GW RESEARCH

THE GEORGE WASHINGTON UNIVERSITY 2024

CLOSING THE HEALING GAP

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PLASMA PROMISE

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CAN THE HUMANITIES LEARN TO LOVE AI?

MAPPING THE MIGRANT JOURNEY

Geography researchers are mapping the journeys of hundreds of asylum-seeking migrants at the U.S.-Mexico border. Their goal is to better understand how border restrictions are impacting migrant safety and security—and to use their data to inform immigration policies.

FROM THE VICE PROVOST FOR RESEARCH

At the George Washington University, in the heart of the nation's capital, we tackle the grand challenges. Our scholars are driven to make a difference. They pursue impact and improve lives through the creation of new knowledge and new ways of thinking about the world.

These pages are full of examples from across the disciplines—the contributions humanists are making to improve the development of trustworthy artificial intelligence (AI) **(page 16)**, efforts to understand how brain injuries heal and to expose the unequal distribution of heart attacks **(page 10)**, and illustrating the threat that climate change poses to independent restaurants and local food systems **(page 4)**.

Our cover story highlights a collaboration with universities in Texas to map and document the path of migrants on their way to America's southern border. The goal is to better understand where migrants are facing increased violence, extortion and other ills along their perilous journey and how U.S. border policy can alleviate—or exacerbate—these hardships **(page 22)**.

In the face of shared trauma—poverty, natural disasters or war—a GW anthropologist and psychiatrist is developing and testing evidence-based interventions that non-specialists can adopt to better support people in their communities with mental health struggles. The approaches are showing promise both in international settings and closer to home **(page 32)**.

A GW engineer has dedicated his research efforts to understanding the physics and applications of plasma—the fourth state of matter. His innovative work has harnessed the unique attributes of plasma to propel small satellites in space and to selectively kill cancer cells in intractable tumors **(page 40)**.

Our scholars also have an outsized impact on their fields and in the public discourse by authoring books. On average, GW faculty publish more than 120 books per year. While only a tiny fraction of those are highlighted here, this community is a publishing powerhouse **(page 20)**.

Whether it's publishing a new medical textbook or a compelling work of fiction, creating artwork that explores the collaboration between artist and AI **(back cover)**, or using satellite data to track the disparate impact of pollutants around warehouses **(page 9)**, GW scholars are inspiring us to look at the world through a new lens.

Robert H. Miller
Interim Vice Provost for Research

For more regular updates about discoveries, innovations and expertise at GW, sign up for the *GW Research Quarterly*.

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CREDIT: WILLIAM ATKINS

A jet of cold plasma is able to kill cancer cells while leaving healthy cells unharmed. Story on page 40.

CREDIT: WILLIAM ATKINS

FEATURES

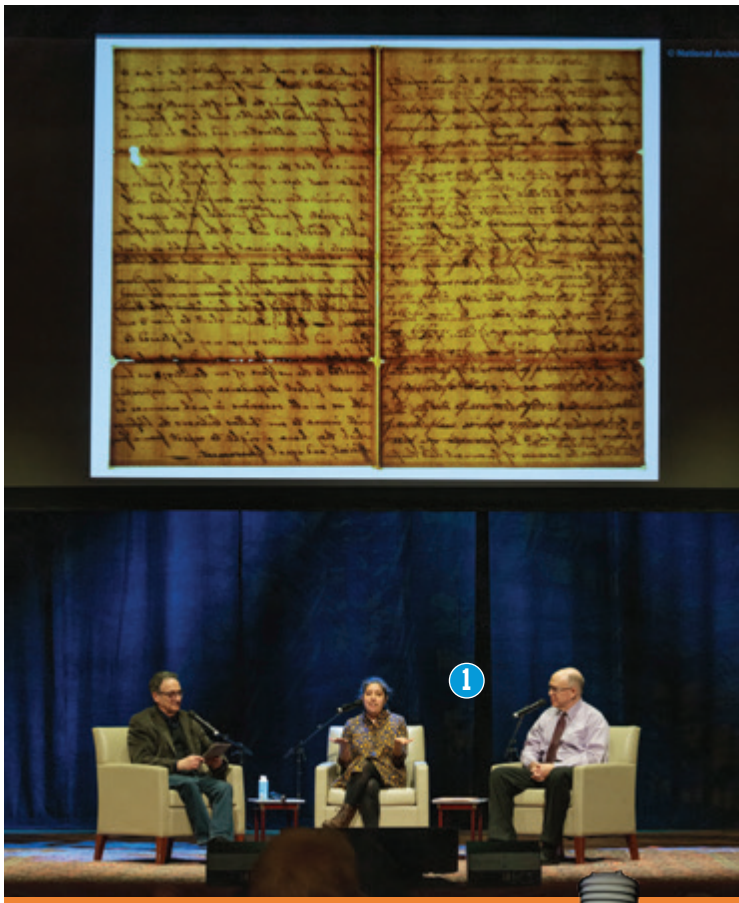
DEPARTMENTS

FRONT COVER:
Photograph by Jiri - stock.adobe.com

BACK COVER:
Photograph by Denny Henry. Art by Xitong (Rocky) Yuan.

LIVE FROM GW, IT'S SCIENCE FRIDAY!

At GW, science is in the air and on the air. In March 2024, the popular radio program Science Friday taped a show in front of a live audience at GW's Lisner Auditorium. Science Friday host Ira Flatow interviewed local experts on everything from preserving historical documents to animal autopsies at the National Zoo. Sponsored by GW's Office of the Vice Provost for Research, the taped show was later rebroadcast across 450+ public radio stations to Science Friday's more than 1.8 million listeners.



1 Ira Flatow talks with restoration experts from the National Archives about the science of preserving America's founding documents.

2 Pathologist Kali Holder from the Smithsonian's National Zoo investigates animal deaths at the zoo and shares how her work improves the care of animals at the zoo and in the wild.

3 GW President Ellen M. Granberg recalls listening to the very first episode of Science Friday in 1991.

4 GW's Tara A. Scully (right), associate professor of biology and director of curriculum development for the Global Food Institute, discusses the ecology of the Chesapeake Bay and its role as a local food source.

5 During a discussion on how trees keep D.C. and Baltimore cool, a bike equipped with air temperature sensors that assess the spatial variability in urban heat makes an appearance.

Listen to "Eating More Oysters Helps Us—And The Chesapeake Bay" on Science Friday. ▶

GW on SciFri

William Atkins

Ira Flatow

GLOBAL FOOD

RESTAURANTS FACE CLIMATE CHANGE CRISIS

A new report from GW's Global Food Institute (GFI) and the James Beard Foundation® illustrates how climate change poses an immediate threat to the independent restaurant industry—endangering a powerful economic engine that creates millions of jobs across the country and supports the growth and viability of farms and other local businesses.

The report, "The Climate Reality for Independent Restaurants: A Deep Dive into the Supply Chain," details how rising temperatures, extreme weather events, floods, drought, fire and shifts in agricultural patterns are all driving up costs for a vulnerable industry.

"Independent restaurants are already experiencing the impacts and immediate threats of climate change, along with the millions that they employ, the farmers that they rely on and the people they feed," said Tara A. Scully, GFI's director of curriculum development and a contributing author of the report.

According to the report, the independent restaurant industry is the fifth largest employer in the United States, totaling 3.9 million workers. It generates $75 billion in wages in local economies across the country and over $209 billion in revenue.

But climate change and its impacts pose an immediate threat to the food supply chain of independent restaurants, and the decreased availability and quality of commodity and specialty crops represent a longer-term challenge—from restaurant closures and layoffs to rising consumer costs and environmental threats to farmers.

Environmental disruptions impair restaurant operations and food supply chains at local, regional and global levels, the report details. Low crop supply, ingredient shortages and operational challenges due to extreme weather disruptions have forced independent restaurant owners and chefs to confront rising and wildly fluctuating costs.

"As a chef, and in my work with restaurants around the world, I see firsthand the impact of climate change on the ingredients we source, the dishes we prepare and on the communities and people we serve," said José Andrés, world-renowned chef, author, humanitarian and founder of GFI at GW. "This research is more than just a collection of data and insights; it's a rallying cry for chefs, restaurateurs, food producers, policymakers and all actors across the supply chain." GWR

CREDIT: JACOB LUND-STOCK.ADOBE.COM

HEAD OF THE TABLE

"I am honored to join the Global Food Institute at this critical moment. Together, we will pave the way for innovative solutions to food insecurity, malnutrition, climate change and the myriad global challenges we face."

STACY DEAN, an expert in food policy and nutrition with more than 30 years of experience in the government and nonprofit sectors, became the inaugural Carbonell Family Executive Director of the Global Food Institute in July 2024. Dean was formerly the Deputy Under Secretary for the U.S. Department of Agriculture's Food, Nutrition and Consumer Services.

HEALTH LAW

HOUSING IS HEALTH

Imagine that you are a single mother and your roof leaks, or there is a rodent infestation in your home, and you report it to your landlord—but instead of fixing the problem, he files to evict you. Scenarios like these are distressingly common, according to Emily A. Benfer, associate professor of clinical law and director of the Health Equity Policy and Advocacy Clinic at GW.

They are also bad for your health.

In "Housing is Health: Prioritizing Health Justice and Equity in the U.S. Eviction System," Benfer draws from the public health and social science fields to demonstrate the links between eviction and negative health outcomes for different populations. Multiple aspects of the eviction system function as structural determinants of health inequity, she says. An example would be extractive management strategies used by landlords who evict tenants who report problems rather than fixing them because eviction is easier and cheaper.

These dire consequences can persuade tenants not to report problems—even problems that jeopardize health—due to fears of retaliation in the form of an eviction.

"You see a lot of low-income children with asthma in D.C. caused by exposure to mold and infestations," Benfer says. "The highest rate of emergency room visits for asthma occurred in the three ZIP codes that make up Southeast D.C., where there's a high incidence of substandard conditions and infestations in rental housing. Those ER visits are entirely preventable."

Part of the problem is the U.S. eviction system. When tenants go to eviction court, it typically takes between 90 seconds and three minutes for a case to be decided. Moreover, few tenants have legal representation. National studies show that while 83% of landlords have attorneys, only 3% of tenants do. According to Benfer, "this imbalance of justice becomes a conveyor belt of injustice."

3%

Percentage of tenants facing eviction that have legal counsel, compared to 83% of landlords.

1 of 3

Number of children in low-income households who will face eviction before they turn 15.

90 sec

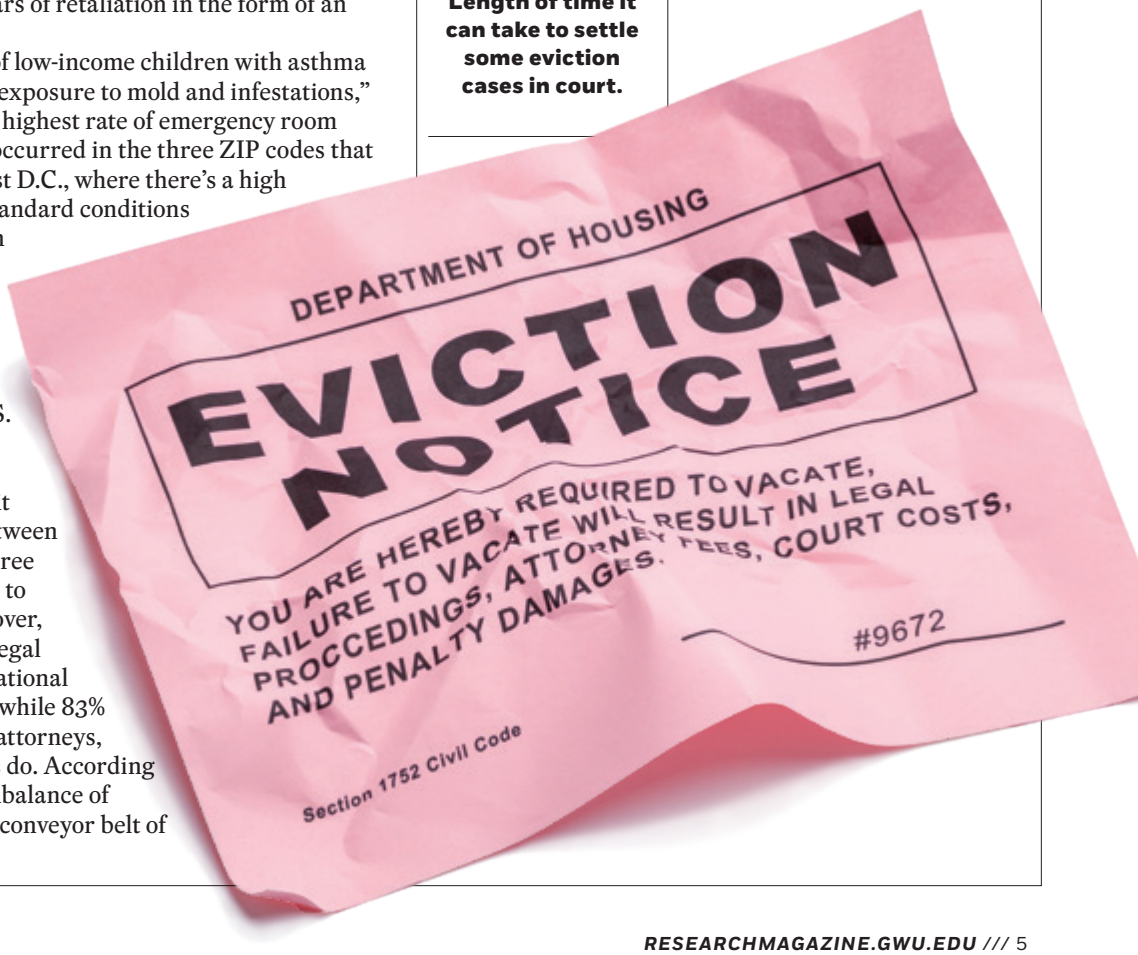
Length of time it can take to settle some eviction cases in court.

Benfer proposes solutions to this unjust state of affairs. She advocates for numerous protective and corrective policies and practices that work to fix the system, such as codifying in law a tenant's right to counsel, which dramatically lowers eviction rates.

In a previous study she led, Benfer found that when tenants have the right to an attorney, judges stop rubber-stamping evictions.

"It is not acceptable in the United States that we have a system in place that is perpetuating severe harm, especially when we could have a different outcome altogether if we prioritize health equity and social justice."

The study was published in the Yale Journal of Health Policy, Law, and Ethics. GWR



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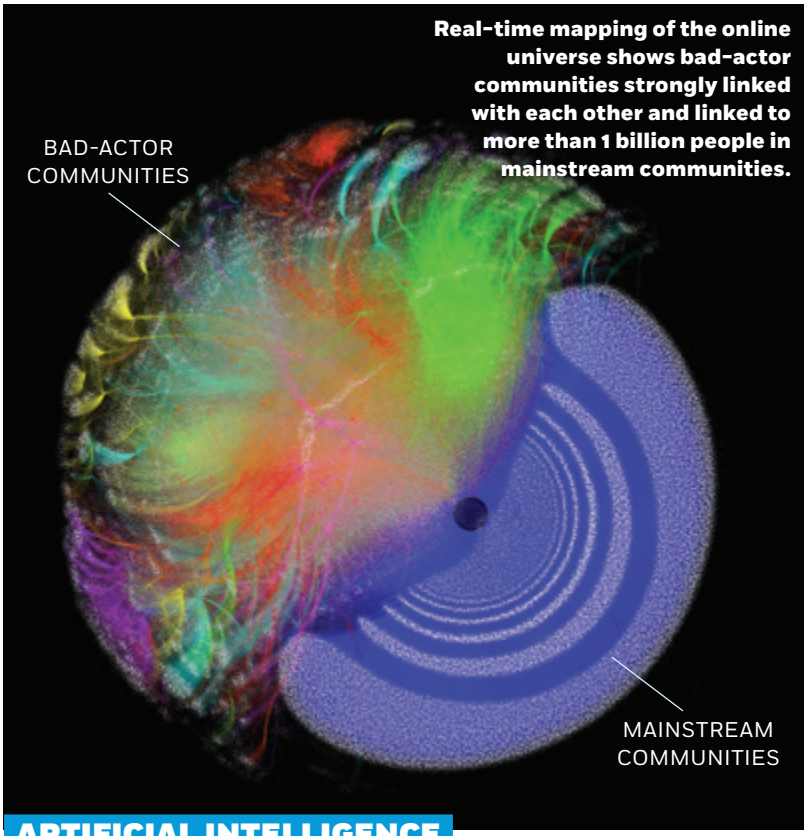

Real-time mapping of the online universe shows bad-actor communities strongly linked with each other and linked to more than 1 billion people in mainstream communities.

ARTIFICIAL INTELLIGENCE

AI BAD ACTORS AND ELECTIONS

A GW study showed how bad-actor artificial intelligence (AI) activity could escalate into a daily occurrence by mid-2024, potentially impacting the election results in more than 50 countries holding national elections this year. While analysts have long sounded the alarm on the threat of bad actors using AI to disseminate and amplify disinformation during elections, this is the first quantitative analysis predicting how those actors will misuse AI globally.

