

RESEARCH

2020-2021

Changing lives through creativity and innovation

University of Connecticut
Office of the Vice President for Research

UConn

WELCOME TO UConn RESEARCH

Dear Friends,

UConn is home to thousands of faculty, students, and staff whose creative and scholarly work is having profound impacts on our world. In these pages, we share the stories and achievements of some of the members of our community who have made astonishing contributions to society in the past year.

Our achievements are many and diverse. Our researchers, scholars, and artists find myriad sources of inspiration, but share a commitment to excellence and a passion for change.

The mission of the Office of the Vice President for Research (OVPR) is to empower the UConn community to achieve transformative work. We began our own journey of transformation with major investments in our people, programs, partnerships, and infrastructure. Over the past four years, our investments in creativity and scholarship have led to big gains in research funding, transformative and socially responsive research, and new entrepreneurial enterprises that drive our economy and bring the benefits of discovery to people in our community.

The stories we tell here show that we are prepared to be a strong partner in addressing the challenges facing human societies and life on Earth. With a bold vision and with passion, intellect, and creativity, UConn contributes to the vitality and prosperity of future generations in Connecticut and the world.

Professor Radenka Maric

Vice President for Research, Innovation and Entrepreneurship
Connecticut Clean Energy Fund Professor of Sustainable Energy

Prof. Radenka Maric (right, with Ph.D. student Alanna Gado) and her research group are investigating new technologies for clean energy and sustainability. Professor Maric has significantly advanced understanding of materials and catalysts and has developed innovative manufacturing processes for fuel cell technologies and storage materials, leading to higher-performance, commercially viable clean energy systems.

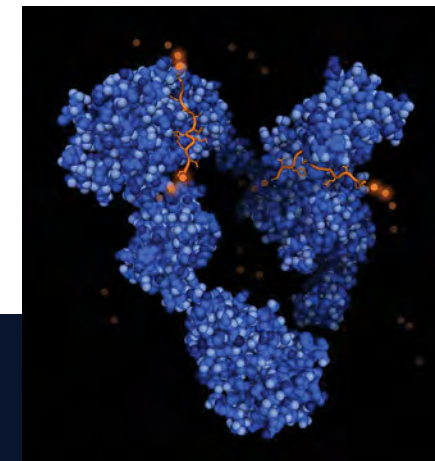
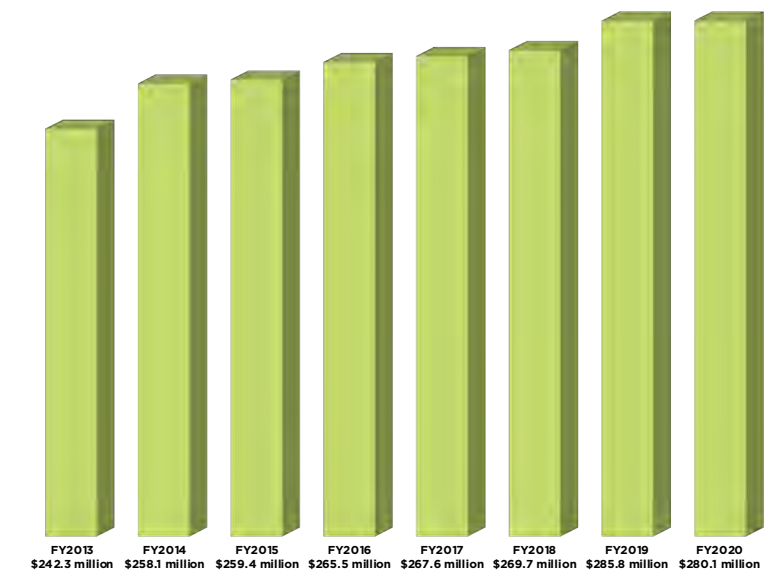


UConn RESEARCH IN BRIEF

UConn is the leading public research institution in New England. UConn research generates new knowledge and understanding of our world that help us address local and global challenges. UConn research contributes to the economy through innovation, promoting business development, and supplying a highly educated workforce.

