts in Massachusetts emphasize household access to affordable, efficient, and clean energy services such as heating, cooling, and lighting. The Massachusetts Energy Equity Project (MEEP) is a data-driven assessment of benefits from three key programs: the Mass Save energy efficiency program, federal Low Income Heating Assistance Program (LIHEAP), and the Weatherization Assistance Program (WAP). The faculty leaders are IGS Associate Directors Cutler Cleveland (Earth & Environment) and Patricia Fabian (Environmental Health), working alongside IGS core faculty Robert Kaufmann (Earth & Environment). The project will use statistical analysis, geographic information systems, and data visualizations to show how the energy benefits of these programs are distributed across households in Massachusetts. The resulting information will aid cities and towns in their efforts to decarbonize and simultaneously increase equitable access to clean energy services. The research is supported by a grant from Eversource Energy and driven by data from Eversource and National Grid.

## ■ ENERGY JUSTICE IN OFFSHORE WIND

Momentum is building for offshore wind in the United States, supported by billions of dollars in federal and industry investment. And now a **\$2.5 million grant** from the US Department of Energy (DOE) is making it a national priority to understand the complex energy justice implications of this burgeoning renewable energy sector. With funding from DOE's Wind Energy Technologies Office, IGS is collaborating with the University of Rhode Island and the University of Delaware to identify energy justice indicators to measure the community effects of offshore wind energy development in the Northeastern US. Key to the project's approach is the involvement of port communities in New London, Connecticut, and New Bedford, Massachusetts, both considered important assets for supporting the future of offshore wind development in the region. The team brings together experts in energy policy, environmental science, and community engagement to evaluate and monitor the potential impacts of this transition. From BU, research will be led by IGS Executive Director Rebecca Pearl-Martinez and IGS Director Benjamin Sovacool, a professor in the department of earth and environment.



IGS joined its partners at the University of Rhode Island, University of Delaware, and NAACP in touring the State Pier in New London, Connecticut with the Connecticut Port Authority (CPA). The site has been retrofitted and transformed into a state-of-the-art heavy-lifting facility for offshore wind energy. Photo courtesy of the CPA.



# Leadership

## Executive Leadership



**Benjamin Sovacool**  
Director, IGS  
Professor, Earth & Environment,  
Arts & Sciences



**Rebecca Pearl-Martinez**  
Executive Director, IGS

## Faculty Associate Directors



**Cutler Cleveland**  
Professor, Earth & Environment,  
Arts & Sciences



**M. Patricia Fabian**  
Associate Professor,  
Environmental Health,  
School of Public Health



**Arunima Krishna**  
Associate Professor,  
Mass Communication,  
Advertising, and Public Relations,  
College of Communication



**Nalin Kulatilaka**  
Wing Tat Lee Family Professor  
in Finance, Questrom School  
of Business; Director, Impact  
Measurement & Allocation  
Program



**Emily Ryan**  
Associate Professor, Mechanical  
Engineering and Materials  
Science & Engineering,  
College of Engineering



**Henrik Selin**  
Professor, International  
Relations, Frederick S. Pardee  
School of Global Studies

# Advisory Board



**Ned Bartlett**  
Former Chief Compliance Officer,  
Veolia North America



**Megan Beauregard**  
Chief Legal Officer and Secretary,  
Enel North America, Inc.



**Nathaniel Dalton**  
Co-Founder and CEO of Sora  
Union; Co-Founder, Former  
President, and CEO of Affiliated  
Managers Group



**Richard Golden**  
Founding Partner,  
Venture Access Group



**James Goudreau**  
Co-Founder and Principal,  
The Goudreau Group



**Penni McLean-Conner**  
Executive Vice President,  
Customer Experience and Energy  
Strategy, Eversource Energy



**Sheldon Simon**  
Founder and CEO,  
Third Gear Investments



**Mayank Singhal**  
Vice Chairman and Managing  
Director, PI Industries Ltd.



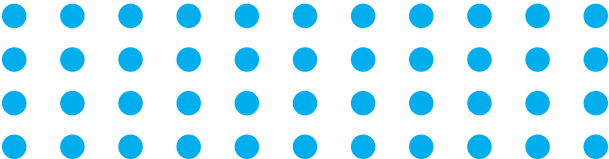
**John Skrinar**  
Partner, Cresta Fund Management



**James West**  
Senior Managing Director,  
Evercore ISI



*Pictured are (from left): IGS Director Benjamin Sovacool with IGS  
Advisory Board Chair Sheldon Simon at the Institute's annual  
gathering. Photo by Ryan Smith, Rooted in Light Media.*





## Staff



**Serrie Anderson**  
Director of Finance and  
Administration



**Heather Clifford**  
Data Scientist and Co-Lead,  
Visualizing Energy



**Roselourdes Deshon Mejia**  
Financial Administrator



**Xander Dunlap**  
Postdoctoral Associate



**Natalia Escobar-Pemberthy**  
Policy Associate



**Darrick Evensen**  
Senior Research Scientist



**Susan Fredholm Murphy**  
Executive Director, Impact  
Measurement & Allocation  
Program



**Alison Gold**  
Communications and  
Events Specialist



**Can Hankendi**  
Postdoctoral Associate



**Debora Hoffman**  
Marketing Communications  
Specialist, Impact Measurement  
& Allocation Program

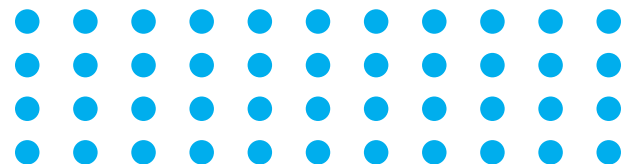


**Laura Hurley**  
Marketing and Communications  
Director



**Hanees Ryu**  
Visiting Researcher

IGS welcomed its first Visiting Researcher, Hanees Ryu, from South Korea. At IGS, Ryu studies the environmental impacts of supply chains for batteries, semiconductors, and turbines. She is also conducting a comprehensive lifecycle assessment to determine the economic feasibility of battery recycling technologies, specifically pyrometallurgy and hydrometallurgy. Her work is supported by grants from the Korea Development Institute and Korea's Ministry of Environment.



# Student Team Members



**Chloe Rowen**  
Operations Assistant



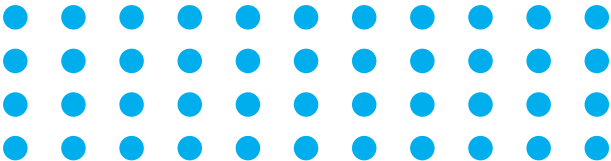
**Anu Shinebayar**  
Operations Assistant



**Manpreet Kaur Singh**  
Campus Climate Lab  
Program Coordinator



**Emery Taylor**  
Campus Climate Lab  
Program Coordinator



Campus Climate Lab Program Coordinator Manpreet K. Singh (left) welcomed incoming student coordinator Emery Taylor (center) and the program's new faculty director, Michael Gevelber. Photo by Carson Paradis.



