

# BOSTON UNIVERSITY INSTITUTE FOR GLOBAL SUSTAINABILITY

Annual Report | 2023



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Institute for Global Sustainability

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# LETTER FROM EXECUTIVE LEADERSHIP

Dear Friends and Colleagues:

What a tremendous first year for the Institute for Global Sustainability (IGS)! In July 2022, we launched IGS to expand beyond the previous institute's focus on sustainable energy to all aspects of sustainability, with a new commitment to interdisciplinarity engaging all Boston University (BU) schools and colleges. We established research clusters on Planetary and Environmental Health, Energy Systems of the Future, and Climate Governance and Sustainability Transitions, all grounded in our distinctive approaches of equity and justice, robust data science, and real-world impact.



We wasted no time crafting innovative research projects and interdisciplinary teams in our first year. IGS awarded funding to BU faculty research on climate disinformation (College of Communication; MET; College of Engineering), health equity and big data (Earth & Environment; School of Public Health), and energy equity and health (School of Public Health). We launched Visualizing Energy to disseminate data-driven stories on energy equity, and the Impact Measurement and Allocation Program expanded research on corporate carbon targets. We were thrilled to win resources for projects investigating energy justice across the renewable energy supply chain (foundation), climate and health (federal government), green jobs from low-carbon buildings (industry), EV adoption (international), the socio-environmental dimensions of data centers (international), and fast-charging battery technologies (industry). These new projects brought in \$8.9M for BU researchers and our collaborators at other institutions. Our faculty leadership and core faculty have published 132 sustainability focused peer-reviewed articles, research papers, and books or chapters this year. Ensuring our research results impact policy and industry, we launched formal partnerships with the National Renewable Energy Laboratory and Schneider Electric.

This year IGS also established the beginnings of a robust sustainability research community across BU. Our new leadership team includes six faculty associate directors representing Earth & Environment in Arts & Sciences, College of Engineering, School of Public Health, Pardee School of Global Studies, College of Communication, and Questrom School of Business. We recruited 90 faculty from diverse schools and colleges to affiliate with IGS. Most serve as affiliated faculty, while a subset of 20 core faculty collaborate on developing and executing research projects. We expanded our advisory board to 10 members with expertise across energy, sustainability, health, and finance, and increased our circle of senior fellows to industry and policy leaders, all of whom share their real-world insights to make IGS research highly relevant outside academia. The Institute team supporting all of this, currently at eight staff, is poised to grow further in the coming year.

We are proud to be centering and elevating students in this new research community. IGS took over leadership of Campus Climate Lab, expanding the focus of campus-based research to all areas of climate change, sustainability, and equity and justice, and working closely with BU Sustainability to ground these efforts in university operations. Last summer, we launched a fellows program that has provided 14 graduate students with the opportunity to learn about sustainability topics across disciplines and advance their own research on topics as diverse as climate justice, battery technology, and urban heat islands. And this spring, sign-ups for our student notification list surpassed 500 graduate and undergraduate students across BU, who accessed exciting opportunities for special events, research and internship positions, and funding for student-led sustainability research. IGS was even named by a BU undergraduate who won the naming competition!

We're excited to share these first-year achievements in the pages that follow and invite you to join our continued efforts to deepen BU's contributions to innovative and impactful sustainability research.

Sincerely,

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

Rebecca Pearl-Martinez  
Executive Director, IGS

# HIGHLIGHTS OF 2022–2023

## Interdisciplinary Collaboration

IGS is now **90** faculty strong, representing 11 of Boston University's schools and colleges. This community is committed to advancing IGS's sustainability research in planetary and environmental health, energy systems of the future, and climate governance and sustainability transitions. In the past year alone their research has been **published** in top journals, including *Nature*, *Science*, *JAMA Network Open*, and more. Among their ranks are six faculty associate directors who are instrumental in coordinating efforts across disciplines and facilitating deep ties with Arts & Sciences, School of Public Health, College of Communication, Questrom School of Business, College of Engineering, and the Frederick S. Pardee School of Global Studies.

## Climate Change, Sustainability, and Justice

IGS leadership is deeply committed to the intersecting questions of climate change, sustainability, and justice. A few examples: Director Benjamin Sovacool is leading a project to explore what the transition to solar and wind energy would look like from the perspectives of feminist, anti-racist, and indigenous justice. Associate Director Patricia Fabian from the School of Public Health co-directs community-engaged research to build resilience against extreme heat in environmental justice communities. Associate Director Cutler Cleveland from Earth & Environment is exploring how energy systems could be transformed to address inequities by combining data analysis, visualizations, and stories that are getting picked up by the media. And Associate Director Emily Ryan from the College of Engineering is leading research projects that think through how social science and questions of justice can be further integrated with technology development.

## Financial Development and Growth

In its first year, IGS won a **\$500,000** grant from the Sloan Foundation on renewable energy justice. IGS was also part of a **\$6.7 million** three-year award from the National Institutes of Health to the BU School of Public Health and Harvard T.H. Chan School of Public Health to create a Research Coordinating Center on climate change and health. IGS additionally won a **\$1.1 million** award with NTNU Social Research on the impacts of data centers in Norway's clean energy transition, plus nearly **\$1 million** in grants from the National Science Foundation and LG Energy Solution on battery research. IGS is a growing source of seed funding as well, with **\$178,000** going to faculty projects through IGS's Sustainability Research Grant in partnership with the School of Public Health, Focused Research Programs led by the Rafik B. Hariri Institute for Computing and Computational Science & Engineering, and the Dean's Catalyst Award in the College of Engineering. Since 2022, IGS's Graduate Student Summer Fellows program has awarded **\$70,000** in student seed funding. Adding to this, Campus Climate Lab awarded **\$115,000** this past year to student-mentor teams under IGS's leadership, for a total of \$219,000 since launching in 2020. More broadly, IGS faculty engaged in sustainability research across BU have served as a principal investigator (PI) or co-PI in pursuing **\$139 million** worth of research proposals.

## ■ BU INSTITUTE TO FOCUS ON EQUITY AND JUSTICE IN THE CLIMATE CHANGE FIGHT

Transitioning the world to sustainable energy without leaving marginalized communities behind is a top priority for new leadership team, including director Benjamin Sovacool

In February 2022, the Intergovernmental Panel on Climate Change (IPCC) released its bleakest forecast of the planet’s health yet: “The rise in weather and climate extremes,” it warned, “has led to some irreversible impacts as natural and human systems are pushed beyond their ability to adapt.” This past spring, the IPCC outlined the work that needs to happen to avert the worst of the climate disaster. One of those charged with crafting its recommendations was [Benjamin Sovacool](#). A social scientist and internationally renowned climate change expert, Sovacool is the director of Boston University’s Institute for Global Sustainability (IGS), a hub for research on energy systems of the future, planetary and environmental health, and climate governance and sustainability transitions.

“There’s no shortage of challenges to address,” says Sovacool, who is also a BU Arts & Sciences professor of earth and environment.

Given the scale of the solutions needed to address these huge issues, Sovacool is welcoming expertise from every sector and school to broaden the focus of sustainability at BU. As well as looking at ways to replace existing fossil fuel infrastructure with low-carbon or zero-carbon alternatives—like wind, solar, and hydro-electricity—Sovacool says one of the



biggest challenges is figuring out how to do that in every part of the world in a fair and just way.

“Fifteen years ago, it was rare to see the word ‘justice’ alongside things like ‘electricity’ or ‘electrons,’” says Sovacool.

[Rebecca Pearl-Martinez](#), executive director of IGS, has worked for decades to address inequality in energy policy.

“Transitioning to renewable energy is the most significant undertaking in our modern history and we need to do that quickly and sustainably, but also equitably,” says Pearl-Martinez. “We have to make sure no one is left behind.”

Climate and environmental justice efforts—like tackling the preponderance of highly polluting power plants in low-income neighborhoods and communities of color—are increasingly embraced by scientific and environmental communities, Sovacool says, but no one has figured out how to perfectly execute a plan to decarbonize a city or state without some sort of trade-offs or negative consequences.

“Energy policy and climate technology aren’t just economic systems, they are also systems that can ruin

lives, systems that can build wealth, constrain the provision of education, or empower women,” Sovacool says. “There are all sorts of very complex interactions that research wasn’t focused on in the past.”