"Everybody is talking about the dangers of AI, but until our study, there was no science on this threat," said Neil Johnson, lead study author and a professor of physics at GW. "You cannot win a battle without a deep understanding of the battlefield."

Johnson said the study shows how, where and when AI will be deployed. For example, it found that bad actors need only basic generative pre-trained transformer (GPT) AI systems to manipulate and bias information on platforms, rather than more advanced systems such as GPT 3 and 4, which tend to have more guardrails. It also showed that a "road network" across 23 social media platforms allows bad-actor communities direct links to billions of users worldwide.

The paper, "Controlling bad-actor-AI activity at scale across online battlefields," was published in PNAS Nexus and funded by the U.S. Air Force Office for Scientific Research and the Templeton Foundation. GWR

SUSTAINABILITY

ELECTRIC CARS DRIVEN LESS THAN GAS CARS

Emissions savings from electric vehicles (EVs) might be overestimated, according to a study by GW and the National Renewable Energy Laboratory.

The assumption among modelers and regulatory bodies has been that EV owners drive their cars about the same number of miles as owners of gas vehicles.

In one of the largest studies on EV mileage to date, the researchers examined odometer data from 12.9 million used cars and 11.9 million used SUVs between 2016 and 2022. They found that battery electric vehicle cars were driven almost 4,500 fewer miles annually than gas cars. The study found a gap for both cars and SUVs: Electric cars traveled 7,165 miles, while gas-powered cars traveled 11,642 miles annually, and electric SUVs traveled 10,587 miles, while their gas-powered counterparts traveled 12,945 miles annually.

"People often assume that buying an EV is good for the environment, and it generally is, but the impacts scale with mileage," said John Helveston, study co-author and assistant professor of engineering management and systems engineering at GW. "Our study shows that the current generation of EV owners aren't using them as much as gas cars. For maximum impact, we need the highest-mileage drivers behind the wheel of EVs rather than low-mileage drivers."

The study, "Quantifying Electric Vehicle Mileage in the United States," was published in Joule. GWR

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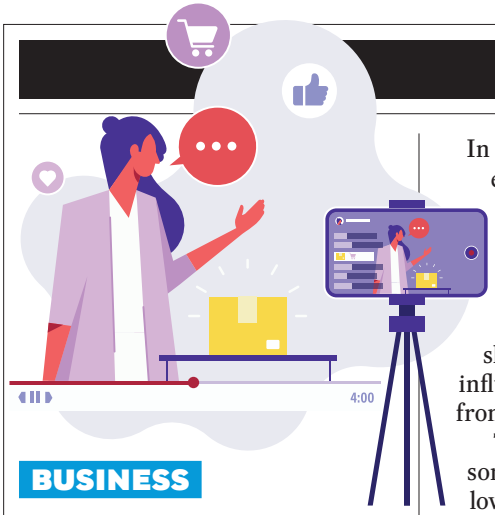


BUSINESS

BRANDS, INFLUENCERS AND LIVESTREAM SHOPPING

In the eight years since Chinese e-commerce giant Alibaba launched Taobao Live, livestream commerce—in which brands sell their products to online consumers in real time—has taken off and now grabs an estimated $562 billion in sales in China.

According to Yixin Lu, associate professor of information systems and technology management at GW, the integration of the shopping experience and entertainment into live broadcasts has transformed the retail industry, and not just in China. Walmart's first livestream sales event on TikTok in 2020 garnered seven times more views than anticipated and increased the brand's TikTok followers by 25 percent.

In a paper, Lu and her collaborators examined whether and under what circumstances sales through livestream commerce can be more profitable than traditional sales channels.

In particular, the research examined the interactions between brands and online influencers. Influencers interact with consumers and promote and sell products on behalf of brands in livestream shows. In return, the influencers receive commissions from brands.

The paper describes how some influencers may insist on lower prices for products to maintain their credibility and avoid reputation damage, which can adversely affect a brand's profit margins. To counter this, brands might increase the commission rates for influencers to better align their incentives with the brand's goals. The paper also notes the importance of matching the product quantity to the influencer's fan base size. This may mean working with a medium-level influencer with a smaller fan base in order to negotiate more effectively on commission rates and product pricing.

The paper, "Managing Sales Via Livestream Commerce: Implications of Price Negotiation and Consumer Price Search," was published in the journal Production and Operations Management. GWR

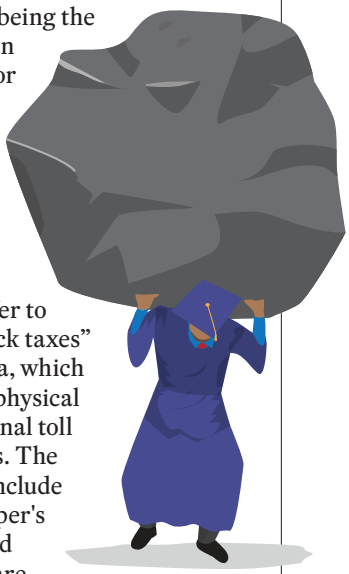
HIGHER EDUCATION

THE TOLL OF 'BLACK TAXES' IN ACADEMIA

In "Black Taxes: African-American Doctoral Students Experiencing Tokenism at a Predominantly White Institution," Deniece Dortch, assistant professor of higher education administration, and her co-authors explore the lived experiences of African American doctoral students at a Midwestern, predominantly white institution. At the heart of the students' experiences is a practice called tokenism, whereby "the symbolic inclusion of a few select individuals from underrepresented groups creates the illusion of diversity." The authors conducted a series of interviews with African American students enrolled in doctoral programs across a range of fields, including the humanities, engineering and medicine.

They found that, regardless of discipline, all participants had experienced some form of racialized tokenism. For example, participants felt they were often expected to speak on behalf of their entire race, gender or both—referred to as "spoketokenism." Others described being treated as diversity experts with authority on social justice issues.

The racial stress, loneliness and extra service demands that come with being the only African American or one of a few such students in a program are what Dortch and her co-authors refer to as the "Black taxes" of academia, which can take a physical and emotional toll on students. The authors conclude that the paper's findings and accounts "are critical for not only understanding the breadth of harm inflicted on this student population but also for elucidating the possibilities for institutional transformation."



The study was published in The Review of Higher Education. GWR

SPACE AGE 2.0

SECURING THE FINAL FRONTIER

Earlier this year, Russia vetoed a UN Security Council resolution that called on all UN members not to place in orbit nuclear weapons or weapons of mass destruction. The failed measure came amid reports from U.S. intelligence agencies that the Kremlin was developing—but had not yet deployed—a space-based nuclear weapon. Meanwhile, China launched a series of satellites that U.S. officials warned might be able to manipulate other orbital assets.

These events have galvanized discussions on space security in what experts are calling Space Age 2.0—a pivotal era of space exploration fraught with profound geopolitical implications.

Scott Pace, director of the Space Policy Institute at GW and a prominent voice on space policy, offers valuable insights into this evolving landscape. His recent works, including a chapter in "The Oxford Handbook of Space Security" and a paper published in the journal Space Policy, provide a comprehensive view of the United States' national security interests in space and strategies to navigate this complex domain.

Pace identifies five critical elements that are necessary to deter hostile actions by other countries: attribution, resiliency, credibility, signaling and cost imposition.

Attribution, he explains, is knowing what's going on in space—having space domain awareness. Resiliency is the ability to endure and not collapse the first time something bad happens. Credibility means a country's space capabilities are real and don't just exist on paper.

"Another critical aspect is signaling—you need to show the other side that you know what they're doing and that you will respond," Pace says. "And you must be able to impose costs, ranging from diplomatic measures to military responses, covering the full spectrum of potential reactions."

In addition to the five elements of deterrence, Pace stresses that the U.S. must also establish and enforce norms of behavior in space to discourage adversarial actions from countries like China and Russia.

"Norms don't compel good behavior by others, but they do provide a common baseline for understanding what sanctions or responses might be warranted for violations," he explains. "It's like a stop sign: It doesn't prevent people from speeding or running through it, but it does allow you to point out the violation to your neighbors and say, 'Hey, that guy just ran the stop sign. Let's address it together.' Norms provide a common basis for cooperative action."

To uphold these norms, Pace emphasizes that the U.S. must be robust and proactive in its space policies, necessitating bipartisan cooperation. Space security should rise above partisan issues because political divisions, he argues, can undermine the country's ability to respond effectively to external threats and weaken international cooperation. GWR

HEALTH INEQUITY

WAREHOUSING INDUSTRY INCREASES HEALTH-HARMING POLLUTANTS

CREDIT: VLADYSLAV-STOCK.ADOBE.COM

America's demand for products delivered to the doorstep has led to a dramatic increase in e-commerce and the warehousing industry.

Now a first-of-its-kind study led by GW researchers shows that people living in communities located next to these large warehouses are exposed to 20% more of a traffic-related air pollutant that can lead to asthma and other life-threatening health conditions.

The research team used a satellite instrument to measure levels of nitrogen dioxide around the nearly 150,000 large warehouses located across the United States. Trucks and other vehicles traveling to and from these large warehouses spew out nitrogen dioxide, particulates and other harmful pollutants.

The researchers also looked at traffic information from the Federal Highway Administration and demographic data from the U.S. Census Bureau.

They found that warehouses with more loading docks and parking spaces attracted the most traffic and were associated with the highest nitrogen dioxide levels.

They also found that communities with large racial and ethnic minority populations are often located near warehouses and are thus inhaling more nitrogen dioxide and other pollutants. For example, this study found that the proportion of Hispanic and Asian people living close to the largest clusters of warehouses is about 250% higher than the average nationwide.

Although warehouses are located all over the U.S., 20% are concentrated in just 10 counties: Los Angeles, California; Harris, Texas: Cook, Illinois; Miami-Dade, Florida; Maricopa, Arizona: San Bernardino, California; Orange, California; Dallas, Texas; Alameda, California; and Cuyahoga, Ohio.

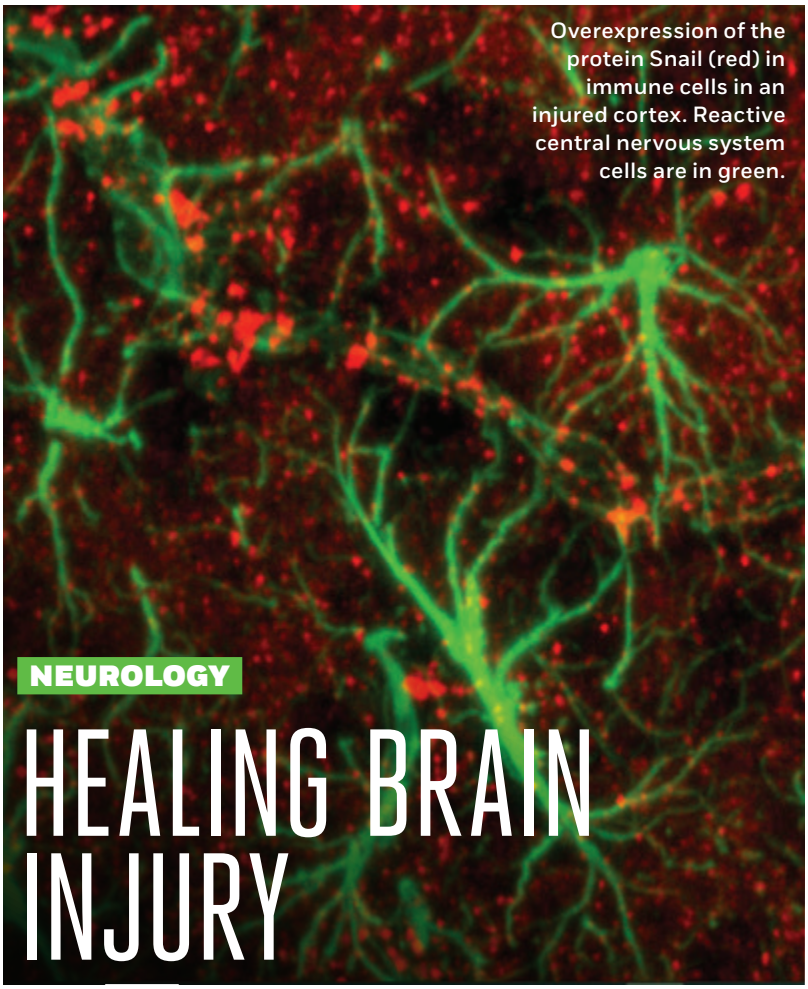
Earlier studies have looked at warehouses and pollution in specific neighborhoods around the country, but this is the first large nationwide study to show that people living near these warehouses are exposed to higher than average levels of pollutants. And while other research has shown that communities of color are exposed to more nitrogen dioxide pollution than predominantly non-Hispanic white communities, this is the first study linking the warehousing industry to the exposure inequities faced by these vulnerable populations, says Gaige Kerr, lead author of the study and an assistant research professor of environmental and occupational health at GW.

The researchers say the study underscores the need for regulations that require warehouses and other industries to adopt measures that would reduce pollutants that damage human health and harm the planet. Policymakers could also establish incentives for corporate leaders in polluting industries to transition away from fossil fuels and toward cleaner trucks and other vehicles.

20%

Increase in exposure to nitrogen dioxide for communities living near warehouses.

The study, "Air pollution impacts from warehousing in the United States uncovered with satellite data," was published in Nature Communications. NASA funded the research. GWR



Overexpression of the protein Snail (red) in immune cells in an injured cortex. Reactive central nervous system cells are in green.

NEUROLOGY

HEALING BRAIN INJURY

In a study published in Proceedings of the National Academy of Sciences Nexus, GW researchers identified for the first time a special group of microglial cells in the central nervous system (CNS) that produce a protein called Snail and how this protein plays a key role in coordinating the response of brain cells after an injury.

After a CNS injury, a group of localized cells start to produce Snail, which has been implicated in the repair process. Changing how much Snail is produced can significantly affect whether the injury starts to heal efficiently or whether there is additional damage. The researchers found that lowering the amount of Snail produced after a CNS injury resulted in inflammation and increased cell death. In contrast, when they increased Snail levels, the outcome of the brain injury improved—suggesting this protein can help limit the spread of injury-induced damage.

"Snail appears to be a key player in coordinating these responses, opening up promising possibilities for treatments that can minimize damage and enhance recovery from neurological injuries," said Robert Miller, senior author of the study and the Vivian Gill Distinguished Research Professor and vice dean of GW's School of Medicine and Health Sciences. GWR

TRANSGENDER CARE

BUILDING COMPETENCY IN AFFIRMING CARE

Significant gaps exist in health care providers' educational preparation to provide competent care for transgender and gender expansive (TGE) patients. Virtual simulations could help address this gap. In a qualitative analysis led by Rhonda Schwindt, an associate professor in GW's School of Nursing whose clinical practice specializes in LGBTQIA+ health, trauma and treatment-resistant mood disorders, virtual simulated encounters with TGE patients improved the competency of psychiatric-mental health nursing practitioners (PMHNPs) in providing affirming care. A number of themes emerged based on reflections from PMHNP students who completed a virtual simulation, including recognizing minority stressors, treating all patients equally and a desire for more knowledge. The study, which was published in the research journal Nursing Education Perspectives, concluded that virtual simulations are effective in preparing PMHNP students to deliver affirming, person-centered care to TGE patients and highlights the need for ongoing education to address knowledge gaps. GWR

HEALTH DISPARITIES

THE UNEQUAL DISTRIBUTION OF HEART ATTACKS

While heart disease deaths have plummeted in the U.S. over the last three decades, a study led by Adam Richards, associate professor of global health and medicine at GW's Milken Institute School of Public Health, shows that heart

CREDIT: ROBERT H. MILLER

attack rates for poorer populations stayed the same or got worse during that same 30-year period.

In a paper published in Circulation: Cardiovascular Quality and Outcomes, Richards and colleagues evaluated data from national surveys of nearly 27,000 people aged 40 to 75 years old who had not experienced a prior heart attack or stroke. They calculated the estimated 10-year risk of cardiovascular disease for each six-year period of the study. Without factoring in income, national-level trends show improvement in cardiovascular disease rates from 1988 to 2018.

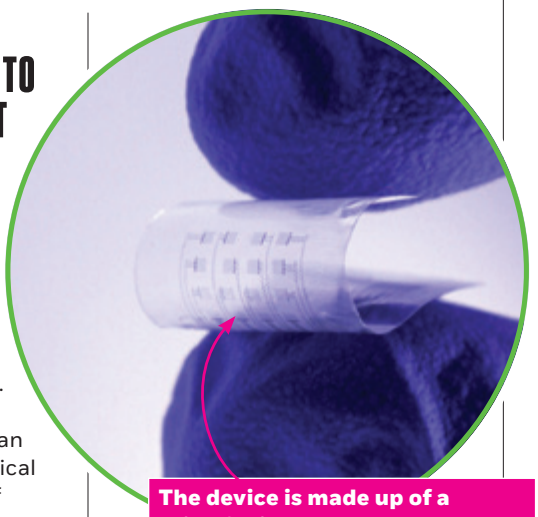
However, when the researchers explored the distribution of these changes according to household income, they found much of the heart-healthy benefits were not experienced equally among members of society. Although the 10-year cardiovascular disease risk fell from 7.7% to 5.1% for the wealthiest segment of the population and from 7.6% to 6.1% for the second-wealthiest group, the risk for people with the lowest incomes remained stagnant at over 8%. GWR

HEART HEALTH

A DISSOLVABLE DEVICE TO MONITOR, TREAT HEART DISEASE

Nearly 700,000 people in the United States die from heart disease every year, and one in three people dies from complications in the first weeks or months following a traumatic heart-related event.