# Core Faculty



**Jonathan Buonocore**  
Assistant Professor,  
Environmental Health,  
School of Public Health



**Ayşe Coşkun**  
Professor, Electrical & Computer  
Engineering and interim  
Associate Dean of Research and  
Faculty Development, College  
of Engineering; Director, Center  
for Information and Systems  
Engineering



**Chuanhua Duan**  
Associate Professor,  
Mechanical Engineering,  
College of Engineering



**Sucharita Gopal**  
Professor, Earth &  
Environment, Arts & Sciences



**Jonathan Greenacre**  
Assistant Professor,  
Global Development Policy,  
Frederick S. Pardee School  
of Global Studies



**Lucy Hutyra**  
Distinguished Professor of  
Earth & Environment,  
Arts & Sciences



**Malika Jeffries-EL**  
Professor, Chemistry,  
Arts & Sciences; Associate Dean,  
Graduate School of  
Arts & Sciences



**Les Kaufman**  
Professor, Biology,  
Arts & Sciences



**Robert Kaufmann**  
Professor, Earth &  
Environment, Arts & Sciences



**Magaly Koch**  
Research Associate Professor,  
Earth & Environment, Arts &  
Sciences, and Center for  
Remote Sensing



**Jonathan Levy**  
Professor and Chair,  
Environmental Health,  
School of Public Health



**Sean Lubner**  
Assistant Professor,  
Mechanical Engineering,  
College of Engineering



**Justin Ren**  
Associate Professor and  
Chair, Operations & Technology  
Management, Questrom  
School of Business



**Madeleine Scammell**  
Associate Professor,  
Environmental Health,  
School of Public Health



**Anne Short Gianotti**  
Associate Professor and  
Associate Chair of Curriculum,  
Earth & Environment,  
Arts & Sciences



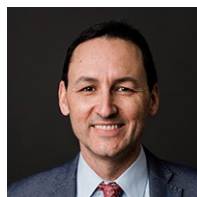
**Ian Sue Wing**  
Professor, Earth &  
Environment, Arts & Sciences



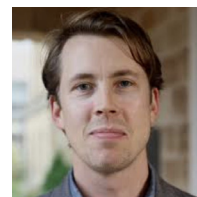
**Remi Trudel**  
Associate Professor,  
Marketing, Questrom  
School of Business



**Irena Vodenska**  
Professor of Finance,  
Director of Finance Programs,  
and Chair of Administrative  
Sciences, Metropolitan College



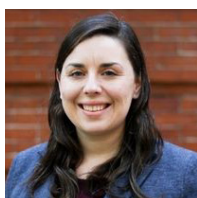
**Gregory Wellenius**  
Professor, Environmental  
Health, School of Public  
Health; Director, Center  
for Climate & Health



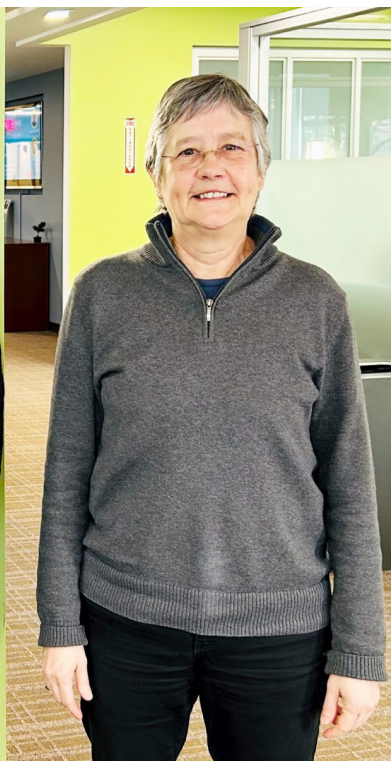
**Chris Wells**  
Associate Professor,  
Emerging Media Studies,  
College of Communication



**Joerg Werner**  
Assistant Professor,  
Mechanical Engineering,  
College of Engineering



**Mary Willis**  
Assistant Professor,  
Epidemiology, School  
of Public Health



Pictured are (from left): Shunichi Koshimura from Tohoku University in Japan and IGS core faculty Magaly Koch (Center for Remote Sensing) who met to discuss a new research collaboration funded by the National Science Foundation and Japan Science and Technology Agency. Photo by IGS staff.



Pictured are (from left): IGS affiliated faculty Michael Gevelber (Mechanical Engineering) in conversation with IGS core faculty Sucharita Gopal (Earth & Environment) at the Institute's annual gathering. Photo by Ryan Smith, Rooted in Light Media.



# Affiliated Faculty

## ARTS & SCIENCES

**Andrew Bell**, Associate Professor, Earth & Environment

**Dennis Carlberg**, Chief Sustainability Officer and Associate Vice President for Climate Action

**Deborah Carr**, Distinguished Professor of Sociology; Director, Center for Innovation in Social Science

**Eric Cueny**, Assistant Professor, Chemistry

**Sarah Davies**, Associate Professor, Biology

**Ethan Deyle**, Research Assistant Professor, Biology

**Michael Dietze**, Professor and Director of Undergraduate Studies, Earth & Environment

**Bahar Erbas**, Senior Lecturer, Economics

**Sergio Fagherazzi**, Professor, Earth & Environment

**Mark Friedl**, William Goodwin Aurelio Professor of Mathematics and Science, Earth & Environment; Director, Center for Remote Sensing

**Robinson W. Fulweiler**, Professor, Earth & Environment and Biology

**Jeffrey Geddes**, Associate Professor, Earth & Environment

**Loretta Lees**, Professor, Sociology; Director, Initiative on Cities

**Dan Li**, Associate Professor and Associate Chair of Faculty Actions, Earth & Environment

**Christoph Nolte**, Associate Professor, Earth & Environment

**Nathan Phillips**, Professor, Earth & Environment

**Richard Primack**, Professor, Biology

**Richard Reibstein**, Lecturer, Earth & Environment

**Andrew Robichaud**, Associate Professor and Director of Graduate Studies, History

**Caterina Scaramelli**, Senior Lecturer, Earth & Environment

**Benjamin Siegel**, Associate Professor and Associate Chair, History

**Abigail Sullivan**, Assistant Professor, Earth & Environment

**Pamela Templer**, Distinguished Professor of Biology and Chair, Biology

## COLLEGE OF ENGINEERING

**Soumendra Basu**, Professor, Mechanical Engineering and Associate Division Head, Materials Science & Engineering

**Michael Caramanis**, Professor, Mechanical Engineering

**Christos Cassandras**, Distinguished Professor, Electrical & Computer Engineering

**Michael Gevelber**, Research Associate Professor, Mechanical Engineering

**Srikanth Gopalan**, Professor, Mechanical Engineering

**Kenneth Lutchen**, Professor, Biomedical Engineering; Senior Advisor to the President

**Malay Mazumder**, Research Professor, Electrical & Computer Engineering

**Uday Pal**, Professor, Mechanical Engineering

**Sahar Sharifzadeh**, Associate Professor, Electrical & Computer Engineering

**Andre Sharon**, Professor, Mechanical Engineering; Director, Fraunhofer USA Center for Manufacturing Innovation

**Muhammad Zaman**, Professor and Vice Chair, Biomedical Engineering; Director, Center on Forced Displacement

## SCHOOL OF PUBLIC HEALTH

**Stephanie Ettinger de Cuba**, Research Associate Professor, Health Law, Policy & Management and Community Health Sciences

