

ROWANRESEARCH

DISCOVERY AND INNOVATION AT ROWAN UNIVERSITY

SPRING 2024



CATCH SOME **SUN**

Developing solutions for
a more sustainable world **10**

Sharing stories of witnesses
to capital punishment **8**

Addressing the opioid epidemic **16**

Beneath smoke drifting from Canadian wildfires, Anthony Thompson, a computer science major, and Ik Jae Lee, assistant professor of mathematics, use a drone to photograph a blueberry field before harvest. The images are analyzed using an algorithm, part of a Rowan project to develop an automated method to predict crop yield and identify bushes affected by blueberry scorch. Their research is partly funded by the New Jersey Department of Agriculture.



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'AROUND THE CORNER'

Scientists say solutions to the opioid epidemic are within reach

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Cover photo: Ken Lau, a professor of chemical engineering in the Henry M. Rowan College of Engineering, holds a piece of glass coated with a polymer film thinner than the width of a human hair. He is researching methods for creating more efficient, polymer-based solar cells and batteries—sustainably.

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RESEARCH BRIEFS



HRSA Administrator Carole Johnson and U.S. Rep. Donald Norcross visit the Rowan-Virtua Regional Integrated Special Needs Center on the Sewell campus of the Virtua Health College of Medicine & Life Sciences of Rowan University.

PRIMARY CARE FOR ALL

The Rowan-Virtua Regional Integrated Special Needs Center (Rowan-Virtua RISN) was named one of two New Jersey institutions to receive a Primary Care Training & Enhancement award from the U.S. Department of Health and Human Services through the Health Resources and Services Administration.

The grant supports a Rowan-Virtua RISN program focused on training future primary care providers, so they can better provide care to individuals with physical or intellectual and developmental disabilities, through clinical and classroom training and rotations.

Founded in 2019, the Rowan-Virtua RISN Center is southern New Jersey's first primary care practice dedicated to serving special needs patients with comprehensive, coordinated and accessible primary care and behavioral health services.

PRIMED FOR GROWTH

In preparation for growing its research profile, Rowan University has appointed Mei Wei, Ph.D., as vice president for research.

Wei joined Rowan from Ohio University, an R1 public research institution, where she served as associate vice president for research and creative activity. Previously, she served as dean of engineering at Ohio University and associate dean for research and graduate education at the University of Connecticut.

An expert in biomaterials and fellow of the American Institute for Medical and Biological Engineering, Wei is also an entrepreneur who co-founded a biomedical device startup company specializing in products for improved bone repair and regeneration.

"I'm excited by the possibilities before us," Wei said. "Rowan is attracting fast-rising researchers who want to make meaningful impacts in their respective fields. They see what I see: an environment primed for growth."



GREENER HIGHWAYS

Thanks to Rowan University inventors, there's now an award-winning method for increasing the use of old asphalt to make new roads and, potentially, pothole patches.

A team of researchers led by Yusuf Mehta, Ph.D., director of Rowan University's Center for Research & Education in Advanced Transportation Engineering Systems (CREATES), received the 2023 Edison Patent Award for Sustainability from the Research & Development Council of New Jersey and the prestigious American Association of State Highway Transportation Officials' High Research Value Award.

A professor of civil and environmental engineering in the Henry M. Rowan College of Engineering, Mehta and three co-inventors found a way to boost recycled asphalt pavement in new mixes by 35 percent, while preserving durability and performance.

"We are protecting natural resources and making a much greener and more sustainable paving material," Mehta said.

The inventors included civil engineering technician Aaron Nolan and civil engineering graduates Khyati Sonpal M'12 and Prashant Shirodkar M'10.

ADVANCING THE REGION'S PHOTONICS INDUSTRY

A new collaboration led by Princeton and Rowan universities to drive economic and technological advancements in photonics—the branch of science that includes lasers, optical fibers and cutting-edge light-based innovations—secured a development grant from the National Science Foundation's Regional Innovation Engines, or NSF Engines, program.

The collaboration includes universities and community colleges, leading photonics companies, statewide economic and workforce development programs, and technology accelerators and incubators that help transition research into startup companies.

One of 44 awarded nationally, the development grant lays the groundwork for a multistate collaboration called Advancing Photonics Technologies that aims to advance research, transition discoveries and build the workforce.

Authorized by the CHIPS and Science Act of 2022, the two-year development awards enable the teams to prepare strong proposals for becoming future NSF Engines and the opportunity to receive up to \$160 million.

Robert V. Chimenti (right), Rowan University photonics program coordinator, and Jamison Engelhardt, a doctoral student in materials science and engineering, work in the photonics lab at Rowan University's Advanced Materials & Manufacturing Institute.



RUSSIA'S SHADOW ECONOMY

James Heinzen, Ph.D., is working to tell the story of how everyday people survived dictatorship in 20th century Russia.

Many did so by developing a thriving black market for material goods, according to Heinzen, who studied declassified archival materials and trial transcripts in Russia for his upcoming book, tentatively titled “Outlaw Entrepreneurs and the Soviet Shadow Economy Under Late Socialism.”

“Outlaw Entrepreneurs” builds upon Heinzen’s two other books: “Inventing a Soviet Countryside: The Soviet State and the Transformation of Rural Russia before Collectivization” (2004) and “The Art of the Bribe: Corruption Under Stalin” (2016).

“I’m a social historian. I’m interested in the lives of ordinary people trying to get by in a dictatorship,” said Heinzen, professor of history in the College of Humanities & Social Sciences and director of the Hollybush Institute for Global Peace and Security.

“The Soviet Union was inefficient in producing consumer goods—clothing, food, furniture and items that people needed for their lives,” continued Heinzen, whose work has been supported by the National Endowment for the Humanities. “To fill this gap, people produced and sold these things illegally, often in extremely creative ways.

“The shadow economy was essential for the survival of the Soviet system. Yet in spite of its importance, little has been written about it beyond the anecdotal.”



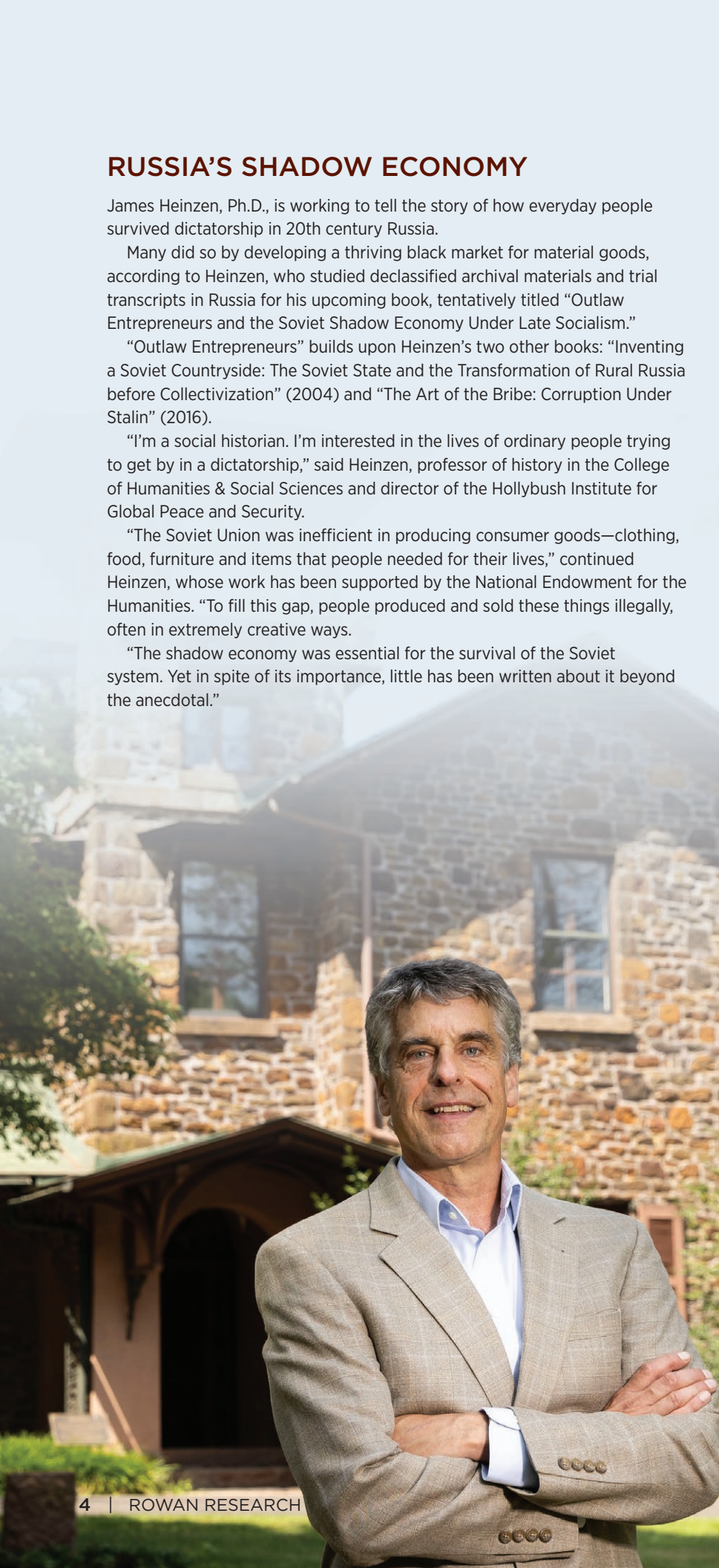
SCHUTTE RECEIVES NOD FOR SALT MARSH STUDIES

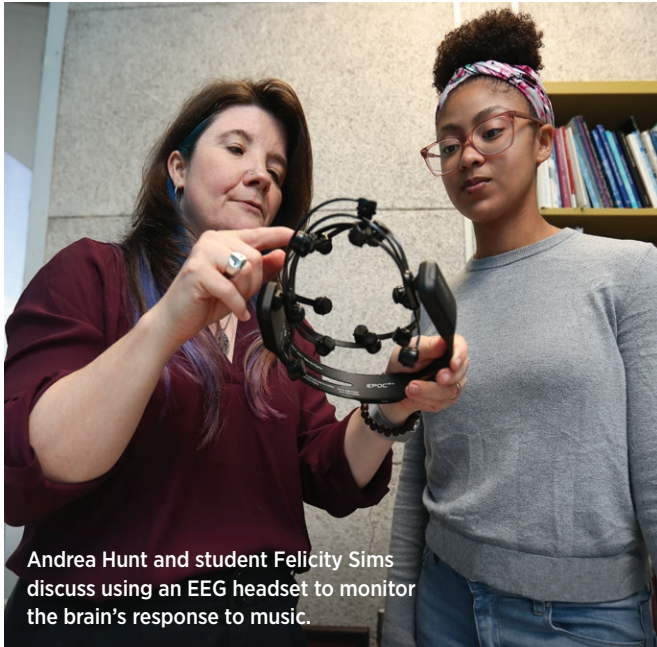
Charles Schutte, Ph.D., received a prestigious Early Career Research Fellowship from the National Academies of Sciences, Engineering and Medicine Gulf Research Program.