In a paper published in Science Advances, Luyao Lu, an assistant professor of biomedical engineering in GW's School of Engineering and Applied Science, demonstrated an experimental device that could one day monitor and treat heart disease and dysfunction in the days, weeks and months following a traumatic heart event. Developed in collaboration with counterparts at Northwestern University, the device is an advanced soft electronics system that uses an array of sensors and actuators to perform more complicated investigations of the heart than traditional devices like a pacemaker. Not only can the device be placed on various sections of the heart but it can communicate information to physicians in real time about a patient's heart. In addition, the device is made of materials approved by the U.S. Food and Drug Administration that are compatible with the human body and able to fully dissolve after a clinically relevant period.



The device is made up of a grid of microelectrodes and interconnects wrapped in a biodegradable polymer material.

CREDIT: LUYAO LU

The work was supported by the National Science Foundation and the National Institutes of Health. GWR

"With the reduced regulatory barriers, the reclassification could pave the way for more clinical trials to evaluate the efficacy of marijuana-based treatments for various medical conditions."

Y. TONY YANG

A professor in health policy at GW's School of Nursing, Yang was quoted in a Modern Healthcare article about the U.S. Drug Enforcement Administration's move to reclassify marijuana as a less dangerous drug. Yang previously co-authored "Cannabis Equity Initiatives: Progress, Problems, and Potentials" in the American Journal of Public Health.

NEW SPECIES NAMED FOR KERMIT THE FROG

IT'S NOT GREEN.

And it's not even really a frog—as we know it. But *Kermitops gratus*, an ancient species discovered by GW doctoral student Cal So and Smithsonian postdoctoral paleontologist Arjun Mann and named for Kermit the Frog, may change our understanding of the amphibian family tree.

The research team uncovered the fossilized skull of the 270-million-year-old ancient amphibian ancestor in a collection of the Smithsonian's National Museum of Natural History. (The fossil had been unearthed 40 years earlier.) Its unique characteristics—including a mishmash of traits that are different from features seen in the skulls of older tetrapods and other living four-legged vertebrates—signaled to the researchers that it was a new species of proto-amphibian.

The study was published in the Zoological Journal of the Linnean Society. GWR

PICTURED So (foreground) and Mann with the fossil skull of *Kermitops gratus* in the Smithsonian's National Museum of Natural History fossil collection.

CREDIT: PHILLIP R. LEE

FROM LEFT Project coordinators Annabelle Manzo and Jacqueline Dioses with student researchers Georgette Encinas and Christopher Flores-Moreno.

MENTAL HEALTH ISSUES IN LATINX YOUTH MAY IMPACT PHYSICAL HEALTH

A bilingual team of undergraduate research assistants played a crucial role in a years-long study that found Latinx youth who experience depression, anxiety or other mental health issues in middle school have a greater chance of developing sleep problems, unhealthy weight gain and sedentary behavior in high school.

The team of Latinx student researchers collected and processed data for the study from a cohort of Latinx middle schoolers and their families in suburban Atlanta, maintaining a long-term relationship with participants over the years-long study. In addition, the student researchers helped refine the study's materials for better intercultural translation, which in turn ensured more accurate and useful responses. It's crucial, they said, that Latinx researchers be present on all sides of projects that involve their communities.

"Cultural competency really informs how we conduct the study," Jacqueline Dioses, an undergraduate project coordinator with GW's Cisneros Hispanic Research Institute, said. "There are so many times where we're reviewing language, and we'll point out that for this community, a phrase doesn't translate well or a sentiment doesn't make sense. Early on, there were questions translated into Spanish where I thought, 'I would never dare say this to my mother.' We want to make sure that a sense of empathy, a sense of compassion is coming through."

The study, led by Kathleen Roche, professor of prevention and community health, and co-authored by Elizabeth Vaquera, Cisneros' executive director, was published in the Journal of Adolescent Health. GWR

MITIGATING DEI BACKFIRE IN BUSINESS

What happens when employees push back against businesses that embrace diversity, equity and inclusion (DEI)? How companies mitigate that pushback, which may include discrimination against underrepresented groups or resistance to required DEI training, is the subject of a paper published in Business Horizons by doctoral student Lauryn Burnett and her co-author, Herman Aguinis, the Avram Tucker Distinguished Scholar and Professor of Management. Burnett and Aguinis found that off-track messaging, inadequate support from leadership and weak workplace structures can contribute to the backfire. The paper also pointed to evidence-based actions that can help prevent or mitigate negative reactions, including clarity around merit-based advancement policies and a multi-tiered approach to monitoring and evaluating DEI practices within an organization.

Lauryn Burnett

"Because this is a practitioner bridge journal, it means that I understand how to translate research into practical advice for managers—something I want to continue throughout my research," Burnett said. GWR

READY TO LAUNCH: A GW STUDENT'S NASA MISSION

For three years, doctoral student Nick Kirschner has worked alongside scientists at NASA's Goddard Space Flight Center on a project called ComPair, which aims to bridge a data gap in gamma-ray astrophysics. Gamma-ray bursts result from some of the universe's most explosive events, including the birth of black holes and collisions between neutron stars. Today's space-based instruments can detect gamma rays at low and high energy ranges, but there's a "sweet spot" in the middle range that remains largely unexplored by current technology.

"There's interesting physics in that gap," Kirschner explains. "If we don't have sensitive enough instruments, we can't get the full picture of what's happening out there."

Thanks to a Space Act Agreement between GW and NASA, Kirschner and other students are helping illuminate the cosmos. GWR

Learn more about Kirschner's journey from Goddard to a desert in New Mexico, where he and a team launched and tested the ComPair instrument. ▶

CREDIT: CISNEROS STUDENTS BY CISNEROS HISPANIC LEADERSHIP INSTITUTE /BURNETT BY BURNETT / KIRSCHNER BY CARA TAYLOR

CONVENING IN THE CAPITAL

GW is a global convener in the nation's capital. With our unique proximity to legislators, policymakers, industry leaders, international experts and national media figures, GW brings to campus an impressive array of thought leaders to debate and dialogue on the issues of the day.

"You can build what the whole world desperately needs, which is a cadre of believers who will find solutions."

U.S. Sen. Chris Coons at an event celebrating GW's new **Alliance for a Sustainable Future**. Coons and GW's Frank Sesno discussed the creative ways GW faculty are combating the effects of climate change.

"This is exactly the type of disagreement and debate that our forefathers had."

Former U.S. Rep. Rodney Davis (R.-Ill.), in conversation with **U.S. Rep. Jamie Raskin** (D-Md.) at the **2024 Paul O'Dwyer Endowed Forum for Political Ethics**. Davis and Raskin discussed everything from impeachment to executive power.

"AI can be used in great ways to expedite the development of effective and safe drugs."

U.S. Food and Drug Administration's Tala Fakhouri at the **Research!America 2023 National Research Health Summit**. Fakhouri joined GW's Jakub Kostal, associate professor of chemistry, and Amgen's David Reese, executive vice president of research and development, to discuss the role of AI in drug development.

CREDIT: COONS, DAVIS, RASKIN, FAKHOURI BY WILLIAM ATKINS

“It’s most important to think about the user experience. What are you actually trying to accomplish for the citizen when you’re building your models?”

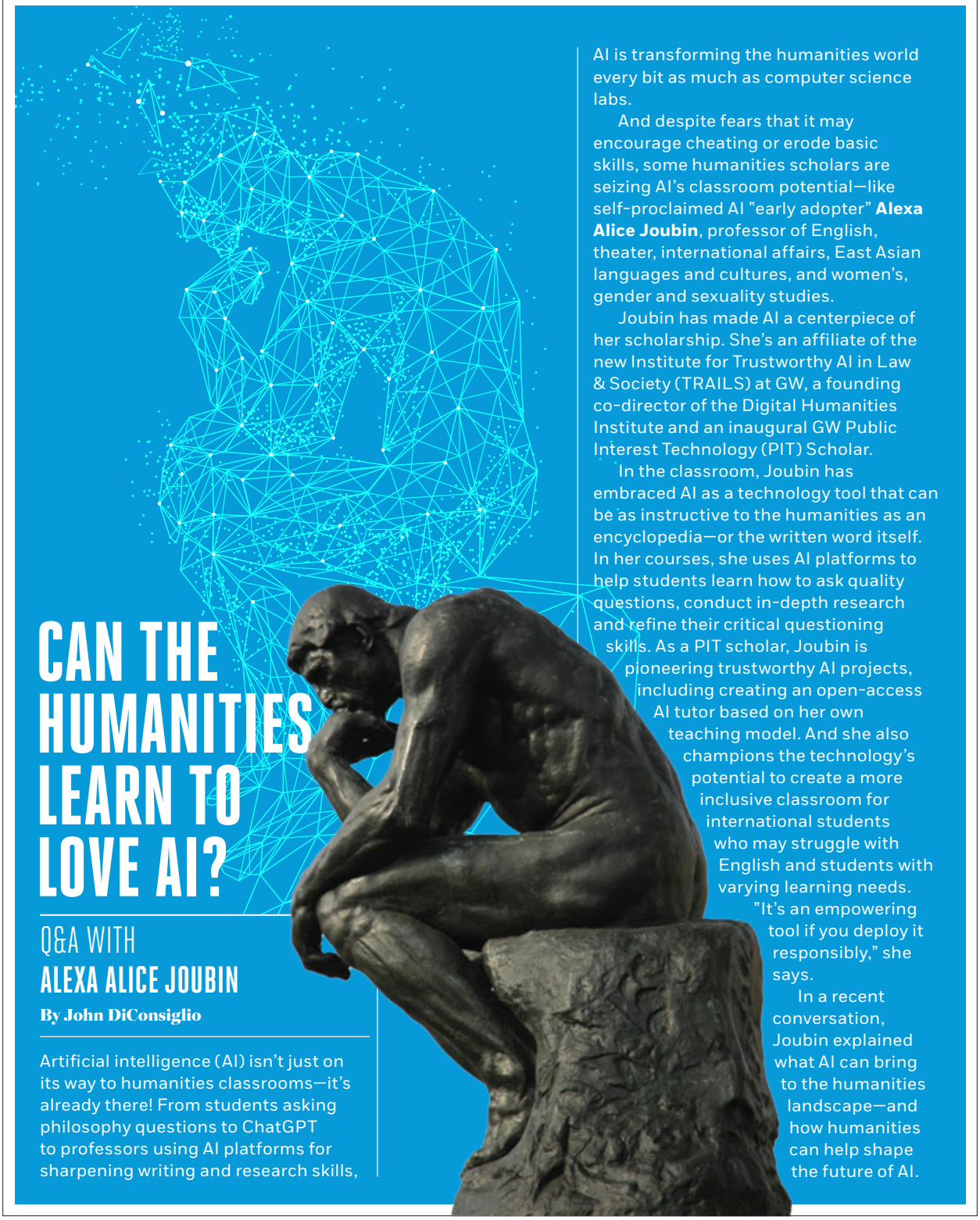
Google’s Joel Minton, chief technology officer for Google Public Sector, talks about how AI can empower the public sector during the **2024 Business and Policy Forum**. Minton joined Nishant Shah, senior advisor for responsible AI for the state of Maryland, Vanetta Pledger, chief information officer for the city of Alexandria, and Jared Johnson, associate vice president of academic technology & customer experience at GW.

“How can we bridge the gap of African legislators in this space, because for so long these discussions were happening at the exclusion of us.”

Neema Lugangira, member of Parliament in Tanzania and chair of the African Parliamentary Network on Internet Governance, at **the Athens Roundtable on Artificial Intelligence and the Rule of Law**. Lugangira spoke about including Global South perspectives in AI governance.

CREDIT: MINTON, SHAH, PLEDGER, JOHNSON BY LINNEA FARNSWORTH / LUGANGIRA BY WILLIAM ATKINS

Q&A



CAN THE HUMANITIES LEARN TO LOVE AI?

Q&A WITH ALEXA ALICE JOUBIN

By John DiConsiglio

Artificial intelligence (AI) isn't just on its way to humanities classrooms—it's already there! From students asking philosophy questions to ChatGPT to professors using AI platforms for sharpening writing and research skills, AI is transforming the humanities world every bit as much as computer science labs.

And despite fears that it may encourage cheating or erode basic skills, some humanities scholars are seizing AI's classroom potential—like self-proclaimed AI "early adopter" **Alexa Alice Joubin**, professor of English, theater, international affairs, East Asian languages and cultures, and women's, gender and sexuality studies.

Joubin has made AI a centerpiece of her scholarship. She's an affiliate of the new Institute for Trustworthy AI in Law & Society (TRAILS) at GW, a founding co-director of the Digital Humanities Institute and an inaugural GW Public Interest Technology (PIT) Scholar.

In the classroom, Joubin has embraced AI as a technology tool that can be as instructive to the humanities as an encyclopedia—or the written word itself. In her courses, she uses AI platforms to help students learn how to ask quality questions, conduct in-depth research and refine their critical questioning skills. As a PIT scholar, Joubin is pioneering trustworthy AI projects, including creating an open-access AI tutor based on her own teaching model. And she also champions the technology's potential to create a more inclusive classroom for international students who may struggle with English and students with varying learning needs.

"It's an empowering tool if you deploy it responsibly," she says.

In a recent conversation, Joubin explained what AI can bring to the humanities landscape—and how humanities can help shape the future of AI.

CREDIT: ADOBE STOCK/CAMERMAN

You describe yourself as an early adopter of AI in the classroom. How did you first become interested?

I'm very interested in the relationship between art and technology. Technology relies on art.

When you launch a new technology, you are telling a story, a narrative. There is technicity in art, and artistic imagination brings forth new technologies. And, of course, art needs technology. If you think about it, what is a quill pen? It's a craft for writing—a technology. Technology is any application of conceptual knowledge for practical goals. As early as ancient Greece, people were dreaming of machines that could do things autonomously. And even in the 20th century, [mathematician] Alan Turing famously gave us the Turing Test on whether there is consciousness in the computer—and consciousness is a humanities question. So this didn't start with ChatGPT. It's one famous iteration over a long history.

When generative AI came along in late 2022, I was thrilled. I jumped on it right away. I was disappointed in the early days. But I've been steadily teaching with AI and urging my students to look at it realistically and critically. It's not a devil and it's not an angel. But AI is in our mix and it's not going away.

Where are we in the relationship between AI and the humanities?

AI really is a humanistic issue, and it has ignited broad interest in questions about free will, mind and body and moral agency. When people talk about ChatGPT, they talk about these questions. That's why the humanities are front and center in this [debate]. Humanities provides a range of tools for people to think critically about our relationship to technology and about the so-called eternal questions. What makes us human? How do you define consciousness? These classic philosophical questions have gone mainstream thanks to all the debate about ChatGPT. Free will has suddenly become an important topic.

Can you give me an example of what AI technology can bring to the humanities classroom?

It can bring a level of self-awareness, because AI is a social simulation machine. It cannot create new knowledge, but it's a repository of social attitudes. I teach my students to treat it like a shadow image of society. It allows you to think at a meta level about your role in a society and how society reacts to certain things. For example, when I teach "Romeo and Juliet" in my drama class, students invariably have ideas about performing the play in a modern setting. AI can generate visuals for the scenes they describe in their heads. But students often come back to me and say: Why are Romeo and Juliet always white? Why aren't they Black or Latinx or a queer couple? It forces them to rethink how they phrase their questions and their default assumption. It's an extremely fun and eye-opening exercise, but it also helps us examine our unspoken, unconscious racism or sexism.

As a new PIT Scholar, one of your priorities has been to explore issues around trustworthy AI. How do you see humanities contributing to that conversation?

How do you build trust? That's fundamentally a humanistic question. And there are many ways to define it—transparency, ethics, accountability, interpretability. Humanities is particularly good at exploring these critical theories in complex domains that deal with open-endedness. They require agile thinking. You have to be dynamic and always assessing and reassessing the context. Humanities scholars know that there's no single universal morality. It depends on perspective. And a key humanities contribution is the ability to entertain ambiguity and multiple perspectives at once. GWR

"AI really is a humanistic issue, and it has ignited broad interest in questions about free will, mind and body and moral agency ... That's why the humanities are front and center in this [debate]."

CREDIT: WILLIAM ATKINS

DISTINCTIONS

GW faculty are recognized for their excellence through an array of honors and awards. Here are a few examples of notable recognitions.

NATIONAL SCIENCE FOUNDATION CAREER AWARDS

In FY24, the National Science Foundation awarded **Sandy Kawano** (left), assistant professor of biology, and **Luyao Lu** (right), assistant professor of biomedical engineering, a Faculty Early Career Development (CAREER) award. Kawano's CAREER award will support her research into the evolutionary biomechanics of salamander locomotion, while Lu's award will support his work developing automated "lab-on-a-chip" platforms that can accurately monitor and modulate the behavior of in vitro live cells. CAREER awards are the NSF's most prestigious honor, supporting new work from junior faculty with the potential to serve as academic role models in research and education and to lead advances in their fields. Seventeen faculty researchers from GW currently have active NSF CAREER awards.

