

IMPACT

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RESEARCH AT BROWN

2021



SPECIAL REPORT

Responding to the Pandemic **P.18**



THE COVID-19 PANDEMIC is one of the most devastating public health challenges of modern times, but it has also given the world the most remarkable validation of the importance of government-supported university research that we have seen in our lifetimes.

Across the United States and the world, university laboratories closed for all but essential activities as COVID-19 cases increased and hospitals and health care workers were overwhelmed. Yet, despite the uncertainty and losses, we have made extraordinary advances in research and in our understanding of the human experience. It has been an exceptional year for Brown research—one of resilience and accomplishment.

In mid-March 2020, non-essential research ramped down at the same time most students left campus and the governor of Rhode Island issued a stay-at-home order. The emergency reduction of laboratory research took only days to effect. Almost immediately, researchers galvanized to assist Rhode Island's health care system, with donations of PPE and other supplies to hospitals and frontline health care workers.

Just as quickly, our researchers turned attention to urgent questions related to the pandemic. The University's COVID-19 Research Seed Fund, announced in April, accelerated innovative work of faculty and students on therapies, technology, and medical interventions. With this fund, 15 important projects launched, including a statewide Biobank providing patients' biological samples to researchers at Brown, as well as to Rhode Island's Lifespan and Care New England health systems.

Throughout this global crisis, many Brown researchers have been prominent voices in newspapers and in broadcast and

digital media: Dr. Ashish Jha, the new dean of the School of Public Health, is informing the nation on public health matters; economist Emily Oster is providing data-driven advice for parents of school-age children; and Dr. Megan Ranney rallied her ER coworkers as she called for national health care changes and became a regular contributor on a major national news network.

Our research community successfully resumed most operations over the summer, with rigorous new safety protocols and double shifts to accommodate reduced staffing densities. Brown faculty, staff, and students have been working with dedication and innovation throughout the pandemic. As a result, we've garnered many highly competitive awards. As one example, the National Science Foundation awarded Brown \$23.7 million for renewal of the Institute for Computational and Experimental Research in Mathematics (ICERM).

In this issue of *Impact*, you will find stories about Brown research achievements in numerous fields, including a special section devoted to COVID and a feature on the Center for the Study of Race and Ethnicity in America. Led by Tricia Rose, CSREA is one of most highly regarded academic centers focused on scholarship on race and ethnicity—a topic brought into sharp relief as the nation grappled with anti-Black racism in 2020. This issue's spotlight on undergraduate research focuses on the work of our students in social issues.

It has been gratifying to see our University research community respond to a challenging year so quickly, effectively, and creatively.



Jill Pipher

Vice President for Research
Elisha Benjamin Andrews Professor of Mathematics

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IMPACT

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RESEARCH BRIEFS

A COMPENDIUM OF RECENT HIGHLIGHTS OF BROWN RESEARCH

Saving “God’s Little Acre”

Archaeology students are reviving the history of one of the oldest African-American cemeteries.

FOR YEARS, STORIES of those buried in God’s Little Acre in Newport, Rhode Island, one of the oldest United States cemeteries for Africans and African Americans, had been slipping away despite a dedicated team of descendants and volunteers.

Stories like that of Charity “Dutchess” Quamino—who was brought to the United States from West Africa as a slave in the 1700s and eventually became a pastry chef and caterer, later serving George Washington for at least one event—have been in danger of disappearing as gravestones weather or recede into the Earth.

Then three Brown archaeology graduate students were drawn into the project by a volunteer at Newport’s Historic Cemetery Advisory Commission, and they became a key part of efforts to preserve and revive the history through a long-needed site map.

The cemetery, founded in the late 17th century, is the final resting place of at least 500 Africans and African Ameri-

cans, many of whom were enslaved. Few stories of people buried were preserved, and the only known cemetery map dated back to 1903 and was incomplete.

Using three-dimensional images and aerial drone footage, graduate students Alex Marko, Dan Plekhov, and Miriam Rothenberg undertook an intense investigation, recording the extensive details on grave markers. They created an interactive map and database they intend to make available to researchers and tourists.

“We know the bigger picture of the slave trade and how inhumane it was,” Plekhov said. “You learn even more when you focus on individual people and individual experiences.”

Soon, Rothenberg said, “people can use a map on their phone or tablet to identify specific graves and interact with this site and its history more personally.”

Said Plekhov, “Making people aware of this lesser-known history, telling these stories . . . could drive us all toward a more inclusive future.” —JILL KIMBALL

Brown graduate students surveyed hundreds of grave markers on the site.

RESEARCH BRIEFS



Experiments showed graphene, a carbon nanomaterial, could be a potent defense against mosquitos.

Take the Sting Out of Mosquitos

Engineering researchers find a promising new tool to stop bites: graphene.

SOMETIMES, SCIENTIFIC breakthroughs are made when researchers are looking for something else.

Robert Hurt, professor in Brown's School of Engineering and leader of the university's Superfund Research Program, had been working with his team on fabrics that incorporate graphene as a barrier against toxic chemicals. "We started thinking about what else the approach might be good for," he recalled.

A novel idea emerged from the brainstorming: mosquito bite protection.

In a paper published in *Proceedings of the National Academy of Sciences*, Hurt's lab showed that multilayer

graphene can provide a two-fold defense against mosquito bites. The ultra-thin material acts as a barrier that mosquitoes are unable to bite through. Experiments also showed that graphene blocks chemical signals mosquitoes use to sense that a blood meal is near, blunting their urge to bite.

The study was based on research with participants who placed their arms in a mosquito-filled enclosure so that only a small patch of their skin was available to the mosquitoes. Researchers compared the number of bites participants received on their bare skin, on skin covered in cheesecloth, and on skin covered by a graphene oxide film sheathed in

cheesecloth. Cintia Castillho PhD '20, the study's lead author, said the graphene material "was a chemical barrier that prevents mosquitoes from sensing that someone is there."

Within days of its release, the study—funded by the National Institute of Environmental Health Sciences, the Superfund Research Program, and the National Science Foundation—drew a large amount of international media and scientific attention. Hurt said properly engineered graphene linings could be used to make mosquito-protective clothing, and "there's a lot of interest in non-chemical mosquito bite protection." —KEVIN STACEY

PHOTOGRAPH BY ISTOCKPHOTO, HURT LAB/BROWN UNIVERSITY (INSET)

ALUMNI IMPACT

SUZANNE RIVERA '91 became president of Macalester College in June 2020, the school's first female and Latinx president. She concentrated in American Civilization at Brown.

"The best research experience I had at Brown was a summer fellowship with Professor Greg Elliott in sociology, developing a new course on poverty in the United States. That research experience demystified the work of academia and fostered in me the joy of discovery. I'd never have been capable of serving in this role at Macalester College without the excellent preparation and the courage of convictions I got at Brown."



PHOTOGRAPH BY DAVID J. TURNER (RIVERA); BROWN UNIVERSITY (ORR)



Marion Orr specializes in urban, racial, and ethnic politics.

The Dean of Urban Politics

A veteran scholar brings the "hidden" into the open in his examinations of race and ethnicity.

WHEN HE WAS AN UNDERGRADUATE student at Savannah State University, Marion Orr was inspired by a professor who "made political science come to life." Thirty-five years after he graduated, the American Political Science Association (APSA) made Orr, a Brown professor, the recipient of the 2019 Hanes Walton Award, which honors political scientists who have made significant contributions to the study of racial and ethnic politics—named after the man who compelled Orr to pursue his field of study.

Orr has authored or edited seven books, and his pioneering research in urban politics and racial and ethnic politics has been widely recognized by experts in his field. His book *The Color of School Reform: Race, Politics, and the Challenge of Urban Education* was named the best book in the ASPA's Urban Politics Section. He has chaired the governing board of the Urban Affairs Association, and at Brown has served as the director of what is now known as the Taubman Center for American Politics and Policy and as chair of the political science department.

For the past several years, Orr has been working on an upcoming biography of former U.S. Representative Charles Diggs, the first African American in Congress from Michigan, a staunch civil rights activist, and founder and first chair of the Congressional Black Caucus. Orr has interviewed dozens of Diggs's family members and former colleagues and has visited the six libraries of the presidents who served during his tenure. While Diggs is often mentioned in histories, "no one has brought him together in one place," Orr said. "My book, I hope, will bring this hidden figure out into the open." —LI GOLDSTEIN '22

RESEARCH BRIEFS

Immunotherapy Enhanced

Scientists are working to block a key tumor-promoting protein.



IMMUNOTHERAPY—an important form of medical treatment that uses the body’s immune system to recognize, attack, and kill cancerous tumor cells—has successes, but still fails with a significant proportion of patients.

Now Brown scientists have found evidence of a way to block a key tumor-promoting protein, MDM2, that has been a significant roadblock to greater effectiveness in immunotherapy.

“Immunotherapy has been one of the biggest breakthroughs in biomedical science and medicine of the last two decades,” said Dr. Wafik El-Deiry (pictured), a professor of pathology and laboratory medicine and associate dean for oncologic sciences, and his lab’s finding could enhance immunotherapy.

El-Deiry’s team found a drug that appears to be inhibiting the MDM2 protein. “It’s tapping into a vulnerability within tumors to help immunotherapy work better,” he said. Results of the study were published in the Nature journal *Cell Death Discovery*, and the research continues.

El-Deiry is inaugural director of the recently launched Cancer Center at Brown University, which in June became part of the highly selective Association of American Cancer Institutes. The center builds on Brown’s growing focus on translational science, aiming to have breakthroughs in basic research advanced to the point where they can make a meaningful medical difference for patients. “Establishing the Cancer Center at Brown will support the programmatic integration of innovative cancer-relevant research,” said El-Deiry.

Innovation to Impact in Medicine

Five teams receive grants to make advances into commercial products benefiting patients.

IN ITS PROGRAM to accelerate medical discoveries becoming commercial technologies, Brown Biomedical Innovations to Impact (BBII) gave five awards to faculty research ranging from analyzing infant cries for signs of opioid withdrawal, to developing anti-malaria treatment, and more.

Each research team was awarded \$100,000 to help translate their scientific discoveries into commercial products benefiting patients. “The goal of the program is to support biomedical technologies that need additional work to become products that have commercialization potential,” said Karen Bullock, the managing director of BBII, “including navigating the gap between the time when federal research funding ends and private investors are ready to invest.”

“We have been focused on supporting and building capacity for translational science,” said Dr. Jack A. Elias, senior vice president for health affairs and dean of medicine and biological sciences. “The BBII awards have been a great tool to help researchers move their discoveries along that pathway toward commercialization.”

Part of the *Brown and the Innovation Economy* initiative, BBII was started with \$8 million in philanthropic gifts from Brown donors and is run by the University’s Division of Biology and Medicine in collaboration with Brown Technology Innovations, part of the Office of the Vice President for Research.

“BBII is a cornerstone of Brown’s efforts to inspire and support innovative research that will improve people’s lives, including treatments and cures for diseases,” said Jill Pipher, vice president for research.

Project proposals were reviewed by an advisory committee including venture capitalists and pharmaceutical experts.

Project awardees are:

QIAN CHEN, a professor of orthopedic research and medical science, to develop a gene therapy treatment for post-traumatic osteoarthritis.

The team of **KAREEN COULOMBE**, an assistant professor of engineering and medical science; **BUM-RAK CHOI**, an associate professor of medicine (research); and **ULRIKE MENDE**, a professor of medicine, to design a test to make new therapeutic drugs that are safer for the heart.

JONATHAN KURTIS, chair of pathology and laboratory medicine, to develop antibody-based therapeutics for malaria.

BARRY LESTER, director of the Brown Center for the Study of Children at Risk, to search for signs in newborn infants of opioid withdrawal.

ANITA SHUKLA, an assistant professor of engineering, to develop treatments to reduce dangerous fungal infections.

—NOEL RUBINTON ’77

A New Approach to Genetic Testing

Two biomedical engineers are teaming up to make procedures less invasive.

GENETIC TESTS are the only way to definitively diagnose a range of medical conditions in developing fetuses, but getting samples is invasive and risky. That has driven Brown researchers, led by biomedical engineering professors Anubhav Tripathi and Anita Shukla, to advance a less invasive, equally reliable alternative.

Currently, the most common way to diagnose genetic disorders during pregnancy is by retrieving trophoblasts—cells found in a mother’s placenta that carry the complete fetal genome—through amniocentesis or chorionic villus sampling, both of which are invasive procedures that carry a risk of miscarriage. A less invasive alternative involves blood tests that look for fetal genetic material in a mother’s bloodstream. But those tests can’t be used for definitive diagnoses, and there’s a limited range of disorders that can be screened.

The labs of Tripathi, an engineering professor who focuses on molecular diagnostics, and Shukla, an assistant professor of engineering who specializes in smart biomaterials, are collaborating on a new technique. They have found a way to enrich trophoblasts from simple cervical swabs using a low-cost and rapid methodology. The technique could enable doctors to diagnose a wide range of genetic disorders without using needles to harvest cells from the placenta.

One of the project’s researchers, Christina Bailey-Hytholt PhD ’20 in biomedical engineering, said, “There is a large need for biomedical engineering techniques toward advancing prenatal and women’s health.” A study about the new procedure was published by the team in the journal *Scientific Reports*, and the work has been funded by the National Science Foundation and PerkinElmer Inc.

—KEVIN STACEY



ALUMNI IMPACT

ALINA MORAN ’93 was named president of Dignity Health—California Hospital Medical Center in Los Angeles in February 2020. At Brown, she was an engineering concentrator.

“Growing up in the Bronx, I did not have many opportunities to learn about how research can inform action or prove a theory. As an engineering student, I was exposed to scientific observation—identifying the problem, reviewing information, developing my hypothesis, and analyzing results. I used this in all aspects of life, in class, with my Hermanas sorority sisters, and with family. Decades later, research plays a prominent role in my profession.”





Risks of injuries for girls and boys in sports can be reduced.

Everything in Moderation, Even Sports

Intense, specialized training can hurt children.

“IT’S WONDERFUL for a child to love a sport and to want to engage in it,” said Alison Field, professor of epidemiology and pediatrics. “But we must keep in mind the number of hours spent playing. They add up pretty quickly.”

Field, who is affiliated with Brown’s School of Public Health and Warren Alpert Medical School, found in a study published in the *Orthopaedic Journal of Sports Medicine* that injury dangers are significantly higher for children who specialize in a sport from a young age and practice more frequently and intensely.