Sovacool and Pearl-Martinez see IGS, and the whole BU community, as well positioned to provide solutions to these complex issues. As difficult and increasingly urgent as the work of expanding low-carbon technologies might be, the growing adoption of climate justice initiatives around the world gives Sovacool hope.

In the chapter he led for the IPCC report, he and other researchers focused on the progress in climate action of non-state actors—cities, corporations, and social movements. And in the next 10 years, he says, non-state actors will save more carbon than many nations. There are currently 50 different places in the world, including in the United States, that are taking climate action with justice and equity at the forefront.

“This shows we’re moving beyond national policy,” Sovacool says.

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

# MISSION, RESEARCH & APPROACH

**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.**

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## **PLANETARY & ENVIRONMENTAL HEALTH**

Climate change, air pollution, water insecurity, desertification, and other environmental factors threaten the health of the planet and human survival. To address these pressing problems, IGS is pursuing research that evaluates spatial analysis of land-use changes, vulnerabilities in the built environment, forest management, the water-energy nexus, climate models, disparities in access to healthcare, community exposure to toxins, and more.

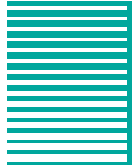
## **ENERGY SYSTEMS OF THE FUTURE**

Our current energy system is a potent contributor to global greenhouse gas emissions. IGS is pursuing research that investigates clean, affordable, accessible systems and advises the energy industry, regulators, and policymakers on the wide-ranging changes needed to meet ambitious climate goals. Research topics focus on both supply and demand, including renewables, energy storage, efficient heating and cooling technologies, electric vehicles

and mobility transitions, distributed energy systems, energy access, clean cooking fuels, and more.

## **CLIMATE GOVERNANCE & SUSTAINABILITY TRANSITIONS**

Sustainability requires new modes of governance, policy mechanisms, and business models along with new community partners. Policymakers, corporate leaders, and communities face the challenge of transitioning energy systems while addressing socio-economic considerations and energy justice. IGS is tackling the politics and business of sustainability transitions at all levels, including corporate social responsibility and performance, urban transitions, new modes of governance, net-zero supply chains, and more.



# LEADERSHIP

## EXECUTIVE LEADERSHIP



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

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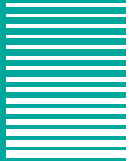


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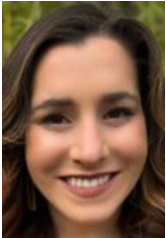


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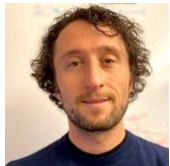


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Photo credit: Ryan Smith, Rooted in Light Media

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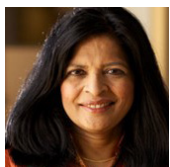
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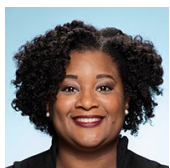
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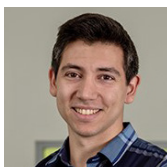
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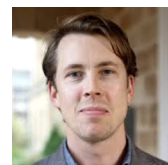
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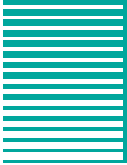
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**Abigail Sullivan**, Assistant Professor, Earth & Environment

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**Christos Cassandras**, Professor, Electrical and Computer Engineering and Systems Engineering

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

**Srikanth Gopalan**, Professor, Mechanical Engineering

**Malay Mazumder**, Research Professor, College of Engineering

**Uday Pal**, Professor, Mechanical Engineering

**Sahar Sharifzadeh**, Associate Professor, College of Engineering

**Andre Sharon**, Professor, Materials Science & Engineering and Mechanical Engineering; Director, Fraunhofer Center for Manufacturing Engineering

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

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

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

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**Jesse Chan**, Assistant Professor, Accounting

**Andrew King**, Professor, Strategy and Innovation

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

**Richard Stuebi**, Lecturer, Strategy and Innovation

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# SENIOR FELLOWS



Senior Fellow Ardeth Barnhart pictured with 2022 IGS Graduate Student Summer Fellow Jing Trerayapiwat at Growing Our Community event on October 27, 2023. Photo credit: Ryan Smith, Rooted in Light Media

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## **Dorothy Robyn**

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## **Kurt Roth**

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## **Pablo Suarez**

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## **Philip Warburg**

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## **Adam Warren**

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## **Yingxia Yang**

Vice President of Commercial Strategy, BrightNight

# CLIMATE GOVERNANCE & SUSTAINABILITY TRANSITIONS

## ■ TWEETS, ADS, AND LIES: RESEARCHERS ARE FIGHTING AGAINST CLIMATE MISINFORMATION

Massachusetts' deputy climate chief joins BU symposium on research aiming to track—and fight back against—climate lies

Scientists have known for decades that the continued use of fossil fuels, like gas, oil, and coal, is the primary reason for the climate crisis. Global temperatures are soaring due to excessive greenhouse gas emissions, but with urgent, systemic actions, there is still time to make a difference. But how do we ensure people get accurate and scientific information about climate change that can help save the planet? It starts with taking on climate lies.

In a yearlong project, called [Data and Misinformation in an Era of Sustainability and Climate Change Crises](#), researchers at Boston University worked to do just that. They recently shared their findings during a full day research symposium held at the Center for Computing & Data Sciences (CDS). The event, aptly titled Taking on Climate Lies, took a deep dive into the project's three main research areas: how climate misinformation permeates social media platforms, in particular Twitter and Reddit; misleading advertising in mainstream media; and language used to sow doubt about the urgency of climate change.

"Misinformation is pervasive, it's at a very unique moment in our culture, and a post-truth society cannot survive," said Benjamin Sovacool, director of BU's Institute for Global Sustainability (IGS). "This work couldn't be more timely."

From the 17th floor of CDS, where the symposium took place, Boston's skyline was on full display—a place threatened by increasing sea level rise and extreme heat. The Charles River glistened below, and the city's famous red and white Citgo sign was visible in the distance through the glass windows behind the audience, as researchers presented findings from the project.

"We need a championing of stories," said Jonathan Schrag, Massachusetts' deputy climate chief and director of investment for decarbonization and resilience, who delivered the keynote address. "We need accurate information that clearly articulates where to invest."

He also advocated for making that information easily accessible for consumers, not just to fight climate lies, but also so they can take full advantage of tax credits passed with the Inflation Reduction Act and other incentives that make decarbonizing and electrifying homes and cars more affordable.



*Jonathan Schrag, Massachusetts' deputy climate chief*

### Climate Misinformation on Twitter

One major theme throughout the symposium was the fossil fuel industry's role in shaping the climate conversation. [Irena Vodenska](#), a BU Metropolitan College professor of finance and IGS core faculty member, and a cross-disciplinary team of BU researchers shared their efforts to examine climate mis- and disinformation on Twitter and Reddit, a tactic that became part of the fossil fuel industry's communication strategy. They analyzed over 22,000 tweets that spread climate disinformation, and identified over 60 Twitter accounts funded by ExxonMobil—the world's largest publicly traded oil and gas company—that promote false and misleading information about the climate crisis. By further analyzing the tweets, they surfaced two major recurring themes from the ExxonMobil-linked accounts: "climate change is not threatening" and "Biden's energy plans hurt economic growth."

### Separating Truth from Lies

Alongside social media, one of the most effective ways climate lies spread is through native advertising—a type of paid content that looks deceptively like real news



*Climate disinformation initiative research team pictured with IGS executive leadership and College of Communication Dean Mariette DiChristina.*

articles. [Michelle Amazeen](#), a BU College of Communication associate professor of mass communication, advertising, and public relations, and [Chris Wells](#), a COM associate professor of emerging media studies and core faculty in IGS, identified the news publications that run the most native advertisements and the companies that pay for them. “It’s a form of camouflage,” Amazeen says. They looked at the top 50 English-language news organizations by web traffic in the US and found that 26 have published native advertising. Those included the New York Times, Washington Post, Wall Street Journal, USA Today, CNN, and the HuffPost. A single native advertising article can cost over \$500,000, making it an extremely enticing revenue stream for media organizations that have notoriously struggled financially since the early 2000s.