SURA DISTINGUISHED SCIENTIST AWARD

Professor of Physics **Chryssa Kouveliotou** was honored with the Southeastern Universities Research Association's (SURA) Distinguished Scientist Award for her career contributions to the field of astrophysics, including transformational work in gamma-ray science, leadership roles within high-energy astronomy and a legacy of mentoring young scientists.

FULBRIGHT AWARDS

5 Number of GW scholars who received Fulbright U.S. Scholar Program awards from the U.S. Department of State and the Fulbright Foreign Scholarship Board for the 2024-2025 academic year. Fulbright Scholars engage in cutting-edge research and expand their professional networks, often continuing collaborations started abroad and laying the groundwork for future partnerships between institutions. The 2024-2025 scholars are: **Eric Cline**, professor of classics, history and anthropology; **Jacob A. English**, director of the Center for Undergraduate Fellowships and Research; **Ashwini Tambe**, professor of women's, gender, and sexuality studies and history; **Allyson Vieira**, assistant professor of foundations; and **Sidney Monroe Williams**, assistant professor of theater and dance.

NATIONAL ACADEMY OF PUBLIC ADMINISTRATION FELLOW

Domonic Bearfield, professor of public policy and public administration, was elected to the National Academy of Public Administration, a congressionally chartered nonpartisan nonprofit that "responds to requests for assistance from Congress, federal agencies, and state, local and international government entities on issues of importance." The Academy's nearly 1,000 fellows also provide thought leadership that advances the field of public administration.

WOODROW WILSON CENTER FELLOWSHIPS

Three GW scholars were selected by the Woodrow Wilson Center for International Scholars in its highly competitive fellowship program for the 2023-24 academic year. **David Shambaugh** (left), the Gaston Sigur Professor of Asian Studies, Political Science & International Affairs, earned the distinction of distinguished fellow, while **Moses Kansanga** (middle), assistant professor of geography and international affairs, and **Joanna Spear** (right), research professor of international affairs, were selected as fellows. Fellows conduct research and write in their areas of expertise while engaging with policymakers in Washington, D.C., Wilson Center staff and other scholars in residence.

EXCELLENCE IN RESEARCH AWARD

The Washington Academy of Sciences awarded **Miguel Lejeune**, a professor of decision sciences and of electrical and computer engineering, its 2024 Excellence in Research Award in Applied Mathematics. The award recognized Lejeune's "scientific contributions to understand the mathematical structure of optimization problems, design computationally efficient model formulations and scalable algorithms, and provide scientific solutions to societal and industry problems."

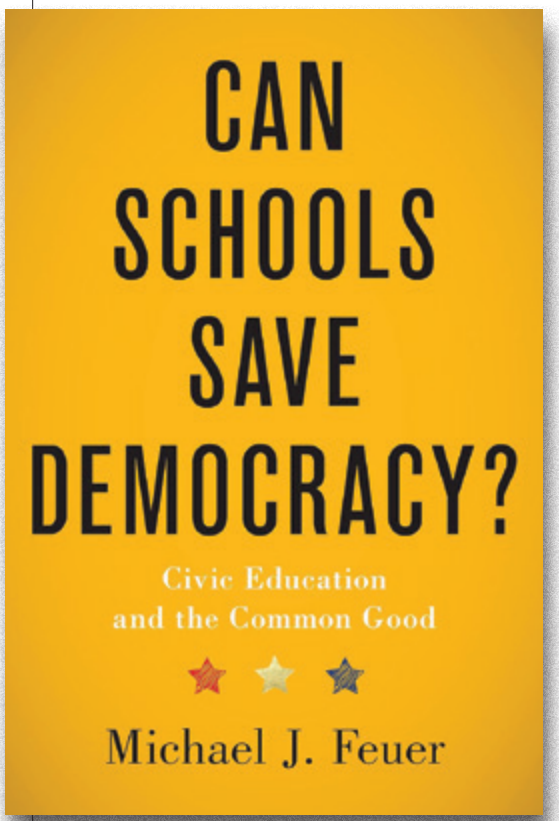
DUKEMINIER AWARD

Cori Alonso-Yoder, an associate professor of fundamentals of lawyering, won UCLA's Williams Institute 2023 Dukeminier Awards Michael Cunningham Prize for her article, "Making a Name for Themselves," published in Rutgers Law Review in 2022. The awards aim to encourage scholars to begin or continue writing about sexual orientation and gender identity law and public policy; provide valuable recognition and support for scholars, law students and lawyers who write in this area; and provide easy access to each year's best scholarly materials for those outside of legal academia, including lawyers, judges, other legal actors and policymakers.

2024 STATUS LIST

Holden Thorp, a professor of chemistry and editor-in-chief of Science, was named to the media company STAT's 2024 STATUS List. The list features 50 influential people shaping the future of health and life sciences across biotech, medicine, health care, policy and health tech. Thorp was honored for challenging the stigma around corrections and retractions in academic publishing with an eye toward increasing public trust in the scientific enterprise. GWR

SHELF LIFE



Can Schools Save Democracy? Civic Education and the Common Good **(Johns Hopkins University Press, 2023)**
By Michael J. Feuer, dean of the Graduate School of Education and Human Development and professor of education policy

In "Can Schools Save Democracy? Civic Education and the Common Good," Michael J. Feuer, dean of the Graduate School of Education and Human Development and professor of education policy, explores relationships between education, capitalism and democracy.

Drawing on a wealth of research, historical analysis and contemporary case examples, Feuer examines how schools can foster critical thinking, civic engagement and a commitment to the common good—qualities that are increasingly vital in today's polarized political climate but also inadequately represented in most high school curricula today.

"To some extent, we have displaced the civic function of public education to make room for more pressure on math, science and the 'basics' that are associated with people getting out of school and getting a good job," says Feuer, who previously served as president of the National Academy of Education. "The good news is a lot of organizations and schools are trying to shift the balance back in the direction of preparing young people for really functioning and participating in democracy."

"Can Schools Save Democracy?" delves into the challenges and opportunities facing educators, especially post pandemic. Feuer introduces a framework for educator preparation that emphasizes collective action, experiential learning and partnerships between schools and their complex constituencies as well as practical suggestions for how to bring those concepts to life.

"Rather than hitting the teachers directly with theories of political economy, collective action, social choice and related concepts, my suggestion is to have them included more prominently in educator preparation programs, so that they become part of the complex set of skills and knowledge future teachers need to be effective in their classrooms," Feuer says. "Along the way, an enriched teacher-ed curriculum of the type I'm recommending could have significant impacts on the future of interdisciplinary education at the college level and on the ways in which school systems engage with their external stakeholder communities."

Feuer's book is a call to action that builds on—and strengthens—optimism about how education can continue to play a vital role in safeguarding core American values. Feuer's insights remind readers that the future of democracy rests in the hands of educators and students alike. By empowering schools to be incubators of democratic values, there's hope for a more just and participatory society. GWR

Michael J. Feuer

CREDIT: MICHAEL J. FEUER

***Writing Blackgirls' and Women's Health Science* (Lexington Books, 2023)**

Edited by Jameta Barlow, director of undergraduate studies for the Women's, Gender, and Sexuality Studies Program

This is a collection of works by scholars, including Barlow, that examines the health and well-being of Black girls and women. As Barlow writes in the first chapter, "the objective of this book is to inspire future writers, scholars, activists and researchers focused on Black girls' and women's health (BGWH) to consider their philosophy of science—their ways of knowing—specifically their ontologies (what is knowledge) and epistemologies (how we come to know and do knowledge)—in their work on BGWH."

***Dialogues on Gun Control* (Routledge, 2023)**

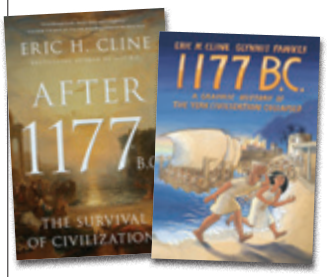
By David Degrazia, Elton Professor of Philosophy

DeGrazia's "Dialogues on Gun Control" features perspectives on the gun control debate between individuals from different backgrounds. The book introduces students, professional academics and others to the American experience with gun violence and gun policy, articulating ethical arguments supporting and opposing substantial gun control and specific possibilities for reform. The dialogues in the book demonstrate how those who initially disagree about the place of guns in American society can communicate constructively and agree on many ideas.

***The Presidency and Domestic Policy: Comparing Leadership Styles, FDR to Biden* (Routledge, 2024)**

By Todd Belt, program director of political management

Belt and his co-authors delve into the leadership approaches of U.S. presidents from FDR to Joe Biden, providing a nuanced analysis of their policy agendas and the challenges they faced. The latest edition adds chapters on Donald Trump and Biden and focuses on the significant domestic policy challenges of their times. With its thorough examination of domestic policy across different administrations, this book offers valuable perspectives for anyone interested in understanding the complexities of presidential leadership in shaping the nation's policy landscape.



***1177 B.C.: A Graphic History of the Year Civilization Collapsed* (Princeton University Press, 2024)**

By Eric H. Cline, professor of classical and ancient Near Eastern studies and anthropology

Cline and archaeological illustrator Glynnis Fawkes bring us a beautifully illustrated version of Cline's 2014 bestselling book, "1177 B.C.: The Year Civilization Collapsed," that tells the story of what caused the ancient civilizations of the Aegean and Eastern Mediterranean to collapse more than 3,000 years ago, bringing the Late Bronze Age to an abrupt end. Cline also published a sequel to his 2014 book that tells the story of what happened after the Bronze Age collapsed, why some civilizations endured, why others gave way to new ones and why some disappeared forever. GWR

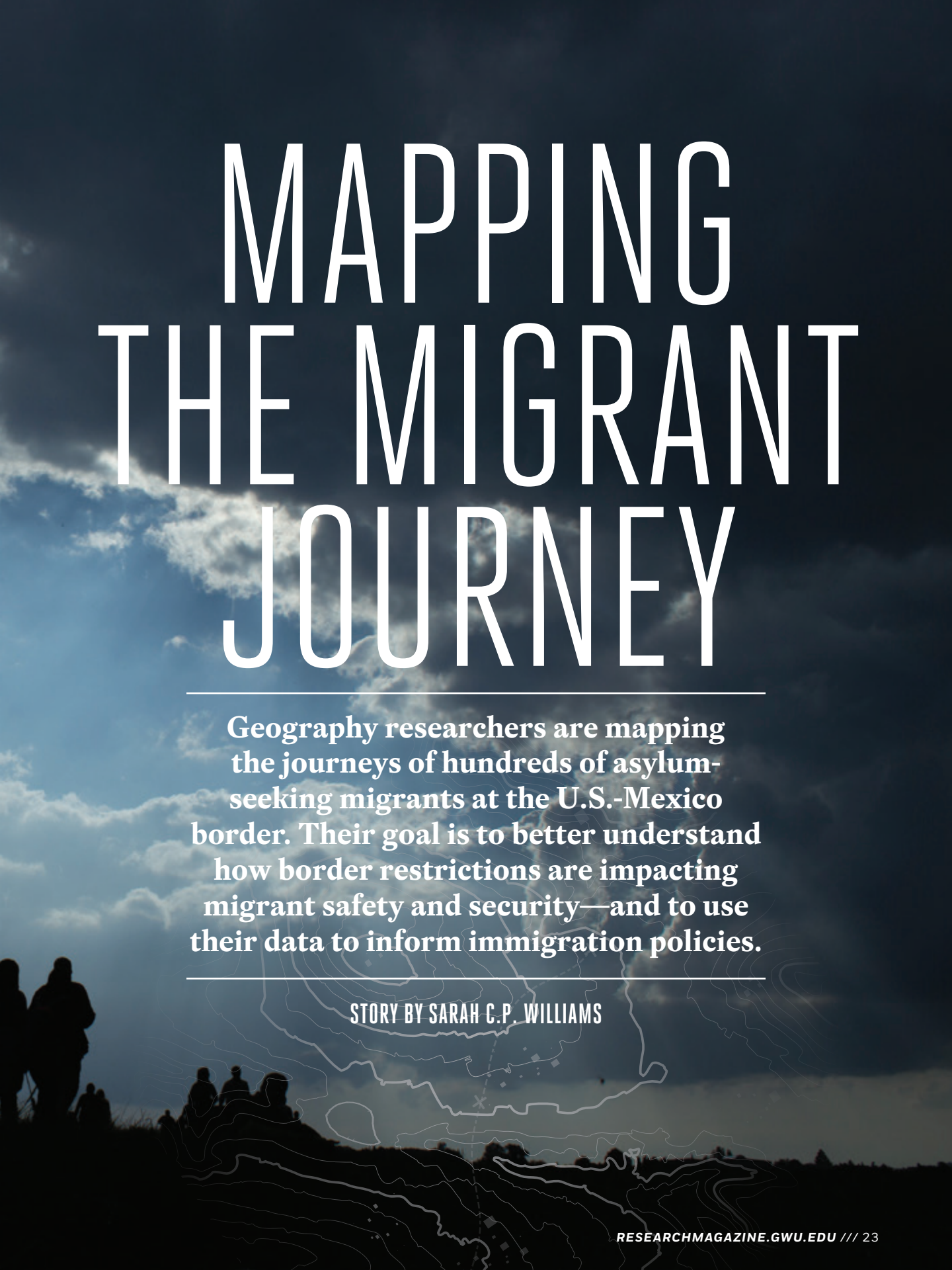
THE 21ST CENTURY'S BEST BOOKS

"The Known World," a 2003 historical novel by American novelist and GW Professor of English Edward P. Jones, was listed No. 4 in The New York Times Book Review's "The 100 Best Books of the 21st Century." A second book by Jones, "All Aunt Hagar's Children," was also included on this list.

MAPPING THE MIGRANT JOURNEY

Geography researchers are mapping the journeys of hundreds of asylum-seeking migrants at the U.S.-Mexico border. Their goal is to better understand how border restrictions are impacting migrant safety and security—and to use their data to inform immigration policies.

STORY BY SARAH C.P. WILLIAMS



“We’re using a geography lens to try to understand the details of not only where these immigrants came from and the routes they took but also what kinds of issues they faced, where they experienced insecurity along the way.”

Elizabeth Chacko
GW professor of geography and international affairs

It took the 21-year-old mother, her husband and their infant daughter eight tries to traverse their way through Mexico to the U.S. border. The first seven times, they were stopped partway through the country, forced to pay a ransom by corrupt Mexican officials or cartel members and sent back to Villahermosa, in southern Mexico.

Mariana (not her real name) and her husband had fled Venezuela in 2021 after an armed paramilitary group invaded and seized their home. First, they had tried to resettle in Peru, where more than a million Venezuelans have fled in recent years. But in 2023, Peru decreed a state of emergency in response to the influx of refugees and began to block Venezuelan immigration—and expel Venezuelans already within its borders. So the couple, now with a young daughter, set their sights on the U.S., traveling north by foot, boat and bus.

The sixth time they were captured remains the most vivid in Mariana's memory. Their bus driver abandoned them to an organized crime gang under a bridge in Veracruz, east of Mexico City. After being driven to a secluded house, Mariana suspected that their captors wanted more than money.

"No tenía miedo que me fueran a violar, tenía más miedo de que me quitaran a mi hija," said Mariana at a shelter in Texas in May 2024, shortly after she filed an asylum claim with the U.S. Border Patrol. "I wasn't afraid that they were going to rape me. I was more afraid that they would take my daughter away from me."

Listening and watching as Mariana's finger traced her family's path toward the U.S. on a large map of the Americas was George Washington University undergraduate Isabella Franco, herself the daughter of a Mexican immigrant.

"It's one thing to see immigration numbers on paper. It's a completely different thing to walk into a shelter and hold a woman's hand as she's sobbing, telling you she was sexually assaulted by the police or that a gun was put to her young child's head," says Franco. "It's not until you sit and listen to these uncomfortable truths that you realize these are real people whose stories need to be told."

Franco is one of 20 students involved in a National Science Foundation (NSF)-funded project led, in part, by Marie Price and Elizabeth Chacko, both immigration experts and professors of geography and international affairs at the GW Columbian College of Arts and Sciences and Elliott School of International Affairs. Price, Chacko, collaborators in Texas and their students have interviewed 150 immigrants, as well as leaders of civil society and religious organizations, border patrol officials, immigration lawyers and other key informants. Through these interviews, the researchers were able to examine the effects of U.S. immigration policies on asylum seekers and gauge the extent of kidnapping, extortion and other violence that immigrants encounter as they trek to the southern U.S. border.

"We're using a geography lens to try to understand the details of not only where these immigrants came from and the routes they took but also what kinds of issues they faced, where they experienced insecurity along the way, whether it was violence, extortion, rape or lack of food," says Chacko. "This is something that is very mappable and can be powerful to see."