**Wendy Heiger-Bernays**, Emeritus Clinical Professor, Environmental Health

**Patrick Kinney**, Beverly Brown Professor of Urban Health, Environmental Health

**Kevin Lane**, Associate Professor, Environmental Health

**Jessica Leibler**, Associate Professor, Environmental Health

**Amruta Nori-Sarma**, Assistant Professor, Environmental Health

**Marcia Pescador Jimenez**, Assistant Professor, Epidemiology

**Monica Wang**, Associate Professor, Community Health Sciences

**Amelia Wesselink**, Research Assistant Professor, Epidemiology

## QUESTROM SCHOOL OF BUSINESS

**Susan Fournier**, Allen Questrom Professor and Dean

**Arzum Akkas**, Assistant Professor, Operations & Technology Management

**Marcus Bellamy**, Associate Professor, Operations & Technology Management

**Jesse Chan**, Assistant Professor, Accounting

**Andrew King**, Allen and Kelli Questrom Professor in Strategy & Innovation

**Paul McManus**, Master Lecturer, Strategy & Innovation

**Maxime Sauzet**, Assistant Professor, Finance

**Richard Stuebi**, Lecturer, Strategy & Innovation

## FREDERICK S. PARDEE SCHOOL OF GLOBAL STUDIES

**Rachel Brulé**, Associate Professor, Global Development Policy

**Kevin Gallagher**, Professor, Global Development Policy; Director, Global Development Policy Center

**Maresh Karra**, Associate Professor, Global Development Policy

**Tsitsi Musasike**, Professor of the Practice, Global Development Policy

## COLLEGE OF COMMUNICATION

**Mariette DiChristina**, Professor of the Practice and Dean

**David Abel**, Professor of the Practice, Journalism

**Michelle Amazeen**, Associate Professor, Mass Communication; Associate Dean of Research

**Brooke Williams**, Associate Professor of the Practice, Computational Journalism

## CHOBANIAN & AVEDISIAN SCHOOL OF MEDICINE

**Davidson Hamer**, Professor, Global Health and Medicine (Schools of Medicine and Public Health)

## COLLEGE OF GENERAL STUDIES

**Richard Deese**, Master Lecturer, Social Sciences

## METROPOLITAN COLLEGE

**Kathleen Park**, Assistant Professor, Administrative Sciences

## SCHOOL OF LAW

**Madison Condon**, Associate Professor, Law

## SCHOOL OF SOCIAL WORK

**Darien Alexander Williams**, Assistant Professor, Macro Practice

## SCHOOL OF THEOLOGY

**Rebecca Copeland**, Assistant Professor, Theology

# Senior Fellows

**IGS SENIOR FELLOWS ARE LEADERS** in their respective fields and engage with the institute through research projects and by providing real-world insights and connections for BU faculty and students.

**Doug Arent**

Executive Director, Strategic Public-Private Partnerships,  
National Renewable Energy Laboratory

**Ardeth Barnhart**

Researcher, Sustainable Development Goals and Higher Education

**Sarah Finnie**

Founding Director, The 51 Percent Project

**Scott Foster**

Former Director, Sustainable Energy Division, United Nations  
Economic Commission for Europe

**Peter Fox-Penner**

Founding Director, Boston University Institute for Sustainable Energy

**David Steven Jacoby**

Managing Director, Boston Strategies International

**David O. Jermain**

Owner, DOJc Consulting

**Alan Lowdon, OBE**

Director of Strategic Development, National Offshore Wind Institute,  
Bristol Community College

**Chella Rajan**

Professor, Humanities and Social Sciences, Indian Institute of  
Technology Madras

**Kathleen Rest**

Former Executive Director, Union of Concerned Scientists

**Wilson Rickerson**

President and Co-Founder, Converge Strategies, LLC

**Dorothy Robyn**

Public Policy Expert

**Kurt Roth**

Head, Building Energy Systems, Fraunhofer USA Center for  
Manufacturing Innovation

**Pablo Suarez**

Associate Director for Research and Innovation, Red Cross Red  
Crescent Climate Centre (In Memoriam)

**Adam Warren**

Director, Accelerated Deployment and Decision Support Center,  
National Renewable Energy Laboratory



**2023 IGS Peter Fox-Penner Award Winner:** Pictured are (from left): IGS Senior Fellow Peter Fox-Penner, founder of the Institute for Sustainable Energy (now IGS); Patricia Fabian, IGS associate director (School of Public Health); Alina McIntyre, graduate student award recipient (School of Public Health); and James Goudreau, IGS advisory board member. Photo by Ryan Smith, Rooted in Light Media.



# Student Research: Campus Climate Lab



Campus Climate Lab teams gathered with the BU community to present their projects at the annual symposium. Photo by Carson Paradis.

## CAMPUS CLIMATE LAB CONTINUES TO SPUR INNOVATIONS

in support of BU's Climate Action Plan and beyond. Since its launch in 2020, CCL has awarded \$340,000 in funding to 203 faculty, students, and staff across 42 projects. IGS leads this initiative in partnership with BU Sustainability and the Office of Research. This year's projects included:

### ADVOCACY & ACTIVISM

- ❖ Developing a community garden network on campus
- ❖ Gathering input from underrepresented student groups on improving the University's environmental justice efforts
- ❖ Transforming a less-used campus green space into a hub for students to learn about cultural plant use and Indigenous culture

### BUILDINGS & OPERATIONS

- ❖ Assessing extreme weather preparedness activities across BU's campuses
- ❖ Designing a building-integrated solar power system to provide sustainable energy
- ❖ Constructing a decision support system to assist BU facility managers in responding to climate change risks
- ❖ Identifying high-consumption water sources across BU campuses
- ❖ Identifying on-campus residences with greater per capita heat burden to optimize allocation of renovation resources
- ❖ Piloting a prototype system to monitor air quality in classrooms
- ❖ Studying the electricity demands at the newly completed Center for Computing & Data Sciences
- ❖ Developing strategies for decarbonizing BU's heating infrastructure

## CLIMATE & HEALTH

- ❖ Creating a bicycle-mounted air pollution monitor for data collection in Boston
- ❖ Exploring how a Miyawaki forest may create environmental and educational impact on campus
- ❖ Assessing equitable access to adequate green space on campus

## CURRICULUM DEVELOPMENT

- ❖ Cultivating climate action through an understanding of biological evolution in BU curriculum
- ❖ Utilizing BU's wind farm data for climate-focused curriculum
- ❖ Developing recommendations for strengthening curricular and cultural campus offerings related to Indigenous knowledge

## WASTE REDUCTION

- ❖ Using machine learning to improve waste disposal strategies on campus
- ❖ Designing a litter collector to reduce plastic waste on the Charles River
- ❖ Evaluating the microplastic output of BU laundry facilities and investigating ways to mitigate emissions
- ❖ Establishing best practices for reducing work-related air travel
- ❖ Addressing challenges in recycling on campus through a new waste classification system

# Student Research: Campus Climate Lab

## Air Quality Sensors Could Be Coming to a Bicycle Near You

*A team of BU undergraduates' air quality monitors have won them the 2024 Janetos Climate Action Prize*

Imagine being able to contribute to scientific research just by riding a bike: your bicycle automatically collecting valuable air quality data from the different neighborhoods you pedal through, creating a mobile network of air quality monitors. That's the vision a group of students at Boston University are working toward.

For their senior design project, a team of College of Engineering (ENG) undergraduate students created a compact air quality sensor pack that can be attached to the front of a bicycle from Bluebikes, Boston's public rental network. As air passes through the sensor box, it measures local levels of carbon dioxide, methane, particulate matter, and nitrous oxides, while also recording temperature and humidity. The sensor is equipped with a GPS to pinpoint where data is being collected, as well as an accelerometer, a device that senses movement of the bike so it knows when to switch on and off.

Squeezing all of those gadgets into a 5"x8" box, ensuring the electrical equipment could be jostled around on a bicycle without damage, all while remaining protected from harsh weather and rain, proved to be a challenge.

"All of the components of the project are equally important," says Sofiya Filippova (ENG'24), who started working on the project in fall 2023. "Because if we don't have the electronics working, or don't have the communication, or don't have the physical enclosure in place, everything falls apart." There was also the added task of making sure the sensor box didn't interfere with the Bluebikes operating system or the rider experience.