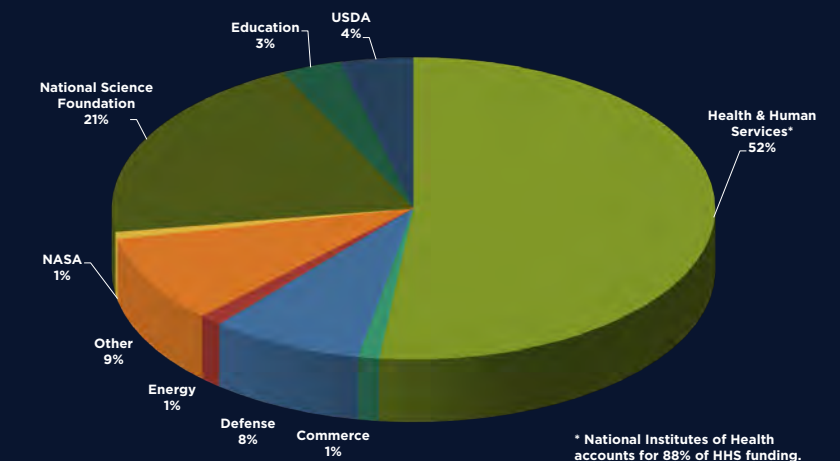
- UConn received \$375 million in new awards in FY2021, an increase of 100% over five years.
- Our faculty compete for federal research dollars with faculty at top universities across the country. Obtaining federal grants is one criterion for receiving tenure at research universities. Our faculty must be creative, innovative, collaborative, and entrepreneurial, and writing a proposal takes a great deal of time and effort.
- Graduates of UConn's research enterprise are hired throughout Connecticut's professional workforce in fields such as engineering, healthcare and medicine, pharmacy, business, public policy, education, and arts and entertainment.

Total Research and Development Expenditure Trend



In 2021, UConn received the largest research award in its history, a \$40 million NSF Major Research Instrumentation Award to UConn Health to establish a national Network for Advanced Nuclear Magnetic Resonance (NMR). The cover image shows a structural model of a protein enzyme bound to its target molecule. NMR spectroscopy was used to identify the bipartite binding interface between the enzyme and its substrate. The ultra-high field NMRs planned for the National Network for Nuclear Magnetic Resonance will provide even better resolution, speed, and sensitivity for similar analyses. (Irina Bezsonova, UConn Health photo)

Sources of FY2021 Federal Awards

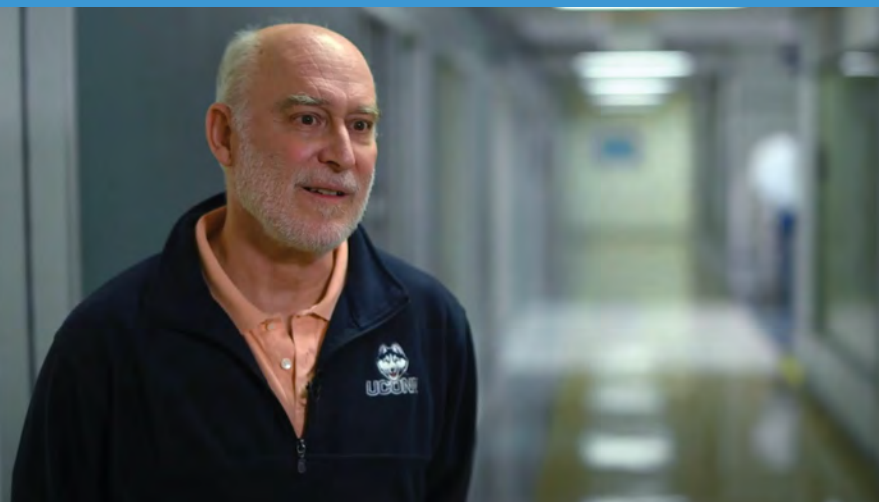


MAJOR AWARDS MOVE UCONN FORWARD



UConn Health Leads New NSF Network for Advanced Nuclear Magnetic Resonance

\$40M Major Research Instrumentation Award



NAN is led by Jeffrey Hoch, the director of the Gregory P. Mullen NMR Structural Biology Facility and a professor in the Department of Molecular Biology and Biophysics at UConn School of Medicine.