The researchers showed dozens of native advertisements paid for by companies like Chevron, the American Petroleum Institute, and Energias de Portugal. Amazeen and Wells have found that disclaimers—like “Paid Post”—do little to alert readers. They explained that these types of ads misrepresent the full extent to which fossil fuel companies are responsible for climate change—often touting their efforts to be “green” and “sustainable,” without acknowledging that those efforts make up a tiny fraction of their business, or that they’re causing the damage in the first place.

Amazeen and [Arunima Krishna](#), a COM assistant professor of mass communication, advertising, and

public relations, also shared how all these types of climate misinformation influence people’s beliefs. In 2021, Krishna surveyed 645 Americans about their views on climate change, categorizing the public into four groups: disinformation immune, disinformation vulnerable, disinformation receptive, and disinformation amplifying—the smallest group, who hold extremely negative attitudes about climate change, doubt humans’ role in accelerating it, and are motivated to spread the disinformation they believe.

According to Krishna, having these categories can lead to better targeted information campaigns that can more effectively educate people about the realities of climate change. She told the symposium audience that, based on the research, before engaging with or trying to influence someone who is vulnerable or has accepted false information about climate change, or any topic, it’s imperative to first understand the other person’s perspective.

“Despite the issues, social media is an incredibly dialogic platform,” Krishna says. “I think that we need to remember that, and go back to the roots of social media, which emerged as a way to encourage dialogue among people who can’t otherwise interact.”

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

## ■ VISUALIZING ENERGY LAUNCHES

What are the health impacts of oil and gas production in the United States? What are the major changes in energy sources used to generate electricity in the world over the past century?

These are just a couple of the questions that IGS's new science communication project, called [Visualizing Energy](#), has already begun to answer. To learn more about the project and its launch, we turned to two key collaborators: [Dr. Cutler Cleveland](#) and [Dr. Heather Clifford](#). Dr. Cleveland serves as an IGS associate director and a professor within BU's department of earth and environment. Dr. Clifford is a data scientist with IGS and has over six years of experience researching climate change and anthropogenic impacts on the environment.

### What is the Visualizing Energy project?

Visualizing Energy is an open access, interdisciplinary science communication project that aims to increase actionable knowledge about a sustainable and just energy transition. We knit data analysis, visualizations, and the written word into stories that reveal how our energy system can be transformed to reduce inequity, steer humanity from climate disaster, improve health and other social outcomes, and lead to healthier natural systems. Visualizing Energy is a public good; its motivations and methods are transparent, and its data products are freely available to all.

### What are the short-term and long-term goals for this project?

Our initial focus is on three interconnected areas: the connection between energy and human well-being; the history of energy transitions; and equity issues surrounding energy transitions (energy justice, energy burden, energy poverty, energy insecurity). Our content is

already in use by faculty around the world in STEM disciplines, the social sciences and humanities, and in professional schools such as public health, business, and law. We collaborated with [WBUR](#) on equity issues associated with electric vehicles, and were featured on Andy Revkin's [Sustain What?](#) show.

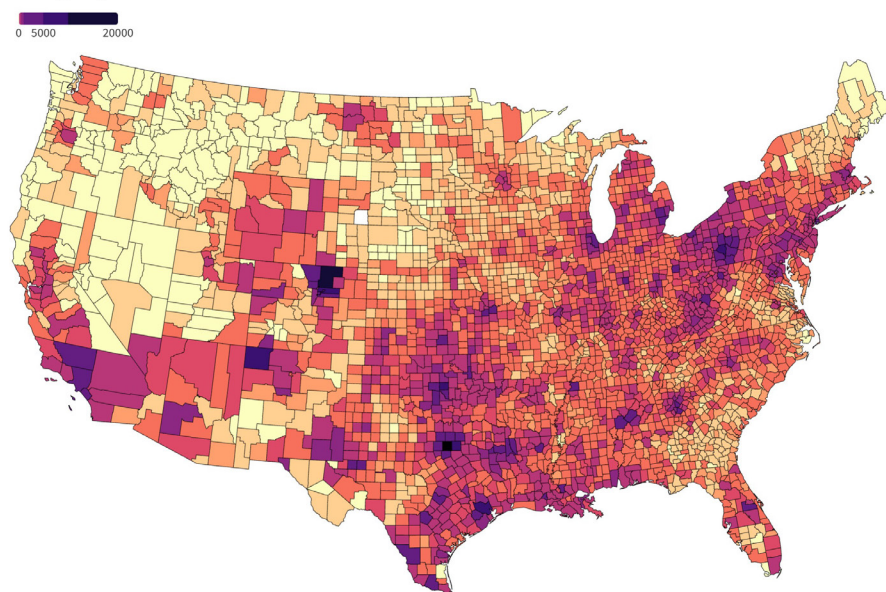
In the future we plan to expand our library of visualization templates, including geospatial data and "scrollytelling," expand our topic coverage and quantity of content, and deepen our outreach and communication capacities. Our goal is to build sustained and strong collaborative relationships with academics and research organizations to stay on the leading edge of knowledge generation in this important space. We hope to be an incubator and focal point for new research and communication in this space.

### Why is it important to use data analysis and visualizations to address pressing societal issues such as climate change?

Visualizing Energy is rooted in the principle that reliable data, rigorous analysis, and communication to a wide swath of society are essential to sound decision-making and good citizenship. We are awash in data but deficient in the shared understanding of the interconnections among energy, society, and the environment. When coupled with rigorous analysis, visualization is essential to communicate with a broad audience. It reveals connections that are cumbersome in words. A good visualization makes it easier for the viewer to quickly understand the information presented, and to apply it to other situations.

A version of this article authored by Katherine Gianni and Giana Carrozza originally appeared on the [BU Experts Medium page](#).

### New cases of childhood asthma exacerbations caused by air pollution from oil and gas production in 2016



Shown here in this recently published [Visualizing Energy data story](#) are the estimated number of one-year new cases of asthma exacerbations in children ages 5-17 caused by fine particulate matter and nitrogen dioxide emissions from oil and gas production, based on research by IGS core faculty [Jonathan Buonocore et al.](#)

## ■ IMPROVING SUSTAINABLE INVESTING METRICS

Today's investors rely on ESG (environmental, social, governance) metrics that lack clarity and consistency, underscoring the need for better data to measure corporate environmental and social impacts. IGS's [Impact Measurement & Allocation Program \(IMAP\)](#), jointly led with the [Susilo Institute for Ethics in the Global Economy](#) at the Questrom School of Business, brings together academic researchers and financial asset managers to research new sources of data for ESG metrics, help develop new metrics, and analyze the use of metrics.

IMAP hosted its first annual [fall workshop](#) in 2022, gathering 50 academic and corporate leaders to address making corporate carbon targets more effective. There was consensus that:

1. Current corporate targets are insufficient to reduce global emissions on the scale required, with the largest reductions scheduled in the long term rather than near term.
2. Better measures of carbon emissions are needed, along with more meaningful allocation of these emissions to responsible parties.

### Select IMAP research projects addressing these issues:

#### *What is the risk associated with corporate carbon targets?*

Investors—and the public—want to know if a company is likely to meet its carbon emissions reduction targets. This project aims to develop a novel methodology to predict that likelihood. Funding from Calvert Research and Management has allowed the project's initial scope to be expanded. This project is led by [Nalin Kulatilaka](#), IMAP director, IGS associate director, and Wing Tat Lee Family Professor of Management, Questrom School of Business; and [Susan Fredholm Murphy](#), IMAP executive director.

#### *Who's deforesting for palm oil?*

Despite industry sustainability standards, palm oil suppliers are clearing forests. This project used satellite imagery to assess compliance by overlaying forest changes in Indonesia and Malaysia with supplier locations. It is led by [Sucharita Gopal](#), IGS core faculty, IMAP affiliated faculty, and professor of Earth & Environment, Arts & Sciences.

## ■ EXAMINING RENEWABLE ENERGY'S HIDDEN IMPACTS

### [Advancing Transformational Energy Justice across the Renewable Energy Supply Chain](#)

With the support of a \$500,000 grant from the Sloan Foundation, Benjamin Sovacool, director of IGS and professor, Earth & Environment, is heading up a new project looking at solar and wind energy transitions across their supply chain in the US to see what justice implications and community vulnerabilities emerge. The research team will examine the less visible production impacts—from mining minerals, manufacturing, and waste. In doing so, they will integrate feminist, anti-racist, Indigenous, and whole systems justice theories and conduct eight case studies, all with the goal of providing much-needed policy recommendations to help steer renewable energy transitions onto just and equitable paths.