The narratives the group has collected so far show just how rampant violence against immigrants has become, especially in northern Mexico—something that the researchers say is a consequence of U.S. immigration policies and the growing involvement of cartels in profiting from migrants. Ultimately, the research team hopes that the stories they share and the data they glean from the narratives can effect change in these policies and a shift in public perception around border politics.

"When you hear the horror stories of what people go through, you can't help but ask how we can reform our current immigration system so that it is more just and equitable," says Price.

A Texas-DC Team

Combined, Price and Chacko have more than 60 years of experience in geography and have carried out research on the flow of people, products and ideas in places as disparate as India, Ethiopia, Bolivia and Venezuela. Price is currently the president of the American Geographical Society, and Chacko conducted immigration research in Singapore on a Fulbright scholarship. Over the last decade, the two experts have collaborated to study the role of immigrants in a diverse array of cities—projects that involved interviewing immigrants around the world and led to reports for the United Nations and the Organization of American States (OAS) authored or co-authored by the GW duo.

As part of the OAS research, Price and Chacko interviewed city officials and immigrant-serving organizations in border cities such as El Paso, Brownsville and San Diego during the COVID pandemic. They heard stories from immigrants about their experiences in their new communities and the journeys they undertook to get there, which piqued their interest around the U.S.-Mexico border; they wondered whether the tales they were hearing were typical.

At the same time, Texas State University Associate Professor of Geography Sarah Blue was launching a research effort focused on immigration in the Rio Grande Valley—the swath of land where the Rio Grande separates the southernmost tip of Texas from Mexico. As of spring 2024, around 8,000 immigrants a month cross the border in this valley, often on a bridge connecting Brownsville, Texas, to Matamoros, Mexico.

Blue was motivated by a desire to not only understand the movement of people across this easternmost part of the U.S.-Mexico border and their experiences but also to involve local researchers and students for whom immigration is often a personal issue.

"There are very few geography researchers who are Latino," says Blue. "But in Texas we have Hispanic-serving institutions that are full of bright, young, motivated students who just don't know how academia works and haven't had a chance to participate in research."

As she planned how to integrate mentorship into her Rio Grande Valley work, Blue sought to

extend her collaborations. She reached out to Price and Chacko, hoping they could bring international experience, an eye for policy and D.C. connections to the project. They agreed, and the group, which also includes professors and students from the University of Texas Rio Grande Valley, was awarded $500,000 from the NSF. In January 2023, team members began their first interviews with immigrants at shelters in Brownsville and Matamoros.

"Connecting Texas and Washington is really powerful for us as researchers as well as for our students," says Blue. "We wouldn't have had access to all these D.C. think tanks, and I suspect that GW students would never have had the opportunity to come down to the border."

FROM TOP TO BOTTOM: **Migrant families playing Loteria (similar to the game Bingo) at Casa del Migrante in Matamoros, Mexico; statue of the Virgin Mary garlanded with rosaries at a homeless center in Brownsville, Texas; replacement shoelaces for migrants.**

When Policy Leads to Violence

Eventually Mariana and her family made it safely to Mexico City—a significant landmark for today's immigrants. Once north of Mexico City, asylum seekers can use the U.S. Customs and Border Protection's mobile app, called CBP One, to request an appointment at the border. The app is currently the primary way for people like Mariana to seek asylum in the U.S.; those who cross the border illegally are currently ineligible for asylum. But wait times for CBP One appointments are several months, and immigrants must wait in Mexico City, near the border or somewhere in between until the date of their scheduled appointment.

Those waits, Chacko and Price's group is finding, put people at additional risk of kidnapping, extortion and other violence.

CREDIT: MAYA O'BRIEN/ISABELLA FRANCO/MARIE PRICE

That sentiment is echoed by organizations like Human Rights Watch, which wrote in May 2024 that the CBP One app "impermissibly limits the right to seek asylum for many people and compels them to wait in foreseeably dangerous and inhumane conditions in Mexico."

While Mariana's family was lucky enough—after their harrowing journey—to stay safe in the months between scheduling their appointment and arriving at the border, many aren't.

"We talked to one family who had been on their way to this appointment they'd been waiting months for, and they got kidnapped and ended up having to sell everything they owned to buy their freedom," says Blue. "Finally, a week later, they were free again, totally traumatized, and they went to the border and explained why they missed their CBP One appointment. They were told, sorry, get in the back of the line again."

At the same time that the CBP One app has become required for legal entry into the U.S. to begin the asylum process, the U.S. has restricted most other legal pathways to immigrate into the country for Mexicans, Guatemalans, Hondurans and Salvadorans. In 2022 and 2023, the government began allowing a limited number of migrants from Venezuela, Haiti, Nicaragua and Cuba—countries facing significant social, economic or political upheaval—to enter the U.S. through a humanitarian program, but their status is temporary. Partially because of the diminishing immigration options, more people than ever are seeking asylum status; more than 800,000 applied in 2023, and a growing backlog means that these applications are often awaiting final decisions for years.

The growing number of asylum seekers and the limitations on daily appointments, Price and Chacko say, is fueling a growth in violence and criminality in northern Mexico. "These migrants are seen as walking money dispensers," says Price. "They need to pay everybody all along the way, and if they don't, they're kidnapped and their families are threatened. It's really a horrible situation."

Chacko agrees.

"We think that, ironically, the tougher the U.S. gets on immigration, the more money it is putting into the hands of cartels and the more violence it is exposing migrants to," she says.

Blue estimates that, of the 70 immigrants the team interviewed in May 2024, more than a quarter had been extorted for money at least once during their journey to the border.

"Many migrants are traversing through a number of countries before getting to Mexico, and for a long time, the most dangerous part of this journey was getting through the remote, dense jungle of the Darién Gap [at the Panama-Colombia border]," says Chacko. "But in speaking to migrants now, they all say that Mexico was by far the most dangerous place because it's where they are all exploited."

"These migrants are seen as walking money dispensers. They need to pay everybody all along the way, and if they don't, they're kidnapped and their families are threatened."

Marie Price
GW professor of geography and international affairs

Turning Narratives into Data & Maps

When the researchers and students sit down with immigrants at shelters in Brownsville and Matamoros, they work their way through a structured list of about 70 questions using a geographic information system (GIS) survey program. This lets them include location data associated with immigrants' journeys, along with their recorded interviews.

They ask questions about immigrants' backgrounds, reasons for leaving their home countries, and experiences getting to and crossing the border.

"The interviews can be really intense," says Maya O'Brien, a GW geography graduate student. "You're talking to someone, and five minutes in you start tearing up. You want to be a human, but you also want to be professional."

Before beginning her graduate degree, O'Brien worked for five years as a technical consultant at Esri, the industry leader in mapping and GIS software. Now she is leading the GW efforts to turn narrative interview material into maps. It is tedious work, she says, since most of the data being collected isn't straightforward numbers or yes/no responses. But she thinks maps—of individual migrants' paths to the U.S. or hot spots where extortion is happening at a high rate–could identify patterns in mobility, lead to new insights on migrant experiences and help capture what is happening at the border in ways that are easy to digest.

"When you see a map showing just how far a person has come, you realize this is a really serious

SOURCE: Map by Maya O'Brien. Work supported by NSF Grant #2222327: Geographies of Migration and (in)Security at the U.S.-Mexican Border.

MARIANA'S JOURNEY

When Venezuela's economic and social situation deteriorated in 2021, Mariana and her husband fled to Peru. As anti-immigrant protests and sentiment erupted in Peru, Mariana returned to Venezuela with her husband and their 10-month-old daughter. That's when they began the long trek to the U.S.-Mexico border. Their perilous journey is one of many that the research team is mapping.

6 MONTHS
OF TRAVELING

6,000 MILES
TRAVELED ON FOOT, BY BUS & BY BOAT

8
COUNTRIES TRAVERSED

A JOURNEY BEGINS
Mariana and her family begin their journey from Venezuela to the U.S.-Mexico border.

GAMBLE IN THE GAP
The family of three crosses the Darién Gap, a dangerous four-day trek on foot through dense rainforest where migrants are exposed to violence and disease.

To Peru and Back
Mariana and her husband flee Venezuela to live in Peru. Two years later, they return to Venezuela with their infant daughter.

CLOCKWISE FROM TOP: Elizabeth Chacko, Sarah Blue, Isabella Franco, Maya O'Brien and Marie Price. BOTTOM: Members of the Texas-DC research team met with U.S. Senator Tim Kaine's staff at the Russell Senate Office Building in Washington, D.C., in June 2023.

undertaking that these people are taking to get where they want to be," says O'Brien.

So far, the research team has been struck by the number of women and children crossing the border; in the past, most immigrants crossing the U.S.-Mexico border were men looking for work. Now that balance is changing; UNICEF estimates that one of every four migrants in Latin America is a child, and the humanitarian aid organization No More Deaths reported in April that, for the first time, more women than men are dying near the border—often due to heat and dehydration.

"Most of them are fleeing conditions that are really dire, and then they face conditions that are really dire," says Price.

Chacko recalls the story of "Susie," a pregnant mother who was fleeing domestic violence with her children. While crossing the dense jungle of the Darién Gap, Indigenous people kidnapped and murdered their traveling companions.

The team has also been surprised by the widespread extent of immigrant extortion by not only cartels and small organized gangs but also Mexican and Guatemalan immigration and border officials and police officers.

"Susie told us it was such a common thing, everywhere they walked, for people to just constantly be stopping them and extorting them," says Price.

Not everyone who crosses the U.S.-Mexico border, of course, is from Central or South America. In the last few years, an increasing number of Chinese, Indian, Russian, Ukranian and African asylum seekers have fled to the border.

The new narratives collected at the border have illuminated just how differently people are treated based on their country of origin—not only by border officials and U.S. policy but also by cartels that separate Spanish speakers from

people speaking other languages. The team heard stories of how migrants from Ukraine were granted deportation protection thanks to U.S. policies, while Haitian migrants, who were also fleeing a dire situation, had to wait for long periods of time in unsafe conditions as their eligibility was assessed case-by-case.

"We like to think that the law is the law and that the U.S. justice system is supposed to work the same for everyone," Blue says. "But it's really complex on the ground, and we've certainly heard stories about some people being released and not others."

Reaching Policymakers

In June, the researchers and students involved in the NSF-funded border project met at GW for a policy summit. Immigration lobbyists and representatives from immigration think tanks and government agencies spoke with the group about what data could be useful to effect change. Many of the speakers underscored the need for numbers surrounding the extortion that immigrants face and concrete data on the ties between U.S. policy and insecurity for immigrants in Mexico.

"I think both students and faculty came away with a much fuller understanding of the community that shapes immigration policy," says Chacko.

Most of the team is skeptical that change on immigration will happen quickly or soon. But they say that even small shifts in how people and politicians perceive the border could eventually make a difference.

"I'm really hoping that this project has some impact on policy, but what I'm hoping even more is that average people just become more accepting of immigrants,"

"When you see a map showing just how far a person has come, you realize this is a really serious undertaking that these people are taking to get where they want to be."

Maya O'Brien
GW geography graduate student

says Franco. "I think people really don't realize the sacrifices these immigrants make just to get their foot into U.S. territory. No one wakes up and decides to cross the border on a whim. It's so difficult and so dangerous."

At the same time, they say that the image of the border itself that is often portrayed in the media—a dangerous, chaotic and overrun place—is wrong. On an average day, the border "is an orderly line of people waiting on the bridge," says O'Brien. "It has the vibe of a DMV office, only the tension is higher because so much is on the line."

In story after story told to the research team, the danger is the organized crime that the immigrants are fleeing in their home countries and in Mexico—not immigrants themselves. Yet current border efforts, particularly those carried out by heavily armed Texas National Guard units deployed independently from the federal government, largely treat all immigrants as threats.

"It's actually quite jarring for these people to be met with a military response, because they have this idea that the U.S. is a safe haven," says Blue. "The vast majority of people are trying to get away from organized crime back home. Associating them with crime—the very thing they are trying to escape—seems very cruel."

By sharing the stories they have heard, Blue, Chacko and Price hope they can break those associations between immigrants and criminality.

"One of the policymakers I talked to in Texas likened the Rio Grande Valley to Ellis Island," says Price. "And I thought that was a pretty powerful metaphor. We let in millions of people with no sophisticated screening—either you had tuberculosis or you didn't—and we all know that it worked out. What if we saw the Rio Grande Valley as a new Ellis Island? We might have some very different policies."

A broadening of legal pathways to immigration and a push to process asylum requests in places farther from the U.S. border could help limit the money flowing from immigrants to Mexican cartels and officials, she says.

When Franco last spoke to Mariana, she had finally submitted her asylum claim and made it across the border. Now, she and her family are waiting for their first court hearing. It's been more than two years since she fled Venezuela.

"These stories really lean into your humanity," says Franco. "If it could be a baby and her parents from Venezuela, it could be you or your neighbors. They are people just like us." GWR

CLOSING THE HEALING

GAP

Researchers at the GW Center for Global Mental Health Equity are working to treat mental illnesses and reduce mental health stigma in settings from Uganda and Nepal to New York City.

STORY // SARAH C.P. WILLIAMS

CREDIT: GW CENTER FOR GLOBAL MENTAL HEALTH EQUITY

THE FIRST TIME HE WENT TO NEPAL, **BRANDON KOHRT** WAS AN UNDERGRADUATE FILM AND ANTHROPOLOGY STUDENT.

It was the late 1990s, and the Communist Party of Nepal had recently launched a war against the monarchy and ruling political parties. Kohrt, who co-wrote an award-winning documentary on Nepal's child soldiers, spent several months at a small traditional healing temple in the rural southeastern part of the country. There, he was struck by the extent of mental anguish among the people coming to the temple—many were struggling with severe mental illnesses and had been brought there by their families.

"It became hard for me to just document the challenges and suffering I saw and not in some way contribute to the alleviation of that suffering," recalls Kohrt. "I began to think that if I was going to bear witness to how people get through really difficult situations around the world, I wanted to be able to contribute in a more meaningful way."

Something else caught his attention too: the degree to which the temple's priests could ease people's suffering through simple conversations and rituals. Every morning, people would arrive to speak with the holy men, who patiently listened to their worries, offering words of advice and light touches with feathers. Visitors seemed to leave happier.

Kohrt, who went on to earn both a Ph.D. in medical anthropology and an M.D., specializing in psychiatry, carried out his thesis research in the early 2000s on how to enlist community members in helping former child-soldiers in Nepal recover from the trauma they had experienced. Kohrt knew that it would take more than a few trained psychiatrists like him to solve the growing mental health struggles of people in developing countries around the world, where mental health resources are scarce and stigma against mental diseases is rampant. But he thought if he could re-create the

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kind of supportive, empathetic, nonjudgmental environment he'd seen at the healing temple in other places, communities could become better at helping those with mental health issues.

Today, Kohrt directs the GW Center for Global Mental Health Equity, which leads worldwide efforts to improve mental health training for people not typically experienced with delivering therapy or formal mental health support. The National Institutes of Health, the World Health Organization (WHO), the Bill & Melinda Gates Foundation and others have funded his work. Kohrt and his colleagues believe that, with the right tools, community health workers, volunteer aid workers at refugee camps, teachers, police officers, social workers and others can be vital players in identifying and treating mental illnesses—and easing the worldwide burden of psychiatric diseases.

"I want to break down the divides between the healer and the healed," says Kohrt, the Charles and Sonia Akman Professor of Global Psychiatry in GW's School of Medicine and Health Sciences. "The goal is that in some ways everyone can be a healer toward others and, on the flip side, everyone should feel comfortable reaching out to those around them when they need support."

ALLEVIATING THE GLOBAL BURDEN

More than 80% of people worldwide who have mental health conditions live in low- and middle-income countries. Exposure to war, poverty, political upheaval and natural disaster in these places often leads directly to higher rates of depression and post-traumatic stress disorder, yet these nations have the fewest mental health resources. According to the WHO, less than a quarter of all people with depression in low-income countries ever receive adequate treatment—mostly because of provider shortages. A handful of countries in Africa and Asia have less than one psychiatrist per million people, and even in urban areas with higher concentrations of trained professionals, cultural norms, religious beliefs and long-held stigmas can prevent people in need from seeking help.

Despite these dismal statistics, Kohrt made an observation as he traveled around the world, and it became a kind of mantra for his career: Everyone has the potential inside them to help heal other people's distress.