Field said a common fear among parents is that, if their children don’t play more, they’ll fall behind in their sport. “But it may actually be the opposite,” she said. “If children do too much, they may get injured and fall behind.”

Her findings, drawn from a multi-year study of 10,138 older children and teens throughout the United States, suggest that, although activity is good for health, there can be too much of a good thing. The youth engaging in the most hours of intense activity per week, often involving specializing, are most likely to be seriously injured.

Risk patterns differed for girls versus boys. For girls, no particular sport stood out as being extra risky to specialize in. However, specialization in general increased girls’ risk of injury by about 30 percent. In contrast, specialization in general did not significantly increase boys’ risk of injury, but certain sports—such as baseball and gymnastics—increased risk.

Field hopes the study’s conclusions will help lead to less intense, less specialized training, and include more cross-training and conditioning.

—KERRY BENSON

PHOTOGRAPH BY ISTOCKPHOTO

Natural Language for Computers

Communication is key to better interaction between humans and computers.



WHEN A COMPUTER program encounters a word like “apple,” explains Ellie Pavlick (pictured), an assistant professor of computer science at Brown, it will often comprehend it as a string of symbols— a-p-p-l-e—to be encoded into

bytes. The driving question is: “What does the computer actually need to know about the word ‘apple’ to know what an apple is?”

Through her research in the area of natural language processing, Pavlick is working to answer that question by teaching computers to encounter language as a human might, in order to facilitate more versatile and meaningful interactions between humans and systems. Ever since her PhD, Pavlick has studied how to represent the nuances of language in computers, studying what a computer may need to know about a particular word in order to fully comprehend its meaning, on its own and in composition with other words.

At Brown, she conducts much of this research in collaboration with the Cognitive, Linguistic, and Psychological Sciences department. “We’re trying to figure out how humans represent language so that we can reverse engineer it and implement it in computers,” Pavlick said.

Two recent grants, from the Defense Advanced Research Projects Agency (DARPA) and the Intelligence Advanced Research Projects Activity (IARPA), are enabling Pavlick to deepen her research. The first is tackling grounded language acquisition, an attempt to mimic in a computer how young children learn and master language. With the IARPA grant of \$6 million—the largest received by the computer science department to date—Pavlick is teaming up with colleagues at Ohio State and the University of Pennsylvania to design “cross-lingual search engines” that can return highly specific results and can function in any language. —LI GOLDSTEIN ’22

ALUMNI IMPACT

DR. NICOLE ALEXANDER-SCOTT MPH ’11 is director of the Rhode Island Department of Health. At Brown, she completed a four-year fellowship in adult and pediatric infectious diseases at the Warren Alpert Medical School and earned a master’s degree in public health.

“COVID-19 is challenging us in unprecedented ways. I am thankful that I can rely upon the tools and values I developed as an infectious disease fellow and public health student at Brown to help me understand and respond to this pandemic. I draw upon these tools to ensure that every Rhode Islander has an equal opportunity to be healthy and safe.”





Kevin Escudero's goal: "Texturing the narratives that I present about the activists."

The Unique Identities of Immigrant Activists

A researcher digs deep to show the multifaceted world of youths.

WHEN KEVIN ESCUDERO began the research process for his book "Organizing While Undocumented: Immigrant Youth's Political Activism under the Law," he knew he faced a stiff challenge. With a renewed national focus on immigrant activism and the federal government's emphasis on creating "deserving" and "underserving" distinctions within the immigrant community, he needed to bring a fresh perspective to an area that had already been extensively researched and discussed.

The difference, he decided, would come through his research approach and the book's overarching argument. Over the next five years, Escudero, an assistant professor of American Studies and ethnic studies at Brown, conducted a close ethnographic study in San Francisco, Chicago, and New York, epicenters of immigrant political activism.

Escudero worked hard to honor his subjects' unique identities in the book published in March 2020, "texturing the narratives that I present about the activists." He emphasized their multi-faceted identities as immigrants, people of color, and queer individuals, and the impact on the movement's political strategies.

UCLA Chicana/o studies professor Leisy Abrego, who spoke at a Brown symposium about Escudero's book, praised his approach, saying, "Working honestly through discussions on privilege, race, homophobia, transphobia, and inequalities ultimately builds more trust and allows people to show up as their whole selves."

Also in 2020, Escudero received a CAREER award from the National Science Foundation, a highly selective early career honor. With the award's five years of funding, he will set up a research lab studying educational career pathways of immigrant students, from college to graduate school to the workforce. —LI GOLDSTEIN '22

Research Honors

Seven professors receive Brown's top awards.

IN ITS ANNUAL program to honor exceptional scholars across a wide variety of disciplines, Brown awarded Research Achievement Awards to seven faculty members.

"It is a great pleasure to recognize the singular accomplishments of these seven researchers," said Vice President for Research Jill Pipher. "Beyond exceptional achievements, these awards are about something larger—Brown is truly making a difference in the world, through both fundamental and translational research."

Provost Richard M. Locke said, "With its culture of collaboration and excellence, Brown is uniquely positioned to address critical societal issues through rigorous research, teaching, and service. Our faculty are central to these efforts. Research helps us understand and mitigate great challenges, and this year's winners are outstanding examples."

Nominations for the awards were reviewed by panels of distinguished Brown faculty.

The winners of 2020 Distinguished Research Achievement Awards are:

MICHAEL LITTMAN (computer science) for research focusing on

artificial intelligence, machine learning, and human-computer interaction.

PETER MONTI (alcohol and addiction studies) for building understanding of the bio-behavioral mechanisms that underlie addictive behavior as well as its prevention and treatment.

JOHN SEDIVY (molecular biology, cell biology, and biochemistry) for making advances in basic research on a form of cellular aging and death known as cell senescence.

The winners of 2020 Early Career Research Achievement Awards are: **SILVIA CHIANG** (pediatrics) for clinical and epidemiological research on pediatric and adolescent tuberculosis.

NICOLAS FAWZI (molecular pharmacology, physiology, and biotechnology) for research centering on increasing understanding of a class of RNA processing assemblies whose dysfunction has implications for several neurodegenerative diseases.

RAMELL ROSS (visual arts) for his creative work as a writer, photographer, and filmmaker, including his film *Hale County This Morning, This Evening*, nominated for a 2018 Academy Award for Best Documentary Feature.

ANITA SHUKLA (engineering), for research focusing on designing responsive and targeted biomaterials for applications in drug delivery and regenerative medicine.

—NOEL RUBINTON '77

How Stimulants Really Work

Neuroscientists find that drugs like Ritalin operate by the brain doing a cost-benefit analysis.

THE COMMON ASSUMPTION has long been that Ritalin, Adderall, and other drugs for the treatment of attention deficit hyperactivity disorder (ADHD) work by helping people focus. It turns out there's more to it.

A study from researchers at Brown marked the first time scientists examined precisely how stimulants such as Ritalin alter cognitive function. They discovered something new: The drugs actually work by directing the brain to fix its attention on the benefits, rather than the costs, of completing difficult tasks.

Study author Michael Frank, a professor of cognitive, linguistic, and psychological sciences and director of the Carney Institute's new Center for Computational Brain Science, said the study shows the drugs "increase your cognitive motivation: Your perceived benefits of performing a demanding task are elevated, while the perceived costs are reduced. This effect is separate from any changes in actual ability."

Brown postdoctoral researcher Andrew Westbrook, the study's lead author, added, "Our brains have been honed to orient us toward the tasks that will have the greatest payoff and the least cost over time."

Westbrook and Frank hope their study will help future researchers and medical professionals better understand cognitive mechanisms, allowing them to identify connections between levels of the neurotransmitter dopamine and disorders such as anxiety, depression, and ADHD.

"Our research is focused on disentangling neural and cognitive functions to understand people's different thought processes and evaluate what's best for their needs," Frank said.

The study, published in the journal *Science*, was done in collaboration with Radboud University in the Netherlands and funded by the National Institutes of Health and the Netherlands Organization for Scientific Research.

—JILL KIMBALL

ALUMNI IMPACT



JONATHAN KARP '86 became CEO of Simon & Schuster in May 2020. He concentrated in American Civilization at Brown.

"When I wasn't at the Brown Daily Herald learning to ask 'Who? What? When? Where? Why? How?' (essential questions for any manager), I was at the Rock, omnivorously browsing. Once, I discovered an obscure study of popular fiction. Years later, as an editor evaluating new works, I would think of that musty book and its archetypes. I still carry my Rock ID in my wallet, in case I'm ever in the neighborhood."

RESEARCH BRIEFS

SHORT TAKES

A long-lost city from ancient Maya civilization, Sak Tz'i', was uncovered in a Mexican backyard by a research team including Associate Professor of Anthropology Andrew Scherer.

Painter Jackson Pollock's "drip" technique was geared to avoid a classic fluid mechanical instability, whether he was aware of it or not, according to a study by Professor of Engineering Roberto Zenit.

Research from Dr. Rebekah Gardner, associate professor of medicine, and colleagues at UC San Francisco, showed that the narrative evaluations of medical students used for clerkships contained significant gender and minority bias.



Victoria Almansa-Villatoro, a PhD student in Egyptology, worked with learning designers at Brown to create an interactive online course about the pyramids, kings, and societies of the third millennium B.C., based on her fieldwork in Egypt.

When organizations take a stand against actions to combat climate change, they get more news coverage than their pro-climate action peers, according to a study from Assistant Professor of Environment and Society and Sociology Rachel Wetts.

New Rhode Island high school hockey safety guidelines were based on the concussion research led by Dr. Peter Kriz, clinical associate professor of orthopaedics and pediatrics at Warren Alpert Medical School.

Proving Einstein Right, a book by Professor of Physics S. James Gates Jr. about the theory of relativity, won the Brown University Book Award and was given to high-achieving high school juniors around the country.



The Moon's Shackleton Crater appears to be home to deposits of water ice.

Unpacking Lunar Ice

A surprising discovery on the Moon's south pole could assist future astronauts.

FUTURE EXPLORERS ON the Moon will need more information about resources available for fuel and other purposes, and new research from planetary scientists at Brown could provide important clues.

The research's discoveries about the age and sources of water ice on the Moon are expected to help both basic science and exploration planning. The majority of the reported ice was found within large craters dating back about 3.1 billion years or longer, but the researchers also found evidence of ice in smaller craters that appear to be relatively recent.

"That was a surprise," said Ariel Deutsch PhD '20, the study's lead author. "There hadn't really been any observations of ice in younger cold traps before."

"The ages of these deposits can potentially tell us something about the origin of the ice, which helps us understand the

sources and distribution of water in the inner solar system," Deutsch said. "We need to understand the distributions of these deposits to figure out how best to access them." After receiving her PhD, Deutsch became a postdoctoral fellow at the NASA Ames Research Center to help further study the ice deposits.

The study, published in the journal *Icarus*, continues Brown's long ties to NASA and planetary research. Deutsch worked with Brown professor James Head PhD '69 and Gregory Neumann PhD '93 from NASA's Goddard Space Flight Center.

Head said, "When we think about sending humans back to the Moon for long-term exploration, we need to know what resources are there that we can count on, and we currently don't know. Studies like this one help us make predictions about where we need to go to answer those questions."

—KEVIN STACEY



Tricia Rose, CSREA's director: "Race is at the heart of whatever happens in our country."

Brown's Center for the Study of Race and Ethnicity in America has carved out a crucial role in dialogue and research.

A Community in Conversation

BY SARAH C. BALDWIN '87 | PHOTOGRAPH BY ALEX GAGNE

LAST SUMMER, DEMONSTRATIONS against police brutality, racism, and white supremacy rocked cities and towns from coast to coast. For many white Americans, the mobilization represented an awakening. For people of color—not to mention scholars of this country's history—the moment felt all too familiar. But this time one thing was different: for many people, denying that racism is a foundational feature of the United States had become all but impossible.

As Brown moved to advance understanding of this profoundly teachable moment, the Center for the Study of Race and Ethnicity in America (CSREA) became the heart of campus efforts. Based on its history, it was natural that, starting in September 2020, the center would host, along with other programs, "Race & in America," a year-long series of panel discussions with distinguished researchers from around the university.

Established in 1986, the CSREA was one of the earliest academic centers in the country focused on scholarship on race and ethnicity; at Brown, it is a site for research and dialogue about a topic that has arguably never been more urgent. Its move in 2016 to its current location in Lippitt House, in the heart of campus, mirrors the growing centrality of race and ethnicity in American academic and popular discourse.



Providence, like elsewhere in the United States, was the site of many racial justice protests in 2020.

“Race is at the heart of whatever happens in our country,” says Tricia Rose AM ’87, PhD ’93, professor of Africana Studies and, since 2013, director of the CSREA. “If we do not develop a more sophisticated understanding of how race works in American society, we will not be able to produce a just, multiracial democracy.”

What distinguishes racism in America, she says, is the enduring myth that it’s going away. In the post-civil rights era, the fallacy of colorblindness—the idea that if, we refuse to acknowledge race and racial inequality, discrimination will vanish—became entrenched across the political spectrum. The center is using scholarship and discussion to close the gap between the notion that racial and ethnic inequalities are a thing of the past and the glaring truth that they are not.

“Racism has been at the root of our darkest periods, and despite the efforts of many across generations—including civil rights activists, students and scholars—we know that racism is pervasive today, and remains an obstacle to achieving true peace and justice for all,” says Provost Richard Locke. “At Brown, we are committed to revealing and addressing legacies of structural racism and discrimination in our society, and we are fortunate to have significant scholarly resources to draw upon in our work. Chief among these is CSREA, which brings together thought leaders to investigate history and reflect and shape contemporary thought, policy, and practice.”

TIMELY, RELEVANT, AND SUPPORTIVE

Rose, whom *Ms.* magazine called a “legendary Black feminist scholar,” has spent her career studying Black history, culture, and sexuality in the post-civil rights era. She is perhaps best known for her pioneering 1994 book, *Black Noise: Rap Music and Black Culture*, which helped establish hip-hop as a topic of scholarly focus. In 2015, she was tapped to direct the new “How Structural Racism Works” series, another collaboration between the Office of the Provost and the CSREA. Based on her ongoing research project, the initiative offers a campus-wide examina-

tion—through lectures, discussions, and workshops—of the range of normalized and interconnected policies, practices, and attitudes that drive racial inequality in this country.

When Rose accepted the CSREA directorship, she envisioned the center as an “ideas hub” that would spawn new ways of thinking and talking about race, and a widely valued campus asset: productive for faculty, important for students, engaging for the public.