### Inaugural IMAP Fall Workshop

Participating industry luminaries included panelists:

**John Streur**, chairman of Calvert Research and Management and IMAP board member (pictured top)

**Patricia Hudson**, senior finance advisor for the Glasgow Financial Alliance for Net Zero Secretariat and the UN High Level Climate Champions (pictured bottom)

**Dan Bakal**, senior program director of Climate & Energy at Ceres

**Riva Krut**, IMAP senior research fellow and former VP and chief sustainability officer at Linde PLC





# ENVIRONMENTAL & PLANETARY HEALTH

## ■ NEW CENTER WILL FOSTER RESEARCH ON CLIMATE AND HEALTH

The first-of-its-kind venture will spur collaborative research, share data resources, and offer mentorship and capacity-building to emerging and established scholars across the globe.

Confronting the increasing threat of climate change requires global cooperation, coordinated action, and knowledge sharing and co-creation to limit further warming and build resilient communities.

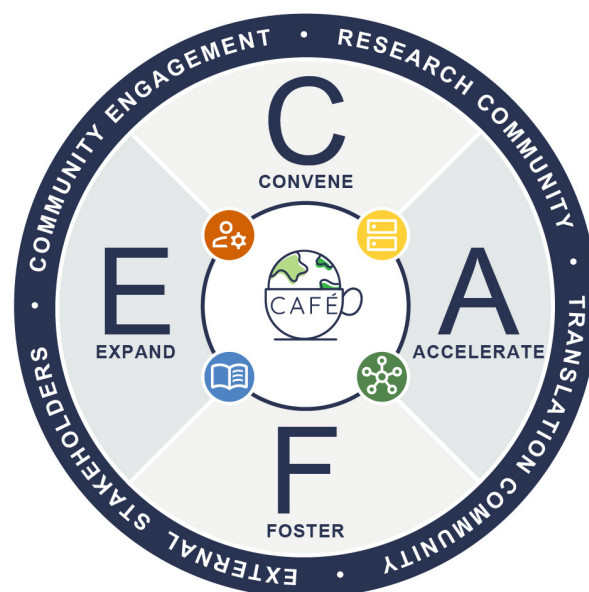
Thanks to a \$6.7 million, three-year grant from the National Institute of Environmental Health Sciences (NIEHS), part of the National Institutes of Health (NIH), researchers from Boston University School of Public Health (BUSPH) and Harvard T.H. Chan School of Public Health (Harvard Chan School) are advancing these critical efforts with the launch of the nation's first and only Research Coordinating Center (RCC) dedicated to accelerating research and translation on the health impacts of climate change.

Named the **BUSPH-Harvard Chan School CAFÉ**, the CAFÉ will Convene, Accelerate, Foster, and Expand a global network of emerging and established researchers from a variety of sectors who are studying issues relevant to the multi-layered consequences of climate change on human health and the environment.

This initiative aims to diversify and expand the climate and health field, and break long-standing barriers to collaboration in academia by providing coordinated research support and opportunities to climate and health scholars across the globe.

The CAFÉ will be led jointly by [Gregory Wellenius](#), professor of environmental health and BU Institute for Global Sustainability (IGS) core faculty; [Amruta Nori-Sarma](#), assistant professor of environmental health and IGS affiliated faculty; and Harvard Chan's Francesca Dominici, Clarence James Gamble Professor of Biostatistics. The partnership will leverage the knowledge and resources between the two institutions to accelerate climate and health data collection and management, share data resources and tools, foster collaborative projects, and keep a pulse on the evolving science within key research areas.

"Our goal is to share our wisdom, expertise, and resources on a national and global scale," says Wellenius, who is also director of BUSPH's Center for Climate and Health. "We hope to bring people together and improve data sharing in ways that will make everyone working to



*Research Coordinating Center on Climate and Health, led by BU and Harvard Schools of Public Health*

translate cutting-edge research into meaningful solutions more successful and effective."

Capacity building—through training, pilot grant opportunities, and mentorship—will be a key priority of the CAFÉ, with an emphasis on collaboration with minority-serving institutions, such as historically Black colleges and universities.

The CAFÉ aims to bring together partners from across a number of sectors beyond academia, including government agencies, community-based and non-governmental organizations, industry, foundations, and potential funders.

IGS's [Benjamin Sovacool](#), director and professor of Earth & Environment, and [Rebecca Pearl-Martinez](#), executive director, will co-lead the resource function of the CAFÉ, working to facilitate collaboration across this community of researchers with the goal of effecting positive change in policy and practice.

Participating faculty and staff at BU will conduct research or provide other support to the CAFÉ, including several additional IGS core and affiliated faculty: [Jonathan Levy](#), chair and professor of environmental health, [Patrick Kinney](#), Beverly A. Brown Professor of Urban Health, [Kevin Lane](#), assistant professor of environmental health, and [Pamela Templer](#), chair and professor of biology.

A version of this article authored by Jillian McKoy was originally published by [BUSPH](#).

## ■ MAPPING THE PUBLIC HEALTH IMPACTS OF ENERGY INFRASTRUCTURE

### Energy & Equity Exposures Database for Population Health

IGS awarded a Sustainability Research Grant in partnership with the Boston University School of Public Health (SPH), paving the way for major advancements in energy sector research on the health and societal implications of different energy transition pathways. To overcome a significant barrier in understanding how energy decisions affect population health in the US, the research team will launch a much-needed harmonized national geospatial database of energy infrastructure. Called the Energy & Equity Exposures Database for Population Health, it promises to deliver an innovative new tool and method for comparing different types of energy infrastructure exposures (fossil fuel pollutants and other related hazards) between communities, with a focus on environmental justice. The year-long project will also establish an energy epidemiology framework, putting a public health emphasis on studying energy-related risk factors, policies, and the co-benefits of clean energy programs. The project team is led by IGS core faculty in SPH, including [Jonathan Buonocore](#), assistant professor, Environmental Health, and [Mary Willis](#), assistant professor, Epidemiology.

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

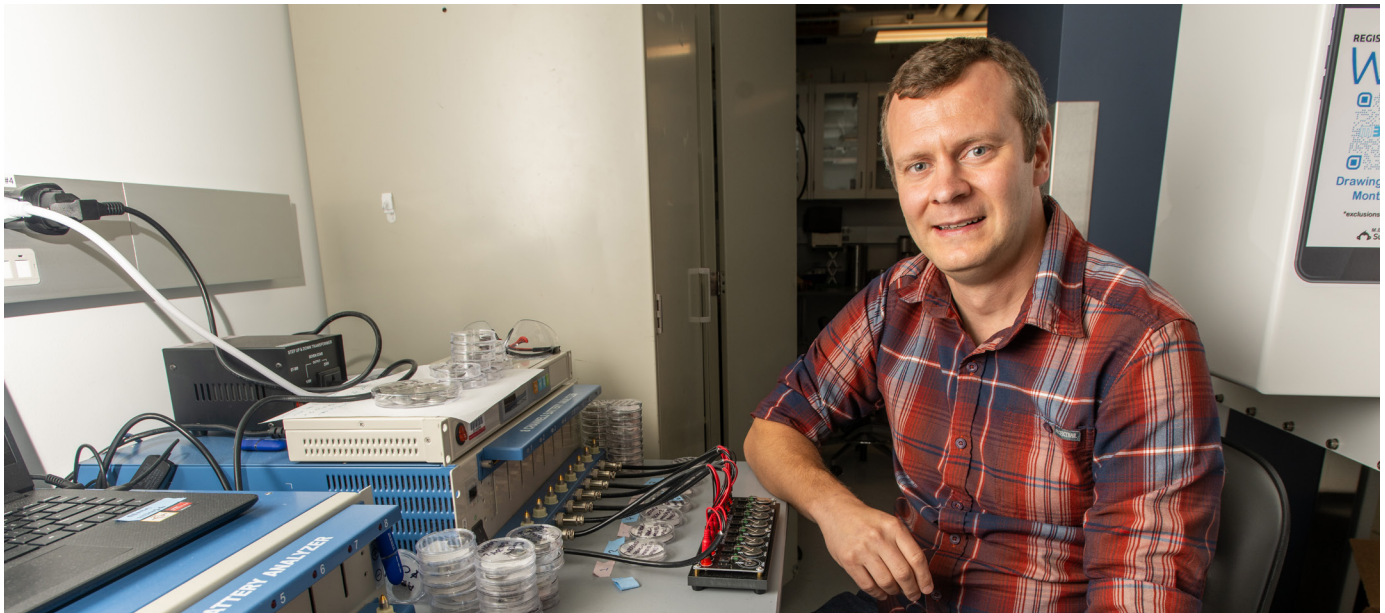
### Health Equity in the Wake of Continued Climate Change: Leveraging Big Data to Inform Action

IGS co-sponsored a new Focused Research Program led by the Rafik B. Hariri Institute for Computing and Computational Science & Engineering to solidify Boston University's early leadership on climate and health research that drives solutions and champions 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 to support collaboration and accelerate the university's pace of research and translation in this area is led by IGS core faculty [Gregory Wellenius](#), professor of Environmental Health and director of the Center for Climate & Health, and IGS affiliated faculty [Lucy Hutyra](#), professor of Earth & Environment and director of the BU Biogeosciences Program.