In June 2021, a team from UConn Health was awarded a \$40 million National Science Foundation (NSF) grant to establish a new national network for advanced Nuclear Magnetic Resonance (NMR) in collaboration with the University of Georgia and the University of Wisconsin. The Network for Advanced NMR (or NAN) is led by Professor Jeffrey Hoch of the Department of Molecular Biology and Biophysics at the UConn School of Medicine.

Nuclear magnetic resonance is a powerful method for analyzing molecules that can help identify biomarkers in biofluids like blood, urine, or spinal fluid. Knowledge gained through NMR can help clinicians diagnose patients and determine how they are responding to treatment.

“Our biggest hope is that NAN and advanced NMR tech-

nology’s expanded use will accelerate the identification of future disease biomarkers and ultimately improve the health and outcomes of patients everywhere, through future advances in diagnostics, drug discovery, treatments and, especially, much-needed cures,” says Hoch.

This \$40 million grant, the largest in the University’s history, will advance molecular research nationally for chemistry, materials science, and bioscience.

“The historic nature of this grant just goes to show that UConn, UConn Health, and the State of Connecticut are national research powerhouses with exceptional faculty who are academic leaders when it comes to ground-breaking innovation and discovery,” said Connecticut Governor Ned Lamont.

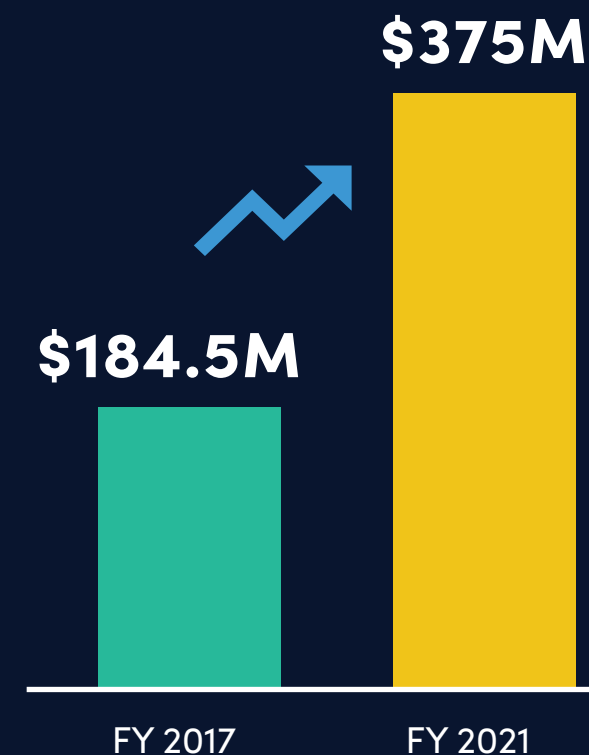
Hoch has long been a leader in the field of NMR technology and accessibility, serving as the director of both NMRbox, an online NMR software resource, and the Biological Magnetic Resonance Data Bank.

“Thanks to NSF’s funding, our new network will empower researchers to have open access to the latest advanced NMR technology with the necessary computational power to fuel future discoveries,” says Hoch.