“I have always been invested in making complicated ideas that matter in the world interesting, relevant, and engaging. That to me is the point of being a teacher and a researcher,” Rose says. It’s also the spirit that animates the CSREA.

Through programming and rigorous research, she set about “building a community in conversation about race.” The conversation would be both informed by scholars and accessible to all. The center has since convened many prominent intellectuals, activists, and artists. One of the first public programs Rose organized, in 2014, took place shortly after a jury declared George Zimmerman not guilty of the murder of unarmed Black teenager Trayvon Martin: a teach-in featuring experts on the targeting of young people of color.

That same year, as its public programming found its audience on campus and beyond, the center began designing programs to support scholars in myriad ways—eventually offering manuscript workshops, writing retreats, course innovation grants, and CSREA Faculty Grants. Intended to cultivate an intellectual community drawn from across Brown, Faculty Grants provide funding and staffing for campus events and research groups that faculty members themselves devise according to their academic interests. Over the years, these have included performances, films, seminars, and lectures on topics as timely and diverse as school segregation, Latina feminism, indigenous language revival, the whiteness of food movements, and refugees and immigration.

Such a grant enabled Elena Shih, assistant professor of American Studies, to hold a manuscript development workshop



Tricia Rose led a conversation with Trevor Noah, host of “The Daily Show,” at Brown in 2017.

in 2019 that helped her refine an edited volume she’d been working on with colleagues around the world. The event brought scholars from Jamaica, Brazil, and Ghana to the center—as well as others who joined via technology—for two days of workshops.

CENTRIPETAL FORCE

Reflecting her own multidisciplinary approach, Rose says the center invites people from within and beyond the humanities and social sciences to contribute to the conversation. “If we were just a center that’s a subset of a given discipline, we wouldn’t need to be able to talk across lots of spaces. We’d have a specialized language, and we would go deep instead of wide. But I think it’s much more important to create an interdisciplinary hub for research and learning. Sociologists have to be able to talk to people in public health, who have to be able to talk to historians, who have to be able to talk to people who work in biomed and genetics,” she says. “A center should bring people together.”

The center also supports fellowship programs to further the work of graduate students and faculty, and, with the Watson Institute for International and Public Affairs, co-sponsors a postdoctoral research associate in race and ethnicity. Ronald Aubert, current visiting professor of the practice, appreciates the CSREA’s “unparalleled exposure to senior thought leadership as well as the exciting intellectual energy of emerging scholars across multiple disciplines.” Former postdoc Mariaelena Huambachano credits the support she received from the CSREA with encouraging her to continue her research and her work with the United Nations as an advocate of indigenous people’s rights. Participating in a round table discussion as part of “How Structural Racism Works,” says former Presidential Diversity Postdoctoral Fellow Yalidy Matos, helped her expand her thinking about how structural racism interfaces with immigration, her area of study.

Notable among the CSREA’s extensive menu of research-focused initiatives, which includes first-book events and informal workshops on current projects, are programs that support and showcase writers, artists, and performers. Past art exhibits have explored microaggressions, appropriation of indigenous culture in modern media, and resilience, among other topics.

“Artists have always been the most powerful of voices for helping us see things around us in ways that are often invisible to those of us who don’t have that gift,” Rose says. “They have the capacity to get at the heart of something in a way that engages your spirit and soul as well as your intellect. They help us connect in ways that words don’t.”

In January 2020, the CSREA, along with centers at Yale University, the University of Chicago, and Stanford University, received a \$4 million grant from the Mellon Foundation to expand the study of race in the humanities across all four campuses. In addition to creating a faculty fellows program that will bring humanities scholars to the center for race-based research, the grant will make possible new multi-campus courses, free public events, exhibits, and conferences. One of the signatures of Brown’s contribution is a humanities lab, a seminar-like space in which faculty and students can collaborate in innovative, boundary-pushing ways and engage in what Rose calls “disciplined freestyling.” She says the lab will be a highly creative space in which to ask, “What if?”

IT’S NEVER OVER

The CSREA records the vast majority of the events it convenes, and the nearly 200 videos in its ever-growing library can be accessed for research purposes by anyone at any time because race-related issues tend to be cyclical, receding and recurring across time.

“The conversation evolves,” Rose says, “but it also continues to *revolve* around a set of issues. You can’t [look at the protests] of summer 2020 and suddenly say, *What’s all this racial talk? What’s going on?* You have to know there’s a long-term conversation about these issues. It’s important to be able to see the conversation unfolding.”

Case in point: the “Race & in America” series draws on Brown scholars to probe the effects of race and anti-Black racism from a variety of perspectives, such as public health, media depictions, and incarceration rates. In her virtual conversation series “Underlying Conditions,” also launched in 2020, Rose engages experts to explore the disproportionate impacts of the COVID-19 pandemic on communities of color through a variety of lenses, including health disparities and the effects on black businesses.

To maintain connections—and conversations—during the pandemic, the center created the e-newsletter “The Art of the Matter,” and started another that features a video pulled from its archive. And in June 2020 Rose partnered with another public intellectual, Harvard scholar Cornel West, to create “The Tight Rope,” a virtual conversation/podcast on subjects ranging from pop culture to peace and justice.

Rose, who signs emails and letters “joy + justice,” admits to becoming weary at times in the battle for justice and its backlash. These, she says, are “bigger than the human spirit, if you let them be.” But she’s also heartened by the speed with which things that were impossible to change five years ago seem to be changing today.

Of joy and justice, she says, “You can’t have one without the other. We need a joyful approach to create justice. And joy can’t happen in its full sense until we’re really invested in trying to produce a just world. Right?” ■

Bring in the Scientists

“Our faculty and their research are defined by extraordinary resilience, creativity, and generosity. I always knew these were characteristics of Brown, but to witness their impact in the context of this pandemic is amazing.”

—Vice President for Research Jill Pipher

Dozens of Brown faculty launched COVID-19 research in the weeks and months after the pandemic started, attracting internal and external funding for projects stretching from biology and medicine to public health, engineering, computer science, economics, and more. While the recently started research is in its early stages, Brown’s COVID projects have already generated hundreds of published papers in respected journals, multiplied initial funding through additional sources, and grown through new collaborations within Brown and externally.



For four researchers,
COVID-19 provided immediate
new possibilities.

Quick

BEFORE COVID, VINCENT MOR was engaged in a broad range of research, including co-leading the largest federal grant in University history, a \$53.4 million award from the National Institute on Aging to help people with Alzheimer's and their caregivers. At the end of January 2020, Mor, professor of health services, policy, and practice at Brown's School of Public Health, chaired an Alzheimer's meeting in Washington, D.C., with about 80 colleagues from around the country, and COVID wasn't a topic of any conversation.

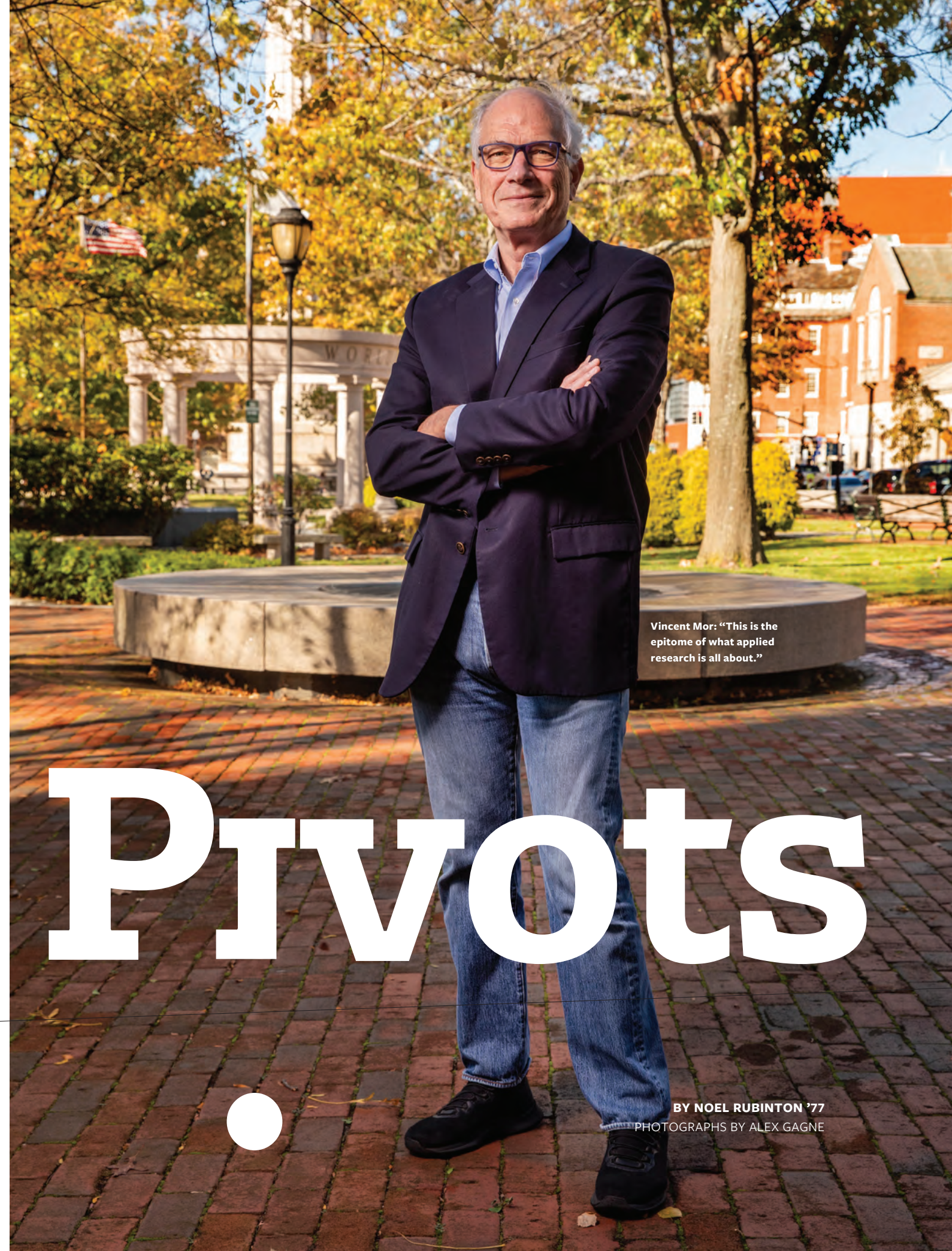
That quickly changed.

A COMMUNITY RESPONDS

Brown faculty have become prominent voices during the pandemic. Here are selected highlights of their expert commentary.

"Right now there are already hundreds of millions of people in China whose lives have been completely turned upside down by the response to the virus."

—**Katherine Mason**, assistant professor of anthropology, *The Scientific Inquirer*, February 18



Vincent Mor: "This is the epitome of what applied research is all about."

Pivots



BY NOEL RUBINTON '77

PHOTOGRAPHS BY ALEX GAGNE

Little information about the effects of the virus on people in nursing homes had been released by China, but it was clear that it was devastating residents of long-term facilities in Italy. “We knew that all hell was breaking loose in Italy and it was just a matter of time before it hit the United States,” Mor said. His team knew the window for action would be brief: “I knew that nursing homes were going to feel the brunt of this.”

By mid-March, Mor was talking to his program officer at the National Institutes of Health (NIH) to see what research would be most helpful. “He impressed on us the importance of having data in real time as quickly as possible,” Mor said. He turned to Genesis HealthCare, a company he’d worked with before and one of the largest nursing home providers in the country, with nearly 400 homes in 26 states.

Quickly, Genesis agreed to give Mor’s team huge data files on a daily basis in return for Brown researchers’ help in unraveling the many mysteries of COVID, including its transmission and possible treatment at nursing homes. “We threw lots of resources at designing a system to receive nightly downloads of data,” Mor said. It rapidly grew into a large research initiative that is generating new ideas and knowledge about the effects of COVID in nursing homes. “This is the epitome of what applied research is all about,” he said.

Mor’s Alzheimer’s Collaboratory group found additional ways to address COVID, receiving seven supplemental awards from the NIH totaling over \$10 million. New project aims include advance care planning in assisted living facilities, strengthening infection control, enhancing testing for historically underserved populations in nursing homes, messaging strategies to increase COVID vaccination uptake among nursing home residents and staff, and monitoring incidence of adverse reactions to COVID vaccinations in nursing homes and the general population of older persons. His group has worked “flat out,” often seven days a

week, on initiatives and to disseminate the results of their research.

Mor said an important goal of his research is to build a counter-narrative, setting the record straight and informing future action. Many people have accused nursing home companies, especially for-profit ones, for not taking enough care to mitigate the havoc of COVID. But Mor believes a more accurate picture is that most nursing homes “are doing their very best” with little financial or scientific support, facing waves of community transmission of the virus that are not under their control. He said solutions need to be on a broader scale: “Our data is pretty compelling, and outbreaks are not due to the nursing homes’ behavior as much as they are attributable to prevalence in the community.”



JUST BEFORE THE PANDEMIC, Daniel Harris, an assistant professor of engineering, was running a busy fluid mechanics lab in the new Engineering Research Center, including many graduate and undergraduate students. Suddenly all the work stopped in mid-March when Brown ramped down all but essential research. “It was a sad moment to leave a vibrant lab and community,” he said.

But the inactivity didn’t last more than a few days. An engineering colleague, Roberto Zenit, contacted Harris about the “Code Life Ventilator Challenge,” a global innovation effort to inspire teams to rapidly design a more efficient and easier to produce ventilator, a critical piece of life-saving equipment for many COVID patients. Harris joined right away. “I didn’t want to sit on the sidelines,” he said, even though he had never worked on medical devices before.

A rapid round of emails and phone and Zoom calls generated a Brown team, including faculty, students, clinicians, and industry consultants. The team designed the Brun02 ventilator prototype in a



Daniel Harris:
“I didn’t want to sit on the sidelines.”

few weeks, even though they initially lacked a physical lab headquarters. But the group’s work quickly required a place for assembly and testing of equipment. Harris’s lab was allowed to reopen as a site for essential research, and he and some students started working in a deserted engineering building. “It was an eerie feeling,” Harris said.

At the same time, Harris took on another job, unusual for a faculty researcher: delivery person. It was temporarily impossible to deliver needed equipment to the lab, and many on the team couldn’t go into the restricted lab space anyway, forcing them to build at home. The workaround was that Harris had packages delivered to his house, and then he drove them to dorms and apartments so teammates could use them.

Harris describes the early weeks as a “sprinted marathon,” with work often going through the night, seven days a week. He and others got the model ventilator operational for the first time at 4 a.m. one night in late March.