Schutte received the fellowship for his work studying coastal wetlands and their ability to capture carbon dioxide, as well as for research into the greenhouse gas methane that’s produced by the same marshes.

A faculty member in the Department of Environmental Science in the School of Earth & Environment, Schutte said the award affirms the importance of his research and provides a funding stream to support it.

“It’s validating to get feedback from experts in the field who see this work as important and exciting,” Schutte said.





Andrea Hunt and student Felicity Sims discuss using an EEG headset to monitor the brain's response to music.

MUSIC AND THE BRAIN

In the music therapy field, there aren't many labs or researchers studying how the body responds to musical experiences. Andrea Hunt, Ph.D., is changing that. Hunt, an assistant professor and director of the College of Performing Arts' music therapy program, studies the interface of neuroscience and music therapy.

She uses electroencephalogram (EEG) testing to map brain activity and other physical data to monitor the impact of music therapy experiences.

And she's getting her students excited about this novel research approach. Bringing EEG testing into the undergraduate classroom gives students a significant understanding of the research process and the effects of music on the body. Monitoring EEG data and other physical responses to music allows Hunt and her students to understand the sympathetic nervous system (fight or flight) and parasympathetic nervous system (rest and digest) responses, which correlate to feelings of relaxation.

Informed by clinical research, Hunt and her students can work towards developing new therapeutic strategies to address mental health needs like stress, anxiety and depression.



CHALLENGES OF POLICING CRIME AND GUN VIOLENCE

The challenges facing police officers are complex. That's where the research of John Shjarback, Ph.D., can make an impact.

A professor of law and justice studies in the College of Humanities & Social Sciences, Shjarback is a prolific researcher whose work focuses on the factors that influence how law enforcement officers perform their duties.

He has partnered with the Atlantic City Police Department to determine the

effectiveness of automated license plate readers on combatting crime.

"We're studying its impact on crime, specifically motor vehicle thefts and gun violence in Atlantic City," he said.

Moreover, Shjarback is working with the Millville Police Department to evaluate how having an embedded social worker to assist the department with mental health crises and addiction-related calls will impact service to the public.

Shjarback's research interests, which include policing, criminal justice policy and violence, focus on helping agencies better manage crime and gun violence.

"Now more than ever, we need good, evaluative research to tackle some of these challenging and complex problems in our society," said Shjarback, whose research has been funded by the New Jersey Gun Violence Research Center at Rutgers University and the South Jersey Institute for Population Health.

SIMPLIFYING BENZODIAZEPINE PRODUCTION

With support from a National Institutes of Health grant, Gustavo Moura-Letts, Ph.D., is pursuing improved methods for the preparation of benzodiazepines, used in the treatment of neurodegenerative diseases and mood disorders.

The research focuses on efficiently making benzodiazepines, so they better focus on the intended target.

“The state-of-the-art approach to make these molecules right now takes 10 to 12 steps,” said Moura-Letts, a professor in the Department of Chemistry & Biochemistry in the College of Science & Mathematics. “With what I am proposing to do, we can reduce it to three to five steps. So, I created a new reaction that would allow us to make the molecules in a much more efficient way, but also would allow us to access different types of molecular architecture.”

The project is focused on the basic chemistry behind the drug’s production, but it has the potential to provide molecules to scientists who could pursue future clinical trials, Moura-Letts said.



Gustavo Moura-Letts works in his organic chemistry lab with Erin Doran, a graduate student in the pharmaceutical sciences program.



THE BRAINS BEHIND SOCIAL BEHAVIOR

Decades of research have shown that vasopressin, a chemical messenger in the brain, influences social behavior. With a five-year, \$2 million grant from the National Institutes of Health, Benjamin Rood, Ph.D., and Elizabeth West, Ph.D., will target specific cells and regions of the brain to better understand this social behavior network.

“A lot of literature on social behavior has focused on a few specific brain regions,” said Rood, an assistant professor in the Department of Cell Biology & Neuroscience, Virtua Health College of Medicine & Life Sciences. “This is the first time anyone studying social behavior has focused on vasopressin-responsive cells in the thalamus, which is thought to be more specifically involved in cognitive behavior.”

The researchers hope better understanding how these brain circuits work could one day improve social interactions and health outcomes.



A NUDGE TOWARD BETTER HEALTH

It's normal human behavior to compare ourselves to others. Sometimes, those social comparisons can motivate. And sometimes, they can backfire.

Dani Arigo, Ph.D., an associate professor of psychology in the College of Science & Mathematics, investigates how social comparisons can be used to encourage healthy habits, particularly physical activity. With support from the National Institutes of Health Director's New Innovator Award, Arigo is pursuing the next frontier in understanding the many ways people are influenced by social comparisons.

The award is part of the agency's High-Risk, High-Reward Research program, which supports highly innovative scientists who propose visionary and broadly impactful behavioral and biomedical research projects. Arigo will use the five-year, \$1.5 million grant to trailblaze new methods for studying social comparisons.

Ultimately, she hopes her work will lead people toward better health outcomes.

"The work that my team and I do is all about small changes," Arigo said, "and we're trying to understand how small changes—prompted by social comparisons, conscious or otherwise—can add up to bigger behavior change, which can improve long-term health outcomes."

STRESS LESS

Kevin Currie, Ph.D., professor of biomedical sciences at Cooper Medical School of Rowan University, studies the cellular and molecular mechanisms that control neurotransmitter and hormone secretion. With funding from the National Institutes of Health, Currie investigates the role of the serotonin transporter (SERT) in the sympathetic nervous system.

In the brain, SERT regulates signaling by a chemical messenger called serotonin, making it an important target for antidepressant medications. Currie wants to better understand the physiological mechanisms used by SERT outside the brain and potential molecular links between depression, anxiety and other neurological disorders.

"Our work has identified a new role for SERT in the adrenal gland where it helps control the surge of adrenaline secretion into the bloodstream that underlies the 'fight-or-flight' response to acute stress," Currie explained. "Understanding the role of SERT and the molecular mechanisms that control neurotransmitter secretion could open the door to more effective medications to treat neurological disorders."



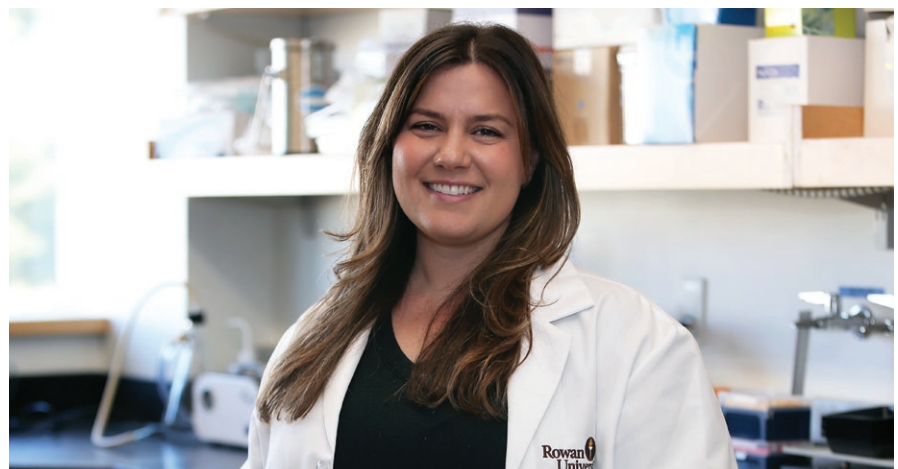
INFLAMMATION, EXERCISE AND THE BRAIN

Melissa Taft Manners, Ph.D., is examining resilience to chronic stress and the positive effects of physical exercise on the brain.

"In recent years, inflammation from chronic stress has been associated with the development of mental illness," noted Manners, an assistant professor in the Department of Biological & Biomedical Sciences in Rowan's College of Science & Mathematics.

With support from the National Institute of Mental Health, Manners' team is investigating what occurs in the brain during chronic stress, which may point to better understanding how to reduce inflammation and, ultimately, how to improve mental health outcomes.

"Exercise is known to promote mental health," Manners said. "We know that exercise is healthy from a physical perspective. Your body benefits from exercise and your brain benefits from exercise. What we are interested in knowing is, does exercise promote an anti-inflammatory environment in the brain, and is this part of developing resilience to chronic stress?"





BEARING WITNESSES

FOR RESEARCH for a book and documentary film, Rowan University sociologist Sandra Joy, Ph.D., spent 10 months last academic year crisscrossing the nation to interview 100 people who have witnessed executions.

With Nova, her beloved dog, by her side, Joy lived in an RV, conducting interviews in nearly 25 states.

She drove more than 40,000 miles to meet with family members, attorneys, spiritual advisers, medical professionals, activists, prison officials and journalists.

“As a trained sociologist, I always want to understand how all of these demographic variables, all of these life experiences, and the social structure, and institutionalized structures, impact how people are affected by particular events,” said Joy, a professor in the College of Humanities & Social Sciences. She has been involved in the anti-death penalty movement for three decades.

“There’s a federal death penalty. We need to hear from the people who are witnesses. They are the eyes and ears for the rest of society and they’re very crucial in the ongoing dialogue we’re having about whether we should continue the death penalty.”



With every interview—from Florida to Alabama to New Mexico to California to Missouri to Ohio and well beyond—Joy heard personal stories that she expects will contribute to the national narrative on capital punishment. She calls her project “Bearing Witnesses.” Photos of each of the witnesses she interviewed line the inside of her RV (shown above).

“I have all of these people who are looking down at me in these pictures that I need to honor with my work,” says Joy, the author of two books that focus on the grief, loss and treatment of families of those on death row and on coalition building in the anti-death penalty movement. She twice has presented her

research on the needs of the children of death row inmates before the United Nations Human Rights Council.

“There’s so much to say about all 100 people who were kind enough to offer their time, open their hearts and go to a place that’s very vulnerable, scary, traumatic and difficult for so many of them,” Joy said.

“I saw in them trauma, resilience, courage—and dedication beyond words. Even if they weren’t there out of mercy, even if they were there because it was their job, it took a lot of courage and a lot of strength for them to be there to be witnesses.”

Joy chronicles her work on her website, bearingwitnesses.com.



BEYOND CLIMATE CRISIS

THE FUTURE IS SUSTAINABLE

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he planet is getting hotter and, after much interdisciplinary research, the causes are clear. “When it comes to climate change,” said climate scientist Andra Garner, Ph.D., “we know that we are the problem. It is absolutely human-caused greenhouse gas emissions that have created our current warming.”