UConn Research: Growing Strong

New Awards

100% increase over five years



Economic Impact

\$503 Million

Annual economic impact of UConn’s research enterprise on Connecticut’s economy

MAJOR AWARDS MOVE UCONN FORWARD

Sustaining the Food Supply: Kumar Venkitanarayanan



Professor Kumar Venkitanarayanan, associate dean of the College of Agriculture, Health, and Natural Resources, leads a USDA-National Institute of Food and Agriculture funded project aimed at developing an integrated and sustainable program to phase out the use of antibiotics in the production of broilers in the poultry industry.

“Poultry meat is projected to be a major source of protein for the increasing human population, which is projected to be 10 billion by 2050,” says Venkitanarayanan. “The broiler industry has been able to reach high levels of production through selective breeding and by using antibiotics as growth promoters. We are not sure how phasing out antibiotic growth promoters will affect the

sustainability of the industry, especially to meet future demand for the increasing population.”

Venkitanarayanan developed the project to address these concerns. He hopes to create a sustainable broiler production system by improving bird and human health and through addressing environmental concerns.

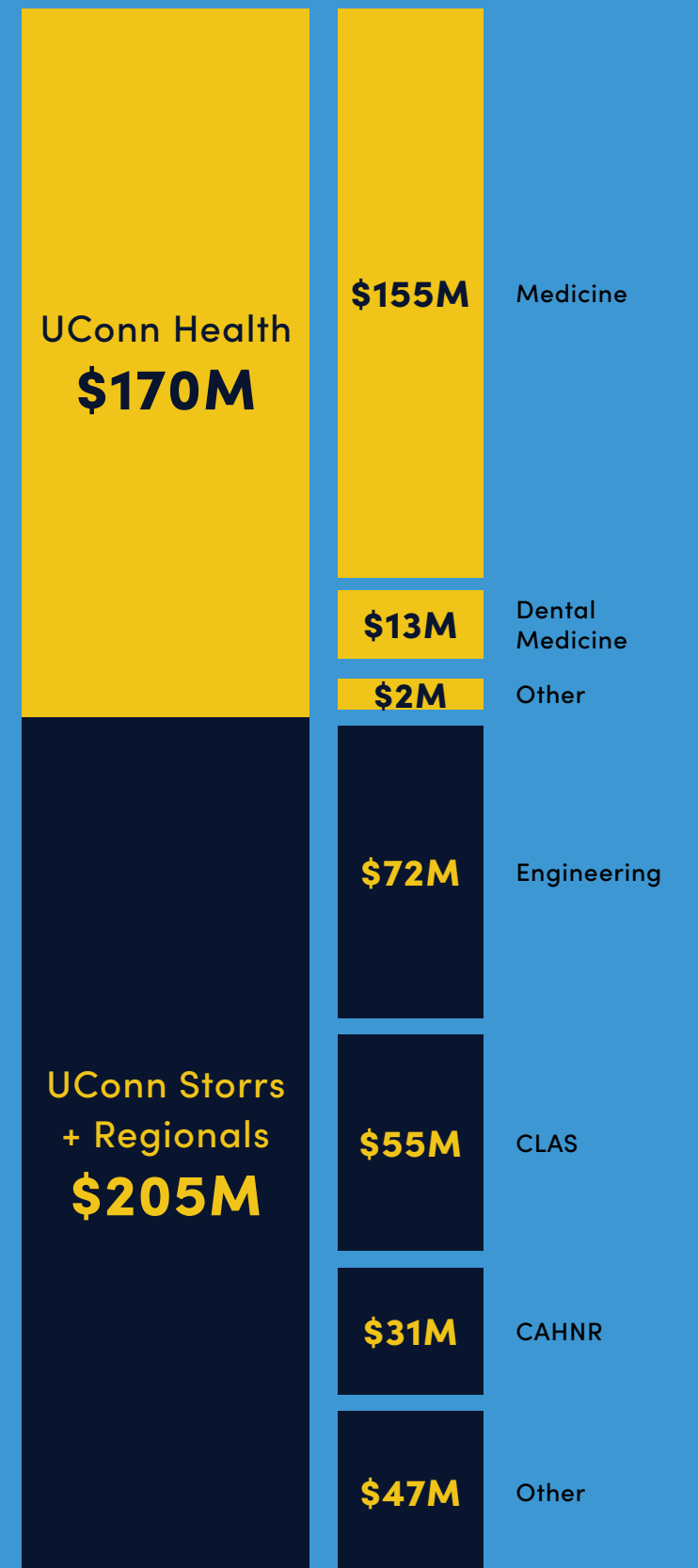
To meet these goals, Venkitanarayanan assembled an interdisciplinary team of 30 researchers from 13 institutions. The team includes experts in microbiology, molecular biology, poultry nutrition, poultry gut health, animal welfare, agricultural engineering, economics, and sociology.