The Brown-designed ventilator went far in the challenge competition, getting to the top 65 of the more than 1,000 entries worldwide, and the team decided to refocus for the longer term. It combined its work with two bio-engineering labs, one at Stanford University and one at the University of Utah. The expanded team then gained core international partners in India, Nepal, and Kenya. The team’s communication network expanded from one Slack channel to 20 different channels, on top of frequent Zoom calls. The research has had unexpected offshoots too. “This crisis has unearthed a lot of inequities in the medical device market globally,” Harris said, and the project leaders hope to spin off a foundation to help reduce these inequities.

As summer turned to fall, Harris’s research work shifted backed toward fluid dynamics projects after his lab reopening plans were approved. Yet he expects that his research trajectory will be forever changed by the COVID experience: “I see a huge opportunity to use some of these skills for a very different cause.” What has he learned about Brown from the experience? “How inter-disciplinary the program is at Brown, with very few barriers . . . , and the passion and the capability of our undergraduate students.”



WHEN AMANDA JAMIESON went to Galveston, Texas, at the end of February for an international conference on the Biology of Acute Respiratory Infection, she heard a lot about the dangers of COVID and its exponentially increasing spread. Back at Brown, she heard people talking about having a few more weeks

“When it pops [in prisons], and it’s about to, it’s going to be really ugly.”

—**Josiah Rich**, professor of medicine and epidemiology, *Huffington Post*, March 10

“My experiences in Liberia [during Ebola] taught me that courage is not the absence of fear—it is doing what you know you must even when you are terrified.”

—**Adam Levine**, associate professor of emergency medicine, *STAT*, March 21

“This pandemic is a wake-up call from the future. It tells us that we need to re-imagine what we mean by the term ‘security threat.’”

—**Stephen Kinzer**, senior fellow at Watson Institute, *Boston Globe*, March 18

“The crisis has made clear that the United States has welcomed the benefits of planetary interconnection but avoided the responsibilities that would help us weather the disasters that spread across the same global networks.”

—**Samuel Zipp**, associate professor of American studies and urban studies, *Washington Post*, March 27



Amanda Jamieson:
“Being an immunologist, there had to be something we could do.”

before any possible shutdown. Jamieson, an assistant professor of molecular microbiology and immunology, was ready to start ramping down right away.

While shutting down many projects was painful and caused significant research losses, Jamieson was already looking forward: “Being an immunologist, there had to be something we could do.” She talked with members of her lab team and others, and, after the university announced its COVID-19 Research Seed Fund in April, Jamieson applied for and became the only researcher to be funded by two Seed awards.

Working with Graphene Composites (GC), a nanomaterials technology company whose CEO is Brown alumnus Sandy Chen ’88, Jamieson is testing a graphene/silver nanoparticle ink formulation to be used in personal protective equipment as a way of reducing virus transmission rates. She said initial results have been promising.

In her other Seed project, Jamieson teamed up with faculty from pathology and laboratory medicine, as well as economics, to try to map the spread of COVID in the Rhode Island population and assess the role of asymptomatic cases.

Buoyed by her seed success, Jamieson applied for a highly competitive COVID Fast Grants opportunity, a program from Emergent Ventures in the Mercatus Center at George Mason University. She won a \$300,000 award that she can use for anything related to COVID and which she plans to use for bioinformatics-related research to look at possible causes of blood coagulation defects in COVID patients.

For several months, Jamieson’s whole team concentrated on COVID work, but was subsequently able to resume its previous grant-funded research.

“In terms of techniques, it’s things we do a lot,” Jamieson said of the COVID work. “But the subjects are completely new. It’s been really interesting learning a new field. I have always felt that how people can survive respiratory disorders is important, and people are appreciating it more. It is more urgent now.”



THE APPLIED MICROECONOMICS work of economics professor John Friedman involves analyzing huge amounts of data. “When the pandemic hit, we lost access to some data sets,” Friedman said, and progress on his work was greatly slowed. But before long, he said, “We were trying to think about what we could do to be helpful.”

Friedman does much of his research through Opportunity Insights, a nonprofit that he is a codirector of and which is dedicated to using “big data” to turn its findings into policy change. He brainstormed with his fellow directors, Raj Chetty and Nathaniel Hendren of Harvard, and soon a new idea came up: to develop a real-time economic activity tracker. During the pandemic, they believed that businesses and others would especially want the most up-to-date statistics on income and spending to help make policy decisions and adjustments.

By May 7, the tracker was in operation and publicly available, following successful negotiations with many private companies to allow use of their data on an anonymous basis. “It has been quite a bit of work on our part but a testament to the public-mindedness of these companies,” Friedman said.

A month later, Friedman and his colleagues published a major research paper based on the tracker, showing its ability to document—faster than had been done before—consumer spending, business revenues, employment rates, and other key indicators. By tapping into private companies’ data, important information and insights that previously were not available for months through usual government sources were now possible within days or a few weeks. Government websites became among the users of the data from Friedman and his team.

The response to the tracker was tremendously positive. Policymakers started using it, as did private companies and other academics. Media around the world wrote about the tracker and its results and used the newly public data to do their own analysis. Friedman and colleagues started briefing U.S. senators and House members using the tracker.



John Friedman:
“Now this is a tool that is out there for policymakers.”

At first, it was “an all-hands-on deck moment,” Friedman said. After a couple of months, he and others have been able to get back to other research, but the tracker has continued to be a major project.

He thinks the tracker is headed toward “changing things in a few different ways for economic research and policy.” The idea of a real-time tracker had been talked about in the past, but never accomplished. “What we capitalized on here was that we are in a pandemic,” he said, “and it motivated companies to do things they wouldn’t ordinarily do. Now this is a tool that is out there for policymakers.”

Friedman added, “This is going to affect the way policy is made,” explaining that real-time data could allow for more targeted decisions, including by government. “We’re not going to give up on thinking about long-term upward mobility,” which had been Opportunity Insights’ previous largest research niche, “but we will keep going on this. This is a space we are going to continue on.” ■

“Counting on people’s memory [for COVID contact tracing] is less than perfect, especially when you have a really busy life.”

—Anna Lysyanskaya, professor of computer science, WPRI-TV, April 17

“Oil fields are not like wine bottles, where you can put in a cork [because of COVID] and return to it later. Shutting an oil field down can damage it.”

—Jeff Colgan, associate professor of political science and international and public affairs, *The Guardian*, May 8

“As a liberal, a 72-year-old, a bioethicist, and most of all as a human being, I am appalled that some states have set forth guidelines . . . that call for discrimination against people in my age group in the event of a shortage of ventilators or ICU beds.”

—Felicia Nimue Ackerman, professor of philosophy, *New York Times*, April 23

“If there’s one thing we learned in this crisis it’s that we can’t fall behind the information curve. We need the most up-to-date information to make decisions.”

—John Friedman, professor of economics, MSNBC “Morning Joe,” May 7

Crisis and Action

Brown researchers launched a wide range of approaches on COVID-19 BY NOEL RUBINTON '77



SEED PROJECTS LAUNCHED

Within two weeks of the dramatic reduction of in-person activity on campus in March 2020, President Christina H. Paxson announced the establishment of a COVID-19 Research Seed Fund “to fast-track innovative research proposals that directly address the urgent needs of the COVID-19 pandemic.”

After a panel of Brown faculty reviewed applications, 15 seed awards totaling \$350,000 and spanning a broad range of disciplines, were announced April 30. In the months that followed, the projects gained momentum.

“This pandemic has tapped into the best of the Brown community, helping the world in a critical moment,” said Paxson. “Brown researchers are having a profound impact on the battle against COVID-19 through their ingenuity in research and wide collaborations.”

■ In one of the first seed projects fully implemented, a biobank containing plasma and serum samples from patients tested for COVID was set up in May at Lifespan’s Clinical Research Center at Rhode Island Hospital. It was established as a source for researchers at Brown and around the state who needed human plasma and serum samples for COVID investigation.

By fall, more than a dozen teams of researchers were using the samples from patients getting treatment at Rhode Island Hospital and Miriam Hospital.

Another team, led by Rosa Baier in the School of Public Health, began publishing issue briefs and developing best practices for future crises in long-term care facilities, based on its national survey of front-line staff during COVID.



And in their first months of operation, researchers from many other seed projects began publishing dozens of top-tier academic papers based on early findings and started larger collaborations with other institutions.

■ The seed awards also began to catalyze further external funding, another goal of the awards. Amanda Jamieson, an assistant professor of molecular microbiology and immunology who received funding in two seed awards, also won a Fast Grant from Emergent Ventures and an innovation grant from the state of Rhode Island. After getting a seed award to develop a home testing kit, William Fairbrother, a professor of biology, received an additional grant from the Fred M. Roddy Foundation.

EXTERNAL FUNDING OBTAINED

New research funding opportunities arose quickly from federal agencies, foundations, and other external sources during the spring and summer. Brown faculty received external funding totaling millions of dollars, with many applications still pending.

■ Katherine Mason, an assistant professor of anthropology, received an award from the National Science Foundation. Teaming up with a Brown PhD student, Yifeng Cai, who conducted interviews in Shanghai, Mason is looking at “how people’s information consumption can affect the trajectory of the pandemic in different places.”

■ Project Hope, a not-for-profit organization, funded the Center for Human Rights and Humanitarian Studies at the Watson Institute to train health workers around the world in how to prevent and treat COVID. By the fall, the center’s training had reached over 66,000 workers in more than 30 countries, led by director Dr. Adam Levine, also director of global emergency medicine at the Warren Alpert Medical School.



OTHER PROJECTS LAUNCHED

■ Emily Oster, a professor of economics and public policy expert, became a national resource on the impact of COVID on children’s education and family issues.

Early in the COVID crisis, Oster—author of two best-selling data-driven parenting advice books, *Expecting Better* and *Cribsheet*—saw an information gap and created a website and other ways to illuminate detailed data and facts. “We can give people context,” she said. In collaboration with medical experts, data scientists, and Brown students, Oster started the COVID-Explained website, which by July had reached more than 50,000 unique users in a month.

■ The Pembroke Center Oral History Project recorded conversations about pandemic experiences, focusing on women, transgender people, and nonbinary people. The Brown Library collected stories, including paper and digital records, in a community archive from alumni, faculty, students, and others.

■ As a nationally recognized researcher on prison health issues, Dr. Josiah Rich, a professor of medicine and epidemiology at Brown and director of the Center for Health and Justice Transformation at the Miriam Hospital, was active after the onset of COVID. His research and advocacy for releasing some U.S. prisoners was published in the *New England Journal of Medicine* and elsewhere.

Rich said health risks are high in heavily populated, confined spaces like prison, and appropriate early releases could protect the health of other prisoners and prison staff and avoid the strain on the general health care system. “The risks involved in letting some people out are far lower than the risks to public health if we keep all of these people locked up,” Rich said.

Rich was part of a panel of experts assembled by the National Academies of Sciences, Engineering, and Medicine to explore ways to further combat COVID. The committee recommended in October 2020 that the number of people housed in correctional institutions be reduced in a fair way.

■ Matthew Kraft, an associate professor of education and economics, conducted national research on emergency remote teaching in K-12 schools in spring 2020. He found only 59 percent of students were able to regularly engage in remote learning, and the lack of Internet access and devices were major barriers to remote learning in schools serving larger populations of Black and low-income students. Kraft also found teachers’ working conditions were closely connected with their sense of success.

■ Anna Lysyanskaya, a professor of computer science and a cryptography expert, is working on a way to use cell phones, without revealing any personal information, to track people who may have been exposed to COVID. Collaborating with an MIT-based team, she is developing a system using the Bluetooth signals that smartphones exchange to track which devices have come in close contact with each other.

■ Undergraduate and graduate students made important contributions to many COVID research projects.

Elizabeth Austin ’20, an engineering concentrator, was one of a number of students who spent months aiding a project based in the School of Engineering to build a better ventilator for COVID and other patients. Austin did design work for the “Brun02” ventilator project and assisted on video and other aspects. “It’s definitely gratifying,” she said. “Being able to connect with people beyond Brown, around the world, reminds you what’s out there.”

For Dilum Aluthge ’15 MD ’23 PhD ’23, assisting on a Center for Biomedical Informatics COVID research project was an unexpected opportunity. He said, “It was very flattering that they asked me to be part of a team and be one of the team leaders.” Working with data to give more access to information to a wide range of people, he added, “is not only possible to do, but necessary.”

“The effort [against COVID] has to be in the hot spots, and the hot spots are where the Latino community resides.”

—Pablo Rodriguez, clinical associate professor of obstetrics and gynecology, *Boston Globe*, May 18

“[Even] really good [nursing] homes, they have staff who go home, and they are going to be living in an environment with lots of COVID, and the staff will bring it in with them.”

—Vincent Mor, professor of health services, policy, and practice, *Associated Press*, May 21

“What we really need [for the homeless] is a more accurate rapid test, universal testing, and access to safe, supportive housing.”

—Liz Samuels, assistant professor of emergency medicine, *Providence Journal*, May 23

“In all likelihood, some infections occurred at the protests; the question is how much. No major new evidence has emerged that suggests the protests were superspreader events.”

—Mark Lurie, associate professor of epidemiology, *New York Times*, July 6

Brown's research community rapidly turned to helping the health care system.

Stepping Up

FACED WITH THE ABRUPT SHUTDOWN of their own research because of COVID-19 in March 2020, many Brown researchers immediately wanted to help those affected by the health crisis.

"There was an immediate awareness of the shortage of supplies in hospitals," said Jill Pipher, Brown's Vice President for Research, and many faculty, staff, and students moved quickly to help.

As part of an initial burst of activity, students and staff used the Brown Design Workshop in Barus & Holley's Prince Lab to make personal protective equipment for local health care organizations. Through 3-D printers, often activated remotely by students who had already left campus, thousands of

reusable N95 masks were made, along with hundreds of face and respirator shields.

"Everybody would like to feel like they can make some contribution to making things better," said Brown Design Workshop director and engineering senior lecturer Chris Bull. Bull said the work is likely to have effects well beyond COVID in terms of community partnerships: "The collaboration has created connections and new possibilities for working together that will outlive this event."

At the same time, a COVID task force of faculty and staff was established to coordinate with hospitals and other institutions, led by Dr. Jeff Bailey, an associate professor of pathology and laboratory medicine.

"This isn't just a historic crisis, it is . . . a pivotal moment for public health."