That’s actually good news, because that means people can solve the problem, said Garner, an assistant professor in the Department of Environmental Science within the School of Earth & Environment.

Compelled by the evidence, Rowan University researchers and their students are developing new solutions across academic disciplines, offering hope for a weary planet.

“It’s absolutely essential, because the resources of the world are diminishing,” said Rowan University President Ali Houshmand, who has pushed the institution to invest in sustainability education. “We need to find alternatives that do not impact the environment negatively.”

MEASURING THE IMPACTS

Over the past few years, Garner has published research about the nature, trajectory and development cycles of hurricanes, often with a focus on East Coast systems and how they’re worsening with climate change.

In a widely reported paper published in October 2023 in the journal *Scientific Reports*, Garner detailed how, over just the past 50 years, the intensification rates of tropical cyclones along the Atlantic rapidly increased as human-caused greenhouse gas emissions warmed the planet and oceans.

Ultimately, Garner said, such evidence should serve as a warning that human activity needs to change—and fast. With support from the National Science Foundation (NSF), Garner is studying the different ways sea-level rise is projected and how data from those projections are used by communities to prepare for what’s to come.

Climate scientist Andra Garner researches the impacts of changing climate on natural hazards, including increasing flood risks associated with tsunamis and sea-level rise, and the evolving characteristics of tropical cyclones.



“There is an urgency,” Garner said. “If we don’t make some pretty big changes and move away from fossil fuels, this is something we can expect to see worsen in the future.”

Climate trend predictions begin with an intimate understanding of the past—the deep past.

Geologist Gerald Rustic, Ph.D., studies foraminifera—single-celled, short-lived ocean organisms that, across many millennia, record changes in their environment. In two NSF-funded research projects, the associate professor in the School of Earth & Environment examines foraminifera shells from ocean floor samples.

By studying those shells, he’s been able to track up to 300,000 years of El Niño and La Niña weather patterns driven by fluctuating Pacific Ocean temperatures.

“Tropical variability has a huge impact on the rest of the planet,” Rustic said. His work adds to a better understanding of climate and the many factors that affect it.

“The climate system is incredibly large and complex,” Rustic said. “If we can understand the past, we can better predict the future.”

COMMUNICATING RESEARCH

Through its Catalysts for Sustainability initiative, Rowan has recruited researchers to not only develop and advance solutions to threats posed by the climate and biodiversity crises, but also to communicate about them.

Garrett Broad, Ph.D., studies the sometimes-thorny language that accompanies scientific breakthroughs. An associate professor in the Edelman College of Communication & Creative Arts, Broad has focused on cellular agriculture—the evolving science of creating dairy and meat products from cultures in a lab.

While some view lab-grown food as a great achievement that could reduce reliance on livestock—and possibly reduce greenhouse gas

President Ali Houshmand harvests peppers at Rowan University’s West Campus Farm.



“It’s absolutely essential, because the resources of the world are diminishing. We need to find alternatives that do not impact the environment negatively.”

—President Ali Houshmand

“The climate system is incredibly large and complex. If we can understand the past, we can better predict the future.”

—Gerald Rustic

emissions—others see it as a threat, Broad’s research has found.

Many who defend conventional food production say it produces a great number of jobs and maintains a traditional lifestyle that often goes back generations. They also question whether alternative production methods would really be more sustainable.

“Anyone who’s advocating for the alternatives should take these concerns seriously,” Broad said. “We might consider how they can be a part of a future that would create other, maybe better-paying jobs.”

CONVERTING CARBON

Carbon dioxide accounts for the majority of the greenhouse gases blanketing the planet, produced mostly by burning fossil fuels.

Rowan researchers and their partners at Sekisui Chemical refined a method for efficiently converting carbon dioxide into raw materials used to make useful products such as plastics. Powered by renewable energy sources, their cost-effective process is sustainable and affordable.

Developed by Samuel Lofland, Ph.D., a Rowan physicist; Atsushi Ikoma, a researcher at Sekisui Chemical, and Naohiro Fujinuma, Ph.D., a Sekisui researcher and Rowan alumnus, the method centers on a novel electrochemical catalyst.

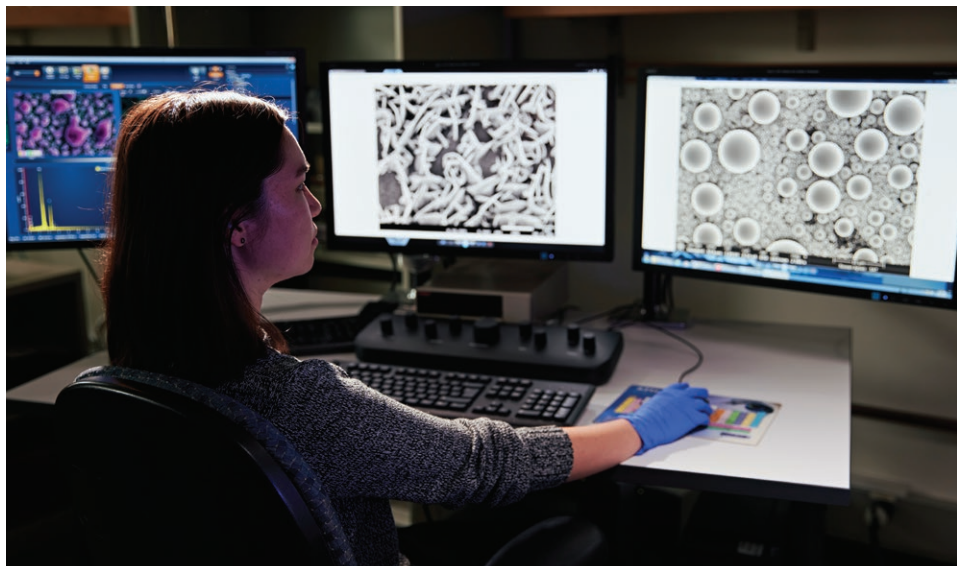
Simply put, “electrochemical catalysis is a means of transforming carbon dioxide into other useful compounds,” explained Lofland, a professor in the Department of Physics & Astronomy in the College of Science & Mathematics.

The new catalyst is made from inexpensive, readily available materials by a method that is easily configurable to large-scale, commercial and industrial applications.

“Our particular catalyst has demonstrated not only high throughput for this reaction but more importantly, high energy efficiency and durability—two factors which are key to the commercialization of this technology,” said Lofland, who was named a fellow of the American Physical Society in 2023 for his contributions to the field.

DIVING INTO HYDROGEN ENERGY

To reach net zero carbon emissions by 2050, the United States is making a massive investment in clean hydrogen energy infrastructure. As one of the education partners supporting the Mid-Atlantic Clean Hydrogen Hub (MACH2), Rowan University is already on board.



Selected by the U.S. Department of Energy for award negotiations to receive up to \$750 million in funding from the Hydrogen Hubs program, MACH2 is building a network of hydrogen producers, consumers and local connective infrastructure in Delaware, southeastern Pennsylvania and South Jersey. The hub will support the production, storage, delivery and end-use of clean hydrogen.

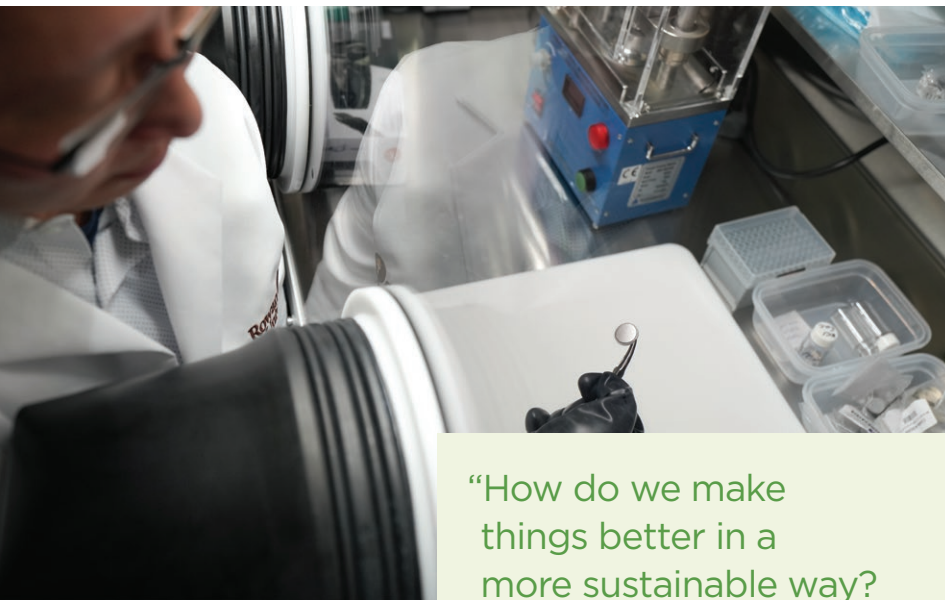
“We have been using hydrogen for a very long time,” said Giuseppe Palmese, Ph.D., dean of the Henry M. Rowan College of Engineering. “The chemical process and petrochemical industries know very well how to work with it safely and cost-effectively.”

Natalie Page, a doctoral student studying materials science and engineering, investigates the morphology and chemical composition of a catalyst.

Hydrogen is the lightest, most abundant element in the universe. It's present in water, plants and animals and makes up more than 90 percent of the sun. When consumed within a fuel cell, hydrogen produces only water and heat, making it an attractive source of pollutant-free energy.

Condensed as a liquid, hydrogen can hold two or three times more energy than other liquid fuels. It's also a low-carbon way to transport energy produced by renewable sources, such as wind turbines, solar fields and nuclear plants.

Ken Lau works in an inert glove box used for battery cell fabrication.



“How do we make things better in a more sustainable way? That’s our challenge and responsibility as chemical engineers.”

—Ken Lau

However, the conversion to hydrogen energy has been slow because the process of isolating hydrogen from other elements requires more energy than it produces. The U.S. investment in hydrogen power offers new opportunities for problem-solvers.

Researchers at the Henry M. Rowan College of Engineering are developing:

- composites and barrier materials for hydrogen storage and distribution;
- polymer systems for gas separations, electrolyzers and fuel cells;

- optimized processes and systems for the conversion of power to hydrogen to power; and
- hydrogen conversion processes from biogas produced by food waste.

“There’s a lot to do and we have the foundation in government, industry and academia to be successful,” Palmese said.

CATCH SOME SUN

The environmental impact of plastics, also called polymers, depends on how the material is made and used. Polymers have many practical, beneficial uses, including in the manufacture of solar cells and batteries.