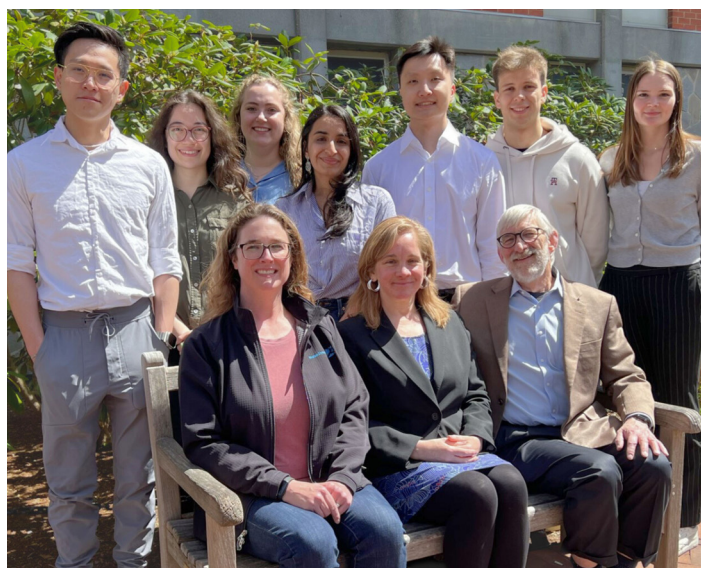
Filippova, along with her teammates—Lorenzo Barale (ENG'25), Luisa DiLorenzo (ENG'24), Maya Lobel (ENG'24), Leon Long (ENG'24), Benjamin Pedi (ENG'25), and Kai Raina Tung (ENG'24)—tackled all of these elements over the past two semesters with Emily Ryan, an ENG associate professor of mechanical engineering and an associate director of BU's Institute for Global Sustainability (IGS). After months of tinkering and wiring, the team landed on a final design and took the sensor box out for a spin, attaching it to the front basket of a Bluebikes bicycle with small zip ties. The students took turns riding the bike, each through different Boston neighborhoods, and at the end of their test rides, reviewed the recorded data in a cloud-based communication system that showed data points mapped block by block throughout the city.

One of the biggest challenges facing the students: fitting all their components into a 5"x8" box that could withstand the rigors of daily riding.

"You can clearly see where the data is mapped, on the scale of one city block, and so that's a huge success in our eyes," Filippova says. With such promising results and potential, the team won the **2024 Janetos Climate Action Prize**, an award given to students working on a high-impact project. The prize is open to projects funded by the Campus Climate Lab, a program led by IGS in partnership with the University's sustainability and research offices. The work will continue to receive funding from the climate lab over the summer.



A version of this article, authored by Jessica Colarossi, originally appeared in **The Brink** on June 4, 2024.



*Pictured here: Winning project team with Campus Climate Lab leadership. Photo by Alison Gold.*

**"A system like this, where you get localized data from all Boston neighborhoods, can really shine light on the differences in the air quality and health disparities between neighborhoods."**

—Luisa DiLorenzo tells *The Brink* in a **video** about the project.



# Student Research: Summer Fellows

**IGS WELCOMES GRADUATE STUDENTS FROM ACROSS BU FOR ITS SUMMER FELLOWS PROGRAM** each year as part of its commitment to supporting the next generation of sustainability researchers. Fellows receive a financial stipend, access to a supportive peer network, and weekly opportunities for faculty engagement, mentoring, and professional development.



**Adham Badawy**

Earth & Environment, Arts & Sciences  
*Cultivating Resilience: Wastewatersheds as Beacons of Climate Adaptation in Agriculture*



**Pilar Botana Martinez**

Environmental Health,  
School of Public Health  
*Rethinking How We Measure Indoor Heat Burden for People Living in Heat Islands*



**Dalilah Paulino de Castro Campos**

Earth & Environment, Arts & Sciences  
*Assessing the Exposure of Socially Vulnerable Populations to Water Scarcity in Southern Europe: A Case Study of Portugal*



**Farbin Fayza**

Electrical & Computer Engineering,  
College of Engineering  
*Assessing the Carbon Sustainability of Photonic Computing for Artificial Intelligence Systems*



**Emily Ghosh**

Materials Science and Engineering,  
College of Engineering  
*GDC-Infiltrated Solid Oxide Electrolysis Cells for Hydrogen Production and Grid-Scale Energy Storage*



**Mira Kelly-Fair**

Earth & Environment, Arts & Sciences  
*Empowering Belizean Communities: Science-Based Solutions for Coastal Ecosystems*



**Erin Polka**

Environmental Health,  
School of Public Health  
*Visualizing Modeled Spatial Patterns of Residential Heating Consumption and Efficiency in Massachusetts*