Photo credit: Tom Wang/Shutterstock.com

# ENERGY SYSTEMS OF THE FUTURE



College of Engineering Assistant Professor Joerg Werner. Photo credit: Cydney Scott for Boston University Photography

## ■ RESEARCHING THE FUTURE OF BATTERIES

### Mapping microscale lithium transport dynamics inside architected electrodes to co-optimize battery energy density and power density

A two-year BU project is underway to transform battery performance, backed by a Dean's Catalyst Award in the College of Engineering (ENG). Led by IGS core faculty in Mechanical Engineering, Assistant Professors [Sean Lubner](#) and [Joerg Werner](#), the project focuses on two pivotal goals: 1.) developing batteries that can rapidly charge and discharge without affecting lifespan; and 2.) optimizing both energy and power density, giving smaller batteries more output. To this end, the team is exploring the unknown reasons for low efficiency and battery failure during quick charging with the use of a new technique that allows real-time battery measurement capabilities. Their research into the future of batteries could be significant for advancements in electric vehicles, grid storage, and handheld electronics. IGS is co-sponsoring this effort to support ENG in incubating novel, interdisciplinary ideas towards sustainability transitions.

### Physical-chemical stabilization of electrodeposition

To advance next-generation batteries that could be the key to longer-range electric vehicles, grid-level storage for renewables, and more, it is essential to understand and control electrodeposition. [Emily Ryan](#), an associate director at IGS and associate professor of Mechanical Engineering, was recently awarded \$546,000 in funding from the National Science Foundation through IGS to study the stability of material interfaces in lithium-ion batteries. In collaboration with researchers at The Hebrew University of Jerusalem, Ryan will study electrodeposition and how it produces stable or unstable interfaces under different material and operating conditions. Electrodeposition is the deposition of metallic ions (disassociated in an electrolyte) onto an electrically conductive surface (the electrode) in the presence of an electric field.

## ■ NAVIGATING TWIN TRANSITIONS: DIGITALIZATION AND SUSTAINABILITY

### Limits to Digitalization (L2D)

As Norway strives to become the world's most sustainable data center hub, a new \$1.1 million international research collaboration between NTNU Social Research and Boston University, supported by the Research Council of Norway, will study the socio-environmental constraints to digital transformation in the context of Norway's transition to clean energy. BU researchers will investigate some of the whole-systems justice issues around data center development, look at harnessing data centers as resources in diverse energy markets, and design optimization models to enable efficient and sustainable operation of data centers. The BU team includes professors [Ayse Coskun](#), Electrical & Computer Engineering and director of the BU Center for Information & Systems Engineering, and [Benjamin Sovacool](#), Earth & Environment and director of IGS. The catalyst for this research partnership was BU's two-year study "Exploring Sustainability via Data Center-Grid Integration Across Different Geographies" (2021-2023), a project jointly sponsored by IGS and the Rafik B. Hariri Institute for Computing and Computational Science & Engineering.



## ■ PIONEERING RESEARCH ON ELECTRIC VEHICLE ATTITUDES IN THE MIDDLE EAST

### Electric Vehicle Adoption and Acceptance in the United Arab Emirates (UAE)

As countries pursue sustainable transitions, electric vehicles (EVs) are gaining increased attention. Although much is known about adoption of EVs in Europe and China, no academic research has explored the Middle East. A new study funded by the Ministry of the Interior of the United Arab Emirates analyzed the barriers and enablers for EV adoption in the UAE, offering a policy roadmap for mass adoption of EVs in the country. IGS Director [Benjamin Sovacool](#) and Senior Research Scientist [Darrick Evensen](#) collaborated with Khalifa University to design, administer, and analyze a survey of more than 5,000 UAE residents. Key findings point to UAE consumers having high interest in purchasing an EV, but little familiarity with owning and operating EVs. These findings will help the UAE government to design and implement policies that improve consumer awareness about EVs.

## ■ SIZING UP FRONTIER TECH FOR EMISSIONS REDUCTION

### Direct Air Carbon Capture and Storage (DACCS) Market Scan

An innovative negative emissions technology, DACCS, is sparking scientific, engineering, and commercial interest. With funding from the Boston Green Ribbon Commission, the research led by [Cutler Cleveland](#), an IGS associate director, and [Lucía Vilallonga](#), an IGS graduate student summer fellow, analyzed diverse sources to evaluate DACCS as a viable pathway for climate action. Boston's local building emissions reduction policy, one of the most ambitious in the United States, frames the assessment, offering guidance to the city on DACCS as a carbon dioxide removal strategy. The report shines a light on current costs, pilot projects, social and political considerations, and future possibilities for DACCS as a climate solution.

# PUBLISHED RESEARCH HIGHLIGHTS

Select research from IGS leadership and core faculty of the 132 sustainability focused peer-reviewed publications, research papers, and books/chapters published this past year.

Research Area	Publication	Title	Authors
Climate Governance & Sustainability Transitions	<a href="#">Nature Sustainability</a>	The effectiveness of global chemicals treaties	Henrik Selin
	<a href="#">Nature Energy</a>	Policy prescriptions to address energy and transport poverty in the United Kingdom	Benjamin Sovacool et al.
	<a href="#">Scientific Reports</a>	Social media enables people-centric climate action in the hard-to-decarbonise building sector	Benjamin Sovacool et al.
	<a href="#">Science</a>	Industrial clusters for deep decarbonization	Benjamin Sovacool et al.
	<a href="#">One Earth</a>	From Stockholm to Minamata and beyond: Governing mercury pollution for a more sustainable future	Henrik Selin et al.
	<a href="#">Nature Communications</a>	US cities increasingly integrate justice into climate planning and create policy tools for climate justice	Claudia Diezmartínez, Anne Short Gianotti
Planetary & Environmental Health	<a href="#">Environmental Research: Health</a>	Air pollution and health impacts of oil & gas production in the United States	Jonathan Buonocore et al.
	<a href="#">Environmental Epidemiology</a>	It's electric! An environmental equity perspective on the lifecycle of our energy sources	Mary Willis, Jonathan Buonocore et al.
	<a href="#">Nature</a>	Sub-continental-scale carbon stocks of individual trees in African drylands	Robert Kaufmann et al.
	<a href="#">Science of The Total Environment</a>	Urban green space and albedo impacts on surface temperature across seven United States cities	Patricia Fabian, Lucy Hutyra et al.
	<a href="#">Nature Energy</a>	Redlining and power plant siting	Jonathan Levy et al.
	<a href="#">Environmental Justice</a>	Facilitators and barriers for keeping cool in an urban heat island: perspectives from residents of an environmental justice community	Madeleine Scammell, Maria Pilar Botana Martinez, Patricia Fabian et al.
Energy Systems of the Future	<a href="#">Nature Communications</a>	Extreme fast charging of commercial Li-ion batteries via combined thermal switching and self-heating approaches	Sean Lubner et al.
	<a href="#">Scientific Reports</a>	Air-conditioning adoption and electricity demand highlight climate change mitigation-adaptation tradeoffs	Ian Sue Wing et al.
	<a href="#">The Electricity Journal</a>	Coal in the 21st century: Integrating policy with practice for just transitions	David Jermain, Z. Justin Ren et al.
	<a href="#">Journal of Materials Chemistry C</a>	Carbazole-substituted benzobisoxazoles: near-UV fluorescent emitters and ambipolar hosts for organic light-emitting diodes	Malika Jeffries-EL et al.
	<a href="#">ACS Energy Letters</a>	A polymer electrolyte with high cationic transport number for safe and stable solid Li-metal batteries	Emily Ryan et al.
	<a href="#">Scientific Reports</a>	Inefficient building electrification will require massive buildout of renewable energy and seasonal energy storage	Jonathan Buonocore et al.