Ken Lau, Ph.D., professor and head of the Department of Chemical Engineering, is researching methods for creating more efficient, polymer-based solar cells and batteries—sustainably.

Lau uses polymers in the form of films that are thinner than the width of a human hair (see cover). He creates these thin layers of polymers using a process called chemical vapor deposition.

“We don’t use a liquid medium or any harsh chemical solvents,” said Lau. “This is a greener synthesis process.”

These polymer thin films are lighter, more flexible and less expensive to produce than other materials—and they conduct electricity, making them attractive for use in efficient solar cells and batteries.

“Your car can run longer or your cell phone or laptops can also last longer,” Lau said. “Instead of an hour to charge your phone, in the future, hopefully, we can achieve battery charging that can be on the order of minutes.”

In an NSF-funded collaboration with the University of Delaware, Lau and his team are using polymer thin films to improve the performance of solar cells. Another NSF-funded project aims to enhance energy and power density, or the amount and time required to achieve a full charge, in lithium ion batteries.

Lau’s research is driven by a central question.

“How do we make things better in a more sustainable way?” Lau said. “That’s our challenge and responsibility as chemical engineers.”



HOTTAKE

Waste-to-energy incinerators are typically a greener choice than landfills, according to Jordan Howell, Ph.D., associate professor of sustainable business. Howell investigated the colorful history and impact of waste management practices in New Jersey for his book, “Garbage in the Garden State” (Rutgers University Press, 2023).

Here, Howell tours Covanta’s facility in Camden, where a grapple crane claws up to 6,000 pounds of municipal solid waste at a time from the tipping floor for incineration. In 2022, the plant processed 400,000 tons of waste, generating enough energy to power 16,000 homes, while keeping its annual average emissions up to 95 percent below federal emissions standards. The facility also recovered more than 15,000 tons of metal for recycling.

SCIENTISTS SAY SOLUTIONS TO THE OPIOID CRISIS ARE

‘AROUND

Well before prescribers firmly understood the addictive power of opioids, Rich Jermyn, D.O., knew something was terribly wrong.

A pioneer in pain management and addiction medicine, Jermyn treated chronic pain among HIV/AIDS patients in his clinic at what is now Rowan-Virtua School of Osteopathic Medicine (SOM) in Stratford. He knew his patients well. So, when many developed an ever-increasing need for the opioids he was prescribing, he recognized two things: The medications weren't as safe for long-term use as their makers had advertised. And the fallout would require an immense effort to repair.

The opioid epidemic has since claimed people across every age, race and socioeconomic demographic. Even as opioid prescriptions have plummeted, deaths due to

“Substance use disorder will never get better until we start looking at addiction as a disease like diabetes and hypertension.”

—Rich Jermyn

THE CORNER'

opioid use disorder (OUD) have continued to soar in the United States as powerful synthetic fentanyl flows into the illegal market, accounting for 75 percent of drug overdose deaths in 2021 alone.

“Substance use disorder will never get better until we start looking at addiction as a disease like diabetes and hypertension,” said Jermyn, dean of Rowan-Virtua SOM and founder of the NeuroMusculoskeletal Institute (NMI), both within the Virtua Health College of Medicine & Life Sciences.

“It’s just a new HIV from a stigma perspective,” said Jermyn. “The reason opioid addiction isn’t being treated better than it is right now is because people think it’s a moral failing. It’s not. It’s a mental health disease and we have treatments for it.”

To address the crisis, Rowan University researchers and physicians are working with

partner health systems to discover new treatments, train the next generation of providers and find new strategies to help people access treatment and recover. Below is just a sample of the research underway.

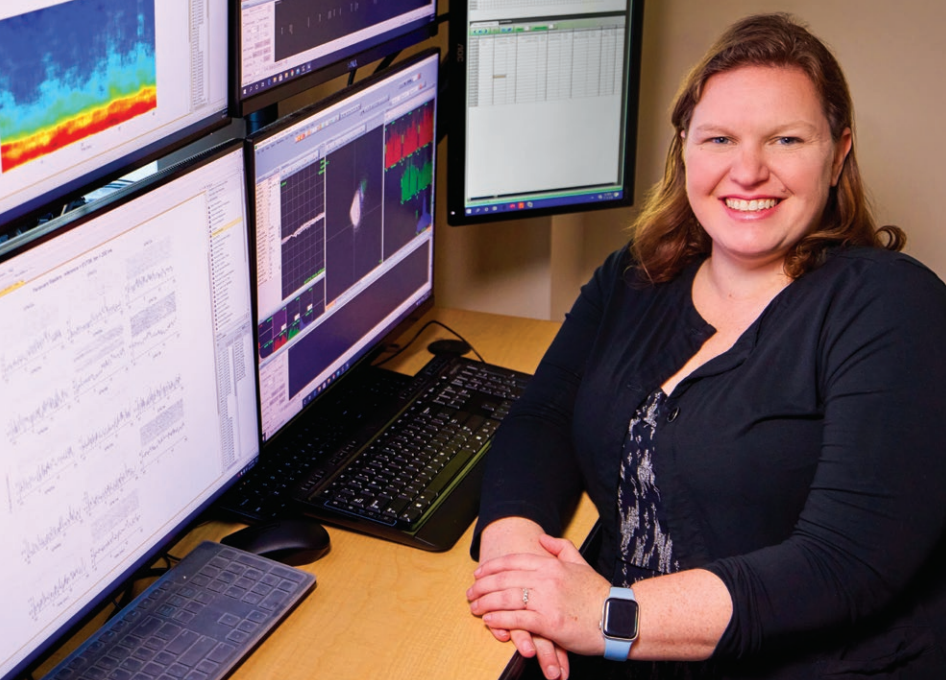
The work, Jermyn said, is mission-critical.

NEW FRONTIERS

With NIDA support, neuroscientists map brain mechanisms, behaviors on road to better treatments

Researchers in the Department of Cell Biology & Neuroscience at Rowan-Virtua School of Translational Biomedical Engineering & Sciences and Rowan-Virtua SOM are working to map the brain mechanisms involved in opioid-reward and opioid-seeking behaviors, information that could lead to the development of new treatments, therapies or prescribing practices.

Rich Jermyn, Rowan-Virtua School of Osteopathic Medicine dean, established the nation’s first medical school curriculum covering the prescription of opioids. His research has netted more than \$24 million in funding, including grants to educate all providers in New Jersey on the appropriate prescription of opioids.



Elizabeth West, an assistant professor at Rowan-Virtua School of Translational Biomedical Engineering & Sciences, studies the neurobiological underpinnings underlying motivation, learning and decision-making.

Early work by behavioral neuroscientists Dan Manvich, Ph.D., and Jessica Loweth, Ph.D., has shown that both drug reinforcement and drug craving for prescription painkillers varies during the rodent reproductive cycle, an understudied area of addiction research they hope to explore further.

“There are findings that, generally speaking, females might be more sensitive to certain aspects of addiction than males,” Loweth said.

Specifically, fluctuating hormones during the reproductive cycle are known to influence craving and relapse. Loweth’s work focuses on how ovarian hormones may affect receptor signaling within the neuronal reward circuitry. Such information could help identify therapeutic targets to reduce craving and promote abstinence in recovering users.

In another line of inquiry supported by the New Jersey Health Foundation, Manvich is collaborating with researchers at the National Institute on Drug Abuse (NIDA) to understand how new compounds for the treatment of opioid use disorder are able to reduce the effects of opioids in the brain.

“If we can understand how these drugs are exerting their therapeutic effects,” Manvich said, “then we can design improved compounds that do it best—optimally maximizing the beneficial effects and minimizing the unwanted side effects.”

INFLECTION POINTS

Stress, anxiety could affect susceptibility to opioid misuse

Stress neurobiologist Dan Chandler, Ph.D., explores how the brain responds to stress and how the brain, specifically the area called the locus coeruleus, generates anxiety in response to stress.

The brain’s naturally occurring opioids, primarily endorphin and enkephalin, bind to receptors in the locus coeruleus, calming anxiety. Chronic stress decreases the levels of opioid receptors in that part of the brain and could prime the brain for a more permanent state of anxiety. As part of a NIDA-funded research collaboration, Chandler and Manvich are studying the effects of opioids on a stressed brain.

“Because stress reduces the brain’s ability to respond to natural opioids, these more potent abused opioids might become more rewarding because they’re reducing the anxiety that’s caused by stress,” Chandler said.

Through NIDA-funded rodent studies, behavioral neuroscientist Elizabeth West, Ph.D., is building on her research on cocaine and decision-making to determine if opioids impair decision-making abilities. She’s also examining whether an individual’s decision-making behavior can predict elevated opioid use.

“I’m interested in susceptibility, vulnerability and resiliency,” West said.

Ultimately, researchers hope to find a method for determining which patients are at higher risk of developing opioid use disorder.

CHANGING THE TRAJECTORY

Researchers focus on neurotransmitters, receptors, genetics and more

With support from a five-year, nearly \$1.9 million award from the National Institutes of Health, neuroscientist Bradford Fischer, Ph.D., biochemist Thomas Keck, Ph.D., and neuroscientist Diana Martinez, Ph.D., are searching for drugs or drug combinations that

IN CAMDEN, A RICH REPOSITORY FOR GENETIC RESEARCH

In 2018, three Camden-based entities—Coriell Institute for Medical Research, Cooper University Health Care and Cooper Medical School of Rowan University (CMSRU)—formed the Camden Opioid Research Initiative, or CORI. The research partners work closely together to investigate the factors that contribute to opioid use disorder (OUD) and overdose, and how genetic and non-genetic information can be used to prevent or treat the disease.

A large proportion of patients with OUD have a family history of the disease, said Darren Boehning, Ph.D., professor of biomedical sciences and associate dean for research at CMSRU. An estimated 25 to 50 percent of the risk for OUD is related to genetics, though the specifics are unknown.

“One thing we do know,” Boehning said, “is it’s probably not a single gene, but something that we call a polygenic risk factor, meaning that there’s a bunch of genes working together that causes you to be more likely to abuse opiates.”

Along with Coriell, CMSRU works to identify risk factors, while the health system handles clinical interventions and works

with the patient population. One key resource is Coriell’s opioid research biobank, a subset of its larger repository of biological samples. Martin Job, Ph.D., an assistant professor of biomedical sciences at CMSRU, is part of the team searching for a preclinical opioid use model in rodent studies that most closely aligns with the human condition.

“If we are successful, we can make a case for focused research using the best model or models,” Job said. That research could lead to more effective medications for the treatment of OUD.

Meanwhile, the health crisis that motivates CORI’s work is unlikely to disappear anytime soon.

“It’s heartbreaking,” Boehning said. “It’s ripped families apart.”

are safer for pain control than opioids like morphine and oxycodone.