—Ashish Jha, dean of the School of Public Health, *Boston Globe*, September 1

"Just like a pregnancy test cannot take the place of birth control, COVID-19 tests should not be seen as substitutes for robust strategies to reduce community transmission."

—Megan Ranney, associate professor of emergency medicine, *NBC News*, October 8



Dr. Jeff Bailey headed Brown's COVID Research Task Force to coordinate with hospitals and other institutions, and worked in multiple COVID research collaborations.



Faculty and staff, many of them based in research labs, gathered more than 4,000 N95 masks and donated them to Rhode Island health care providers and agencies. In addition, they gave gowns, shields, and other items to the Rhode Island Department of Health and the Lifespan and Care New England hospital systems. Supplies came from Brown's Environmental Health and Safety office, as well as labs in the Division of Biology and Medicine, chemistry, engineering, physics, and the Brown Library, where masks are used in work to preserve historical materials.

Dr. Jack A. Elias, senior vice president for health affairs and dean of medicine and biological sciences at Brown, said, "We hope that these donations of much-needed testing supplies and personal protective equipment played a role in helping to keep those frontline personnel safe. I am very proud of our faculty on the front lines and our faculty and staff for coming together to make this happen."

In the lab of Dr. Jonathan Kurtis '89, PhD '95, MD '96, chair of pathology and laboratory medicine, technicians took on the task of mixing viral transport medium, a solution used in COVID-19 testing for swabs to be put into after a sample is taken. The solution was in critically short supply, and the lab made enough for thousands of tests in Rhode Island.

For Kurtis's laboratory manager, Sunthorn Pond-Tor, the work was deeply personal. Pond-Tor, a Cambodian immigrant who came to the United States as a child fleeing the brutal Khmer Rouge regime, said he was proud to be able to help in a time of need.

"When Dr. Kurtis asked me if I was willing to help make viral transport media for COVID-19 I asked, 'When can I start?'" Pond-Tor said. "The United States of America has been my home and has given me the opportunity to achieve my dreams. If there is any way I am able to help in giving back to this country that has helped me, I will do it in any way that I can." ■

Masks and face shields were produced through 3D printing in the Brown Design Workshop.

Seeding Hope

The Brown COVID-19 Research Seed Fund has made awards to 15 projects to conduct research addressing critical health and medical issues that surfaced during the pandemic.

- 1** To disseminate best practices for nursing homes and other long-term care settings, based on an electronic survey of frontline staff. *Center for Long-Term Care Quality & Innovation, Center for Gerontology & Health Care Research*
- 2** Testing, in a mouse model, the role of testosterone, as males apparently are at higher risk for infection and death from COVID-19. *Molecular Microbiology and Immunology*
- 3** Developing an AI platform to differentiate COVID-19 from other viral pneumonia on chest CT scans, and using the information to identify early-stage patients who are likely to transition to severe disease. *Computer Science, Diagnostic Imaging*
- 4** Establishing an inter-institutional informatics infrastructure to support COVID-19 research in Rhode Island through electronic health data, digital health technology, and data science techniques. *Brown Center for Biomedical Informatics, Psychiatry and Human Behavior, Medicine, Biostatistics, Computer Science.*
- 5** Aiming to reduce the virus's capacity to cause death, through immune modulation and discovery of drugs that block it. *Pathology and Laboratory Medicine*
- 6** Developing a sample unit for potential home testing kit. *Molecular Biology, Cell Biology, and Biochemistry*
- 7** Seeking to speed the production of ventilators through a new design using 3D-printed and off-the-shelf parts produced rapidly and locally. *School of Engineering*
- 8** Creating an inter-institutional blood biorepository to support COVID-19 research in Rhode Island. *Biology, Medical Science,*
- Medicine, Emergency Medicine, Engineering*
- 9** Pursuing a broader understanding of how widespread exposure to the COVID-19 virus is in the Rhode Island population. *Molecular Microbiology and Immunology, Economics, Pathology and Laboratory Medicine*
- 10** Testing the ability of graphene/silver nanoparticle ink formulation to be used in personal protective equipment as a way of reducing virus transmission rates. *Molecular Microbiology and Immunology*
- 11** Testing whether Chitinase 3-like 1 (Ch3l1), a powerful inhibitor of epithelial cell death, can be used as a biomarker of CoV-2 infection that predicts disease severity and progression. *Molecular Microbiology and Immunology, Medicine*
- 12** Creating a statewide Rhode Island model to understand the epidemiology and clinical outcomes of patients hospitalized with COVID-19. *Infectious Diseases, Medicine, Behavioral and Social Sciences*
- 13** Identifying inhibitors of the CoV-2 N protein that can potentially be further developed as drugs. *Molecular Pharmacology, Physiology and Biotechnology, Molecular Biology, Cell Biology, and Biochemistry*
- 14** Developing a molecular surveillance tool and the capacity to monitor spread of the virus regionally and beyond. *Biomedical Engineering, Infectious Diseases*
- 15** Reviewing Rhode Island health care claims to see impact of COVID-19 social distancing measures on utilization and outcomes, particularly for the neediest people. *Health Services, Policy, and Practice*

"We are starting to get an evidence-based picture of how school reopenings and remote learning are going . . . and the evidence is pointing in one direction. Schools do not, in fact, appear to be major spreaders of COVID-19."

—**Emily Oster**, professor of economics, *The Atlantic*, October 9

"Schools should be the last thing to close and the first to reopen. From a public health point of view, please don't close schools before you close restaurants, bars and casinos."

—**Ashish Jha**, dean of the School of Public Health, *Providence Journal*, November 24

"There's been a lot of blame placed on nursing homes, and it's important to understand the effect this has on people who work in them."

—**Elizabeth White**, investigator, School of Public Health, *Washington Post*, December 3.

"We've heard a lot of claims of magical cures...Well, the vaccine is the real deal."

—**Megan Ranney**, associate professor of emergency medicine, CNN, December 12

Compiled by Avi Kapach, GS Classics PhD

INDEPENDENT INQUIRIES

BY MAURA SULLIVAN HILL

Many undergraduates are succeeding in research related to pressing social issues.

AS ANDREW STEINBERG '22 stood on the beach on an 80-degree January day, gazing at the ocean, it struck him that “you could mistake the view for a resort town.” But he wasn’t on vacation—Steinberg was at the westernmost point of the United States-Mexico border, between San Diego and Tijuana, as part of a Wintersession class conducting first-hand research about the history and cultural dynamics of the border.

“I stood on the beach facing north, looking at the barrier that cut across the sand into the Pacific Ocean,” Steinberg said. “Along with my classmates, I had become aware of the similar cultures and different policies on both sides of the border. The day before, we had viewed the American side before walking across to study the border’s history and politics from another perspective.”

In Tijuana, a chance meeting with a deported U.S. veteran led Steinberg to develop a further research project to learn more about the circumstances that contribute to the deportation of foreign-born veterans and the legal issues they face in today’s immigration climate.

Steinberg is one of a large cohort of Brown undergraduates doing research on social issues, seeking knowledge in service to a specific community or the wider world.

“Students are drawn to Brown because of the Open Curriculum, so that includes people who are interested in seeing the world differently,” said Betsy Shimberg, associate dean of the College and interim director of the Swearer Center for Public Service. “If you’re somebody who doesn’t want a core curriculum, then you’re somebody who wants to experience college a little differently to begin with. Therefore, you may be somebody who’s going to push against an unjust social issue or be thinking about how we move in our world differently.”

In Steinberg’s work, he found that many deported veterans are foreign-born and were brought to the United States as young children. Often, they are deported after drug convictions, but Steinberg points out that drug use is a coping mechanism of the PTSD many soldiers deal with after their service.

Junaid Malik '20.5 took this photograph of “the birds flying above and across the [Mexico-U.S.] border fence, easily crossing a border that divides Native nations, entire families and communities.”



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1: Francesca Raelison '22 leads a workshop for students in her native Madagascar to combat emotional abuse. 2: Camila Pelsinger '20, now a Rhodes Scholar, studied sexual violence and restorative justice. 3: Kaela Hines '22 researched the 16th- to 19th-century Atlantic slave trade. 4: Zeinab Kante '21 photographed this portion of the United States border wall on the Mexican side. 5: Rachel Black '16 says she uses research skills learned at Brown every day in her education reform job.

“For many, they were thinking they were the only deported veteran that existed and that something is wrong with them, not something wrong with the system,” said Steinberg, who is working with an organization called Deported Veterans Support House (DVSH) to provide legal advocacy for deported veterans and promote awareness of their situation.

Similarly, Kaela Hines '22 is working on research that shares previously untold stories, in her case from the Atlantic slave trade between the 16th and 19th centuries, as part of a project for Brown's Center for the Study of Slavery and Justice (CSSJ). An English nonfiction concentrator with aspirations in journalism and documentary filmmaking, Hines is delving into primary source material about enslaved people, enslavers, and the business practices that were enabled by the Atlantic slave trade. Her research will be part of an upcoming documentary, which, Hines said, is not only giving her practical skills for her future career, but is also especially timely at this moment in American history, as the anti-Black racism and racial injustice movements grow.

“When the documentary does come out, it will be such a good source of education,” Hines said. “A lot of people nowadays are focused on unlearning biases and unlearning what some schools have taught us or what textbooks may have gotten wrong. I think it is really important to have films, because they are digestible and easy to access. They are a means of education and of showing how deep-rooted the slave trade was and is in our society. It was hundreds of years ago, but it has morphed into present-day systems such as mass incarceration.”

Anthony Bogues, the director of the CSSJ, said that the center creates the possibilities for undergraduate students to do this kind of work. He notes that working with Brown undergraduates

is an “intellectual joy,” and echoes Hines in her assessment that, through research, the students are building skills for the future.

“To me, it's the kind of intellectual curiosity that the Brown undergraduate students bring which makes projects very rich and, simultaneously, that engagement gives them a certain set of organizational skills that are important to make ideas work in the world,” Bogues said. “Brown undergraduates bring a rare curiosity and sophistication and therefore put questions on the table that might not have been there otherwise.”

Take Camila Pelsinger '20, who wants to amplify a community approach to dealing with gender-based violence, resulting from her Brown thesis work about a restorative justice program in New Zealand that is the first of its kind. Pelsinger, winner of a 2020 Rhodes scholarship, encountered the restorative justice approach when she was a coordinator with Brown's Sexual Assault Peer Education program and a student leader in the campus-wide effort to better prevent and respond to issues of sexual assault and misconduct. After that experience, she decided to focus her thesis research on restorative justice.

Her findings indicate that the criminal legal system has failed to address pervasive sexual violence, pointing to staggeringly low reporting rates, low conviction rates, and the victim-blaming nature of criminal court proceedings that can further traumatize survivors. Moreover, she notes that even for the small percentage of cases that do result in convictions, prisons themselves are sites of violence and have not been effective in interrupting the cycle of gendered violence, which is rooted in hierarchies of power and control. Instead, a restorative justice process is tailored to address the specific needs of a survivor and sometimes culminates in a conference where survivors express the impact of the harm on

their lives, and perpetrators, and after a lengthy accountability process, take responsibility for the harm they have caused.

“Depending on the needs of the victim-survivor, the outcomes of a restorative justice process might include agreements for the offender to attend clinical treatment, pay restitution, and avoid certain spaces,” said Pelsinger, who hopes her work can lead to similar programs in the United States.

A classmate of Pelsinger, Nupur Bahl '20, is recommending new approaches of her own, in end-of-life care. Bahl's thesis studied a therapeutic practice in end-of-life care, called life review, that allows patients to talk through the story of their life, often with a hospice care provider or chaplain, to gain comfort and meaning. While most published literature on the topic suggests a strict methodology is necessary for these conversations, there is lack of agreement on just what this methodology should be. Bahl's interviews with care professionals conducting life review found the exact opposite. No matter the methodology, the process was viewed as beneficial to both the patient and their loved ones.

Bahl, a health and human biology concentrator, sought out Terrie Fox Wetle, the inaugural dean of Brown's School of Public Health and now professor of health services, policy, and practice, as her advisor on the project because of Wetle's expertise in qualitative public health research and connections with hospice care facilities. Under Wetle's guidance, Bahl put in hours of work outside her classes to learn the interview and analytic skills necessary to collect data from care providers in the field.

“Brown students put in a lot of effort and there's a kind of independence, a sense of, ‘I can do this,’” Wetle said. “And it was like that with Nupur. From the beginning, I tried to convince her that the project was overly ambitious, but she did it. I would have been proud to have had the finished product submitted as a master's thesis.”

Bahl won Brown's George W. Hagy Prize in Human Biology for her work and is submitting it for publication. After graduation, she started a job as a research assistant in the division of population sciences at Dana Farber Cancer Institute in Boston.

“You come to Brown and there's this expectation that you're going to contribute,” she said. “You feel empowered to move the University forward, to be an important and very real part of what the University is doing all the time.”

Being a part of the work of the University means making an impact both in Rhode Island and around the globe.

Internationally, Francesca Raelison '22 is using her research at Brown to help in her native Madagascar, where she's found that emotional abuse is common. She created Omena, a nonprofit that teaches school-aged Malagasy children and adolescents how to recognize emotional abuse in their relationships through in-school workshops. Raelison created workshops and ran a pilot program that reached 350 young people, with immediate positive benefits: 90 percent of participants said they had no prior knowledge of emotional abuse before the workshop.

Focusing locally, Rachel Black '16 centered her undergraduate thesis work on criminal justice reform in Rhode Island. Her research showed that a 2008 Rhode Island law passed to ensure that low-income defendants were not jailed for inability to pay court fees was not, in fact, being properly enforced. Black found that defendants were ending up in jail at the same rates as the year prior to the law's passing. Her research was used to craft a new bill to prevent this from happening, and she testified in front of the Rhode Island House Judiciary Committee in support of the bill, which is still under review.

“I was able to step in and use my expertise and my time to answer a question that someone in the community in criminal justice reform in Rhode Island wanted answered,” said Black, who now works in business development at Education Resource Strategies, a nonprofit to aid the efficient and equitable use of education resources. Now, as she works with schools across the United States to assess how they use their resources, she said she uses the technical research skills she learned at Brown every day, as well as the practice she had building relationships in the public sector.

Black became interested in criminal justice reform after taking a course on the anthropology of homelessness. Undergraduates often cite as inspiration either an experience in the classroom or a co-curricular activity.