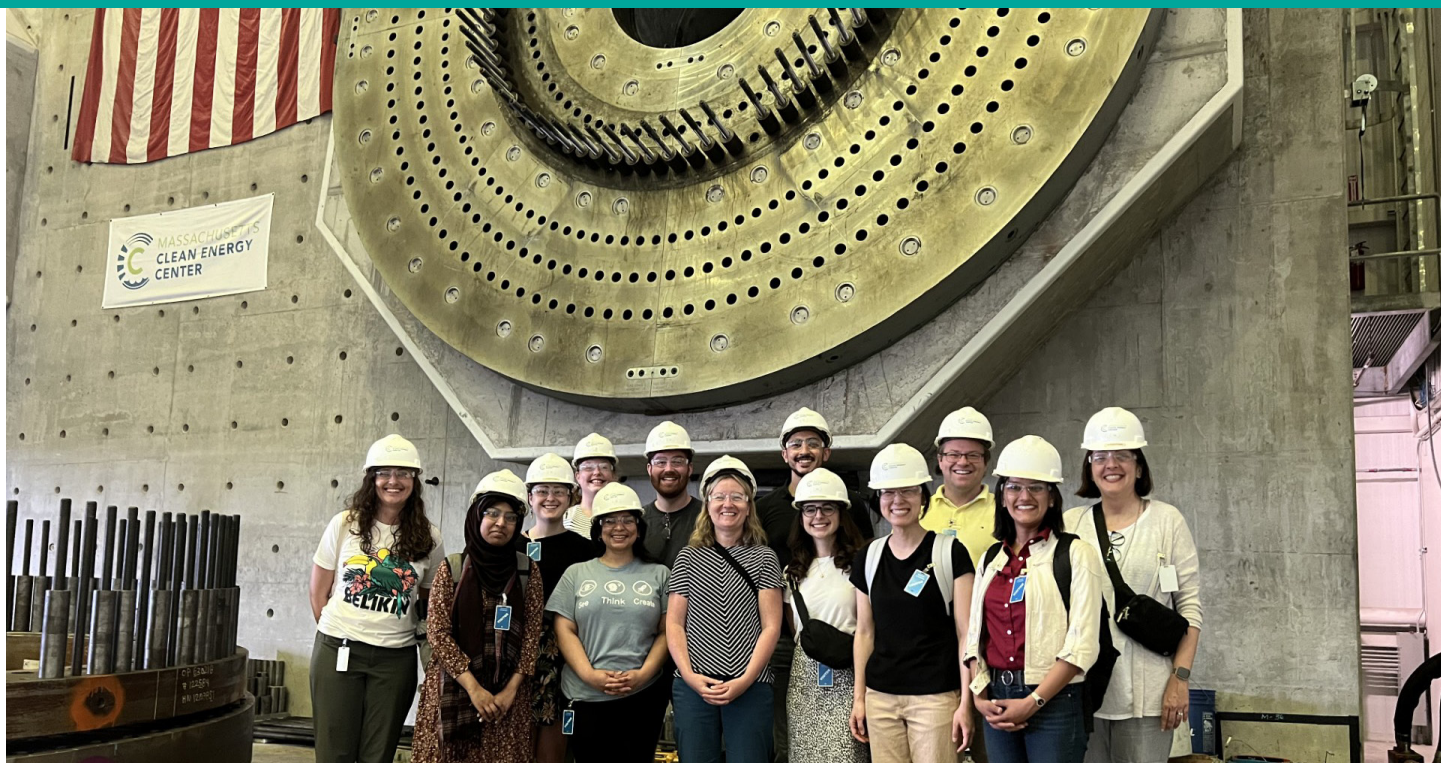


**Brian Sousa**

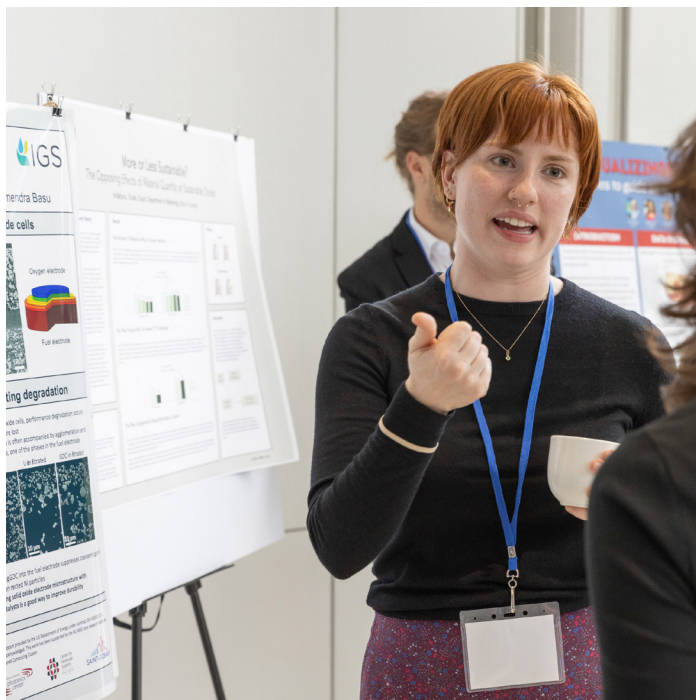
Environmental Health,  
School of Public Health  
*Cost Benefit Analysis of Greenhouse Gas Reduction Technologies and the Associated Health and Water Impacts in the United States*

*"The IGS Fellowship has provided me with a unique opportunity to focus intensively on my research for ten weeks. This dedicated time has allowed me to refine my research ideas, methods, and approaches. Moreover, the program facilitated interactions with scholars and researchers from diverse fields, enriching my perspective and enhancing the interdisciplinary nature of my work." – Adham Badawy*

# Student Research Snapshots



IGS Graduate Student Summer Fellows, faculty, and staff visited the Massachusetts Clean Energy Center Wind Technology Testing Center, the largest turbine blade testing center in North America. Photo by Connor Read.



2023 IGS Graduate Student Summer Fellow Jillian Rix Mulligan (College of Engineering) presented research on the electrochemistry and microstructure of solid oxide fuel cells to increase their efficiency as a renewable energy resource at the IGS annual gathering student poster session. Photo by Ryan Smith, Rooted in Light Media.



Andde Indaburu (Questrom School of Business) presented research on the opposing effects of material quantity on sustainable choice at the IGS annual gathering student poster session. Photo by Ryan Smith, Rooted in Light Media.





IGS was honored to join BU in hosting Lt. Governor Kim Driscoll for this year's launch of Massachusetts STEM Week. A Campus Climate Lab research team from the College of Engineering had an opportunity to discuss their project with Jonathan Schrag, deputy climate chief of Massachusetts. Photo by Manpreet Singh.



The luncheon gathering of summer fellows from IGS and the Frederick S. Pardee Center for the Study of the Longer-Range Future is an annual tradition for sharing independent research across disciplines. Photo by Alison Gold.



Lizette Pizza (left) and Sophie Zimbler, both from Psychological & Brain Sciences, presented at the IGS annual gathering poster session. Photo by Ryan Smith, Rooted in Light Media.



Emma Longo (College of Communication) was recognized with the 2023 IGS Undergraduate Student Award for her contributions to climate communication research. Photo by Ryan Smith, Rooted in Light Media.



IGS debuted a [brand-new video](#) featuring BU student sustainability and climate research convened by the Institute. It was produced by Real World Productions at the College of Communication. Photo by Rebecca Pearl-Martinez.

# Published Research Highlights

**IGS LEADERSHIP AND CORE FACULTY PUBLISHED 107 SUSTAINABILITY AND CLIMATE ARTICLES** from July 2023 through June 2024, including the following select research highlights in top-ranked academic journals:

## CLIMATE GOVERNANCE & SUSTAINABILITY TRANSITIONS

**Nature**, Extending the sustainable development goals to 2050 — a road map, Benjamin Sovacool (IGS; Arts & Sciences), et al.

**Nature Communications**, Public engagement for inclusive and sustainable governance of climate interventions, Benjamin Sovacool (IGS; Arts & Sciences), et al.

**Energy & Environmental Science**, Reconfiguring European industry for net-zero: a qualitative review of hydrogen and carbon capture utilization and storage benefits and implementation challenges, Benjamin Sovacool (IGS; Arts & Sciences), et al.

**Nature Communications**, Public perceptions on carbon removal from focus groups in 22 countries, Benjamin Sovacool (IGS; Arts & Sciences), et al.

**Nature Climate Change**, Municipal finance shapes urban climate action and justice, Anne Short Gianotti (Arts & Sciences), et al.

**Renewable and Sustainable Energy Reviews**, Political economy of low-carbon electricity: Governance effects across 198 countries, Benjamin Sovacool (IGS; Arts & Sciences), et al.

**Science Communication**, Missing voices: Examining how misinformation-susceptible individuals from underrepresented communities engage, perceive, and combat science misinformation, Michelle Amazeen (College of Communication) and Arunima Krishna (College of Communication)

**Journal of Climate Finance**, Evaluating hedge fund activism: Engine Number 1 and ExxonMobil, Robert Kaufmann (Arts & Sciences), Nalin Kulatilaka (Questrom School of Business), et al.

**Journal of Marketing**, Affording disposal control: The effect of circular take-back programs on psychological ownership and valuation, Remi Trudel (Questrom School of Business); et al.

## ENERGY SYSTEMS OF THE FUTURE

**Journal of Energy Storage**, A framework for nucleation in electrochemical systems and the effect of surface energy on dendrite growth, Emily Ryan (College of Engineering), Sahar Sharifzadeh (College of Engineering), et al.

**Sustainable Computing: Informatics and Systems**, Data center and load aggregator coordination towards electricity demand response, Ayşe Coşkun (College of Engineering), et al.

**Nature Communications**, Rewritable printing of ionic liquid nanofilm utilizing focused ion beam induced film wetting, Chuanhua Duan (College of Engineering), et al.

**Environmental Research Letters**, Coal transitions—part 2: phase-out dynamics in global long-term mitigation scenarios, Benjamin Sovacool (IGS; Arts & Sciences), et al.

**Nature Materials**, Bridging the gap in mesoscopic length scales, Joerg G. Werner (College of Engineering)

**Nature Communications**, Nonintrusive thermal-wave sensor for operando quantification of degradation in commercial batteries, Sean D. Lubner (College of Engineering), et al.

**Journal of Electrochemical Energy Conversion and Storage**, Smoothed particle hydrodynamics modeling of electrodeposition and dendritic growth under migration-and diffusion-controlled mass transport, Emily Ryan (College of Engineering), et al.

**Advanced Functional Materials**, Mechanically rupturing liquid metal oxide induces electrochemical energy, Joerg G. Werner (College of Engineering), et al.

**Analytical Methods**, Screening for electrically conductive defects in thin functional films using electrochemiluminescence, Joerg G. Werner (College of Engineering), et al.

## PLANETARY & ENVIRONMENTAL HEALTH

**Nature Communications**, Global projections of heat exposure of older adults, Ian Sue Wing (College of Arts & Sciences), Deborah Carr (Arts & Sciences), et al.

**Environmental Science & Policy**, The sociotechnical dynamics of blue carbon management: Testing typologies of ideographs, innovation, and co-impacts for marine carbon removal, Benjamin Sovacool (IGS; Arts & Sciences), et al.

**Nature Medicine**, Impact of extreme weather events on healthcare utilization and mortality in the United States, Gregory A. Wellenius (School of Public Health), et al.