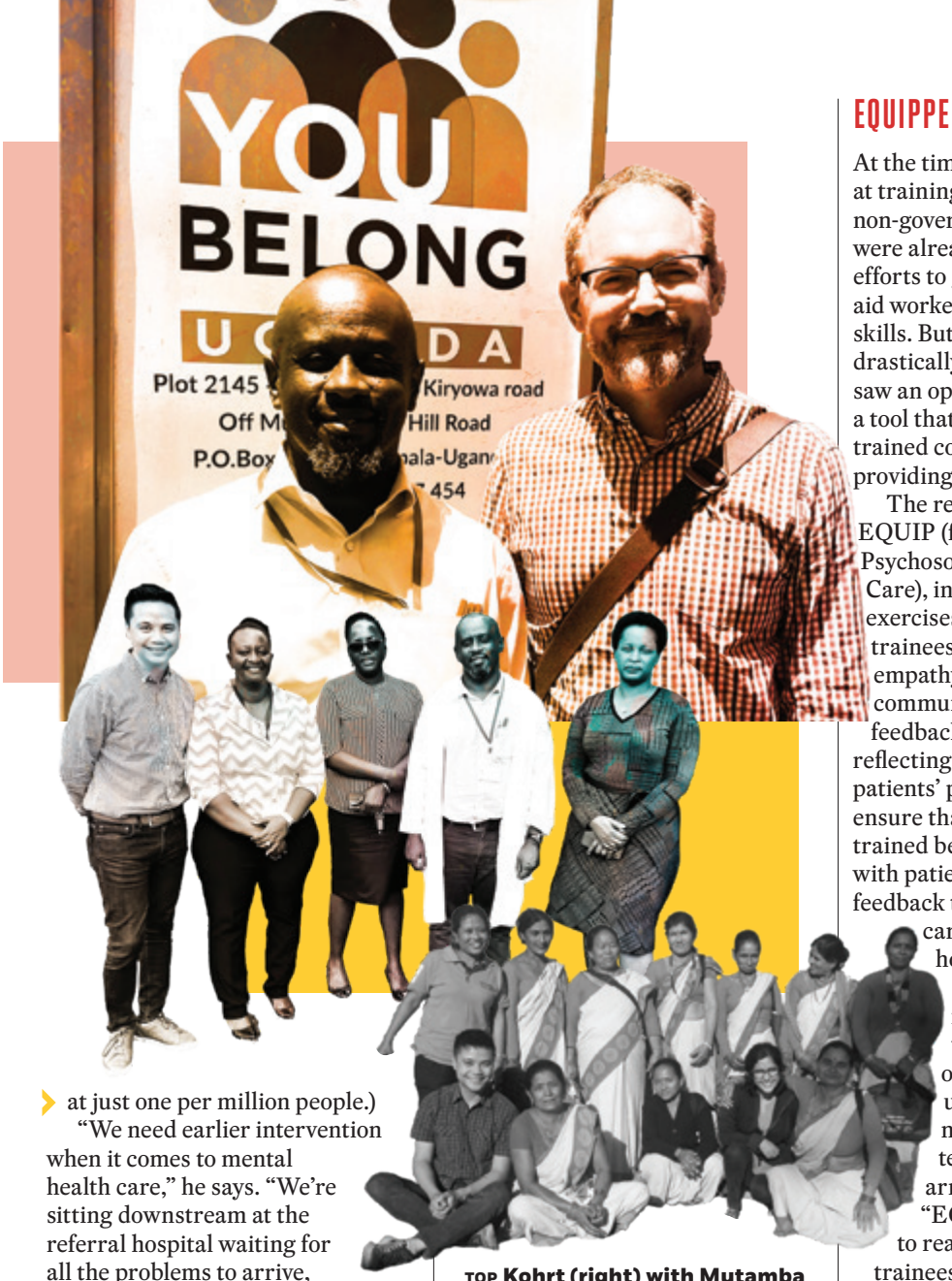
"I think it's incredibly problematic that we have this idea in our heads that only when you've been trained for years and have all these degrees can you really understand someone's emotional experience," says Kohrt. "It really devalues the fact that actually many people, with the right support, can be incredible healers and have a very strong emotional connection and understanding of others."

Kohrt's research began to focus on efforts to boost the capacity of community members in places experiencing war, poverty and natural disaster to provide mental health support to those around them.

Byamah Mutamba, a senior psychiatrist at Butabika National Referral Mental Hospital in Uganda and a long-time collaborator of Kohrt's, says that training people already immersed in communities to help triage mental health struggles can help ease the burden on providers like him. His 600-bed hospital, located in the capital city of Kampala, is a referral hospital meant to handle large volumes of patients referred from smaller hospitals and clinics. But even its resources are stretched. The hospital usually has more than 1,100 patients, Mutamba says, and is staffed by just 13 psychiatrists. (Uganda has one of the lowest rates of psychiatrists in the world,

"I think it's incredibly problematic that we have this idea in our heads that only when you've been trained for years and have all these degrees can you really understand someone's emotional experience."

CREDIT: GW CENTER FOR GLOBAL MENTAL HEALTH EQUITY



TOP Kohrt (right) with Mutamba (left). CENTER Rai (left) with collaborators in Uganda. BOTTOM Rai (bottom left) with community health volunteers in Nepal.

at just one per million people.)

"We need earlier intervention when it comes to mental health care," he says. "We're sitting downstream at the referral hospital waiting for all the problems to arrive, and we're very, very overburdened. Community health workers are a good upstream resource that can help prevent some of the problems from getting to us."

In Uganda, Kohrt, Mutamba and Sauharda Rai, a research scientist at the GW Center for Global Mental Health Equity, have been trying to do just that—training community health workers to provide basic mental health treatment in the home, in the community and at primary health facilities through a project supported by the Wellcome Trust.

EQUIPPED TO HEAL

At the time Kohrt began to look at training non-specialists, many non-governmental aid organizations were already boosting their efforts to give social workers and aid workers more mental health skills. But their programs varied drastically in effectiveness. Kohrt saw an opening to help by creating a tool that would gauge how well trained community workers were in providing mental health services.

The resulting toolkit, now called EQUIP (for Ensuring Quality in Psychosocial and Mental Health Care), includes a set of role play exercises that tests how effective trainees are at skills like showing empathy, using nonverbal communication, providing feedback to patients, and reflecting on and reframing their patients' problems. EQUIP works to ensure that non-specialists are well-trained before they begin working with patients but also provides feedback to the organizations carrying out the training on how to improve.

Rozane El Masri, a research coordinator with the non-governmental organization War Child, used EQUIP while training non-specialists to support teenagers affected by armed conflict in Lebanon. "EQUIP enables trainers to really zoom in on what our trainees need. We understand what areas we need to focus on during training and tailor our sessions accordingly," she told the WHO in 2022.

In early pilot studies in Lebanon, Peru and Nepal, community health workers and other providers who were taught psychological interventions using EQUIP had better helping skills after just two weeks of mental health training compared with providers taught without the EQUIP platform. Studies in other countries have confirmed how well EQUIP assesses the skills of trainees and

CREDIT: GW CENTER FOR GLOBAL MENTAL HEALTH EQUITY

better prepares mental health workers.

Today, Kohrt estimates that EQUIP has been used in more than 1,000 trainings across 37 countries. The toolkit is freely available through the WHO, and Kohrt's team at the GW Center for Global Mental Health Equity helps interested trainers and program managers get started using EQUIP.

Mansurat Raji, a GW researcher who works closely with Kohrt on EQUIP, has traveled around the world helping with these efforts. She says the most rewarding part of the program is seeing the difference it makes for people who finally have access to mental health support.

With Raji's help and the incorporation of EQUIP into mental health interventions, the non-governmental organizations Grow Strong Foundation and Transcultural Psychosocial Organization Nigeria trained their aid workers to carry out informal counseling sessions with caregivers in Nigerian refugee camps while also building playgrounds and establishing nutrition and education programs for children. Many people in the camps had experienced severe violence, upheaval and loss due to years of armed conflict that have led to more than 2 million displaced people in the northeast of Nigeria. Before the intervention, children and their mothers often sat silent and alone, interacting with few people around them. Most were wary to ask for advice or help from anyone working in the refugee camps.

"The change after the program was implemented was incredible," Raji remembers. "You saw kids starting to play again and to speak with each other. The mothers said that for the first time they felt safe talking to the health workers and the staff."

When adults who participated in the programs were asked whether their mental health and well-being had improved, 97% said yes.

"People don't seek mental health care because they don't want to be stigmatized by their community and their family, but also health care workers carry their own personal stigma."

SAUHARDA RAI

RESEARCH SCIENTIST WITH THE GW CENTER FOR GLOBAL MENTAL HEALTH EQUITY

CREDIT: GW CENTER FOR GLOBAL MENTAL HEALTH EQUITY

FIGHTING STIGMA

Even when community health workers can be trained to recognize psychiatric diseases, provide basic levels of support and refer patients to get treatment, there is a large hurdle that often remains: stigma.

On one of his earliest trips to the Nepali healing temple, Kohrt recalls a man who—thanks to the support of the priests—saw an improvement in the severe mood swings he had been having. But when the man returned home, he was still shunned by his family, who believed he was cursed.

In most of the developing world, stigma against mental conditions is rampant—20 countries including Bangladesh, Uganda and Kenya still criminalize attempted suicide. Even trained health care providers often discriminate against those with psychiatric diseases, believe that mental illness is incurable or prefer not to work with those struggling with mental health conditions.

"The stigma works in a lot of directions," says Rai. "People don't seek mental health care because they don't want to be stigmatized by their community and their family, but also health care workers carry their own personal stigma. They might not want to work with patients who have mental health problems because they may think they're violent, for instance."

Kohrt, Rai and their colleagues are changing that. Recently, in collaboration with the Transcultural Psychosocial Organization (TPO Nepal), they created a program called RESHAPE (Reducing Stigma among Healthcare Providers) that involves integrating people with lived experience of mental illness into training sessions for community health workers.

"It's important for them to see the real humans behind what they've been learning about," says Rai.

Kohrt's group found that when patients spoke with community health workers in Nepal during training, the health workers not

only scored lower on a scale of stigma but also became more accurate at diagnosing mental health conditions. He thinks that is because they rely less on memorized checklists of symptoms and more on the nuances of a person's experience and what they may be struggling with.

As part of RESHAPE, Kohrt and Rai have adapted a technique called PhotoVoice to help patients step into the role of advocates, sharing their stories through a series of photographs and spoken word.

In one PhotoVoice series, a Nepali man who is in recovery from alcohol use disorder clicks through photos of the local store where he spent his entire paycheck on alcohol, the bridge that he stumbled drunkenly over, and the community health workers who finally diagnosed him and helped him recover. In his last photo, he shows a beautiful and intricate ceiling mural that he painted of clouds and birds when he was able to return to his vocation as a painter.

"He says that when he was living in the throes of alcoholism, his hands shook so much that the most he could paint was a single color on a wall," Kohrt recounts. "But because of this treatment, he can create art. And that story really resonates with the health care workers who hear it."

Today, RESHAPE and PhotoVoice have been expanded into studies in China, Ethiopia, India, Tunisia and Uganda, and the team has developed a freely available manual on it.

PhotoVoice helps those struggling with a mental health condition document and share their stories. Through a series of photographs and spoken word, the approach helps to reduce stigma among health care workers by building empathy and greater understanding.

A CRISIS CLOSER TO HOME

For decades, Kohrt optimized his community-based mental health care approach for the developing world, where shortages of trained professionals are especially dire. But higher-income countries like the U.S. are also facing a mental health crisis, with rising rates of depression, anxiety, suicide and substance abuse over recent years. According to the National Institute of Mental Health, more than one in five U.S. adults lives with a mental illness, and 570 counties across the U.S. are considered "mental health care deserts," with no psychologists, psychiatrists or counselors. When rates of mental health challenges increased during the COVID-19 pandemic, Kohrt and his team wondered if mental health care strategies they'd developed and validated in other countries could be applied closer to home.

In 2021, Kohrt received a five-year, $3.5 million grant from the National Institutes of Health to bring his training strategies to underserved populations in New York City. There, his team, in collaboration with the New York City Mayor's Office of Community Mental Health, is working with organizations that provide youth mentoring, job training, housing assistance and other support.

"Imagine you're someone working in a housing assistance office," says Kohrt. "Your clients regularly come in to meet with you and fill out paperwork, and you might notice that one of them is really struggling. They're perhaps too anxious to get their forms filled out. What can you do to help reduce their distress?"

Kohrt and colleagues are using a brief, five-session intervention called Problem Management Plus (PM+), originally developed by WHO researchers and tested by Kohrt's team in Nepal. In PM+, community workers or volunteers take a two-week class to become

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GLOBAL MENTAL HEALTH

By the Numbers

80%

Percent of people worldwide with a mental health condition who live in low- and middle-income countries.

World Health Organization

12%

Percent of people with psychosis in low-income countries who receive mental health care.

World Health Organization

570

Number of U.S. counties that are considered "mental health care deserts."

National Institute of Mental Health

1 BILLION

Number of people in the world living with a mental disorder.

World Health Organization

1 IN 5

Number of U.S. adults living with a mental illness.

National Institute of Mental Health

1/3

Percent of people with psychosis in low-income countries who receive mental health care.

World Health Organization

a PM+ helper. Kohrt's team collaborated with Adam Brown, an associate professor of psychology and head of the Trauma and Global Mental Health Lab at The New School in New York City, to adapt the training to a part-time format for 12 weeks over Zoom. The ultimate goal of PM+ is not to have the trained helpers offer treatment for a specific disorder but to enhance their ability to help people who are struggling with their mental health.

"I'd say it's like a soft introduction to therapy," says GW senior research associate Chynere Best, who is on the New York City PM+ team. "We want you to be able to sit with a client for a dedicated period of time and work through a specific problem that the client is having."

In developing countries like Nepal, studies have already shown that PM+ can significantly reduce psychological distress and depression symptoms. Best says data on whether those results hold true in a high-resource country like the U.S. are still being collected, but she has heard positive feedback from the organizations involved. One case worker at a low-income housing facility told Best she was skeptical that the course would be useful. But since finishing PM+ training, she's been able to help clients better cope with challenges. One client explained that the deep breathing exercises learned in PM+ sessions were helpful in controlling their anger.

Members of the GW Center for Global Mental Health Equity, FROM LEFT TO RIGHT: **Sauharda Rai, Mansurat Raji, Chynere Best and Brandon Kohrt.**

So far, Best and Kohrt have worked with 39 different organizations across all five boroughs of New York City to integrate PM+ into their social support efforts. But the team is already thinking bigger—they'd like to expand the program to other U.S. cities, including Washington, D.C.

"What we want is to integrate psychological skills into other daily things that people are doing, whether that is a community health worker providing postnatal care in Pakistan or a social worker in New York City," says Kohrt.

Wherever Kohrt's work brings him, he remembers what he first learned at the Nepali temple more than 30 years ago: Small shows of support and acts of kindness from the community around them can go a long way in easing people's distress. For people around the world to embrace this idea will take a shift in ideas about mental health, a reduction of the stigmas surrounding mental health, and efforts to spread the training of mental health support skills. Slowly, he says, those things are beginning to happen. Recently, organizations in Gaza and Ukraine have begun using EQUIP to assess their mental health training efforts.

"Mental health seems like an insurmountable problem, so it's easy to get demoralized," Kohrt says. "But as I see more and more people get interested in solving these challenges, it really creates hope for the future." GWR

CREDIT: GW CENTER FOR GLOBAL MENTAL HEALTH EQUITY


PLASMA

PROMISE

STORY // SARAH C.P. WILLIAMS

PHOTOGRAPHY // WILLIAM ATKINS

AEROSPACE ENGINEER AND GW PROFESSOR **MICHAEL KEIDAR** HAS SPENT HIS CAREER STUDYING THE PHYSICS OF PLASMA AND HOW TO HARNESS THIS FOURTH STATE OF MATTER FOR REAL-WORLD APPLICATIONS. HIS RESEARCH IS YIELDING BIG RESULTS IN EVERYTHING FROM SATELLITE PROPULSION TO CANCER TREATMENTS.

CREDIT: TK

IN 2015, MICHAEL KEIDAR STOOD IN THE VIEWING AREA OF AN OPERATING ROOM

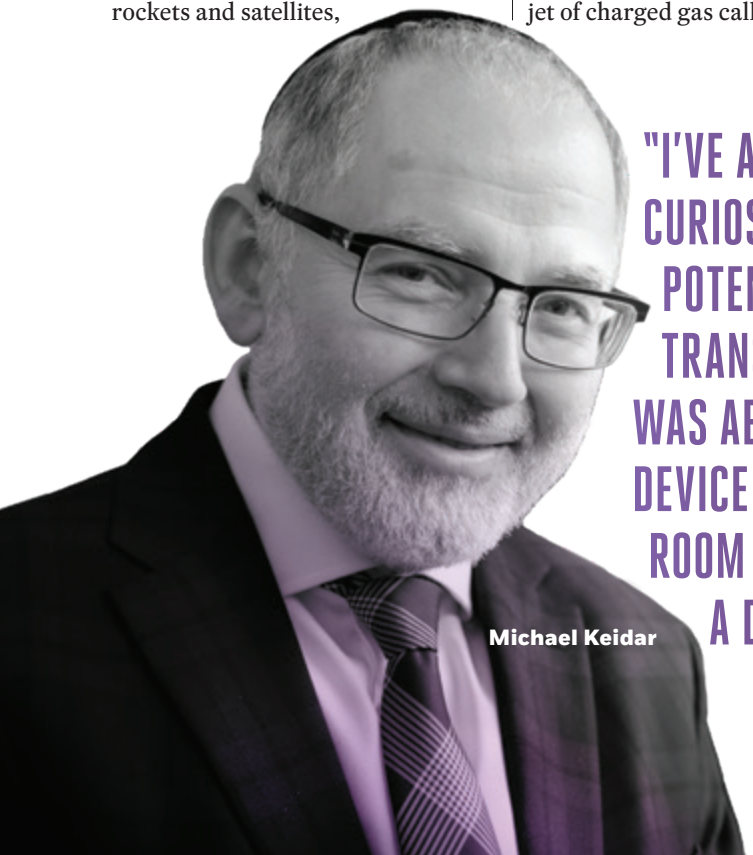
in Louisiana watching as surgeons opened the abdomen of a 56-year-old woman whose body had been ravaged by stage 4 colon cancer. He remembers being surprised by the classical music playing in the background. As an aerospace engineer, Keidar didn't usually spend much time in ORs; after decades developing thrusters for rockets and satellites, he was more familiar with physics labs and launchpads.