In collaboration with faculty mentors and practitioners, students are able to create new knowledge, according to Oludurotimi Adetunji, associate dean of the College for undergraduate research and inclusive science. He said, “The training that they are getting now will provide them with the drive they need to continue this work beyond their time at Brown.” ■

FOCUS

A CLOSER LOOK AT RESEARCHERS AND PROJECTS GAINING WIDER INFLUENCE

Mathematics, Reimagined

Brown's ICERM, one of just six U.S. mathematical institutes, is reshaping how research is done. BY KEVIN STACEY AND NOEL RUBINTON '77



CHANGING THE WAY mathematicians approach their work has been the driving ambition of Brown's Institute for Computational and Experimental Research in Mathematics (ICERM) since its start in 2010 as a national mathematics institute.

In July 2020, ICERM received a huge validation of its work, as the National Science Foundation made its largest award ever to Brown, giving the university and ICERM \$23.7 million for the next five years of research and education programing.

ICERM's Illustrating Mathematics program in the fall of 2019 certainly fit the institute's goals, as it brought together dozens of mathematicians from around the world and also painters, sculptors and other visual artists to explore the images and objects produced in the course of mathematical study.

For three months, ICERM, high atop 121 South Main St. in Providence, buzzed with energy and overflowed with artwork during many in-depth sessions aimed at helping mathematicians use modern computer visualization in their research, using lectures, workshops, and smaller-scale conversations that are a central part of the institute's collaborations.

Panel discussions, many including professors from the Rhode Island School of Design, focused on the intersection of art and science, and a 3D printer brought in specially for the program rarely rested. Brown's Granoff Center for the Creative Arts hosted a public exhibition of art created by mathematicians, and ICERM published its first-ever catalogue of mathematical art work. "We aim to show people that math is everywhere and intertwined with many branches of creative work," said ICERM director and Brown mathematics professor Brendan Hassett (pictured).

Speaking about the NSF renewal grant, Hassett said, "Since its founding a decade ago, ICERM has been on a trajectory of steady growth in the research programs we offer and in the number of scholars and students who participate in them. We're thrilled that NSF has recognized that trajectory and has chosen to renew our funding at such a high level."

Jill Pipher, ICERM's founding director and now Vice President for Research at Brown, said, "The funding level is a testament to the confidence that the National Science Foundation has in ICERM's mission and in our execution of it. It is also a vote of confidence in the successful management of this major national research center, something that can only be achieved with the unwavering support from both faculty and administration that ICERM has enjoyed from its start in 2010."

With hundreds of mathematicians visiting each year, ICERM helps them share new ideas and collaborate on research projects.

"A lot of people probably assume that what mathematicians do all day is work on computers and try to do hard computations," Hassett said. "But the traditional approach to math is really pencil and paper. ICERM was founded on the need to focus on the aspects of mathematical discovery that involve playing with examples and doing experiments, which aren't traditionally reported in mathematics scholarship."

The power of that computational approach can be seen in ICERM's contributions to major areas of mathematical research, Hassett said. A recent example was ICERM-supported research on the Langlands program, a set of conjectures often viewed as a grand unifying theory of mathematics. ICERM's work on the topic contributed to the L-Functions and Modular Forms Database—a collection of mathematical objects relevant to the Langlands program. The database now contains millions of objects and countless links between them.

At ICERM's Illustrating Mathematics program, a depiction of what it would look inside a negatively curved space was created by Matthias Goerner, a software engineer at Pixar animation studios, and professors Saul Schleimer of the University of Warwick and Henry Segerman of Oklahoma State University.

IMAGE COURTESY MATTHEW GOERNER/HENRY SEGERMAN/SAUL SCHLEIMER

“Our goal as an institution is to have an impact nationally on the mathematics culture, and that naturally enriches the mathematical and intellectual community at Brown,” Hassett said. “ICERM creates new opportunities for Brown faculty and students and fosters collaborations and interactions.”

Hassett said ICERM will continue to expand its programming. Among the activities already planned is a semester program on partial differential equations, the equations used to describe everything from fluid flows to gravitation. Another program will explore braids, the study of how strands of rope can be entangled. Braids give rise to algebraic structures that could be useful in data encryption.

ICERM will also focus on emerging venues for disseminating research findings and approaches. “The main vehicle for presenting scholarly output has traditionally been through academic journals,” Hassett said. “But, if a researcher is developing new computer code, a journal article isn’t always the best way to present it. We’re looking to expand the use and visibility of things like code repositories as a means of sharing new algorithms, approaches, and results.”

“Our goal as an institution is to have an impact nationally on the mathematics culture.” — ICERM DIRECTOR BRENDAN HASSETT

Another priority will be to expand outreach activities aimed at increasing diversity and inclusion in the mathematical sciences. Those activities include GirlsGetMath, a summer math camp for high school students held at ICERM. ICERM recently won a new grant from Jet Blue to take the program nationwide.

As in Illustrating Mathematics, ICERM, one of six federally funded mathematics institutes, brings new technologies and techniques to studying topics spanning pure and applied mathematics.

Pipher said she looks forward to seeing ICERM continue to flourish: “The quantity and quality of science and research being produced at this institute is just phenomenal.” ■

Books Born Digital

The university launches a digital publishing initiative to lift scholarship with interactive features.

BY SOPHIE CULPEPPER '21

WHEN FIRST PUBLISHED over 400 years ago, *Furnace and Fugue* was a multimedia publication strikingly innovative for its time.

Originally published in 1617, the unusual text used 50 sets of written words, musical notation, and images to retell Ovid’s legend of Atalanta in the form of an alchemical allegory.

And today, Brown’s Digital Publications Initiative is using the same book to break ground again with its first “born-digital” publication.

Professor of History and Italian Studies Tara Nummedal and Donna Bilak, an independent scholar, are coeditors of the new edition of Michael Maier’s *Atalanta fugiens*, the first in a series of planned digital publications from the University. Their edition, published in July by the University of Virginia Press, is a pilot of the Digital Publications Initiative at Brown—a venture with large potential implications for the way scholarship is produced, published, and evaluated.

Funded by two grants from the Andrew W. Mellon Foundation, the initiative, which has been overseen since 2015 by the Office of the Dean of the Faculty and the University Library, supports humanities scholars in publishing monographs and editions in an entirely new format, combining a high level of scholarship with creative interactive features.

“The idea was not to produce a static e-book or static PDF, but to create born-digital, enhanced scholarly monographs,” explained Digital Scholarship Editor Allison Levy, emphasizing that the publications are not rooted in print.

Furnace and Fugue, specifically, “is innovative for how it uses digital to dissolve disciplinary boundaries,” Bilak noted.

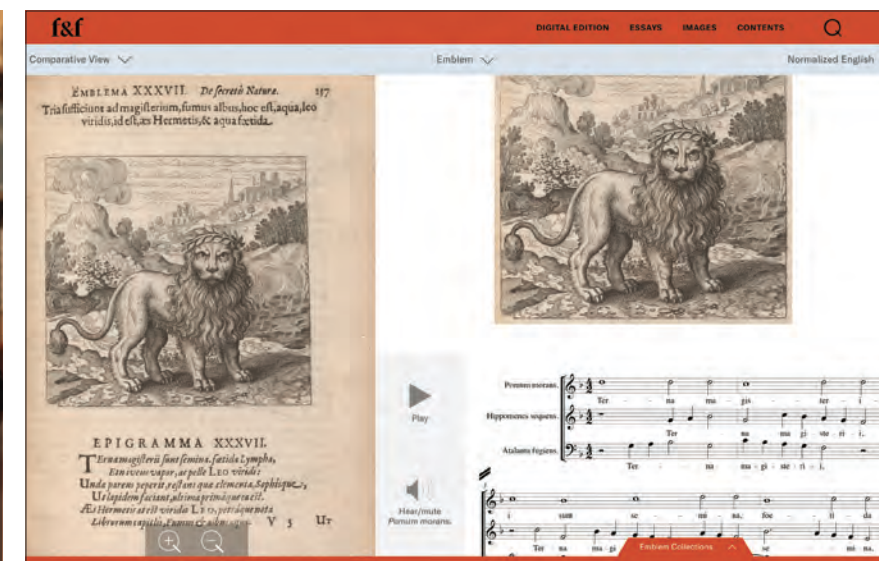
Rather than mere digital texts interspersed with hyperlinks, multimedia is actually integrated into the publications themselves by the Center for Digital Scholarship in the Rockefeller Library.

In the case of *Furnace and Fugue*, readers can not only hear and manipulate the fugues, which were recorded by professional musicians in the digital studio in the Rockefeller Library. Readers can even create “collections” of emblems, or sections, that engage with the scholarly arguments, tell other stories, or identify patterns, and can share their collections with others by sending a uniquely generated URL.

Nadine Zimmerli, editor of History and Social Sciences at the University of Virginia Press, said *Furnace and Fugue* “is the cutting edge of what’s possible,” adding, “I believe other digital publications will be measured against publications such as *Furnace and Fugue*.”



Tara Nummedal examines Brown’s copy of the 17th century *Atalanta fugiens*, on which the digital *Furnace and Fugue* (screen shot, right) is based



Brown’s University Librarian, Joseph Meisel, agreed.

The publication of *Furnace and Fugue* “is an amazing accomplishment, given that only a few years ago there was a great deal of uncertainty and hesitancy among both faculty and presses about born-digital long-form scholarship,” he said. “By demonstrating that such works can be of the highest scholarly quality and open up new possibilities for faculty to develop their ideas, Brown has really helped change the conversation.”

Dean of the Faculty Kevin McLaughlin said that the initiative is drawing attention “not only on campus, but nationally and internationally.”

The initiative at the University is currently overseeing five other faculty-led publications, expected to be published in the next few years.

In his forthcoming *Islamic Pasts and Futures: Horizons in Time*, Professor of Islamic Humanities Shahzad Bashir also makes use of the nonlinear capabilities of digital publication. The book seeks to “turn upside down the way the relationship between Islam and time has been understood in modern scholarship since the 19th century,” he explained.

Digital capabilities have “completely transformed the project” by making it more layered and sophisticated than it could be in print. For instance, Bashir’s table of contents, instead of appearing as a list, is presented as a scattered constellation-like set of points, so that the reader can choose any point as their beginning, rather than automatically starting with Chapter 1.

“The text becomes less dense, but the conceptualization becomes more dense,” he added.

The publications require extensive interdisciplinary collaboration. In the case of *Furnace and Fugue*, this extends to

“Such works can be of the highest scholarly quality and open up new possibilities.”

—UNIVERSITY LIBRARIAN JOSEPH MEISEL

collaborations outside the traditional forms and boundaries of the academy, such as between Prof. Nummedal and Bilak. Bilak said it highlights the importance of institutional support in producing new forms of scholarly editions, which in turn facilitates the production of new knowledge.

McLaughlin has worked to encourage respect for this new format of scholarship to be similar to that for dissertations and printed publications. This support is intended to allow early career scholars to experiment with the new scholarship format.

The initiative is “providing the infrastructure and technical and editorial support for faculty to take advantage of” the possibilities of digital publishing, McLaughlin said.

A future challenge remains: “We need to know how to talk about that work and how to evaluate it in a university setting,” Nummedal added.

Of course, nobody could have anticipated that *Furnace and Fugue* would be published in the midst of a global pandemic which has dramatically accelerated the demand for innovation in learning methods.

COVID-19 “is not the context I wanted for this book,” Nummedal said. “But, in a way, it’s really timely,” due to the increased need for inventive digital material.

“Everyone has no choice but to engage with digital scholarship on some level right now,” Levy added. ■

The Big World of Tiny Nanocrystals

A chemist is turning tiny artificial particles into building blocks for energy harvesting and more. BY EMILIJA SAGAITYTE '22

FOR OU CHEN, working with artificial particles known as nanocrystals is like being in a wonderland. “These tiny particles can do so many amazing things,” said Chen, an assistant professor of chemistry, and they have comprised the core of his research since he came to Brown in 2015.

Chen and colleagues in his lab are currently in the process of making their nanocrystals part of state-of-the-art, window-like panels encasing a solar energy harvesting system. Around the world, roofs checkered with dark-blue solar panels have gained acceptance. These panels cover substantial space, but even a roof-full cannot gather enough energy to power a high-rise building. The panels Chen is designing are a potentially transformative solution.

A type of nanocrystal that his lab has been studying—the quantum dot—could be embedded in the windows to help capture and transfer light energy to standard solar cells lining the frame, which would then convert that energy to electricity. These solar panels would save space, as they would be easier to incorporate into buildings without obstructing daylight, so they could span entire skyscrapers and collectively generate ample electricity.

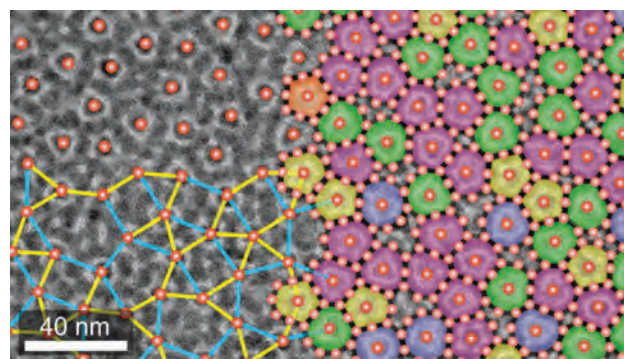
Nanocrystals hold promise in medicine as well, and Chen is aiming to maximize that potential through a collaboration with researchers at Rhode Island Hospital. Scientists can modify the particles so that, once injected into the bloodstream, they latch onto specific types of cells, such as cancer cells. Quantum dots’ abilities to absorb and emit light would allow medical professionals to image targeted cells and detect their locations. Quantum dots can also efficiently use electricity to release colored light—a property that makes them apt alternatives for components of television, computer, smart phone, and tablet displays.

Chen said nanocrystals’ adaptability to a variety of applications is due in large part to their countless conceivable combinations. Each nanocrystal is a highly organized arrangement of atoms, so that synthesizing them from different elements and attaching chemical molecules called “ligands” to the particles’ surface yields their unique properties.

Chen’s accomplishments and prospects for his research have already garnered significant attention. In 2020 alone, he earned numerous accolades: an early career fellowship from the Sloan Foundation, an Early Career Development (CAREER) award from the National Science Foundation, and a three-year 3M Non-Tenured Faculty Award. He was also named a Camille Dreyfus Teacher-Scholar.



Ou Chen holds a model of a nanoparticle building block. He and his team recently discovered quasicrystalline lattice (below), a new form of nanoparticle material.



Chen has spent plenty of time working as a chemist, but he simultaneously takes on the role of an engineer, creating and piecing together particles about a millionth of a millimeter in size.