# STUDENT RESEARCH

## ■ CAMPUS CLIMATE LAB



Since 2020: **31** Campus Climate Lab projects funded | **\$219K** awarded | **130** participants

Campus Climate Lab set a new record for the number of projects funded this past year. Student and mentor teams tackled a range of projects in support of BU's Climate Action Plan and advancing equity and justice through sustainability solutions. Some projects are just getting started with visioning and prototyping while others are in their pilot and implementation phases. Objectives include:

### Reducing Waste

- Reducing BU's food waste through machine learning in dining halls
- Designing a litter collector to reduce plastic waste on the Charles River
- Implementing sustainable practices to reduce waste in BU's biomedical research

### Curriculum Development

- Utilizing BU's wind farm data for climate-focused curriculum
- Cultivating climate action through an understanding of biological evolution in BU curriculum
- Enhancing BU's undergrad sustainability curriculum through student engagement

### Advocacy & Activism

- Creating an aquaponics art exhibit from algae growth research to educate about indigenous sovereignty and food security
- Promoting faith-based climate responses through campus group discussions
- Expanding campus gardens with a permanent greenhouse at BU

- Utilizing public art to advocate for sustainability and equity

### Climate & Health

- Assessing climate change impacts on Boston Medical Center's services
- Refining BU's extreme weather preparedness plan to better serve vulnerable groups
- Developing a bicycle-mounted air pollution monitor for data collection in Boston

### Buildings & Operations

- Transforming BU's Cummington Mall into walkable, eco-friendly space
- Targeting a 50% cut in BU's heating-related greenhouse gas emissions
- Enhancing energy efficiency in BU's buildings with real-time occupancy sensing
- Developing a rooftop solar power system with energy storage for 30% more output
- Identifying high-consumption water sources across BU campuses
- Harvesting clean energy from parking lot traffic



### Computing & Data Sciences Building: Sustainability Proving Ground

Harnessing BU's greenest building to study electric heating's grid impact with energy storage solutions, plus developing predictive models for zero-waste behavior.

## ■ ANTHONY JANETOS CLIMATE ACTION PRIZE 2023

### HOW TO MAKE RESEARCH LABS MORE SUSTAINABLE

The global research community creates billions of pounds of plastic waste a year—an award-winning BU Campus Climate Lab-backed project aims to make science more eco-friendly.

Scientists are increasingly joining together to warn the public about the world's current climate emergency and the dire consequences to come if we don't make big changes, fast. But the dirty secret is that many of these scientists' labs inadvertently contribute to the problem: one study finds that research labs produce 12 billion pounds of plastic waste a year.

When researcher Angie Serrano saw this statistic, she became inspired to do her part. In January 2022, Serrano, a Boston University Chobanian & Avedisian School of Medicine assistant professor of vascular biology, started her own lab at the Center for Regenerative Medicine (CReM) and realized it gave her the perfect opportunity to incorporate eco-friendly practices from the beginning.

Fortunately, BU had a way to help her get started. Serrano and her group pitched their idea of researching better ways the University's labs could recycle, reuse materials, and reduce energy use to the BU Campus Climate Lab. It's an initiative that supports student and faculty research teams to identify innovative climate solutions right on BU's campus—with the hope that findings can one day have a broader impact off campus.

They were one of 21 teams awarded Campus Climate Lab funding this school year. Their effort would prove so successful that it also earned one team member—Carly Golden (CAMED'27)—this year's Anthony

Janetos Climate Action Prize. Now, having recorded what worked and what didn't, they're creating a blueprint for other BU laboratories with guidelines on the best sustainable practices and the required financial commitment.

Since its founding three years ago, the Campus Climate Lab—now overseen by the Institute for Global Sustainability (IGS), in collaboration with BU Sustainability and the Office of Research—has funded 31 projects. These projects have helped make campus landscaping more eco-friendly, explored how to make Cummington Mall more walkable, and brought diverse campus faith groups together to talk environmental justice. Serrano's team was given a \$9,200 grant for its eco-friendly labs project.

**Rebecca Pearl-Martinez**, IGS executive director and Campus Climate Lab director, describes the Serrano Lab's project as innovative,

impactful, and well-executed. "BU has a tremendous number of labs that could learn from this," she says. A version of this article authored by Amy Laskowski originally appeared in [The Brink](#).

#### Last Year's Winners (2022)

**Olivia Henning (Environmental Analysis and Policy, CAS '22)**

**Lucía Vilallonga (Statistics and Computer Science, CAS '22)**

*"Quantifying Scope 3 Emissions Associated with Employee Travel at Boston University"*

Henning and Vilallonga collaborated with Questrom School of Business students to tackle BU's scope 3 emissions around air travel, furthering the BU Climate Action Plan's efficacy.



Pictured are (from left): Saylor Williams, Serrano Lab manager; Manpreet Singh (GRS'24), Campus Climate Lab program coordinator; Gloria Waters, BU vice president and associate provost for research; Rebecca Pearl-Martinez, IGS executive director and Campus Climate Lab director; Angie Serrano, a BU medical school assistant professor of vascular biology; Carly Golden (CAMED'27); Dennis Carlberg, associate vice president of BU Sustainability; and Greg Miller, CReM lab manager. Photo credit: Jake Belcher

## GRADUATE STUDENT SUMMER FELLOWS

### 2023 IGS FELLOWS & RESEARCH FOCUS



**Claudia Diezmartínez**

Earth & Environment, Arts & Sciences | *Justice in urban climate finance: analyzing how cities are funding and financing just urban transitions*



**Aaron Kahn**

Materials Science & Engineering, College of Engineering | *Thermal wave sensors for clean energy technology development*



**Jillian Mulligan**

Materials Science & Engineering, College of Engineering | *Reversible solid oxide cells for improving gridscale renewable energy implementation*



**Bright Olunusi**

Earth & Environment, Arts & Sciences | *Dynamics of human wildlife coexistence: A case study of American black bear in Massachusetts*



**Xiaofei Qin**

Earth & Environment, Arts & Sciences | *Multi-level, cross-sector evaluation of the integration of environmental justice into policies and action for urban heat island mitigation in the US*



**Sakshi Sharma**

Computer Science, Arts & Sciences | *Corporate carbon risk*



**Vedika Srivastava**

Computer Science, Arts & Sciences | *Energy justice in Massachusetts*



**Lucía Vilallonga**

Mathematics & Statistics, Arts & Sciences | *Improving numerical rainfall prediction methods using machine learning*



Photo credit: Rebecca Pearl-Martinez

**“Participating in the IGS fellowship program was hugely beneficial in that it gave me an opportunity to contextualize my research, which is generally centered in basic science, within a broader interdisciplinary framework. Meeting other fellows and speakers with focuses in social justice, data science, and environmental science, to name a few, has helped me to think about how my research fits into a larger picture of addressing issues of energy justice.”**

**Jillian Mulligan, PhD candidate, Division of Materials Science & Engineering**



## 2022 IGS FELLOWS & RESEARCH FOCUS



**Cori Barnes**

Earth & Environment, Arts & Sciences | *Exploring bicycle equity in Boston*



**Sasha Gilmore**

Earth & Environment, Arts & Sciences | *Marginalized community impacts and sustainability initiatives regarding climate heat extremes in Boston, MA*



**Allan Rego**

Mechanical Engineering, College of Engineering | *Investigating the feasibility of distributed energy storage and generation technology as a supporting infrastructure in the Azores' transition to renewable energy*



**Stephanie Strickland**

Media Studies, College of Communication | *Evaluating the role of message type and message source against intention to act among media consumers*



**Jing Trerayapiwat**

Chemistry, Arts & Sciences | *New materials screening for calcium looping sorbent at room temperature using photochemical decomposition*



**Liaoyuan Zhang**

Economics, Arts & Sciences | *A demand-side study for carbon valuation: willingness to pay estimation for US, China, and Sweden in 2020*



Fellows pictured with IGS Director Benjamin Sovacool. Photo credit: Rebecca Pearl-Martinez

**“There was something so enriching about being able to collaborate with people across disciplines who cared about the same issues. As a media scientist, being able to learn from scientists directly and help facilitate conversations on how to translate research into public impact helped ignite my passion for climate communications in a new way. This program exposed me to fields I would have otherwise never had access to, and I was brought to the table for important conversations around the future of our industry (and our planet) as I attempt to find my footing in it.”**

**Stephanie Strickland, MS, Media Science and Consumer Research**

# COLLABORATIONS

## ■ NATIONAL RENEWABLE ENERGY LABORATORY

Building collaborations on energy justice and climate health

Boston University's partnership with the National Renewable Energy Laboratory (NREL) to encourage novel research collaborations in the clean energy transition, an effort spearheaded by IGS, is leading to important new relationships for advancing equity and justice.