Carefully, over the course of more than seven hours, the surgeons removed tumors from the woman's colon, gallbladder, spleen, pancreas, liver and diaphragm. After removing each tumor, they grasped a small light-saber-like wand that emitted a bluish-purple jet of charged gas called plasma and traced the boundaries around where each tumor had been in the body. This is what Keidar was here to watch.

He had recently discovered in the lab that very short bursts of "cold" plasma—cold because it doesn't give off heat—could kill cancer cells without harming healthy cells. Now, at the hospital in Louisiana, he watched as a combination of electromagnetic waves and charged molecules passed through a device he'd invented and bombarded the patient's tissue.

Long after the patient was wheeled to recovery and the concertos and symphonies were silenced, biopsies would confirm that Keidar's findings in the lab had held true in a living human patient: Cold plasma could be used safely to destroy cancer cells.

"I've always been driven more by curiosity about physics than by the potential for my results to have translational outcomes, but it was absolutely incredible to see my device being used in the operating room and know that it could make a difference for patients," says Keidar, who today is the A. James Clark Professor of Engineering at the George Washington University.



Michael Keidar

"I'VE ALWAYS BEEN DRIVEN MORE BY CURIOSITY ABOUT PHYSICS THAN BY THE POTENTIAL FOR MY RESULTS TO HAVE TRANSLATIONAL OUTCOMES, BUT IT WAS ABSOLUTELY INCREDIBLE TO SEE MY DEVICE BEING USED IN THE OPERATING ROOM AND KNOW THAT IT COULD MAKE A DIFFERENCE FOR PATIENTS."

ROCKET MAN

Growing up, Keidar was fascinated by space. As an undergraduate at Kharkov Aviation Institute in Ukraine, he studied new electric propulsion systems for spacecraft. Scientists had long used chemical propulsion to send rockets into space—when a fuel burns, its chemical bonds break, releasing a powerful burst of energy. But chemical propulsion relies on a weighty fuel supply and provides diminishing returns: A heavier craft requires more fuel to move, which in turns adds to its weight.

Electric propulsion, on the other hand, uses solar panels or nuclear reactors to generate an electric charge that can propel a rocket with lighter components and less waste.

"These electric rockets were incredibly efficient and were really at the forefront of research in rocketry at the time," says Keidar.

As he began his graduate studies at Tel Aviv University in Israel, plasma—the charged gas generated by many electric propulsion systems—captured Keidar's interest.

When a typical gas is heated to thousands of degrees, its atoms are ripped apart into positively and negatively charged particles. Both visible light and heat are often emitted. This plasma—different enough from typical gas that it is considered a fourth state of matter—makes up most of the universe, including the center of our sun. On Earth, you can see plasma within flames, flashes of lightning and the auroras.

"What's so fascinating about plasma is that it's very abundant in the universe but very rare here on Earth," says Keidar. "We can't experience it and learn how to manipulate it unless we recreate it in the lab. I really wanted to understand it better."

When plasma is created within an electric field — positive at one end and negative at the other—its charged ions are ejected out of the system at incredible speed because of the repulsion of the charges. This forceful burst of gas propels whatever is attached to the thruster, in the same way an untied balloon buzzes around a room as air shoots out.

This micro-cathode arc thruster was launched into space in 2015 and used to maneuver a small CubeSat called BRICSat-P.

CREDIT: UNITED LAUNCH ALLIANCE (ULA)

When he launched his research career, first at Cornell University and then at the University of Michigan, Keidar saw incredible promise in using plasma to maneuver small satellites around in space. Tiny shoebox-sized satellites are increasingly used for communication, to track weather patterns and to carry out reconnaissance. But controlling the motion of such satellites, which can't support large fuel tanks or bulky solar panels, has been tricky. Keidar helped solve the problem, becoming a leader in the design of small plasma thrusters that use powerful magnetic and electric fields to turn gas into plasma.

Over the years, he has filed more than a dozen patents related to plasma propulsion and seen multiple versions of his devices launched into space to guide satellites designed by the United States Naval Academy and NASA.

But Keidar didn't stop at rocket science.

BRANCHING OUT TO BIOLOGY

When Keidar moved his lab to GW in 2007, he saw an opportunity to collaborate with biologists and biomedical engineers to study the impact of charged plasma on living tissue. First, he needed to create a device that could generate plasma at a safe temperature and still be small and nimble enough for a person to wield, whether in the lab or the hospital.

While the plasma thrusters Keidar developed for steering satellites aimed to convert 99% of the atoms within a gas into charged ions, his new cold plasma device for medicine aimed to convert just one charged particle in every 100,000 atoms into such charged ions—

essentially, a weakly ionized gas.

"What we do is use a very high electric field for a very, very short period of time," Keidar explains. "Because it's such a short interaction, you don't heat up the material. You can touch this stream of plasma with your finger, and you won't feel anything at all."

Once he had a toothbrush-sized device that could eject a stream of cold plasma, Keidar approached Mary Ann Stepp, a professor of anatomy and cell biology at GW's School of Medicine and Health Sciences who studies the cellular basis of wound healing. Some researchers had proposed using plasma to improve and speed wound healing.

"They were physicists and really didn't know anything about culturing cells and carrying out these studies," says Stepp. "I didn't know anything about plasma but felt like I could cross these bridges between physics and biology and really help them advance their research a lot."

In their first tests of applying cold plasma to living cells, Keidar and Stepp's research groups aimed cold plasma at cells in a Petri dish for 30 seconds at a time. The rush of charged particles ejected from Keidar's cold plasma device had little effect on most cells but subtly slowed the movement of some. The researchers began to wonder whether, in addition to wound healing—a situation when you want cells to stay still—cold plasma could keep cancer cells from spreading around the body. So they tested the impact of cold plasma on isolated cancer cells.

"I still have those first images," says Keidar. "It was unbelievable, really a shock. We thought we might see a small effect, but it was dramatic. The plasma was incredibly selective in killing cancer cells."

In 2010 and 2011, a few chance encounters further shaped the direction of this work. While on a treadmill at the gym, Keidar struck up a conversation with Johns Hopkins University researcher Barry Trink, who studied head and neck cancer. The scientists began collaborating and, together, tested whether cold plasma could kill the cells making up these tumors.

Then neurosurgeon Jonathan Sherman joined the faculty at GW and was mistakenly referred to Keidar while searching for a radiation system he wanted to use to treat brain cancer. Keidar didn't have the system but told Sherman about his results with cold plasma. Sherman was intrigued and suggested they study whether Keidar's device might help treat glioblastoma, one of the most aggressive types of cancer.

"Brain tumors are incredibly complex, making them difficult to study, and we have very few good treatment options," says Sherman, now director of surgical neuro-oncology at West Virginia University Berkeley Medical Center. "Many of these therapies show promise in the lab yet don't work once you test them in patients, so I was very cautiously optimistic."

Keidar's results with both Trink and Sherman were promising: In test after test, cold plasma had no impact on healthy cells but killed cancer cells—from an ever expanding list of tumor types, including not only head and neck cancer and glioblastoma but also breast, ovarian, prostate, colorectal and lung cancers.

Yet one question remained: Why?

MAKING SENSE OF COLD PLASMA

GW graduate student Vikas Soni watches a glioblastoma cell under the microscope. It is fluorescently stained blue so he can see its internal structures. He has just exposed it to one minute of cold plasma.

"First, you see the nucleus being fragmented into pieces. In biology, that means the cell has DNA damage," he narrates. "That cell is not going to survive." Indeed,

"I DIDN'T KNOW ANYTHING ABOUT PLASMA BUT FELT LIKE I COULD CROSS THESE BRIDGES BETWEEN PHYSICS AND BIOLOGY."

MARY ANN STEPP

CREDIT: MARY ANN STEPP

Graduate student Vikas Soni blasts cancer cells in a Petri dish with a jet of cold plasma. After 30 minutes, the cancer cells shrivel up and die.

within 30 minutes of incubation, the cell shrivels up, its contents spilling into the surrounding culture dish. Ultimately, it dies.

Keidar, Stepp and their colleagues knew that some of the charged atoms contained in cold plasma were oxygen and nitrogen. In biology, these are called reactive oxygen species (ROS) and reactive nitrogen species (RNS); they carry out more chemical reactions within cells than the usual oxygen and nitrogen in the air we breathe. In general, higher levels of these reactive molecules are bad for cells. Cancer cells typically have higher-than-usual levels, thought to be both a cause and consequence of their faster-than-usual growth.

In a series of experiments, Soni and other members of the Keidar lab showed that when tumor cells are barraged with cold plasma, ROS and RNS seep through their outer membranes and overwhelm the cells, causing death. When otherwise healthy cells, however, are exposed to cold plasma, they end up with only moderate levels of the reactive species.

Part of that difference is attributed to the initial amounts of reactive species in the cells—cancer cells start out with higher levels, so are in greater danger of becoming overloaded. But some of the differences also have to do with mutations, the membranes of cancer cells and pores within those membranes, which allow more reactive species through. Other dysfunctional molecules within cancer cells also make it harder for the cells to combat the reactive species once they are inside.

"Healthy cells can proofread themselves and get those reactive species back down to a normal level pretty easily and attain homeostasis [stability]," says Soni. "But cancer cells can't do that."

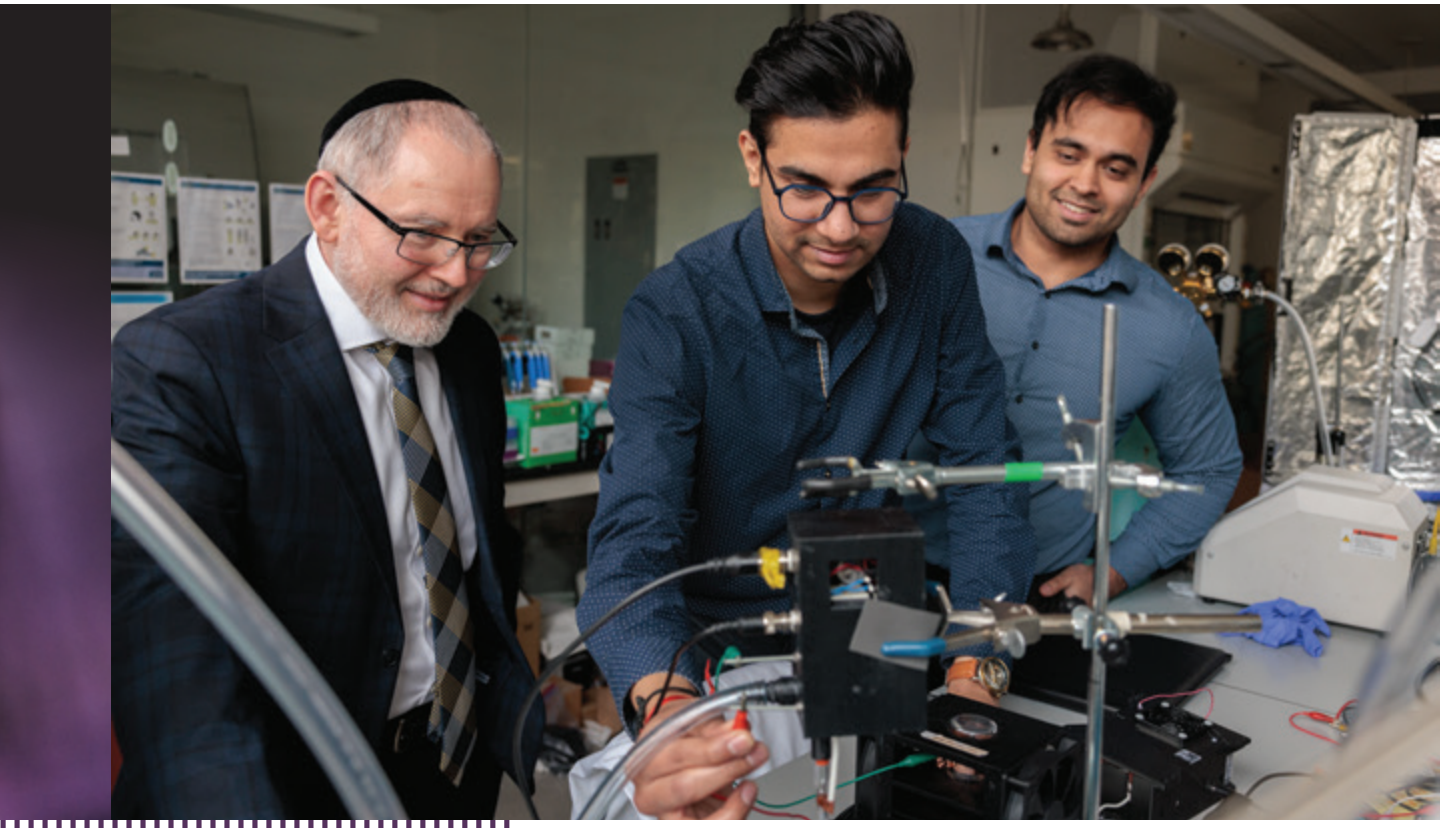
After incredibly positive data on the ability of cold plasma to shrink tumors on the sides of mice, even with skin acting as a barrier, Soni wondered whether the technology might work on brain tumors not only during surgery but from the outside. To mimic the protective shield made by the skull, he cut slices of thick human leg bone and placed them on top of lab dishes containing glioblastoma cells. After Soni aimed the plasma wand at the setup, the cancer cells died. He then tested this in mice with brain tumors—the first time a non-invasive treatment for glioblastoma using cold plasma had ever made it to animal models. Once again, the tumors shrank.

"We thought maybe we did something wrong," Soni laughs. "But we repeated the experiment a few times and kept getting similar results."

The results did not make sense at first; ROS and RNS molecules cannot penetrate bone. But cold plasma releases something more than charged atoms—a unique spectrum of electromagnetic waves. Those waves, students in Keidar's lab group discovered, traveled through skin and bone and coaxed cells to increase their own production of reactive species, having the same impact as the direct physical effects of ROS and RNS. Keidar, Soni and Sherman reported this finding in a 2021 article in the journal Cancers.

TOWARD CLINICAL TRIALS

In 2013, Keidar's patented cold plasma technology was licensed to a biomedical device company, US Medical Innovations (USMI). USMI carried out its own experiments with cold plasma using the device and began to plan clinical trials. The Food and Drug Administration's "compassionate use" program allows new treatments to be used



Keidar (LEFT) with graduate students Vikas Soni (MIDDLE) and Anmol Taploo (RIGHT).

on seriously ill patients who have no other treatment options—this allowed several tests of the device, including the 2015 surgery that Keidar watched in Louisiana.

More recently, USMI led a larger Phase I trial at Rush University Medical Center in Chicago and Sheba Medical Center in Israel. The trial tested the cold plasma device on 20 patients undergoing surgery for a variety of advanced stage 4 cancers. While many patients ultimately succumbed to their cancer, the trial helped establish the safety of the technology and showed that few patients had any tumor regrowth in the areas treated with cold plasma.

"What's amazing about this technology is that there's no damage to the normal tissue, so if it hits a nerve, an artery or a normal brain cell, it has no effect," said USMI CEO Jerome Canady in a 2023 interview. "It's truly a lifesaver."

At the same time USMI was moving forward with Keidar's initial device—which projected a physical stream of cold plasma, full of reactive molecules—Keidar's group was developing a second type of device, based on the finding that the electromagnetic waves alone could have a biological impact. The new device keeps the plasma contained within a tube that simply has to be held in the vicinity of tumor cells. Keidar won a National Science Foundation Innovation Corps (I-Corps) grant to help commercialize the technology and began talking to surgeons and oncologists about how they might use it.

"We talked to hundreds of doctors and hospitals, and everyone was, in general, intrigued. Most surgeons, though, said, 'It's interesting, but I have lots of other tools and don't know exactly how this works,'" remembers Keidar. "But there was one group of people who were really excited: neurosurgeons."

When removing a brain tumor, neurosurgeons must walk a fine line between ensuring they get all of a tumor out and protecting healthy brain cells. While a surgeon removing a breast tumor may be able to err on the side of removing extra healthy tissue, inside the skull this can cost patients their brain function. Moreover, few drugs are effective in treating glioblastoma after safely removing as much tumor as possible. Using cold plasma to kill the remaining cancer cells around where a brain tumor was removed without harming other cells could help save a patient's ability to walk or talk. Shrinking a tumor from the outside before surgery could similarly mean a smaller area of the brain affected by surgery.

With collaborators at Duke University—which has one of the largest banks of brain tumors in the world—Keidar and Sherman are now moving their new, contained cold plasma device toward clinical trials for glioblastoma.