“The gold standard of what we’re looking for is an equally effective pain-relieving drug that does not have abuse potential and has fewer side effects than delivering opioids alone,” said Fischer, an associate professor of biomedical sciences at Cooper Medical School of Rowan University (CMSRU).

They want to better understand how opioids work with the body’s gamma-aminobutyric acid type (GABA) system. GABA is an inhibitory neurotransmitter in the central nervous system

that reduces a nerve cell’s ability to send pain-related messages.

Their recent work with chemists at the University of Wisconsin–Milwaukee has shown that combining morphine with a new GABA Type A receptor modulator may offer the same level of pain relief at lower morphine doses, said Keck, an associate professor of chemistry and biochemistry in the College of Science & Mathematics.

The epidemic’s broad impact drives their work. “I’ve always been fascinated with how dramatically opioid addiction can change some people’s lives,” Keck said. “I think it would be

“I’ve always been fascinated with how dramatically opioid addiction can change some people’s lives.”

—Thomas Keck

fairly rare for somebody to have no substance use disorders in their family.”

New drug combinations could become a critical component of a personalized pain treatment plan, Fischer said, and could change the trajectory of the opioid crisis.

Neuropharmacologist Amanda Fakira, Ph.D., is also working to develop a new, safer therapeutic—one that targets the cravings that promote addiction.

“We give opiates to people because they’re in pain,” said Fakira, an assistant professor of biomedical sciences at CMSRU. “And then people become dependent on them. So, the more you take, the more opioids you need. The opioids themselves are changing your biochemistry.”

In her quest to identify new therapeutic targets, Fakira is studying a little-understood receptor called GPR83. If the expression of the receptor in a particular region of the brain is changed, Fakira found, the rewarding effects of opioids are reduced.

Her lab identified a molecule that binds to the GPR83 receptor and may block the rewarding or addictive effects of morphine, while improving pain relief.

With support from the prestigious Sinsheimer Scholar Award from the Alexandrine and Alexander L. Sinsheimer Fund, Fakira plans further investigations into how this mechanism works and whether it could help prevent addiction—and eventually, perhaps, whether there’s an effect on respiratory depression, as well.

The search for more therapeutic treatments is still necessary. That’s because there’s a problem with addiction treatment, said behavioral neuropharmacologist Martin Job, Ph.D.

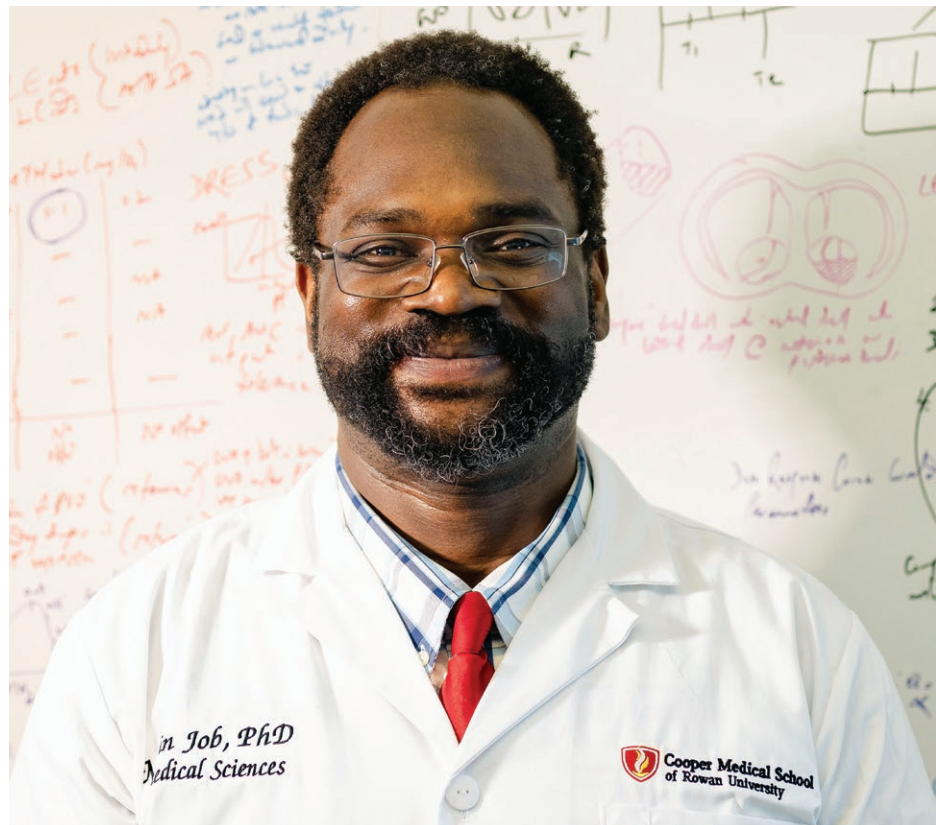
“There are no one-size-fits-all cures,” said Job.

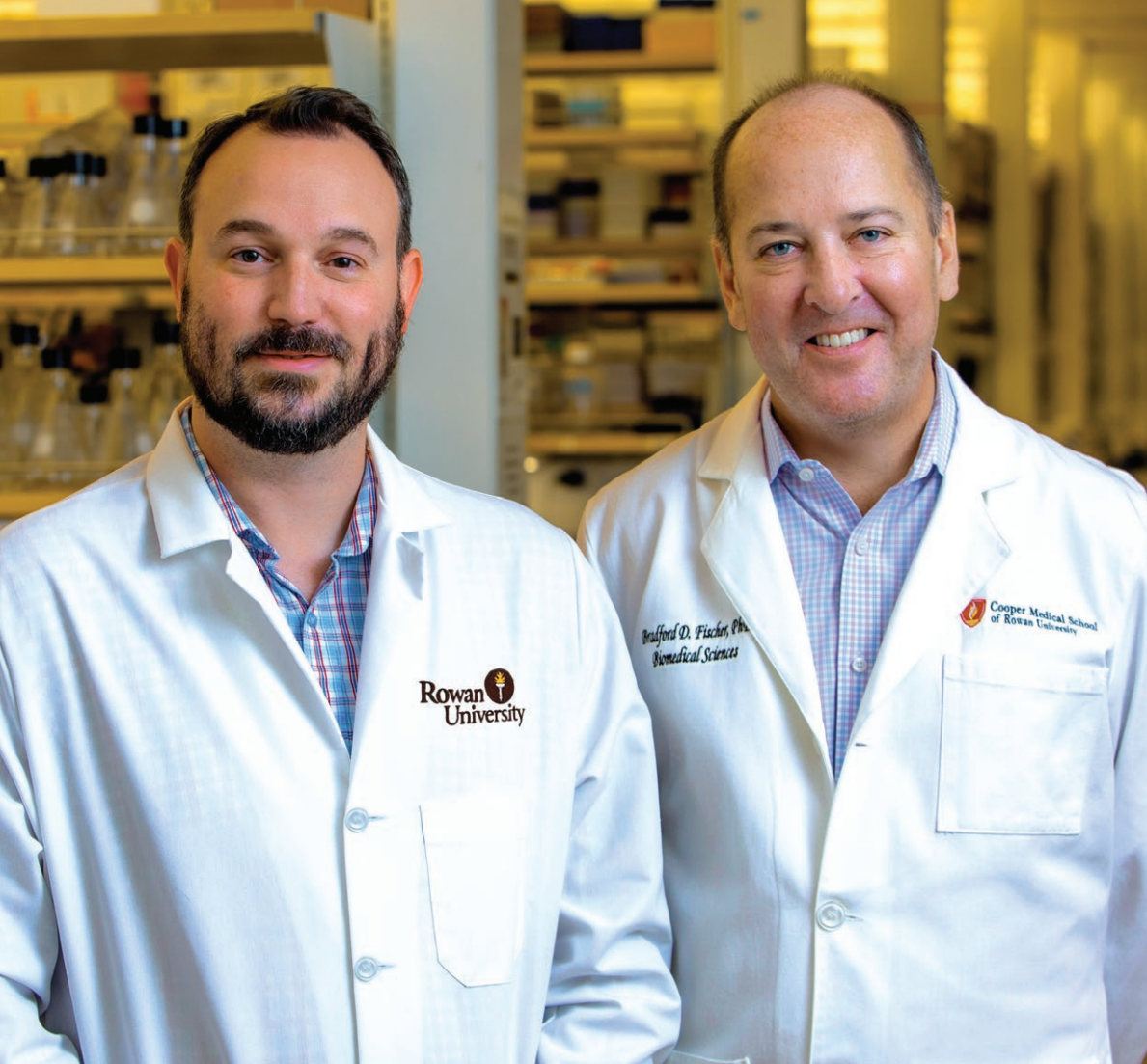
“I’m trying to look at the individual and understand how they’re different.”

Available treatments—including medications like methadone and buprenorphine—aren’t effective for everyone. Even when they do work, they don’t work all the time.

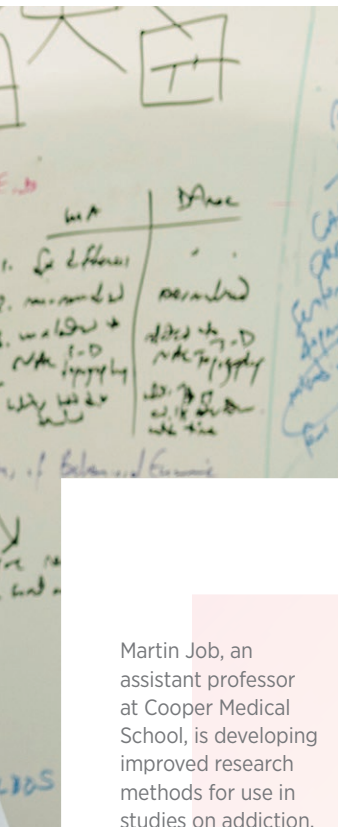
“The argument has been that the answer is in genetics,” said Job, an assistant professor of biomedical sciences at CMSRU. “But we know it’s more than that.”

He believes a host of factors may contribute to a person’s response to treatment, including the length of their addiction, their socioeconomic status, environmental stress and more. He is working to better understand addiction types, so health care providers can recommend personalized treatment plans to





Thomas Keck (left), an associate professor at College of Science & Mathematics, works closely with medicinal chemists to develop new medications for neuropsychiatric disorders. Bradford Fischer (right), an associate professor at Cooper Medical School, educates medical students on topics related to neuroscience, neuropharmacology and substance abuse.



Martin Job, an assistant professor at Cooper Medical School, is developing improved research methods for use in studies on addiction.

their patients using a combination of behavioral tests, blood tests and questionnaires.

“This is going to be a new way of looking at things,” Job said.

TAKING IT TO THE STREET Clinicians find creative ways to reach—and treat—marginalized populations

It’s one thing to have treatments available. It’s another to get them to the people who need them most.