When he analyzes the resulting structures with an electron microscope, a kaleidoscope of black-and-white shapes emerges. Within these images lie collections of nanocrystals that are

visual evidence of the significant advances Chen’s lab has achieved, and he tests how the particles interact with light, electricity, magnetism, and other physical phenomena.

Chen assembles these chemical “building blocks” into macroscale superstructures and creates cutting-edge technology.

But much about these superstructures and nanocrystals is not yet clear: “The underlying mechanism is still not fully understood,” Chen said. His expertise in inorganic chemistry has enabled his lab to experiment with the chemical composition of individual nanocrystals.

His lab recently developed a quantum dot unique in its tetrahedral shape, which resembles a triangular pyramid and allows for the formation of sturdier, more complex materials. This breakthrough not only earned publication in the journal *Nature* in 2018, but also instigated another fruitful investigation, featured in the *Science* journal.

Chen’s latest discovery of a single-component quasicrystal came about from his study of stacking nanocrystals on top of a solution as opposed to on a solid surface. In the course of this experimenting, Chen and his team observed an unexpected capability of their quantum dots: formation of a quasicrystal in solution.

Quasicrystals are ordered structures without a repeated pattern that can be used to make unique materials, like non-stick cooking pans, but they typically consist of two different kinds of components, such as two types of atoms. Chen’s lab became the first to show a one-component quasicrystal, whose applications remain to be explored but may enable researchers to convert standard materials into novel ones, such as by making metals transparent or magnets that can shape-shift.

Chen believes the remarkable chemical and physical properties of nanocrystals can be harnessed to advance technology in many more ways. “We can create very, very high-quality, precisely controlled nanocrystals,” Chen said. “Then we can use that for further discovery.”

Brown chemistry department chair Lai-Sheng Wang said of Chen’s work, “He can turn ordinary materials into something wonderful. He came here and just made an immediate impact.”

“We are doing a lot of fundamental research to keep pushing the boundary moving forward,” Chen said, “but my big dream is that we can really create materials for applications that have the possibility to change people’s lives.” ■

School Discipline: The Race Gap

A sociologist investigates why teachers punish Black and Latino children more severely.

BY COLLEEN CRONIN '21

WHEN TRYING TO UNDERSTAND why Black and Latino students are disproportionately suspended and expelled compared to white students, Jayanti Owens wanted to try a new approach.

Owens, an assistant professor of sociology at Brown’s Watson Institute, had pored over previous studies that had thoroughly documented the disparities and tested how differences in disciplinary policies at predominantly Black schools and the behavior of Black students could explain the discipline gap.

But the research was often focused on specific geographic areas, and Owens wondered how much those hypotheses accounted for racial gaps across different populations and groups at a broader societal level. Informed by literature and personal experience, she also wanted to test a third theory: Was it true that teachers punish Black and Latino children more severely than white children for the same behavior? And how much did that differential treatment impact the gap?

Owens was shocked to learn the extent of the answer. Based on her findings, teacher treatment accounts for 46 percent of the Black-white racial gap in school suspensions and expulsions among children 5 to 9 years old.

“It is entirely possible that teachers are imbuing those stereotypes, unconsciously or consciously.” —PROFESSOR JAYANTI OWENS

“Something that I have long observed, anecdotally in life, is that oftentimes students of color are assumed to behave worse,” Owens said. “But the reality, in the finding that we came to, is that there are racial differences in behavior, but they don’t explain why Black students are being suspended at higher rates. There is something else going on.”

A year after her initial findings, the pandemic and one of the largest social movements in history have further highlighted racial disparities and racism in America, and Owens is again investigating how those issues play out in schools from a new angle.



Jayanti Owens hopes greater attention to racial disparities will lead to positive change.

As a 2020 William T. Grant Scholar, Owens recently embarked on a five-year research plan to dig deeper and ask a new question: How does race impact teachers' perceptions of student behavior?

Although her previous study examined teacher treatment, it assumed teachers' evaluations of student behavior were accurate.

But in a society often characterizing Black and Latino students as dangerous, "it is entirely possible that teachers are imbuing those stereotypes, unconsciously or consciously, in the process of observing students' behaviors in the first place," Owens said. If so, a teacher could perceive identical misbehavior more negatively if exhibited by a Black or Latino as opposed to white student.

To test that hypothesis, Owens will record the perceptions of teachers from across the United States as they observe video vignettes of identical, routine misbehavior portrayed by actors of varying racial backgrounds. The behavior, children and teachers' reaction to that behavior within the video, the props, and even the clothing will be the same in each vignette.

"The only thing that differs," she said, "is the race of the student."

Following this investigation, Owens will take it a step further to design and test interventions that offset the mechanisms that contribute the most to racial gaps.

The unprecedented approach is nothing new for Owens—it's a thread that runs through most of her work.

"She was always interested in looking at things from just a slightly different point of view," said Swarthmore College Provost and sociologist Sarah Willie-LeBreton, who also advised Owens's senior thesis.

Owens's published research on the racial discipline gap

"begins to subvert some of the unintentional victim-blaming research that is out there," Willie-LeBreton said, referring to research that focuses solely on how students in marginalized communities differ from their white, middle-class counterparts.

Mentors like Willie-LeBreton inspired Owens as an undergraduate at Swarthmore and encouraged her to investigate disparities Owens studied, witnessed, and experienced first-hand.

"They really took seriously that what I and many others had been experiencing is grounded in an actual social process that can be studied through social science," she said.

Growing up in a predominately white community, Owens said she saw the "ways in which subtle forms of bias and discrimination manifested" against non-white people in her community, saying those encounters often happened with well-intentioned people.

From those observations and encouragement from mentors, she knew that racism and racial disparities were themes she wanted to explore further.

Though Owens decided to use her experience to inform research and believes increased faculty diversity is important, she worries about pigeonholing people of color into diversity work.

"I don't think that it is the right strategy to solely target faculty of color for questions that our society and everyone in it should be asking," Owens said. "And that includes white people."

During this time of racial reckoning, she is glad to see a larger group of people paying attention to disparities that she has spent her life witnessing and documenting.

"I'm really hopeful that this moment could lead to substantial change," she said. "I hope that doing this work in this moment means this work will be taken a lot more seriously." ■

BROWN RESEARCH INDEX

With more than 700 regular faculty and hundreds more in clinical and other categories, Brown produces an enormous range and volume of research. The Brown Research Index captures some of this through faculty books published and selected faculty honors.

By the Book

In 2019, Brown professors published 99 books, spanning many disciplines and subjects.

AMERICAN STUDIES

MATTHEW GUTERL

- *Hotel Life* (Chinese edition)

ELIZABETH HOOVER

- *Indigenous Food Sovereignty in the United States: Restoring Cultural Knowledge, Protecting Environments, and Regaining Health* (Editor)

STEVEN LUBAR

- *Little Compton: A Changing Landscape* (Editor)

ANTHROPOLOGY

REBECCA LOUISE CARTER

- *Prayers for the People: Homicide and Humanity in the Crescent City*

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AVI KAPACH, GS CLASSICS PH.D.

BROWN RESEARCH INDEX

Selected Faculty Research Honors

During the 2019–20 academic year, faculty won dozens of research honors from national and international organizations.

ELI Y. ADASHI

Professor of Medical Science

- Elected Fellow, Hastings Center

FAIZ AHMED

Associate Professor of History

- Senior Fellowship, Koc University's Research Center for Anatolian Civilizations

ONESIMO T. ALMEIDA

Professor of Portuguese and Brazilian Studies

- D. Diniz Prize, Fundacao Casa de Mateus

LETICIA ALVARADO

Associate Professor of American Studies

- American Fellowship, American Association of University Women
- Creative Capital/Warhol Foundation Arts Writers Grant Program, Andy Warhol Foundation for the Visual Arts

CHRISTIAN ARBELAEZ

Associate Professor of Emergency Medicine

- Marcus L. Martin Leadership Award, Society for Academic Emergency Medicine (SAEM)

RICHARD A. ARENBERG

Clarence Raymond Adams and Rachel Blodgett Adams

Visiting Professor of the Practice of Political Science; Senior Fellow in International and Public Affairs

- Benjamin Franklin Award, Independent Book Publishers Association (IBPA)

HERBERT D. ARONOW

Associate Professor of Medicine

- President-Elect, Society for Vascular Medicine
- Inductee, International Andreas Gruentzig Society

KAREN E. ASPRY

Associate Professor of Medicine; Clinician Educator

- President's Service Award, National Lipid Association (NLA)
- President-Elect, Northeast Lipid Association (NELA)

RUTH IRIS BAHAR

Professor of Computer Science; Professor of Engineering

- Marie R. Pistilli Women in Engineering Achievement Award, Design Automation Conference

OMER BARTOV

John P. Birkelund Distinguished Professor of European History; Professor of German Studies

- National Jewish Book Award in Holocaust Studies in Memory of Ernest W. Michel, Jewish Book Council

YURI BAZILEVS

E. Paul Sorenson Professor of Engineering

- Gustus L. Larson Memorial Award, Pi Tau Sigma (National Mechanical Engineering, Honor Society) and American Society of Mechanical Engineers

RICHARD J. BENNETT

Professor of Biology

- Fellow, American Society of Microbiology

THEOPHILUS A. BENSON

Assistant Professor of Computer Science

- Faculty Early Career Development (CAREER) Program Award, National Science Foundation

LALIT BEURA

Assistant Professor of Molecular Microbiology and Immunology

- Thermo Fisher Trainee Achievement Award, American Association of Immunologists
- Research Fellowship, Searle Scholars Program

KATIE BROOKS BIELLO

Associate Professor of Behavioral and Social Sciences; Associate Professor of Epidemiology; Vice Chair, Department of Behavioral and Social Sciences

- Sexual & Gender Minority Early Stage Investigator Award, National Institutes of Health Sexual & Gender Minority Research Office

BARRYMORE BOGUES

Asa Messer Professor of Humanities and Critical Theory; Professor of Africana Studies; Director, Center for the Study of Slavery and Justice

- CLUE+ Fellowship, CLUE+ Research Institute for Culture, Cognition, History, and Heritage, Vrije Universiteit Amsterdam

GHADA BOURJEILY

Professor of Medicine

- Distinguished CHEST Educator, American College of Chest Physicians

ELIZABETH BRAINERD

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- President-Elect, Society for Integrative and Comparative Biology
- Fellow, American Association for Anatomy

JOSEPH M. BRAUN

Associate Professor of Epidemiology

- Dean's Award for Excellence in Research Collaboration in Public Health, Brown University

GARY BUBLY

Clinical Professor of Emergency Medicine; Clinical Professor of Medicine; Vice Chair, Clinical Integration and Innovation

- Charles "Bud" Kahn, M.D., Lifetime Leadership Award, Miriam Hospital Medical Staff Association

CAROLINE CASTIGLIONE

Professor of Italian Studies; Professor of History

- Franklin Research Grant, American Philosophical Society

MELODY CHAN

Associate Professor of Mathematics

- Association for Women in Mathematics—Microsoft Research Prize in Algebra and Number Theory, Association for Women in Mathematics
- Faculty Early Career Development (CAREER) Program Award, National Science Foundation

ERIC CHASON

Professor of Engineering

- Functioned Materials Division John Bardeen Award, Minerals, Metals, and Materials Society

OU CHEN

Assistant Professor of Chemistry

- Sloan Research Fellowship, Alfred P. Sloan Foundation
- Camille Dreyfus Teacher-Scholar Award, Camille and Henry Dreyfus Foundation
- Faculty Early Career Development (CAREER) Program Award, National Science Foundation
- Non-Tenured Faculty Award, 3M

SILVIA CHIANG

Assistant Professor of Pediatrics

- Early Career Research Achievement Award, Brown University
- Child Health Award, Charles H. Hood Foundation

NITSAN CHOREV

Harmon Family Professor of Sociology and International Studies

- President-Elect, Society for the Advancement of Socio-Economics

BRIAN CLYNE

Associate Professor of Emergency Medicine; Associate Professor of Medical Science

- Hal Jayne Excellence in Education Award, Society for Academic Emergency Medicine

ANTHONY COKES

Professor of Modern Culture and Media; Chair, Department of Modern Culture and Media

- Berlin Prize Fellow, American Academy in Berlin
- Rome Prize Fellow, American Academy in Rome

LORIN CRAWFORD

RGSS Assistant Professor of Biostatistics

- 100 Most Influential African Americans, *The Root*
- Black History Month Honoree, Mathematically Gifted and Black

ISSA J. DAHABREH

Associate Professor of Health Services, Policy, and Practice; Associate Professor of Epidemiology

- Early Career Development Award, Society for Research Synthesis Methodology

BATHSHEBA DEMUTH

Assistant Professor of History; Assistant Professor of Environment and Society

- Andrew Carnegie Fellow, Carnegie Corporation of New York

PENELOPE HILL DENNEHY

Professor of Pediatrics; Vice Chair, Pediatrics

- Distinguished Physician Award, Pediatric Infectious Diseases Society

YUL D. EJNES

Clinical Associate Professor of Medicine

- Chair-Elect, American Board of Internal Medicine Board of Directors
- Irving Addison Beck Laureate Award, American College of Physicians

KEVIN A. ESCUDERO

Assistant Professor of American Studies

- Faculty Early Career Development (CAREER) Program Award, National Science Foundation

PAJA FAUDREE

Associate Professor of Anthropology

- Core Fulbright U.S. Scholar, Fulbright Scholar Program

NICOLAS LUX FAWZI

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- Faculty Early Career Development (CAREER) Program Award, National Science Foundation

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- Clinical Research Award, Orthopaedic Research and Education Foundation

HUAJIAN GAO

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- Research Excellence Honoree, University of Maryland

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Associate Professor of Emergency Medicine; Associate Professor of Health Services, Policy, and Practice

- Paul B. Beeson Emerging Leaders Career Development Award in Aging, American Federation for Aging Research

CARLY MICHELLE GOLDSTEIN

Assistant Professor of Psychiatry and Human Behavior

- Fellow, American Association of Cardiovascular and Pulmonary Rehabilitation

JAMES GREEN

Carlos Manuel de Cespedes Professor of Latin American History

- Berlin Prize Fellow, American Academy in Berlin
- Fulbright Distinguished Visiting Professor, International Relations Institute of University of Sao Paulo

ROEE GUTMAN

Associate Professor of Biostatistics

- Dean's Award for Excellence in Research Collaboration in Public Health, Brown University