**The BMJ**, Short term exposure to low level ambient fine particulate matter and natural cause, cardiovascular, and respiratory morbidity among US adults with health insurance: case time series study, Amruta Nori-Sarma (School of Public Health), Gregory A. Wellenius (School of Public Health), et al.

**Science of the Total Environment**, Water sources for street trees in mesic urban environments, Pamela H. Templer (Arts & Sciences), Lucy R. Hutyla (Arts & Sciences), et al.



# Published Research Highlights & Accolades

(Continued)

## **Science of the Total Environment,**

Changes in traffic congestion and air pollution due to major roadway infrastructure improvements in Texas, Mary D. Willis (School of Public Health), et al.

**Journal of Urban Health,** Simulating energy use, indoor temperatures, and utility cost impacts amidst a warming climate in a multi-family housing model, Jonathan Levy (School of Public Health) and Patricia Fabian (School of Public Health), et al.

**Sustainability,** The deforestation and biodiversity risks of power plant projects in Southeast Asia: A big data spatial analytical framework, Sucharita Gopal (Arts & Sciences), Kevin Gallagher (Pardee School of Global Studies), Magaly Koch (Arts & Sciences), Les Kaufman (Arts & Sciences), et al.

## **Science of the Total Environment,**

Soils at the temperate forest edge: An investigation of soil characteristics and carbon dynamics, Pamela H. Templer (Arts & Sciences), Lucy R. Hutyra (Arts & Sciences), et al.



Pictured from IGS are (from left): Rebecca Pearl-Martinez, executive director; Emily Ryan, associate director (College of Engineering); Benjamin Sovacool, director; Patricia Fabian, associate director (School of Public Health); Cutler Cleveland, associate director (Arts & Sciences). Photo by Ryan Smith, Rooted in Light Media.

## SELECT IGS FACULTY ACCOLADES

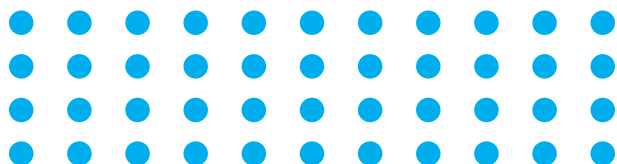
- ❖ **Lucy Hutyra** (Arts & Sciences) won a 2023 MacArthur Genius Grant.
- ❖ **Deborah Carr, Lucy Hutyra, and Pamela Templer** were named Arts & Sciences Term Distinguished Professors for their international renown and excellence in research, teaching, and service.
- ❖ **Patricia Fabian** (School of Public Health) and **Lucy Hutyra** were appointed to the Climate Science Advisory Panel through the new Massachusetts Office of Climate Science.
- ❖ **Sean Lubner** (College of Engineering) received a Young Investigator Program Award from the Air Force Office of Scientific Research.
- ❖ **Joerg Werner** (College of Engineering) received the DARPA Young Faculty Award.
- ❖ **Sarah Davies** (Arts & Sciences) was awarded the 2024 International Coral Reef Society Early-Career Scientist Award for research excellence in coral reef science.
- ❖ **Pamela Templer** (Arts & Sciences) was invited to join the U.S. National Committee for the International Union of Biological Sciences and serve as an author on the U.S. Global Change Research Program's First National Nature Assessment.
- ❖ **Michael Gevelber** (College of Engineering) received the IGS Sustainability Champion Award.
- ❖ **Srikanth Gopalan, Soumendra Basu, Uday Pal** (College of Engineering), and partners received \$5 million for research into high temperature electrolysis for green hydrogen production from the US Department of Energy.
- ❖ **Uday Pal** (College of Engineering) was recognized as a distinguished member of The Minerals, Metals & Materials Society at an honorary symposium.

# Collaborations: National Laboratories

## ■ NATIONAL RENEWABLE ENERGY LABORATORY

IGS continues to have a strong relationship with the National Renewable Energy Laboratory (NREL), the nation's premier lab for low-carbon energy supply and infrastructure. IGS Director Benjamin Sovacool and Postdoctoral Fellow Xander Dunlap have been assisting the Accelerated Deployment and Decision Support (ADDS) center within the Energy Systems Integration directorate at NREL to evaluate multiple social and environmental justice dimensions related to the supply chains of select critical minerals, including extraction, processing, recycling, and disposal.

In a separate collaboration with the Center for Integrated Mobility Sciences at NREL, IGS Director Benjamin Sovacool co-authored a paper in [Energy and Climate Change](#) analyzing the results of a national survey of the US public to better identify and quantify the significance of key factors associated with the deployment of electric vehicles and charging infrastructure. Results indicate that individual characteristics, such as income, age, region, and single vs. multi-family housing type can significantly affect electric vehicle purchase preferences, especially those concerning overnight charging and perceptions of benefits and barriers. Moreover, results challenge earlier findings in the literature by showing how certain elements, such as expected electric driving range, certain travel behaviors (e.g., driving distance, destination types), the most common perceived benefits (e.g., cleaner air) or barriers (e.g., reliability concerns), and preferred location for public charging seem to not vary much or at all with the socioeconomic, demographic, and geographical variables examined in this study.



## ■ SANDIA NATIONAL LABORATORIES

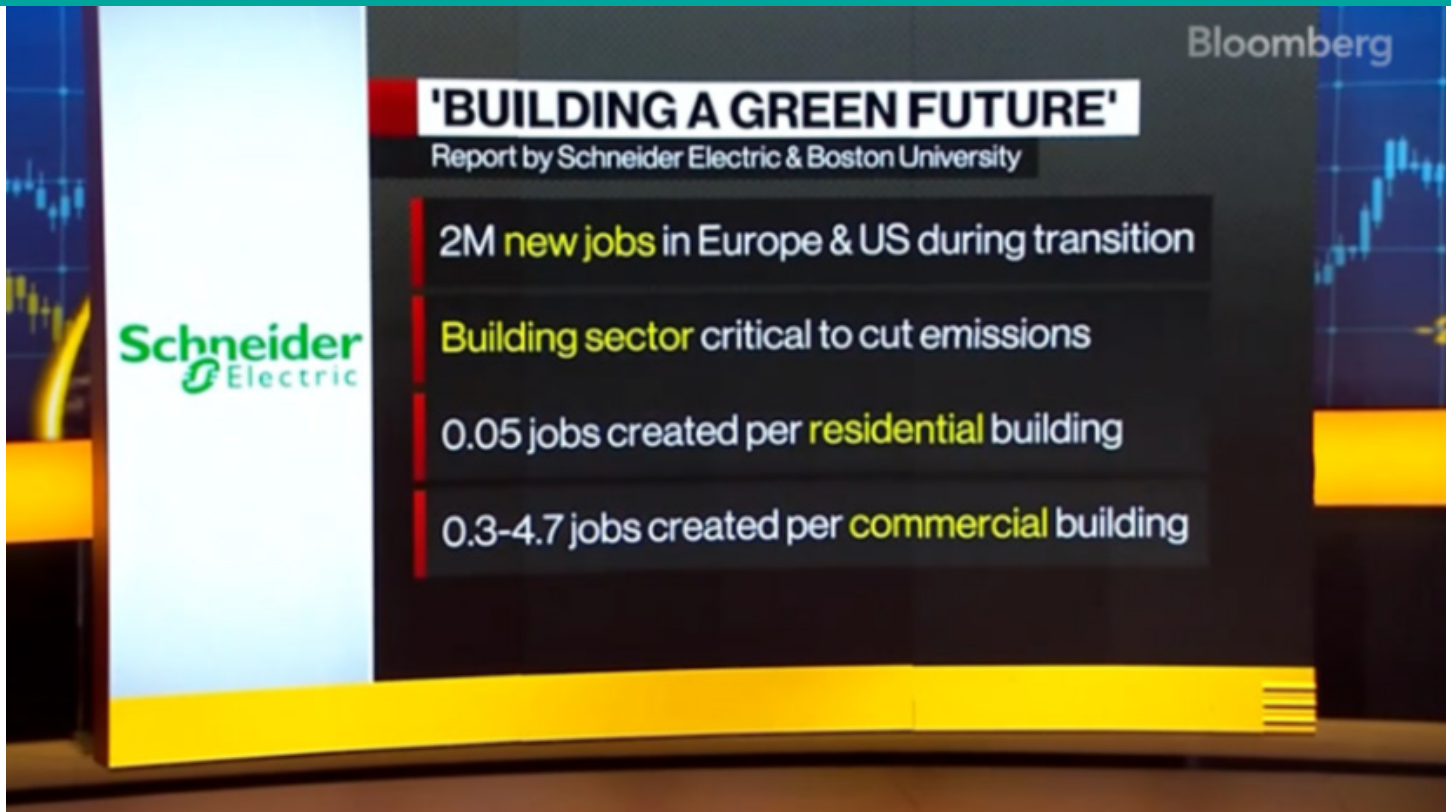
Highly regarded for its leadership in national security, Sandia Labs hosted IGS Director Benjamin Sovacool as part of its Climate Speaker Series this past fall. This series features top experts discussing the challenges and opportunities that the US faces in addressing climate security. Sovacool's talk explored the sociotechnical dynamics of negative emissions, carbon removal, and solar geoengineering, highlighting the interplay of science, technology, and policy in responding to climate change. Sovacool's research team has conducted extensive field visits to direct carbon capture facilities in Canada and Iceland, toured a seagrass nursery in Wales, and observed marine cloud brightening and coral reef restoration operations over Australia's Great Barrier Reef. A key insight from his talk was the lack of broad consensus on the desirability of these innovative approaches. "Most key stakeholders haven't made up their mind," Sovacool noted, emphasizing that the future of these technologies could be significantly influenced by research trends, deployment practices, and major policy decisions in the next five to 10 years.