“You’ve got to meet the patients where they are,” said Jermyn. “That includes addiction.”

As part of its mission to treat the underserved, Rowan-Virtua SOM uses \$22 million in extramural funding largely to reach marginalized populations and find creative ways to address health care disparities in southern New Jersey.

During the COVID pandemic, for example, Jermyn marshaled a mobile unit to deliver Suboxone to people with opioid use disorder and COVID vaccines to unhoused populations.

Other grants support suicide prevention among veterans; “train the trainer” programs to promote the use of Narcan in communities with high rates of opioid overdoses; and virtual courses to teach New Jersey doctors how to manage opioid-dependent patients.

“We’re not only treating the substance use disorder, but we’re actually treating the patient,” Jermyn said. “This might be the first time that they’ve had any medical evaluation. And we find a host of chronic conditions that are being untreated.

“This is why we’re out in the community,” Jermyn said. “It’s boots on the ground.”

Bethany Raiff, Ph.D., a psychology professor in the College of Science & Mathematics, works

to help individuals with OUD choose to stick with treatment—specifically, with buprenorphine.

Reward-based behavioral interventions provide immediate incentives to engage in healthy behavior. The method underpins research Raiff has been conducting in Camden, where patients can request buprenorphine at a walk-in clinic.

“You can get a lot of people coming in the door to get that first prescription, but less than half of them come back,” Raiff said. In fact, only about 40% typically return for their second appointment, scheduled within 10 days of the first. “We are really focusing on trying to get people back in the door.”

She is finding ways to do so through a randomized controlled trial. Half of a group of 60 patients have received an incentive—in the form of \$50 on a debit card—to return for follow-up appointments, and the other half have had treatment as usual.

Preliminary data shows that while only about 40% of the control group returned for a second visit, about 70% of the incentive group did so.

Raiff is analyzing factors that predict who returns for appointments and who doesn't, so she can identify ways to address the barriers that get in patients' way. Such research is deeply motivating, Raiff said.

PATH TO RECOVERY INCLUDES PEERS

Scott Stevens is lucky to be here. At 13, he tried his first “Perc 30”—a semi-synthetic opioid similar to oxycodone, commonly called Percocet.

“It just snapped something in my brain,” he said. “And it became, you know, my life.”

For years, Stevens misused opioids, alcohol and benzodiazepines. It led him to multiple stays at “psychiatric hospitals, rehabs, total despair and hopelessness,” he said.

Through trial and error, he found a pathway to recovery through a 12-step program and a recovery-centered lifestyle. Drug- and alcohol-

free for six years, Stevens is among the growing percentage of people to achieve long-term recovery from substance use disorder.

Today, Stevens is the project coordinator for a grant-funded peer coaching program supported by a partnership with Cooper University Health Care and overseen by NeuroMusculoskeletal Institute, which specializes in multimodal and interdisciplinary treatment for pain and substance use disorder.

Among its clinically proven interventions is the certified peer recovery coaches program, in which individuals

who are in recovery—like Stevens—support those still struggling with addiction.

“They call them peer recovery coaches for a reason,” said Stevens.

“Eye-to-eye, peer-to-peer—you’ve been through the same suffering.”

Results from a 2022 Rowan-Virtua SOM study published in the *Journal of Osteopathic Medicine* showed program participants received benefits across nearly all national outcome measure categories when paired with trained recovery coaches for six months, achieving, among other things, a higher rate of abstinence from drugs.



Neuropharmacologist Amanda Fakira, an assistant professor of biomedical sciences at Cooper Medical School, has made new discoveries about how the GPR83 receptor alters opioid effects.

“So, the more you take, the more opioids you need. The opioids themselves are changing your biochemistry.”

—Amanda Fakira

“There’s nothing more rewarding,” Raiff said, “than using an intervention that can keep people alive.”

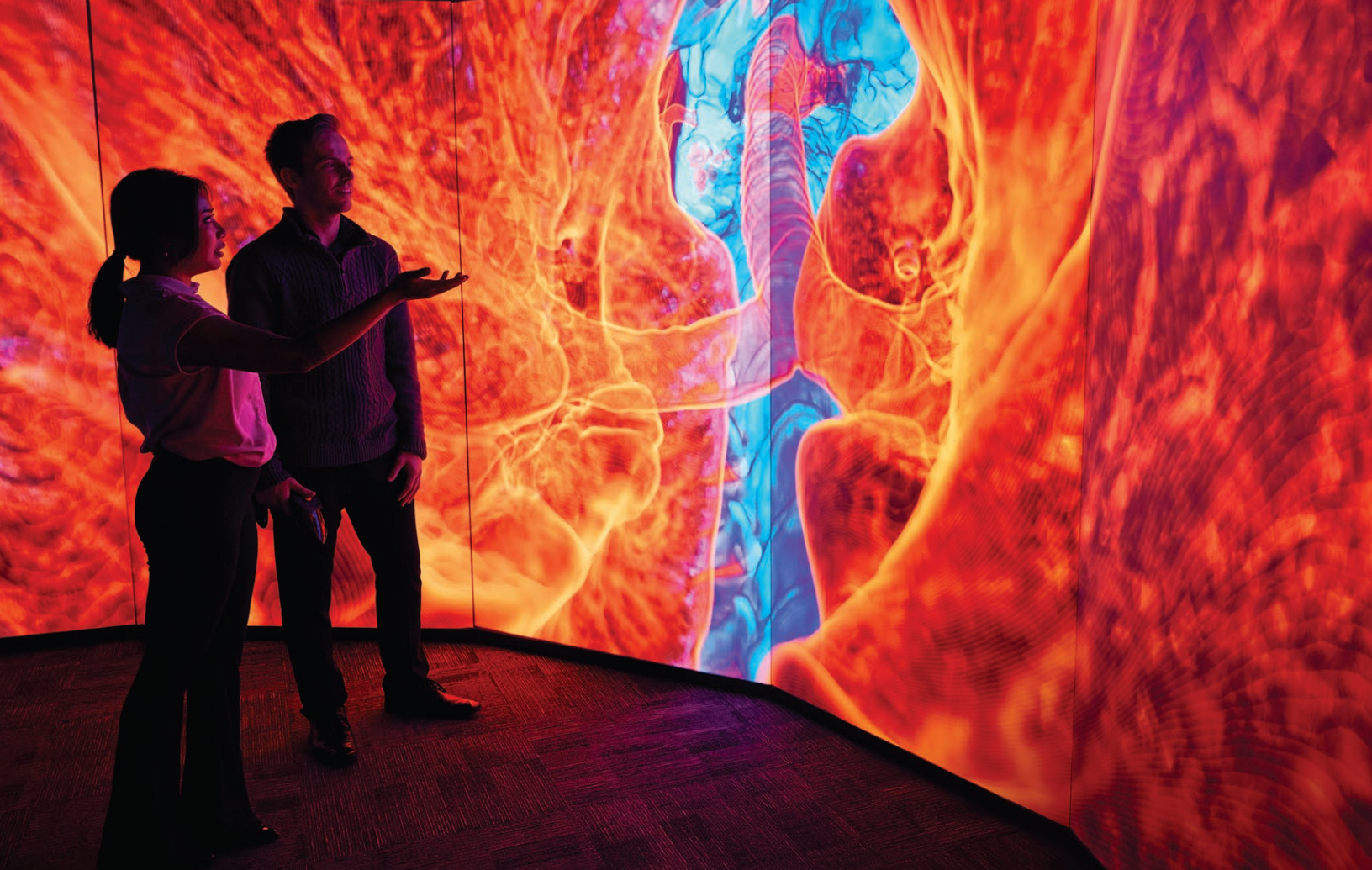
‘FAST AND FURIOUS’

While synthetic opioids like fentanyl have accounted for the majority of drug overdose deaths in recent years, adulteration of fentanyl with the animal tranquilizer xylazine has emerged as a major public health concern that is complicating resuscitation and recovery options.

But investigators aren’t giving up. “A particular challenge with xylazine-

containing fentanyl is that Narcan seems to be less effective for counteracting overdose, but the research is coming fast and furious,” said Manvich, who is closely following studies characterizing the effects of xylazine-fentanyl combinations.

“There are a lot of outstanding researchers working to address these questions,” the behavioral neuroscientist added. “As long as the NIH has a healthy budget and continues to fund the research, I do really believe that novel medications and improved treatment strategies are around the corner.”



BUILDING BETTER AI THROUGH VR

MACHINES LEARN FASTER when they are fed more information. And, it turns out, simulated virtual reality environments create tons of it.

So, why not combine the two?

In 2023, Rowan University's virtual reality research center became the Machine & Artificial Intelligence Virtual Reality Center (MAVRC), where computer algorithms generate their own simulations, speeding their learning processes and refining their capabilities.

Think of it as an invaluable training ground for AI models, said MAVRC Director Nidhal Bouaynaya, Ph.D.

The goal is to create realistic and immersive VR environments that seamlessly adapt and respond to human interactions in real time, while offering AI-generated recommendations to its users.

"We're pushing the boundaries of what's possible at the intersection of artificial intelligence and mixed reality," said Bouaynaya, associate dean for research and graduate studies, and professor of electrical and computer engineering in the Henry M. Rowan College of Engineering.

"This is a powerful tool with great potential for many industries, from manufacturing and transportation to health care and marketing."

Garrett Williams and Leeza Duller, both graduate students at Rowan's Machine & Artificial Intelligence Virtual Reality Center, explore a person's lungs and pulmonary arteries using a CT scan displayed on the center's immersive screens. The center's capabilities allow users to control the camera angles and colors to view different parts of the body, including organs and bones.

Bigger, faster, smarter

AS SOCIETY INCREASINGLY

relies on digital tools such as big data, the Internet of Things and artificial intelligence methods, engineering practices must keep pace.

Enter Rowan University's new Digital Engineering Hub (DEHub), a research center in the Henry M. Rowan College of Engineering with an innovative approach to next-generation engineering.

"We want to make products, leveraging the digital transformation," said Antonios Kotsos, Ph.D., director of DEHub. "Sensing, design, manufacturing, testing and deployment are linked in digital engineering, so customization and adaptations can happen much faster."

"Now that we have capable computers, now that we have advanced sensors, now that we have machine learning and artificial intelligence, how do we apply them to engineering to do things bigger, better, faster and more in-depth?" said Yolanda Mack, Ph.D., co-director of DEHub.

Through cutting-edge processes such as model-based engineering, digital manufacturing, digital engineering, intelligent materials and systems, and integrated sensing and data-processing, the DEHub can address engineering problems in areas including infrastructure, robotics, defense, aerospace, marine, energy and biomedical applications.