Professor Kumar Venkitanarayanan is investigating antibiotic-free poultry production for a healthy and sustainable food supply.



FY 2021 New Awards \$375M



UCONN'S WORLD-CLASS FACULTY

*Changing the World through Creativity, Innovation, and
Community Engagement*



Laurinda Jaffe and Cato Laurencin Elected to the National Academy of Sciences

Advancing Scientific Understanding of Fertility: Dr. Laurinda Jaffe

In 2021, Professor Laurinda Jaffe, chair of the Department of Cell Biology in the School of Medicine, was elected to the National Academy of Sciences, in acknowledgment of her distinguished achievements in original research.

Her pioneering research is driving major advances in the scientific understanding of fertility. Her groundbreaking NIH-funded work exploring how young ovarian cells, or oocytes, begin developing has uncovered the physiological mechanisms that control these cells and their patterns of communication with other cells.

In humans, eggs are stored for decades in an arrested state in nests known as follicles. These follicles support the oocyte and keep it in this arrested state. Once the egg is ready to be fertilized, the brain will send a signal which acts on the green cells in the follicle and leads to the egg resuming its activities and being released from the follicles into the oviduct so it potentially can be fertilized.

The Jaffe lab studies how these green cells translate the signal from the brain into another signal to the egg so that the egg can be released from the follicle at the proper time. By studying this process, the Jaffe lab is increasing our understanding of female biology and reproductive health.

Jaffe and her team have secured nearly four decades of continuous support from the Eunice Shriver National

Institutes of Child Health and Human Development. This funding includes a \$2.5 million MERIT grant, a distinction afforded to only about 5 percent of NIH-funded investigators.

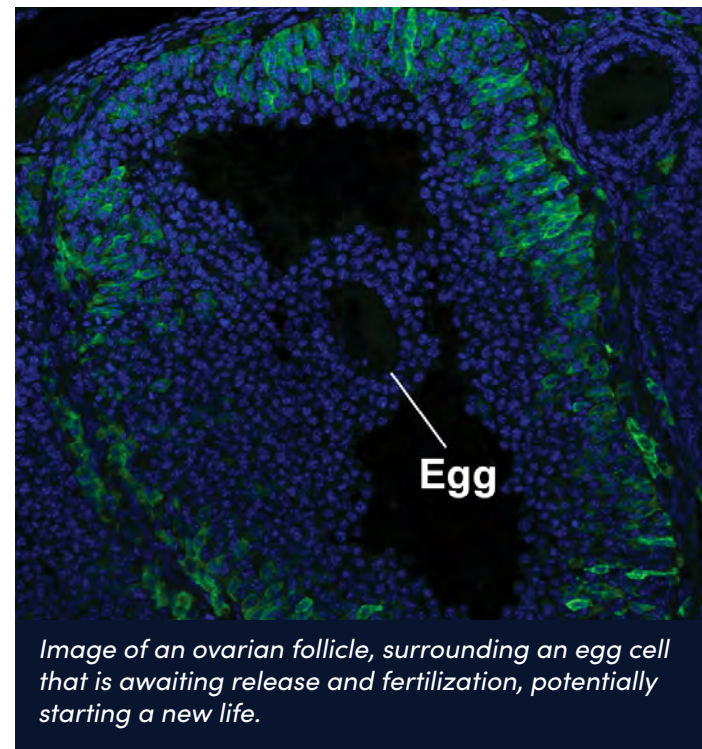


Image of an ovarian follicle, surrounding an egg cell that is awaiting release and fertilization, potentially starting a new life.