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- Visiting Fellow, Bard Graduate Research Center

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Associate Professor of Classics

- T.B.L. Webster Fellow, Institute of Classical Studies, School of Advanced Study, University of London

DAVID T. HARRINGTON

Professor of Surgery

- President, Association of Program Directors in Surgery

TIM J. G. HARRIS

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- Maddock Research Fellowship, Marsh's Library

PETER W. HOWITT

Professor Emeritus of Economics

- Frontiers of Knowledge Award, Banco Bilbao Vizcaya Argentaria Fundacion

JEFF HUANG

Associate Professor of Computer Science

- Young Investigator Program, Army Research Office

JEFFREY I. HUNT

Professor of Psychiatry and Human Behavior

- Cancro Academic Leadership Award, American Academy of Child and Adolescent Psychiatry

CARL KAESTLE

Professor Emeritus of Education, History, and Public Policy

- Elected Member, American Academy of Arts and Sciences

COLLEEN R. KELLY

Associate Professor of Medicine

- Fellow, American Gastroenterological Association

CAROLINA L. HAASS-KOFFLER

Assistant Professor of Psychiatry and Human Behavior; Assistant Professor of Behavioral and Social Sciences

- Elected Associate Member, American College of Neuropsychopharmacology

CHRISTOPHER KOLLER

Professor of the Practice of Health Services, Policy, and Practice

- Barbara Starfield Primary Care Leadership Award, Patient-Centered Primary Care Collaborative

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- Center for Advanced Studies (CAS) Fellow, Ludwig-Maximilians-Universitat Munchen

DAVID H. LAIDLAW

Professor of Computer Science

- Visualization Academy Inductee, Institute of Electrical and Electronics Engineers Computer Society

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Assistant Professor of Medical Science; Clinician Educator

- John H. Clark, MD Physician Award, Federation of State Medical Boards

JUNG-EUN LEE

Assistant Professor of Earth, Environmental, and Planetary Sciences

- Faculty Early Career Development (CAREER) Program Award, National Science Foundation

JESSACA LEINAWEAVER

Professor of Anthropology

- Core Fulbright U.S. Scholar, Fulbright Scholar Program
- Fulbright Canada Research Chair in Society and Culture, Dalhousie University

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- Distinguished Research Achievement Award, Brown University
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Professor of Cognitive, Linguistic, and Psychological Sciences

- Scientific Impact Award, Society of Experimental Social Psychology

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- Fellow, Hedwig van Ameringen Executive Leadership in Academic Medicine Program

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Associate Professor of Economics

- Distinguished Young Scientist Award in Socio-Economic Sciences, Bodossaki Foundation

IVAN W. MILLER

Professor of Psychiatry and Human Behavior

- Innovation in Suicide Prevention Award, American College of Emergency Physicians/American Foundation for Suicide Prevention

PETER MONTI

Donald G. Millar Distinguished Professor of Alcohol and Addiction Studies; Professor of Behavioral and Social Sciences; Director, Center for Alcohol and Addiction Studies

- Distinguished Research Achievement Award, Brown University
- Jack Mendelson Award, National Institute on Alcohol Abuse and Alcoholism

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Professor of Medicine

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- Composer-In-Residence, New England Philharmonic
- Fellow, Civitella Ranieri Center Foundation

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- Young Scholars Program, Foundation for Child Development

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- Distinguished Fellow, American Psychiatric Association

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Professor of Medicine

- President, American College of Cardiology

SOHINI RAMACHANDRAN

Associate Professor of Biology; Associate Professor of Computer Science

- Presidential Early Career Award in Science and Engineering (PECASE), White House Office of Science and Technology Policy

KAVITA RAMANAN

Roland George Dwight Richardson University Professor of Applied Mathematics

- Elected Member, American Association for the Advancement of Science (AAAS)
- Elected Fellow, Society of International and Applied Mathematics (SIAM)
- Fellow, John Simon Guggenheim Memorial Foundation
- Distinguished Alumnus Award, Indian Institute of Technology Bombay

MEGAN L. RANNEY

Warren Alpert Endowed Associate Professor of Emergency Medicine; Associate Professor of Health Services, Policy, and Practice; Founding Director, Brown-Lifespan Center for Digital Health

- Health Innovators Fellowship, Aspen Institute
- 45 Under 45 Award, Emergency Medicine Residents' Association
- Policy Pioneer Award, American College of Emergency Physicians

PATRICIA R. RECUPERO

Clinical Professor of Psychiatry and Human Behavior; Clinical Professor of Medical Science

- Manfred S. Guttmacher Award, American Psychiatric Association

DANIEL C. RITCHIE

Assistant Professor of Computer Science

- Faculty Early Career Development (CAREER) Program Award, National Science Foundation

RAMELL ROSS

Assistant Professor of Visual Art

- Early Career Research Achievement Award, Brown University
- Fellow, United States Artists

LYNN ROTHSCHILD

Adjunct Professor of Molecular Biology, Cell Biology, and Biochemistry

- Innovative Advanced Concepts Fellow, NASA

SHARON I. ROUNDS

Associate Dean, Clinical Affairs; Professor of Medicine; Professor of Pathology and Laboratory Medicine

- Fellow, American Thoracic Society

BRENDA M. RUBENSTEIN

Joukowsky Family Assistant Professor of Chemistry

- Chemical and Engineering News Talented 12, American Chemical Society
- Young Investigator Program, Air Force Office of Scientific Research
- Cottrell Scholar, Research Corporation for Science Advancement

IAN J. SALDANHA

Assistant Professor of Health Services, Policy, and Practice; Assistant Professor of Epidemiology

- Elected Member, Society for Research Synthesis Methodology

EMILIA HUERTA-SANCHEZ

Assistant Professor of Ecology and Evolutionary Biology

- Sloan Research Fellowship, Alfred P. Sloan Foundation
- Young Investigator Grant, Human Frontier Science Program

DAVID A. SAVITZ

Chair, Department of Epidemiology; Professor of Epidemiology; Professor of Obstetrics and Gynecology; Professor of Pediatrics

- David Rall Medal, National Academy of Medicine
- John Snow Award, American Public Health Association

JOSHUA B. SCHECHTER

Associate Professor of Philosophy

- Fellowship, George A. and Eliza Gardner Howard Foundation

ANDREW SCHRANK

Olive C. Watson Professor of Sociology and International and Public Affairs

- Innovation, Equity, and the Future of Prosperity Fellow, Canadian Institute for Advanced Research

RICHARD SCHWARTZ

Chancellor's Professor of Mathematics

- Simons Fellowship in Mathematics, Simons Foundation
- Mathematics Member, Institute for Advanced Study

JOHN M. SEDIVY

Hermon C. Bumpus Professor of Biology; Associate Dean and Director, Center for the Biology of Aging

- Distinguished Research Achievement Award, Brown University

SAMIR A. SHAH

Clinical Professor of Medicine

- President-Elect, Digestive Disease National Coalition

CHI-WANG SHU

Theodore B. Stowell University Professor of Applied Mathematics

- Elected Fellow, Association for Women in Mathematics

ANITA SHUKLA

Assistant Professor of Engineering; Assistant Professor of Molecular Pharmacology, Physiology, and Biotechnology

- Presidential Early Career Award in Science and Engineering (PECASE), White House Office of Science and Technology Policy
- Early Career Research Achievement Award, Brown University
- Faculty Early Career Development (CAREER) Program Award, National Science Foundation

MARK SIGMAN

Krishnamurthi Family Professor of Urology; Professor of Surgery; Professor of Pathology and Laboratory Medicine

- Star Award, American Society for Reproductive Medicine
- Distinguished Surgeon Award, Society of Reproductive Surgeons

ARUN SINGH

Clinical Professor Emeritus of Surgery

- Lifetime Achievement Award, American Heart Association

DANIEL SMITH

Charles C. Tillinghast Jr. Professor of International Studies; Professor of Anthropology

- Fellow, John Simon Guggenheim Memorial Foundation

HEATHER SMITH

Assistant Professor of Obstetrics and Gynecology; Clinician Educator

- President-Elect, American Medical Association Foundation

MARIAH STUMP

Assistant Professor of Medicine; Clinician Educator

- Fellow, American College of Physicians

ROBERT M. SWIFT

Professor of Psychiatry and Human Behavior; Professor of Behavioral and Social Sciences

- Dean's Award for Faculty Research Mentoring, Brown University Division of Biology and Medicine

KALI S. THOMAS

Associate Professor of Health Services, Policy, and Practice

- Terrie Fox Wetle Award in Health Services and Aging Research, American Federation for Aging Research
- Early Career Research Achievement Award, Brown University

SARAH L. THOMAS

Associate Professor of Hispanic Studies

- Faculty Research Fellowship, Pembroke Center for Teaching and Research on Women

JENNIFER TIDEY

Associate Dean for Research, School of Public Health; Professor of Behavioral and Social Sciences; Professor of Psychiatry and Human Behavior

- Elected Fellow, College on Problems of Drug Dependence
- Elected Fellow, American Psychological Association

MATTHEW TURNER

Professor of Economics

- Peter B. Kenen Fellowship, International Economics Section, Department of Economics, Princeton University

DANIEL VACA

Robert Gale Noyes Assistant Professor of Humanities

- Fellow, Center for the Study of Religion and American Culture

ANDRIES VAN DAM

Thomas J. Watson Jr. Professor of Technology and Education; Professor of Computer Science

- Distinguished Educator Award, Association for Computing Management Special Interest Group on Computer Graphics and Interactive Techniques

PARKER VANVALKENBURGH

Assistant Professor of Anthropology

- Tulsa Race Massacre Centennial Commission, University of Tulsa

BETTY R. VOHR

Professor of Pediatrics

- Dale Richmond/Justin Coleman Award, American Academy of Pediatrics

ANASTASIA VOLOVICH

Professor of Physics

- Elected Fellow, American Physical Society

JACK R. WANDS

Jeffrey and Kimberley Greenberg-Artemis and Martha Joukowsky Professor of Gastroenterology; Professor of Medicine; Professor of Medical Science

- Fellow, American Academy for the Advancement of Science (AAAS)

LU WANG

David S. Josephson Assistant Professor of Music

- Berlin Prize Fellow, American Academy in Berlin

TERRIE FOX WETLE

Professor of Health Services, Policy, and Practice

- Inaugural Terrie Fox Wetle Award in Health Services and Aging Research, American Federation for Aging Research

TARA L. WHITE

Assistant Professor of Behavioral and Social Sciences

- Fellow, Association for Psychological Science

HONGWEI YAO

Associate Professor of Molecular Biology, Cell Biology, and Biochemistry

- Falk Catalyst Research Award, Dr. Ralph and Marian Falk Medical Research Trust

ANDREW R. ZULLO

Assistant Professor of Health Services, Policy, and Practice; Assistant Professor of Epidemiology

- Health in Aging Foundation New Investigator Award, American Geriatrics Society

Sources: Brown University Dean of the Faculty's Office, School of Public Health, and Division of Biology and Medicine

COMPILED BY ALEXANDRA PECK, GS ANTHROPOLOGY PH.D.

END NOTES

Speaking Out

Ashish Jha and Megan Ranney have been key national voices.

BY NOEL RUBINTON '77

DURING THE COVID-19 PANDEMIC, Dr. Ashish Jha and Dr. Megan Ranney have appeared as expert guests on hundreds of television and radio programs, as well as being interviewed for hundreds more major newspaper and online articles and writing widely discussed commentaries. They have become highly recognized faces of Brown.

Jha was named Brown's new dean of the School of Public Health in February, as COVID was emerging. While not due to start until September 1, Jha spent the spring and summer deeply involved in advising Brown and other groups around the world, along with his roles as director of Harvard's Global Health Institute, internist at the VA Boston Healthcare System, and professor of medicine at Harvard Medical School.

Ranney, associate professor of emergency medicine at the Warren Alpert Medical School and emergency physician at Rhode Island Hospital, is the inaugural director of the Brown-Lifespan Center for Digital Health. During the pandemic, she cofounded Get Us PPE, a national group helping frontline health care workers and others obtain needed Personal Protective Equipment.

Here are excerpts from a recent *Impact* conversation with them.

During COVID, what have you learned about the impact of research at Brown and beyond?

MEGAN RANNEY: COVID-19 has accelerated our ability to translate what is done within the university's metaphorical walls into the real world. I've always known that my colleagues here are doing really cool, groundbreaking research, but COVID-19 has called on researchers to step outside their comfort zone,

and has also created new links between our researchers and the public.

ASHISH JHA: If we go back to January, we knew nothing about this virus. And then of course we had no therapies, we had no vaccine. We were sitting ducks. In an extraordinarily short time, we have learned a ton about whom it affects, how it affects them, what we can do to prevent it. We have essentially decoded a disease that none of us knew about. While there is much work ahead, the whole biomedical community needs to be applauded for the work that has been done.

Why have you made it such a priority to speak publicly about COVID?

JHA: It started as an educational effort. When the pandemic really got going, I found that people were generally confused about what was happening. I found there was hunger for fact-based analysis.

In a time of great anxiety and confusion, engaging with the public was a really important part of public health leadership and helping people understand the moment they were in, helping them separate fact from fiction.

RANNEY: I love being a clinician, and I love being a researcher. But the drive behind all of that is the desire to make the world a better place. It was clear early in COVID that there was a deficit of voices translating science into terms that individuals and communities across America could use. We were lucky to have the opportunity to take our knowledge, observations, and collective insights and present them to the public in ways that could shift behavior, policy, or philanthropy.

During this period, what have you learned about the value of having medical schools and schools of public health?

JHA: Throughout history, human populations have been decimated by disease outbreaks. And the reason why this one, as awful as it has been, will not decimate the human population is because of biomedical science and public health science. They are a central pillar for how we generate knowledge about the natural world and how we form the basis for policy-making and decision-making.

RANNEY: A great medical school and a great school of public health, particularly when they work together, can serve as rational voices to inform the development or modification of effective health systems.

Another important value is creating a work force of the future. By training our students in ways that grow empathy, inquisitiveness, and commitment to data—and by intentionally growing a diverse work force that looks like the communities we serve—we can be both on-the-ground and high-level leaders of the work that needs to be done. ■



Ashish Jha (left) and Megan Ranney have stressed public education as a way to combat COVID-19.



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BORDERS EXAMINED

In a January 2020 Wintersession course on "Borderlands," exploring the U.S.-Mexico border between Southern California and the Mexican cities of Tijuana and Mexicali, Zeinab Kante '21 photographed this boy on the Mexican side of the wall.