As it develops, the hub will work with industry partners in manufacturing, health care and infrastructure, as well as government agencies, to define next-generation digital engineering applications.

Introduced at Rowan in September 2023, the hub already is collaborating with a team of universities to revolutionize the design of metals for the Defense Advanced Research Projects Agency using digital engineering techniques. Researchers are designing a bladed disk for a turbine engine, and then will manufacture, test and optimize its performance.

In other work funded by the National Institute of Standards and Technology, DEHub is working with a consortium of universities to standardize a procedure for metal additive manufacturing that can be widely adopted by industry.

Another project involves the creation of a digital twin—a digital replica with real-time diagnostics and prognostics capabilities—for a U.S. Navy vessel. Just as a car has sensors monitoring speed, fuel levels and tire air pressure, the vessel will be outfitted with sensors that will monitor the structural, electrical and mechanical health of the ship.

"We're trying to use artificial intelligence and machine learning to help the ship owner make decisions or produce automated decisions," Kotsos said.

DEHub's facilities will be located in Rowan Hall and will include metal 3D printers, materials testing and nondestructive evaluation, as well as computing capabilities for data-driven modeling.



Teaching Black history

IN WHAT COULD BECOME a prototype for states across the nation, two Rowan researchers are teaming up to develop a curriculum to provide current and future teachers with the content knowledge and tools they need to teach Black history.

The Black Humanities in Education Initiative Through History and Culture is an interdisciplinary, multipronged approach to support the development and instruction of content knowledge for pre-service and in-service teachers.

Chanelle Rose, Ph.D., a history professor and coordinator of Africana Studies in the College of Humanities & Social Sciences, and Valarie Lee, Ed.D., professor of critical literacy, technology and multilingual education in the College of Education, lead the project.

The initiative, which is funded by a grant from the National Endowment for the Humanities, will include developing a curriculum on African American history and culture for current and future teachers in South Jersey school districts.

While New Jersey lawmakers in 2023 strengthened the state's Amistad Law to infuse Black history into curricula in the state's schools year-round, there's much work to be done to ensure today's students are receiving an education in Black history that goes beyond learning about the contributions of Rev. Dr. Martin Luther King Jr. or Rosa Parks, noted Rose, the grant's principal investigator.

Through the initiative, teachers will have access to source materials—pictures, autobiographies, letters, oral interviews, songs, poems, maps and artifacts—that they can integrate into their future lesson plans. They'll also gain content knowledge to

transform the way they teach Black history to K-12 public school students, according to Rose.

"The initiative adopts an interdisciplinary approach to teaching Black history that focuses on the intersection of philosophy, literature, politics and history," Rose said.

"Not everyone has the content knowledge to teach this and to develop innovative lesson plans on African American history. There's a critical need for this."

That's especially true now as the study of Black history in schools has come under fire in many states across the nation, Lee noted.

"In the current politically contentious climate where an increasing number of public school teachers fear potential repercussions for teaching Black history, the Black Humanities in Education Initiative provides a sustainable model for teachers to develop content knowledge to share this information in the classroom.

"Currently, there are concerted efforts in the United States to actually make this content illegal," Lee continued. "This work is more critical than ever. It really does have the ability to impact K-12 education in New Jersey and it could become a prototype for other states."

Valarie Lee and Chanelle Rose are leading critical efforts to improve the teaching of Black history in New Jersey schools.





VIRTUAL REALITY BRINGS NEW COURSES TO LIFE

IN ITS WORK TO MOVE HIGHER EDUCATION ever forward, Rowan University is introducing a new approach to learning using virtual reality (VR)-enabled experiences that combine “education through exploration” pedagogy and cinematic storytelling techniques through a collaboration with Dreamscape Learn and Arizona State University (ASU).

According to a study conducted by ASU, students who conducted virtual field research in its “Alien Zoo” labs were nearly twice as likely to earn an A lab grade when compared with their peers in traditional wet labs. The findings held true across all demographics, except for honors students whose scores remained the same for either course.

The University plans to build new, interdisciplinary immersive courses across all of its colleges and schools. Rowan anticipates licensing original immersive courseware to other institutions using the platform.

Immersive technology also allows users to deeply explore visual data, such as CT scans for medical education, as well as “digital twins” or virtual representations of existing structures or objects, offering new avenues for research.

“We are fully committed to becoming the University of the Future in every way imaginable,” said Rowan University President Ali Houshmand. “Our investment now means we can extend this innovative educational experience to many more students, both on our campuses and beyond.”

Students Brendan Bermingham and Zayne Pino explore the VR demonstration space designed to help faculty develop immersive courses.

SIMPLE, ACCURATE— AND REVOLUTIONARY

A blood test for Alzheimer’s disease could transform research, treatments

A NEW BLOOD TEST that can detect the presence of Alzheimer’s disease (AD) up to 10 years before symptoms emerge has a nearly 97 percent accuracy rate, according to its developers at Rowan-Virtua School of Osteopathic Medicine (SOM) and Durin Technologies, Inc. Their study involving 328 blood samples was published in the *Journal of Alzheimer’s Disease*.

“Alzheimer’s disease pathology begins a decade or more before the emergence of

symptoms,” said Robert Nagele, Ph.D., founder and chief scientific officer at Durin Technologies, Inc., and a professor of geriatrics and gerontology at Rowan-Virtua SOM. “An accurate, non-invasive blood test for early detection and monitoring of AD could improve outcomes for patients.”

The test uses just eight autoantibody biomarkers, and the research team showed it could identify the presence of AD pathology even among individuals who have no trace of the disease.

“Our test correctly identified nearly 97 percent of participants who were diagnosed as cognitively normal at the time their samples were taken, but who progressed, within an average of 48 months, to either the mild cognitive impairment stage or more advanced Alzheimer’s disease,” said Dr. Cassandra DeMarshall, an alumnus of Rowan’s Graduate School of Biological Sciences and Durin’s director of research. “To our knowledge, this is the first blood test to accurately detect Alzheimer’s-related pathology several years before either clinical symptoms or more expensive and invasive tests can identify the disease.”

The test is minimally invasive, inexpensive and has significant potential to improve the development and use of treatments for AD. The test also has the potential to facilitate monitoring of AD-related pathological changes in the brains of patients with mild cognitive impairment at even earlier, pre-symptomatic stages.



Answering ancient questions

Connolly leads NASA asteroid return sample

A JOURNEY OF SOME TWO BILLION MILES by NASA's OSIRIS-REx spacecraft ended in September 2023 in the Utah desert, bringing with it space rocks that scientists hope may unravel some of the mysteries of the solar system.

Harold Connolly Jr., Ph.D., a petrologist and cosmochemist who chairs Rowan University's Department of Geology, is leading research into the spacecraft's return sample.

Connolly holds titles of co-investigator and mission sample scientist on the NASA mission and is supervising analysis by a 250-member international team that's studying the sample from Bennu, a potentially hazardous asteroid that the spacecraft rendezvoused with 200 million miles from Earth.

OSIRIS-REx, which launched in September 2016 from Cape Canaveral in Florida, completed a procedure above Bennu's surface in October 2020 in which the vessel extended a robotic arm, expelled a burst of nitrogen to loosen the surface and collected the sample for passage back to Earth.

"One of the things we're trying to determine is where did life come from?" he said. "In order for there to be life as we know it, you need an atmosphere, you need water, but first you need a planet."

Perhaps even more important, he said, by studying the sample from Bennu scientists hope to learn more about how asteroids behave and how to prevent them from hitting Earth.

Connolly said surprises like those already revealed by Bennu and the OSIRIS-REx mission make science eternally fascinating—and the research into its sample is just getting started.

"I'm an explorer of space, time and the human experience," he said. "Bennu is more complex than we expected. It's quite diverse."

Harold Connolly Jr.,
a petrologist and
cosmochemist, chairs
Rowan University's
Department of Geology.



Researchers begin to handle the probe that returned to Earth after its seven-year mission in space.

PHOTO: NASA



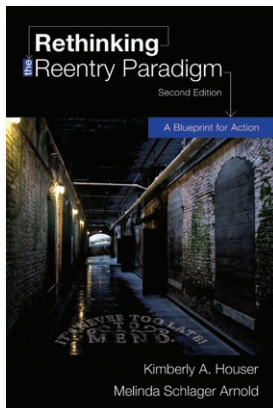
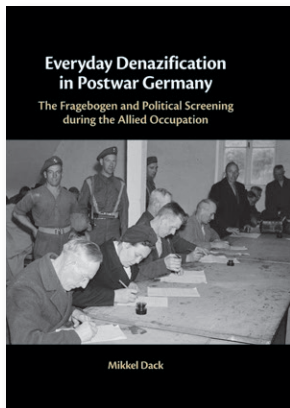
BOOKS BY ROWAN FACULTY

EVERYDAY DENAZIFICATION IN POSTWAR GERMANY: THE FRAGEBOGEN AND POLITICAL SCREENING DURING THE ALLIED OCCUPATION

Mikkel Dack, Ph.D., Assistant Professor of History, College of Humanities & Social Sciences

Cambridge University Press
March 2023

The first non-violent deradicalization campaign in modern times, the Fragebogen was a radical program to purge Naziism from Germany and preserve peace in Europe. Consisting of 20 million questionnaires distributed between 1945 and 1949 to Germans who had to prove their non-Nazi status to gain employment, the surveys defined much of the denazification experience and were immensely consequential to the material and emotional recovery of Germans. The 131-question surveys, distributed by American, British, French and Soviet armies after the defeat of the Third Reich, were drafted by university professors and social scientists. In “Everyday Denazification in Postwar Germany,” Mikkel Dack uses recently declassified documents to illustrate the positive elements of the denazification campaign, contributing to a more comprehensive history of the Fragebogen, which involved mid-level planners, civil affairs soldiers, and regular German citizens.



RETHINKING THE REENTRY PARADIGM: A BLUEPRINT FOR ACTION

Kimberly Houser, Ph.D., Associate Professor of Law & Justice, College of Humanities & Social Sciences, and Melinda Schlager Arnold, Provost and Vice President of Academic Affairs, Texas A&M University-Texarkana

Carolina Academic Press
February 2023

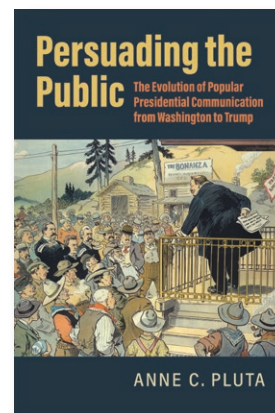
Even with a 17 percent drop in incarceration rates since 2009, the United States still incarcerates individuals at rates higher than any other westernized country. Complex factors, including sentencing policies, politics, the war on drugs, economics, and inequality, contribute to the nation's incarceration rate, according to Kimberly Houser and Melinda Schlager Arnold. In “Rethinking the Reentry Paradigm,” now in its second edition, Houser and Schlager Arnold maintain that an offender's reentry into society should be a process that occurs over time, rather than a static, isolated event tied to a prison release date. Their work suggests solutions to reentry issues, beginning with an offender's entry to prison and culminating with reintegration into the community. “Rethinking the Reentry Paradigm” also explores the implications of the reentry process for the returning offender, as well as family members, the community and society at large.