*IGS Director Benjamin Sovacool with a team of divers at Moore Reef inside Australia's Great Barrier Reef Marine Park. Photo courtesy of Benjamin Sovacool.*



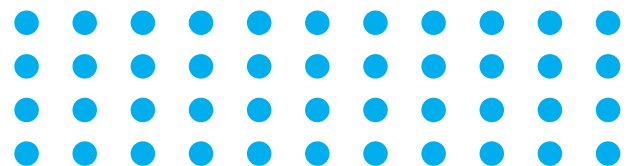
# Collaborations: Industry



IGS's research partnership with Schneider Electric was featured at the 2023 BNEF Summit in London. Photo courtesy of Schneider Electric.

## ■ SCHNEIDER ELECTRIC

Decarbonizing residential and commercial buildings, which currently account for nearly 40% of carbon emissions in the United States, is essential for meeting long-term climate goals. Last year, IGS and the Schneider Electric Sustainability Research Institute published a first-of-its-kind study in [The Electricity Journal](#) showing that over two million new jobs could be created in the US and Europe during the transition to net-zero buildings. These findings were spotlighted at the 2023 BNEF Summit in London, which brought together leaders at the intersection of energy, finance, and technology, and were also featured on *Bloomberg TV*. Now this research partnership is working to address the social, political, and economic hurdles hindering building decarbonization. A postdoctoral scholar has joined IGS to lead high-impact research at the nexus of regulatory frameworks, business practices, and the scientific community. This role will focus on identifying key barriers to sustainable building transitions and accelerating progress through a comprehensive body of research, thereby driving meaningful advancements in both policy and industry practices.



# Collaborations: Academic, Federal & Global

## ACADEMIC

### ❖ Ostrom Workshop

IGS Director Benjamin Sovacool presented a novel framework for risk-risk tradeoffs in climate change mitigation at Indiana University's **Ostrom Workshop**, a prestigious forum for global experts to share solutions to pressing challenges on shared and contested resources. Sovacool's lecture was based on a paper published in **Risk Analysis**, "Risk-risk governance in a low-carbon future: Exploring institutional, technological, and behavioral tradeoffs in climate geoengineering pathways."

### ❖ University Energy Institute Collaborative

IGS, along with the University of Pennsylvania Kleinman Center for Energy Policy and the Penn State Institute of Energy and the Environment, co-hosted university energy research scholars in the US for a workshop on Advancing Decarbonization & Equity Research in the Northeast and Mid-Atlantic. Attendees from Columbia, Duke, and Harvard universities, among others, gathered in Philadelphia to exchange ideas, thanks to funding from the University Energy Institute Collaborative. IGS Director Benjamin Sovacool participated in a panel on advancing research methods and conceptual frameworks for decarbonization and equity.

## FEDERAL

### ❖ US Global Change Research Program

IGS Executive Director Rebecca Pearl-Martinez and IGS Policy Associate Natalia Escobar-Pemberthy, alongside IGS affiliated faculty Amruta Nori-Sarma and core faculty Mary Willis, presented BU efforts on climate and health to the Interagency Crosscutting Group on Climate Change and Human Health (CCHHG) of the US Global Change Research Program. CCHHG convenes 15 US federal agencies and is co-chaired by the Centers for Disease Control and Prevention, the National Oceanic and Atmospheric Administration, and the Environmental Protection Agency.

### ❖ EU-US Transportation Research Symposium

IGS Director Benjamin Sovacool was one of 20 experts selected to represent the US at the Seventh EU-US Transportation Research Symposium, organized by the European Commission, US Department of Transportation, Transportation Research Board, and the EU-funded SYMPEUS project, which was held at the National Academies in Washington, D.C. Sovacool was part of an exploratory group that led discussion of "Ensuring a Just Transition to Net-Zero Transport."

### ❖ National Academies of Sciences, Engineering, and Medicine

College of Communication Dean Mariette DiChristina, IGS affiliated faculty, moderated a **panel** at the National Academies of Sciences, Engineering, and Medicine (NASEM) Climate Crossroads Summit. DiChristina is a member of the National Academies Climate Crossroads Advisory Committee and the Standing Committee on Advancing Science Communication.

IGS Associate Director Patricia Fabian from the BU School of Public Health presented on "**Moving Environmental Justice Indoors: Lessons from the Field**" at NASEM's September meeting, Why Indoor Chemistry Matters Workshop 1: Environmental Justice Considerations and Impact of Products and Services of Indoor Chemistry. The event explored how to engage environmental justice communities in formulating research priorities and recommendations for future indoor air quality standards.

As a panelist at NASEM's **Developing and Assessing Ideas for Social and Behavioral Research to Speed Efficient and Equitable Industrial Decarbonization** workshop in February, IGS Director Benjamin Sovacool discussed "Exploring Social Science Factors Impacting Technology Development Toward Industrial Decarbonization in the United States." The panel addressed community co-benefits, barriers, challenges, and risks of deploying technologies for industrial decarbonization. Sovacool also sits on NASEM's Board on Environmental Change and Society.

## GLOBAL

### ❖ European Research Council Executive Agency

IGS Director Benjamin Sovacool delivered a keynote address for International Earth Day as part of a lunch seminar hosted by the European Research Council Executive Agency. He discussed the sociotechnical dynamics of negative emissions, carbon removal, and solar geoengineering.

### ❖ House of Lords Committee Session

IGS Director Benjamin Sovacool testified at the United Kingdom Parliament's Lords Environment and Climate Change Committee during their September session on electric vehicles.

### ❖ United Nations Economic Commission for Europe

IGS Senior Fellow David Jermain presented to the UNECE's Sustainable Energy Committee with research insights into offsetting losses from coal phaseouts by phasing in coal as a resource for carbon materials precursors, hydrogen energy production, renewable energy on mine sites, and additional value streams.