"It's incredibly exciting to think

about the potential this has, but we're also trying to be cautious," says Sherman. "We want to go to clinical trials with a high confidence of success. So over the years, I've really pushed to wait for trials until we have enough data to determine how best to deliver treatment with the device. We're trying to be patient right now; however, we are very close to moving into the trial phase of our research."

BALANCING A BROAD RESEARCH PROGRAM

Since discovering the effect of cold plasma on cancer cells, Keidar's lab has also continued studying rocket propulsion; some of its most impactful work on satellites has come in the last few years. Keidar keeps both lines of research active and engaged, splitting his students and staff between projects.

"I think my students enjoy being a part of this lab because they end up having really versatile skills, getting a very broad education and being able to go into different fields," says Keidar. "I have several students who did their Ph.D.s on propulsion but then ended up working for biomedical companies."

Graduate student Anmol Taploo agrees. His research, funded by DARPA, focuses on developing plasma thrusters that convert air from Earth's upper atmosphere into plasma to guide very low-Earth orbit satellites. But he collaborates regularly with Soni, helping with plasma diagnostics.

"There's definitely a bridge between propulsion and medicine," says Taploo. "We both have to be able to do plasma diagnostics—measuring the properties of plasma. And so there's knowledge that can be shared there."

Keidar also doesn't shy away from taking his work in new directions.

During the COVID-19 pandemic, members of Keidar's lab wondered whether the same plasma devices they were using to kill cancer cells could also be used to inactivate the COVID-19 virus. Initial results suggested that they could, and Keidar won an NSF RAPID grant to develop a "plasma brush" that could decontaminate personal protective equipment like masks.

"I THINK MY STUDENTS ENJOY BEING A PART OF THIS LAB BECAUSE THEY END UP HAVING REALLY VERSATILE SKILLS, GETTING A VERY BROAD EDUCATION AND BEING ABLE TO GO INTO DIFFERENT FIELDS."

Michael Keidar

Since then, Keidar's student Soni has tested the experimental brush on other pathogens, including the flu virus, *Escherichia coli (E. coli)* and methicillin-resistant *Staphylococcus aureus* (MRSA) bacteria. In all cases, the plasma brush killed the germs—something potentially useful for decontaminating surfaces at hospitals or other places prone to spreading infections. Now, armed with a GW Technology Maturation Award, Soni is moving the technology toward commercialization.

Keidar's broad research portfolio is reflected in the diversity of funders who've supported his work over the years, including NSF, the Department of Defense and DARPA, the Department of Energy, NASA, the National Institutes of Health and even industry partners through corporate research agreements.

Yet, after all his successes in translating his research to both outer space and medicine, Keidar remains grounded in basic questions about plasma. He says what he most wants to know right now is how to better control low-temperature plasmas in very subtle ways. That could not only improve medical devices and thrusters but also the use of extremely precise jets of plasma to etch patterns onto computer microchips—a third area plasma research has the potential to impact. It's a topic he's only recently begun to explore but is already making strides in.

"He is really a genius outside-the-box thinker," says Sherman when talking about Keidar. "He's an easy-going guy who is an innovator and an entrepreneur at heart and wants to take his ideas and have success with them."

For Keidar, the sky's no limit. GWR

MILESTONES

OFFICE OF INNOVATION AND ENTREPRENEURSHIP CELEBRATES IMPACT AND LOOKS TO THE FUTURE

When Jim Chung was appointed director of the newly formed Office of Innovation and Entrepreneurship (OIE) in 2010, he had a simple yet lofty vision to build a "hotbed of entrepreneurship" at GW.

After 14 years at the helm, he did exactly that.

As the former vice provost for research, innovation and entrepreneurship at GW, Chung helped make GW a preeminent place for scholars, researchers and students to problem solve and create change through innovation.

Over the years, students and faculty from all 10 colleges at GW have participated in OIE programming, and the office has launched over 350 start-ups and raised more than $1.8 billion in follow-up funding.

"GW attracts students and researchers who want to be in Washington, D.C., and want to change the world, and the office has created a new channel for them to have greater impact," said Chung, who credits scores of deans, professors, alumni volunteers, sponsors and his team for helping him build the office over the years. "We've been able to capitalize on the strengths of GW and provide resources that have helped propel GW into one of the top universities for innovation and entrepreneurship in the world."

> "HE [CHUNG] BUILT ONE OF THE BEST ENTREPRENEURSHIP PROGRAMS IN THE COUNTRY. IT IS GLOBALLY RECOGNIZED AS A GREAT PROGRAM, AND JIM SHOULD GET ALL THE CREDIT HE CAN POSSIBLY BE GIVEN."
>
> **Bob Smith**
> Director of GW's I-Corps program

Now Chung is passing the leadership baton to Bob Smith, director of GW's I-Corps program.

Smith, who has more than 30 years of experience in innovation and entrepreneurship, wants to build on the foundation that Chung established, helping students, faculty, alumni and partners solve global challenges. He will work with GW schools to open the window for new grants and take the mentorship program to the next level by making it available to alumni. Smith also aims to establish industry advisory panels and to delve more into new fields such as the sustainability space.

Overall, he wants to ensure the GW community knows that OIE is a university-wide resource that can help them take their ideas to the next level, no matter what that level is.

"He [Chung] built one of the best entrepreneurship programs in the country," Smith said. "It is globally recognized as a great program, and Jim should get all the credit he can possibly be given."

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CREDIT: WILLIAM ATKINS

A LEGACY OF INNOVATION

Since its launch in 2010, GW's Office of Innovation and Entrepreneurship has continuously reached new heights.

2010

GW launches the Office of Innovation and Entrepreneurship and appoints **Jim Chung** as director.

2013

The National Science Foundation (NSF) awards GW and two partner institutions **$3.75 million** to establish a Mid-Atlantic node as part of the federal agency's Innovation Corps (I-Corps) program, which helps entrepreneurial students and faculty researchers bring their discoveries to the market.

2016

NSF awards GW and three collaborating institutions **$3.45 million** to renew their D.C.-area node as part of the I-Corps program, boosting the national innovation ecosystem.

2017

GW participates in the **United Nations Knowledge Summit on Micro-, Small- and Medium-sized Enterprises**. Organized by the International Council for Small Business, the summit works to promote entrepreneurship and small businesses worldwide.

2019

» The **GW Innovation + Entrepreneurship Lab** and co-working space opens.

» OIE partners with the **Korea Innovation Center** to incubate promising Korean technology startups. Today, OIE conducts international programming with teams in **more than 45 countries**.

2021

» GW's New Venture Competition is **ranked No. 1** among university entrepreneurship competitions by the Times of Entrepreneurship.

» NSF awards **$15 million** to GW and nine other partner institutions to boost regional innovation through the Mid-Atlantic I-Corps Hub.

» OIE launches the **Entrepreneur Development Network of D.C. pilot program** to support District-based entrepreneurs, universities, accelerators and economic development organizations.

2023

OIE signs a **Memorandum of Understanding** with the World Business Angel Investment Forum's (WBAF) Financial Inclusion Center, reflecting a mutual commitment to job creation and increased prosperity worldwide. At WBAF's international investment competition in South Africa, two health innovation companies founded at GW were among the five finalists to win recognition.

2024

OIE announces the **GW x Penn West Global Build Fellowship**, which will provide H1B visa solutions to foreign start-up founders in return for creating micro-internship opportunities for GW students. GWR

YOUNG ENTREPRENEURS

BUDDING ENTREPRENEURS WIN CASH PRIZES AT 2024 NEW VENTURE COMPETITION

GW Business junior Camryn Baum (LEFT) celebrates with a first-place check after she and her team won the Consumer Goods and Services Track.

Innovative GW students and young alumni earned thousands of dollars in prize money for their startup visions as finalists of the nationally recognized New Venture Competition (NVC), the flagship event put on by the Office of Innovation and Entrepreneurship.

The finalists of the four vertical tracks (Consumer Goods and Services, Business Goods and Services, Social Innovation and Health Care & Life Sciences), in addition to a track for those just getting their feet wet in entrepreneurship (Explorer), presented their innovative ideas at an awards show at GW's Jack Morton Auditorium.

Aerospace and mechanical engineering students Vikas Soni and Anmol Taploo won the most prize money at $19,000—a top $10,000 prize in the Health Care & Life Sciences Track, another $5,000 for Best Prototype and $4,000 for winning the Spirit of NVC Award.

Their plasma medicine technology—which they call JivaJet—seeks to address the challenges of antibiotic-resistant bacterial infections in veterinary health care. The device uses cold atmospheric plasma to target and eliminate antibiotic-resistant bacteria on the skin by generating free radicals that target the DNA and cell membrane of the bacteria.

A total of 192 teams participated in this year's NVC, the 16th time it has been held since its inaugural competition in 2009. The awards ceremony included presentations from 12 finalists across all four vertical tracks. The three winners who emerged from the Explorer Track were also announced.

All 10 GW schools had teams in the competition this year, and participation was up 20% from 2023. This is a particular point of pride for Director of Student Entrepreneurship Kate Heath, M.B.A. '10, who has an oft-stated commitment to cross-campus inclusivity when it comes to OIE's programming.

"Not only were all 10 schools represented, but nine of them were in the finals and took home major awards, including teams from GSEHD, Nursing and Corcoran—schools where 'entrepreneurship' is not a common topic," Heath said. "It just goes to show that at GW,

CREDIT: WILLIAM ATKINS

Explorer Track awardee Marguerite Rowell (left) from the School of Nursing with Paul Wahlbeck, dean of GW's Columbian College of Arts and Sciences.

innovation truly lives everywhere."

GW medical student Abhisri Ramesh's venture, A.Eye, came second in prize money winnings, topping out at $17,500. Ramesh won second place in the Health Care & Life Sciences Track, in addition to taking home the $10,000 CirrusLabs Best Tech Venture prize. A.Eye is a medical platform for ophthalmologists that provides advanced diagnostic assistance and streamlines image interpretation workflows by leveraging predictive and generative AI algorithms.

Ramesh's pitch for A.Eye was that it could help detect age-related macular degeneration at an earlier stage and prevent sudden loss of sight. She credited OIE, especially the Mentors-in-Residence program, for supporting her work.

"When you step into the entrepreneurship space for the first time, I think one of the biggest questions is just figuring out what your next step should be," she said. "Having that support of them directing your vision and thinking about those next steps has been really, really helpful."

> **"It just goes to show that at GW, innovation truly lives everywhere."**
>
> **Kate Heath**
> Director of Student Entrepreneurship

The team of GW Business juniors Camryn Baum, Laura Sofia and Joanna Destil, in addition to Columbian College of Arts and Sciences senior Sofia Bertini and Milken Institute School of Public Health sophomore Brooke Moses, also built on a venture started in 2022 as the group won first place for the Consumer Goods and Services Track, in addition to the Best Market Assessment specialty prize, winning a total of $15,000.

Their product, Adjust-A-Bra, is a redesign of the modern-day sports bra that aims to minimize the financial and societal cost of women's size fluctuations through aspects of adjustability. Adjust-A-Bra is the first product of their bigger brand, EveryActive.

GW Engineering students Ammar Kamaruszaman, Rigel Brown, Taylor White, Nicolo Kreuger and Treesta James won top prize for Social Innovation and the Best Financial Understanding Category Prize, totaling $15,000. Their initiative, called Engineering Horizons, helps GW engineering students volunteer within the local community and foster space for eighth-grade students within D.C. Public Schools to widen their perspectives within STEM by providing science tutoring.

"The problems are rooted within historical and systemic inequities," Kamaruszaman said. "As college students, what can we do to help?"

Former GW men's swimming and diving teammates Karol Mlynarczyk and Dylan Koo, both seniors, and Youssef Ragab, B.B.A. '21, M.S. '22, earned top prize in the Business Goods and Services Track for their venture, In-Locator, an app that would make the in-store journey individualized through tailored shopping and mapping.

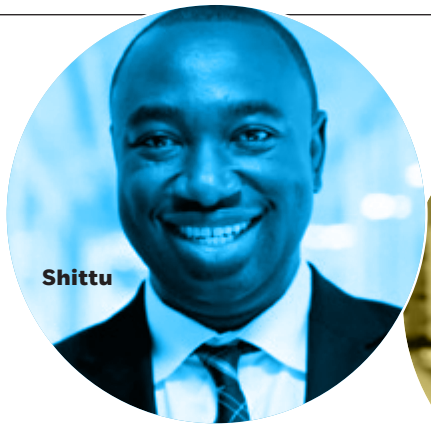
GW Business M.B.A. candidate Kunal Bagre won the coveted People's Choice Award, a $7,500 prize decided on by an online vote for "fan favorite," for his venture called Immersiview, which would give users an opportunity to experience live events through a VR headset.

School of Nursing student Marguerite Rowell won the Explorer Track award for her venture, Nurse Math LLC, an app that addresses the absence of financial education in nursing programs and offers step-by-step calculations for health care and business formulas.

New to this year's competition was corporate sponsor NextEra Energy, which created the Innovation in Sustainability prize. GWR

See all of the NVC winners. ▶

CREDIT: WILLIAM ATKINS



COMMERCIALIZATION

GW PROFESSOR AND ALUMNUS PARTNER TO BRING MEDICAL SENSOR TO MARKET

Medical devices like infusion pumps, EKG monitors and electronic hospital beds are critical for providing patient care in hospitals. They are also expensive, not just to purchase but in the costly maintenance schedules they incur. Some estimates put annual American hospital spending on these devices at almost 200 billion dollars.

Hospital managers may defer to manufacturer-set maintenance schedules that are neither the most efficient use of the hospital's financial resources nor the safest, most responsive approach.

But what if the machines themselves could tell managers what they need and when?

That's the new model that Connor Roberts, a double alumnus of GW's School of Engineering and Applied Science, is working to develop alongside GW's Ekundayo Shittu, an associate professor of engineering management and systems engineering. Roberts is CEO and founder of Opal HTM, which innovates devices and advanced algorithms to track equipment use, analyze machines' reliability over time and quantify key factors like a device's age, usage and physical location. To date, they have received almost $1 million of competitive funding from multiple sources, including a $550,000 Partnerships for Innovation grant from the National Science Foundation (NSF), a $275,000 NSF Phase 1 STTR award, a $50,000 GW Technology Maturation award, and a $25,000 investment from a Maryland-based venture capital company.

More recently, GW's Technology Commercialization Office awarded Opal HTM the very first $100,000 SBIR Matching Fund grant. The grant, along with a recently signed exclusive patent license from GW, will help Opal HTM develop a health care technology that addresses critical challenges in medical device management, making it smarter, safer and more efficient.

"We want to empower hospitals, who are always being asked to do more with less," says Shittu, who is a corporate adviser to Opal HTM and also a member of the GW chapter of the National Academy of Inventors and the National Innovation Network. GWR

TECHNOLOGY COMMERCIALIZATION BY THE NUMBERS

$1.1M
Gross licensing income generated from GW inventions in FY24.

53
Number of GW inventions disclosed in FY24.

8
Number of licensing deals for GW inventions secured in FY24.

INVENTOR OF THE YEAR

Rong Li, Ross Professor of Basic Science Research at GW's School of Medicine and Health Sciences, was named the 2024 GW Inventor of the Year.

Li's research explores the underlying mechanisms found in certain breast cancers that prevent immune cells from entering tumors to kill the cancer cells inside. He has developed an antibody to break down those tumor defenses.

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CREDIT: LI BY MICHAEL LEONG

GW TAI

TRUSTWORTHY AI INITIATIVE

The GW Trustworthy AI Initiative (TAI) brings together a collection of research and educational programs to deliver timely education, foster problem-driven research and inform evidence-based policy.

OUR APPROACH

GW TAI utilizes a socio-technical approach that integrates design, development and deployment of AI systems with the consideration of the social and ethical effects those systems will have in the real world.

» RESEARCH

GW TAI emphasizes interdisciplinary research from across the university and connects choices about data and design to strategies for the governance of AI systems.

» EDUCATION

GW develops and delivers cutting-edge educational programs for students and mid-career professionals that prepare tomorrow's leaders, researchers and innovators to co-design the AI future.

» CONVENING

GW's proximity to policymakers and the region's growing tech sector positions us to convene and collaborate with key stakeholders from government, industry, academia and community groups to determine how to design AI-enabled systems society can trust.

» PARTNERSHIP

GW TAI's corporate partnerships program facilitates a two-way dissemination. Corporate partners have access to future talent and GW TAI experts, and corporate partners share their real-world experiences and data to inspire GW TAI research in order to develop timely research-backed solutions.

Join Us

To connect with a TAI scholar, learn about educational programming, or discuss corporate partnership opportunities, contact: GWTAI@gwu.edu

Visit the GW TAI website for more information:
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ART MEETS AI

Graphic design student Xitong (Rocky) Yuan presented “Invisible Scroll 墨隐若现” at the GW Corcoran School of the Arts and Design’s NEXT Festival. Yuan’s work explores the collaboration between artist and artificial intelligence (AI). Using an electroencephalogram and AI algorithm control, Yuan transforms static landscapes into self-generated spatial experiences that capture ephemeral landscape moments.

📷 Denny Henry (Corcoran BFA ’07)