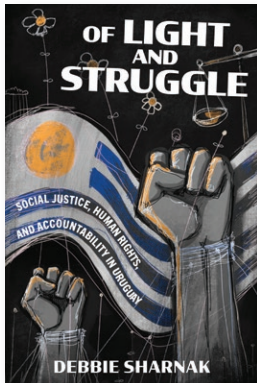
PERSUADING THE PUBLIC: THE EVOLUTION OF POPULAR PRESIDENTIAL COMMUNICATION FROM WASHINGTON TO TRUMP

Anne Pluta, Ph.D., Associate Professor of Political Science, College of Humanities & Social Sciences

University Press of Kansas
March 2023

Even the earliest American presidents understood their unique relationship with the public and sought to leverage that connection through popular communication. That's what Anne Pluta found when she analyzed the popular communication practices of American presidents from 1789-2021. Studying thousands of public speeches by presidents, including more than 3,000 made before 1929, Pluta, in “Persuading the Public,” demonstrates that the 19th and early 20th centuries are essential periods in understanding presidential communication. Her analysis challenges the claim by many presidential scholars that presidential communication during those times periods followed the constitutional norms of the 19th century and was ceremonial and exceedingly rare. Pluta's view of presidential communication, which she calls opportunistic communication, explains the relationship between the president and the people in terms of a framework of opportunities structured by technology, the media, enfranchisement and party politics.





**OF LIGHT AND STRUGGLE:
SOCIAL JUSTICE, HUMAN RIGHTS,
AND ACCOUNTABILITY IN URUGUAY**

Debbie Sharnak, Ph.D., Assistant Professor of History,
College of Humanities & Social Sciences

University of Pennsylvania Press
June 2023

The language and politics of human rights have shifted over time as a result of conflict and convergence between local, national and global dynamics. In “Of Light and Struggle,” which chronicles the crushing dictatorship in Uruguay from 1973-1985, Debbie Sharnak explores how activists,

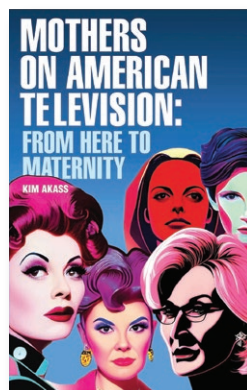
transnational social movements and international policymakers collaborated—and clashed—in response to the dictatorship era and the country’s eventual transition back to democratic rule. Sharnak examines how human rights language became a powerful discourse for social change. By focusing on the years in which Uruguay’s crushing repression included the highest rate of political incarceration in the world, “Of Light and Struggle” demonstrates how the country’s struggle has implications for the possibilities and constraints of human rights on a global scale.

**MOTHERS ON AMERICAN TELEVISION:
FROM HERE TO MATERNITY**

Kim Akass, Ph.D., Professor of Radio, Television & Film,
Edelman College of Communication & Creative Arts

Manchester University Press
September 2023

Kim Akass takes an in-depth view of the institution of motherhood and how it is represented on American television. Taking a feminist, Marxist, cultural studies and psychoanalytical approach, Akass offers a history of the positioning of mothers in American society and provides a detailed analysis of series like “The Sopranos,” “Sex and the City,” “The Handmaid’s Tale” and more. Akass reflects on newspaper “mommy wars,” in which reviewers sometimes compare working vs. stay-at-home moms, employment patterns and alternative views of motherhood. The book is organized into three broad sections: Mothers on Network Television; Original Dramas; and Adaptations.



BOOK COVER DESIGN: PROFESSOR AMANDA ALMON

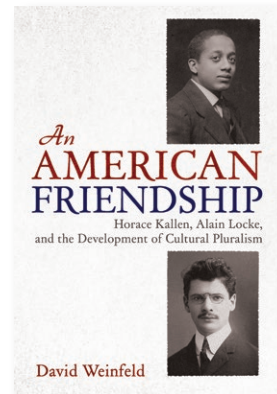
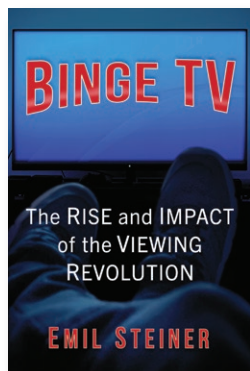
**BINGE TV: THE RISE AND IMPACT
OF THE VIEWING REVOLUTION**

Emil Steiner, Ph.D., Assistant Professor of Journalism,
Edelman College of Communication & Creative Arts

McFarland
March 2023

Binge TV watching is having a moment, but the moment has lasted much longer than many viewers might think. Long before fans binged hours of “Stranger Things” (Netflix), “Succession” (HBO Max), or “Ted Lasso” (Apple TV+), many viewers were already binge watching. They just didn’t have a name for it.

In a new book, “Binge TV: The Rise and Impact of the Viewing Revolution,” media scholar Emil Steiner breaks down how binge watching—viewing multiple episodes of a television program in rapid succession—started, and how it ushered in a cultural revolution, becoming the default mode of watching for many viewers today.



**AN AMERICAN
FRIENDSHIP: HORACE
KALLEN, ALAIN LOCKE,
AND THE DEVELOPMENT
OF CULTURAL PLURALISM**

David Weinfeld, Ph.D., Assistant
Professor of World Religions, College
of Humanities & Social Sciences

Cornell University Press
May 2023

In “An American Friendship,” David Weinfeld explores how cultural pluralism, the intellectual precursor to modern multiculturalism, can be traced to the friendship between two philosophers: Horace Kallen and Alain Locke. Together, Weinfeld writes, Kallen and Locke advanced the idea that different ethnic groups can and should coexist in the United States, perpetuating their cultures for the betterment of the country as a whole. Weinfeld explores the genesis of multiculturalism by chronicling the friendship between Kallen, a Jewish immigrant and leading American Zionist, and Locke, the first Black Rhodes scholar who is best known as the intellectual godfather of the Harlem Renaissance. Their friendship itself was a metaphor for cultural pluralism, exemplified by people who found common ground while appreciating each other’s differences, Weinfeld writes. Focusing on Kallen and Locke, “An American Friendship” provides critical background for understanding the conflicts over identity politics that polarize American society today.



GROUND

THE ARCTIC IS WARMING THREE TIMES FASTER THAN THE REST OF THE WORLD. TRANSPORTATION ENGINEERING RESEARCHERS AT ROWAN UNIVERSITY ARE RACING TO MEET THE CHALLENGES AHEAD.

FAR ABOVE THE CONTINENTAL UNITED STATES, thawing permafrost and melting sea ice are rapidly changing conditions on the ground.

The changing climate is presenting new possibilities for military operations in the Arctic—while creating a slew of logistical problems for roads, airfields and bridges.

In preparation for what's to come, researchers from Rowan University's Center for Research & Education in Advanced Transportation Engineering Systems (CREATES) are developing innovative construction technologies and materials, with support from the U.S. Army Corps of Engineers (USACE), Engineer Research and Development Center (ERDC) and its Cold Regions Research and Engineering Laboratory (CRREL).

Recently, CREATES secured a \$30 million, five-year contract with ERDC to expand their work together. Led by Yusuf Mehta, Ph.D., and Ayman Ali, Ph.D., the effort spans a wide range of projects, including the development of a cost-effective, electrically heated pavement system designed to efficiently melt away snow and ice from roads and airfields.

“Our collaboration with Army Corps research engineers allows us to explore creative solutions for cold regions, from pavements that can melt ice and detect frost to more resilient asphalt and concrete materials that can withstand cold conditions,” Mehta said.

The self-deicing system is drawing attention.

Earlier tests conducted at Rowan's testing facility in southern New Jersey evaluated test strips installed over steel electrodes, spaced



SHIFT

at six or 12 inches apart, and connected to a power source.

Electrical data from two heated test strips showed the strip containing a conductive high-performance overlay mixture required nearly 50 percent less power to warm the surface above freezing than a strip containing conductive asphalt binder.

Results from the tests were highlighted by Transportation Research Record, a scientific journal published by the Transportation Research Board.

“We are dedicated to advancing this electrically heated pavement system to make it a viable and sustainable solution for winter weather maintenance,” said Mehta, CREATES director and the project’s principal investigator. “By refining these methodologies, we aim to contribute to safer and more efficient travel, not just in New Jersey, but potentially across regions experiencing severe winter challenges.”

The next phase of research will be conducted at full scale under extreme cold weather conditions at an Arctic testing facility operated by the U.S. Army Corps of Engineers, said Ali, CREATES associate director.

“Successful application of the electrically heated pavement systems will help the Army and other Department of Defense agencies build safe, horizontal infrastructure, such as airfields and runways,” Ali said. “We expect this design will reduce delays in air operations in the Arctic and subarctic regions.”

Research engineers from CRREL work closely with universities around the country, guiding studies like this one, providing expertise and helping to develop the next generation of engineers.

Danielle Kennedy, CRREL program director and a research civil engineer, meets weekly with various teams from CREATES.

“We have been working with Rowan since 2016 and the CREATES program has grown a lot since then,” Kennedy noted. “It’s helped us grow our technology areas at the ERDC a lot, as well. We’re going to conferences with the students and presenting work together. We’re publishing papers together. It’s really been a beneficial relationship for both ERDC and Rowan. I think there’s a lot of potential for future capabilities with all these projects that we’re developing now.”

Researchers from CREATES and ERDC inspect the construction of a pavement strip as part of continuing research in the Arctic.



VIRTUAL PRODUCTION FOR THE BIG SCREEN

SET ON what looks like a cell tower 300 feet above ground, a worker builds infrastructure for the latest mobile phone technology. But things aren't as dangerous as they appear to be.

That's because filmmakers are shooting just three feet off the floor of a Hollywood studio using dynamic new technology called virtual production, which Professor Jonathan Mason is helping expand to the big screen.

Using images from Google Earth as stand-ins for real locations, then tweaking them in Epic Games' Unreal Engine game design software, filmmakers can stretch the limits of visual storytelling, Mason said. Hybrid filmmaking, which he's written about for *Filmmaker Magazine* and *American Cinematographer*, is changing the industry.

"When you're an indie filmmaker, a large part of the challenge is problem-solving," said Mason, a radio, television and film professor in the Edelman College of Communication & Creative Arts. "There's an inventiveness that's part of the rush."