Through NREL's University Partnerships Program, IGS and NREL have formalized their first joint research appointments, making BU one of a select few universities nationwide to offer these collaborations. The inaugural appointees, IGS's Director [Benjamin Sovacool](#) and Executive Director [Rebecca Pearl-Martinez](#), both bring considerable expertise in environmental justice issues to the global challenge of finding decarbonization pathways and ensuring energy security. These appointments arrive at a critical time for the Biden administration's ambitious climate goals and implementation of the Justice40 Initiative by federal entities such as the Department of Energy and NREL.

IGS is also working closely with NREL leadership [Doug Arent](#), executive director of strategic public-private partnerships, and [Adam Warren](#), director of the Accelerated Deployment and Decision Support Center, who are both Senior Fellows of the institute.

Student mentorship is another significant part of IGS and NREL's work together. Three of IGS's [2023 graduate student summer fellows](#) conducted independent research in climate and energy justice with the guidance of NREL staff. Claudia Diezmartínez (Earth & Environment) is exploring how cities finance climate justice, Vedika Srivastava (Computer Science) is building an energy justice tool for the City of Boston, and Xiaofei Qin (Earth & Environment) is studying the integration of environmental justice in policies and action to support urban heat island mitigation.

Additionally, the partnership is leading to innovative research ties centered on environmental health and climate-health-justice topics. In a learning session for



NREL staff, [Jonathan Levy](#), IGS core faculty and chair of the Department of Environmental Health at the School of Public Health, presented his work on the vital connection between buildings, indoor and outdoor air quality, and public health. Levy shared insights from modeling studies that evaluated the public health and economic impacts of climate mitigation strategies for residential buildings, focusing on lower-income households. Rebecca Pearl-Martinez, IGS executive director, highlighted IGS research that intersects with NREL's implementation of Justice40, including efforts on residential decarbonization, energy equity data analysis and visualizations, climate justice in smaller US cities, and economic development around US offshore wind.

**“Putting a more sustainable and just future at the forefront of our partnership with Boston University is critical to navigating the global challenges of climate change and energy sustainability, and finding the best ways forward to a clean energy economy.”**

**Doug Arent, executive director of strategic public-private partnerships, NREL**

## ■ US & GLOBAL POLICY RESEARCH AND CONVENINGS

### National Academies' Board on Environmental Change and Society

Recognized as the most prestigious scientific body in the US, the National Academies of Sciences, Engineering, and Medicine elected IGS Director Benjamin Sovacool to serve as a member of its Board on Environmental Change and Society (BECS). Over the past year, Dr. Sovacool has further supported the National Academies, discussing equity in net metering for a Department of Energy study mandated by Congress and joining a BECS panel examining the private sector's contribution to US climate mitigation.

### Justice Week

As part of the US Department of Energy's (DOE) Justice Week 2022, IGS Director Benjamin Sovacool presented on Valuing Social Science and Interdisciplinary and Inclusive Energy Research, with an introduction by Shalanda Baker, director of the Office of Economic Impact and Diversity and secretarial advisor on equity at the DOE.

### Solar Colloquium

Benjamin Sovacool also shared his research insights as part of the DOE's Solar Colloquium speaker series, presenting "Towards improved solar energy justice: Exploring the complex inequities of a household low-carbon transition." Sovacool explored four types of inequities in household solar adoption, using a unique framework to identify various interconnected inequities and suggest paths for more sustainable and equitable solar energy adoption.

### Capitol Hill Briefing

IGS core faculty Gregory Wellenius, director of the Center for Climate & Health, and affiliated faculty Amruta Nori-Sarma, both of the School of Public Health, hosted a Capitol Hill briefing for Congressional staff on building equitable resilience to climate events. Nori-Sarma highlighted CAFÉ, a joint BU-Harvard environmental health research coordination center supported by a \$6.7 million National Institutes of Health grant. Wellenius moderated a Q&A session, followed by closing remarks from US Senator Edward Markey (D-MA).

### White House Summit

IGS Associate Director Patricia Fabian of the School of Public Health attended the White House Summit on Improving Indoor Air Quality.

### Environmental Protection Agency

IGS Associate Director Arunima Krishna of the College of Communication co-presented research on climate misinformation to staff of the US Environmental Protection Agency Office of Research and Development.

### US Government Accountability Office

IGS Executive Director Rebecca Pearl-Martinez took part in a BFO Connects panel at the US Government Accountability Office's Boston field office, discussing strategies in Massachusetts Gateway Cities to enhance climate resilience and economic opportunity.

### Bureau of Ocean Energy Management (BOEM)

IGS core faculty Les Kaufman of Biology and Sucharita Gopal of Earth & Environment are co-leading a team of scientists from Boston University, Blue World Research

**"Dr. Benjamin Sovacool has been called the father of energy justice. Many of us in this field really owe a debt of gratitude to him for his leadership in the field."**

**Shalanda Baker, director of the Office of Economic Impact and Diversity and secretarial advisor on equity at the US Department of Energy**

Institute, and the National Oceanic and Atmospheric Administration's National Centers for Coastal Ocean Science to study ecosystem-based development on the US outer continental shelf. Their goal is to help BOEM minimize impacts from activities related to energy development. IGS affiliated faculty Ethan Deyle of Biology will also play a critical role.

### Canadian Standing Senate Committee

IGS Director Benjamin Sovacool provided oral testimony on Climate Change and the Canadian Oil & Gas Industry before the Canadian Standing Senate Committee on Energy, the Environment and Natural Resources.

### Intergovernmental Panel on Climate Change (IPCC)

IGS Director Benjamin Sovacool, a lead author of the IPCC's Working Group III report on the Mitigation of Climate Change, opened an IPCC pavilion session on Managing Just Transitions at the UN Climate Change Conference (COP27), providing an overview of the report's approach to just transitions.



Thomas A. Kwan, director of sustainability research at the Schneider Electric™ Sustainability Research Institute, spoke about their partnership with IGS at the inaugural IGS community building event for faculty, students, and staff. Photo credit: Ryan Smith, Rooted in Light Media

## ■ SCHNEIDER ELECTRIC

Projecting over 2 million new jobs in transition to net-zero buildings

A premier IGS research collaboration with the Schneider Electric Sustainability Research Institute (SRI) led to a [first-of-its-kind study](#) that estimated more than 2 million new jobs and up to 141 million additional job years can be created in Europe and the United States alone by adopting readily available clean energy technologies in new and retrofitted buildings.

Published in the June 2023 edition of *The Electricity Journal*, the study is the first to estimate job creation in low-carbon “buildings of the future” at such a granular level. Doing so could make these findings more useful and relevant for informing specific building projects. Taking a micro-scale view, the study looked at deploying rooftop solar panels, heat pumps, and batteries for self-produced renewable energy based on six building archetypes. These span residential, hospital, hotel, office, retail, and education in regions of North America, Europe, and Asia.

IGS and Schneider Electric are also collaborating in other key areas related to green buildings and global trade analysis:

### Shedding light on roadblocks to green buildings

Beyond economic factors, what hinders the decarbonization of buildings? The vast network of stakeholders for construction projects is one reason the sector struggles to adopt green solutions at a scale necessary for global greenhouse gas reduction.