# Notable Media Quotes

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“There’s a rapidly growing body of evidence on health impacts of folks living near oil and gas production wells.” But there’s less robust research on the health impacts of other fossil-fuel infrastructure like storage facilities, as the field is still relatively new.

**Jonathan Buonocore, *The Boston Globe***

“More Fossil-fuel Facilities Are in Environmental Justice Communities, BU Researchers Find”



“

“It’s a real city planning challenge for extremely valuable real estate. It’s going to take some very intentional planning on the part of decision-makers to prioritize access to charging infrastructure in neighborhoods that historically have lacked access to all types of public amenities in that space.”

**Cutler Cleveland, *The Bay State Banner***

“\$12.5 Million to Help Develop EV Infrastructure”

“

“In one word, the way to design strategies is partnership. Heat is complex, solutions are complex. I’m a scientist, I have expertise in certain areas. But who needs to be sitting at the table are the communities that are impacted by heat, the city governments that are investing in cooling solutions around the city, and physicians.”

**Patricia Fabian, *The Lancet***

“Spotlight on Health & Climate Change: Extreme Heat and Health”



# Events: ClimaTech Conference



Pictured are (from left) IGS advisory board member Penni McLean-Conner (Eversource), IGS core faculty Lucy Hutyra (Earth & Environment), IGS Associate Director Patricia Fabian (Environmental Health), and Melissa Lavinson of the Massachusetts Office of Energy Transformation discussed community-based solutions for urban heat at the inaugural ClimaTech conference. Photo by Laura Hurley.

## Climate Disinformation, Heat Resilience & Sustainability Leadership: IGS & BU at ClimaTech

IGS experts took the stage with global climate and technology leaders at the first-ever **ClimaTech** conference, hosted in Boston June 3-5. Co-organized by Massachusetts Governor Maura Healey, Boston Mayor Michelle Wu, and industry and academic partners including BU, ClimaTech convened professionals from a wide range of industries and sectors to exchange innovative ideas and mobilize climate action.

“When you talk about even reducing emissions, you’re talking about technologies that you need to deploy in manufacturing, in housing, in transportation, in healthcare, you could go on and on and on,” Healey said at the event. “That’s basically what climate technology is. And we think that with the likes of people attending in this room and who will be attending and presenting at this wonderful conference, we have an ability to do it in an unparalleled way right here.”

Throughout the conference, speakers emphasized the indispensable role of academic institutions in fueling both climate solutions and economic growth.

“Boston’s business community is unique in that we benefit from being home to the best colleges and universities in the

world,” Wu said in her opening remarks. “These institutions offer not only the best and brightest talent but also highly developed technical infrastructure that lends itself to creating groundbreaking climate technology.”

From IGS, Michelle Amazeen, affiliated faculty in the College of Communication, shared her innovative research on how news organizations contribute to climate disinformation. IGS Associate Director Patricia Fabian (School of Public Health), core faculty Lucy Hutyra (Earth & Environment), and advisory board member Penni McLean-Conner, executive vice president of customer experience and energy strategy at Eversource Energy, participated in a panel alongside Melissa Lavinson, executive director of the state’s Office of Energy Transformation. They discussed the urgent need for heat resilience solutions in urban communities while transforming our energy infrastructure. At a panel on academia’s role in meeting the climate crisis, BU Senior Advisor to the President and IGS affiliated faculty Kenneth Lutchten discussed the necessity of uniting policymakers, investors, urban planners, community leaders, researchers, and others to achieve meaningful climate progress.



A version of this article, authored by Alison Gold, originally appeared on the IGS [website](#).



# IGS & BU Events

## FILM SCREENING

### ❖ Inundation District

More than 200 members of the BU community registered to attend a free screening of *Inundation District*, the latest documentary by David Abel, Pulitzer Prize-winning reporter, BU College of Communication professor of the practice in journalism, and IGS affiliated faculty. *Inundation District* explores the implications of one city's decision to ignore the threats posed by climate change and spend billions of dollars building a new waterfront district — on landfill, at sea level, and in the bullseye of rising seas. The screening was followed by an audience Q&A. The event was co-hosted by IGS and the College of Communication in partnership with BU Sustainability and the Initiative on Cities.

## RESEARCH ON TAP

*Lightning talks hosted by the Office of Research, engaging an audience of BU faculty, staff, and graduate students:*

### ❖ Measuring Corporate Impacts on the Environment & Society

Within the investment industry, the metrics commonly used to gauge the social and environmental impact of businesses, known as ESG (environmental, social, and governance), are an increasingly important topic. However, the factors they represent are challenging to measure. This *Research on Tap* presented a wide range of research from BU faculty helping to develop E, S, and G metrics that better reflect and communicate social and environmental impact. The event was hosted by IGS Associate Director Nalin Kulatilaka, with presentations by IGS core faculty Jonathan Buonocore and Sucharita Gopal and IGS affiliated faculty Jesse Chan.

### ❖ Climate Change and Infectious Diseases

Climate change and associated aberrant weather patterns are responsible for a wide array of health issues, posing an urgent need for research to guide evidence-based public health policy. This *Research on Tap* convened students, faculty, and research scientists from various disciplines within BU to share their ongoing projects, available resources, datasets, and ideas to facilitate new collaborations within the University. Hosted by IGS affiliated faculty David Hamer and core faculty Greg Wellenius, both representing the School of Public Health, this event included presentations by IGS core faculty Les Kaufman and IGS affiliated faculty Ethan Deyle, Michael Dietze, and Jessica Leibler. Following these presentations, Hamer moderated a panel including Wellenius and IGS Executive Director Rebecca Pearl-Martinez.



IGS Executive Director Rebecca Pearl-Martinez (left) speaks on a panel at *Research on Tap: Climate Change and Infectious Diseases*. Photo by Benjamin Sovacool.

## RESEARCH FOR PEOPLE & PLANET WEBINARS

*IGS-hosted webinar series spanning topics across the Institute's research mission*

### ❖ Investigating Consumer Interest in Circular Take-Back Programs

Many major retailers have recently introduced circular take-back programs as part of their corporate sustainability strategies. IGS core faculty Remi Trudel, associate professor of marketing at the Questrom School of Business, *presented* his latest research on consumer perceptions of such take-back programs. His study drew on field data from Fortune 500 companies and eight experiments aimed at understanding the impact of these programs on purchase behavior and to what extent consumers value them.

### ❖ Promoting Solar Equity: Residential Photovoltaic Adoption Trends in New York State

IGS core faculty Robert Kaufmann and doctoral student Anita Tendler, both in the department of earth and environment, *presented* on the current state of the energy transition to clean energy sources like solar power, with a focus on the residential photovoltaic market in New York State. They highlighted the importance of ensuring equitable access to clean energy, particularly in lower-income communities that not only bear the burden of historical energy and environmental injustices but also lag in solar adoption rates.





IGS had the privilege of hosting Ugandan climate justice activist and Nobel Peace Prize nominee Vanessa Nakate for a memorable luncheon at IGS with the Institute's community of faculty, students, and staff. The BU African Studies Center organized Nakate's visit and made this inspirational event possible. Photo by IGS staff.



IGS Associate Director Arunima Krishna (right) moderated a Q&A session with the director of Inundation District, David Abel (left), College of Communication professor and IGS affiliated faculty. Photo by IGS staff.



Boston's first Green New Deal Director, Oliver Sellers-Garcia, gave the keynote at IGS's annual gathering. Photo by Ryan Smith, Rooted in Light Media.



Members of the BU community attended an open house celebration at IGS's new office on the Charles River Campus. Photo by IGS staff.



Power & People Symposium keynote speaker Matthew Tejada, senior vice president, environmental health, Natural Resources Defense Council. Photo by Molly Potter.





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*Photo by Ryan Smith, Rooted in Light Media.*