### Global trade analysis

What is the impact of individual countries’ decarbonization roadmaps on global trade? Multiregional, multisector analysis expands into new topical areas.

**“This study brings greater detail to the sizable potential for new jobs created by low-carbon buildings, a compelling co-benefit of decarbonization that could have the power to ease social and economic concerns and positively shape climate policy.”**

**Benjamin Sovacool, director, Boston University Institute for Global Sustainability, and professor, Earth & Environment, Arts & Sciences**



## NOTABLE MEDIA QUOTES



**“Justice is great, but you also have to ask justice for whom? It can’t just be justice for Americans, or justice for homeowners, or justice for ratepayers, because that will create further injustices in the attempt to do something just.”**

**Benjamin Sovacool**  
IGS director

*Foreign Policy*, “Heat of the Moment, What Does a Just Transition Really Mean?”



**“We really worry about gas stoves for people in those [vulnerable] situations. Opening your window works fine if you’re not next to a [NO<sub>2</sub>-heavy] highway. These conversations have to take the broader context into account.”**

**Patricia Fabian**  
IGS associate director

*National Geographic*, “The Scientific Case Against Gas Stoves”

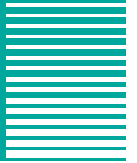


**If implemented, the EPA’s proposed carbon pollution standards for fossil fuel-fired power plants are “going to force changes in behavior management and technology, which could include actually shutting down some plants that are going to be very hard to make free of greenhouse gases.”**

**Cutler Cleveland**  
IGS associate director

*Scripps News*, “Biden’s EPA Proposes Limits on Power Plants’ Greenhouse Gas Emissions”

# EVENTS



## RESEARCH FOR PEOPLE & PLANET

IGS-hosted webinar series spanning topics across the institute's research mission, reaching 585 people globally.

### ■ PLANETARY AND ENVIRONMENTAL HEALTH

#### Daily Heat and Firearm Violence in 100 US Cities

Researchers from the Boston University School of Public Health (SPH) and the University of Washington attributed nearly 8,000 US shootings in recent years to higher-than-average temperatures. SPH researchers discussed their study [Analysis of Daily Ambient Temperature and Firearm Violence in 100 US Cities](#), discussing the potential to curb gun violence and the significance of heat adaptation in city climate plans.

#### Residential Weatherization, Energy Security & Health Disparities

Programs to decarbonize and weatherize homes can reduce health disparities linked to energy insecurity, yet these programs are often underused by vulnerable populations. Experts from Children's HealthWatch, Metropolitan Area Planning Council, and GreenRoots explored the connections between these programs, energy security, and health disparities, as well as the importance of community involvement in their execution.

### ■ CLIMATE GOVERNANCE AND SUSTAINABILITY TRANSITIONS

#### Justice, Energy & Transport: Key Climate Mitigation Insights from the IPCC Report

Periodically the UN's Intergovernmental Panel on Climate Change (IPCC) calls on experts from around the world to review the latest science on climate change, providing vital insights on climate risks. IGS Director [Benjamin Sovacool](#), a lead author for [Climate Change 2022: Mitigation of Climate Change](#), highlighted his work, emphasizing findings on equity, justice, energy systems, and transportation.

#### Rebuilding Ukraine: Energy Infrastructure and Energy Security

Ukraine's National Recovery Plan aims for resilient rebuilding. Over \$200 billion in investments is estimated to reshape the country's energy framework. IGS Senior Research Scientist [Darrick Evensen](#) delved into the IGS whitepaper, [Energy Security, Climate Change, and the Future of Ukraine Reconstruction](#).

### ■ ENERGY SYSTEMS OF THE FUTURE

#### Bioenergy Pathways

Using more bio-based fuels and energy can reduce waste, lessen reliance on foreign fuels, and support decarbonization. Experts from the Cornell College of Agriculture and Life Sciences, Born Global, and the National Renewable Energy Laboratory discussed bioenergy approaches, bringing both academic and industry insights.



Pictured from left to right at the “Sustainability, Health Equity, and Antiracism in the 21st Century” symposium on September 30, 2022: Monica Wang, chair of narrative at the BU Center for Antiracist Research; Muhammad Umar, REI’s divisional vice president of talent, diversity and change management; and Rebecca Pearl-Martinez, IGS’s executive director.

## ON-CAMPUS EVENTS

### Sustainability, Health Equity, and Antiracism in the 21st Century

IGS panelists [Rebecca Pearl-Martinez](#), executive director, and [Patricia Fabian](#), associate director, joined the BU Center for Antiracist Research symposium. They explored how climate change exacerbates vulnerabilities in marginalized communities and strategies for cultivating environmentally responsible companies.

### ■ EARTH DAY

IGS Earth Day events, part of university-wide programming

### Entangled

IGS screened the award-winning documentary *Entangled*, followed by a Q&A with filmmaker and Pulitzer Prize-winner [David Abel](#), IGS affiliated faculty and professor of the practice at the College of Communication. The film delves into the clash between endangered North Atlantic right whales, the lobster industry, and a federal agency. Over 115 participants registered, sparking thoughtful discussions on framing sustainability narratives. The event was co-sponsored by the College of Communication, BU Sustainability, BU Arts Initiative, and the BU Energy & Sustainability Club.

### Boston Terror | Boston Healing

To illuminate the plight of Indigenous peoples in the United States, BU Sustainability and the Office of the Senior Diversity Officer partnered with IGS and the Howard Thurman Center to welcome anthropologist David Shane Lowry to campus. The event led with a [lecture](#) on policies and practices that displace Indigenous communities, followed by an Indigenous voices film panel. IGS Executive Director [Rebecca Pearl-Martinez](#) made closing remarks, committing to channel research attention toward Indigenous and other forms of injustice.

### ■ RESEARCH ON TAP

Research lightning talks hosted by the Office of Research, engaging an audience of 208 BU faculty, staff, and graduate students

### Developing Technologies for a Sustainable Future

Industries like manufacturing, transportation, agriculture, and construction must evolve to mitigate climate change. BU faculty are developing the very technologies that can help reduce their environmental impact. This Research on Tap event

hosted by IGS Associate Director [Emily Ryan](#) also featured IGS Director [Benjamin Sovacool](#), core faculty [Ayse Coskun](#), [Chuanhua Duan](#), [Robert Kaufmann](#), [Sean Lubner](#), and [Joerg Werner](#), and affiliated faculty [Srikanth Gopalan](#). Co-sponsored by IGS, College of Engineering, and Arts & Sciences.

### Environmental Cultures, Power, and Equity

Effective climate research typically emphasizes current solutions, new technologies, and the Global North, often overlooking important historical insights about governance, culture, and religion. This Research on Tap convened experts across Boston University to discuss humanity’s interactions with power and inequity in their environments, with the goal of creating technological and social systems that can sustain human well-being with equitable and effective climate responses. Hosted by IGS Associate Director [Cutler Cleveland](#) and affiliated faculty [Caterina Scaramelli](#) and featuring IGS Director [Benjamin Sovacool](#), core faculty [Madeleine Scammell](#) and [Anne Short Gianotti](#), and affiliated faculty [Madison Condon](#) and [Rebecca Copeland](#).



▲ Pictured from left to right at IGS’s “Growing Our Institute” event on October 27, 2022: Stephanie Strickland (College of Communication); Amanda Baumann (Mechanical Engineering); Sarah Garvey (Earth & Environment); Alicia Zhang, (Earth & Environment); Claudia Diezmartínez Peregrina (Earth & Environment), Lucía Vilallonga (Statistics). Photo credit: Ryan Smith, Rooted in Light Media (also bottom left)

▼ Pictured left: 2022 recipients of the inaugural IGS faculty and student sustainability research awards, announced at the Growing Our Institute event on October 27, 2023: Sarah Garvey (PhD, Earth & Environment) was honored with the IGS Peter Fox-Penner Award and IGS affiliated faculty Rick Reibstein (Earth & Environment) with the IGS Sustainability Champion Award. Pictured right: IGS associate director Patricia Fabian and Pilar Botana Martinez, PhD student, both of Environmental Health, attended The Earthshot Prize Awards in Boston on December 2, 2023 as part of the Boston University delegation.





# STAY CONNECTED



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