Breaking New Ground through Regenerative Engineering: Dr. Cato Laurencin

Dr. Cato T. Laurencin, University Professor and Albert and Wilda Van Dusen Distinguished Professor of Orthopaedic Surgery, founded the field of regenerative engineering. His seminal accomplishments in tissue regeneration, biomaterials science, nanotechnology, and regenerative engineering have made him the foremost engineer-physician-scientist in the world. He is one of the nation's leading advocates for health equity and a mentor and role model for underrepresented students in medicine and the sciences.

Laurencin received ten major honors in the 2020–2021 academic year, including the NAACP's Spingarn Medal, its most iconic award. Other recipients include W.E.B. DuBois, Marian Anderson, Thurgood Marshall, Dr. Martin Luther King, Jr., and Maya Angelou.

Laurencin also received the Herbert W. Nickens Award from the Association of American Medical Colleges, honoring his contributions to promoting justice in medical education and healthcare equity throughout the nation.

Dr. Laurencin Receives Ten Great Awards in Twelve Months

1. James Bailey Award, the highest honor of the Society for Biological Engineering
2. Herbert Nickens Award, for work in social justice and fairness from the AAMC
3. Acta Biomaterialia Gold Medal, for demonstrated leadership in the field of science and engineering of biomaterials
4. Elected Fellow, Polymeric Science and Engineering, American Chemical Society
5. Elected to the National Academy of Sciences
6. Elected Fellow, The American Ceramic Society
7. The Spingarn Medal, the highest honor of the NAACP
8. Elected to the Royal Academy of Engineering
9. The Hoover Medal, conferred by the 5 major engineering societies in recognition of humanitarian efforts
10. The Cato T. Laurencin Regenerative Engineering Founder's Award created by the American Institute of Chemical Engineers



Unlocking Causes and Cures for Degenerative Muscle Diseases: Dr. Se-Jin Lee



Dr. Se-Jin Lee, M.D., Ph.D., is an internationally renowned geneticist focused on understanding the control of muscle growth and function. Lee is a member of the National Academy of Sciences and National Academy of Inventors and a Presidential Distinguished Professor with joint faculty appointments at UConn School of Medicine and The Jackson Laboratory (JAX).

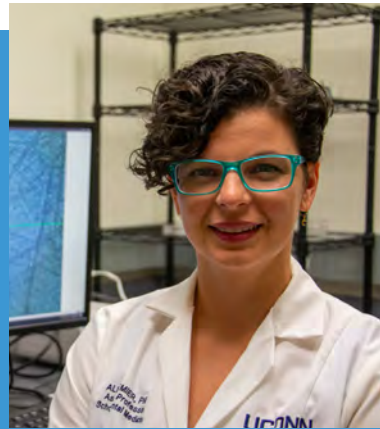
Lee's breakthrough research includes discovering myostatin, a protein that blocks muscle growth. Lee is focused on utilizing the properties of myostatin to develop new

treatments for patients with muscle degenerative and wasting conditions, such as in cancer or during aging, as well as metabolic diseases, such as obesity and diabetes. His research also explores the role that signaling molecules play in regulating human development and adult tissue homeostasis, using various experimental approaches, especially mouse genetics, to investigate the roles of these proteins in tissue growth, repair, and disease. Lee has received numerous honors, including the Rolf Luft Award from the Karolinska Institute and the Ho-Am Prize in Medicine.

WORLD-CLASS FACULTY

Call UConn Home

Eight UConn Faculty Receive NSF CAREER Awards in 2020-2021



Alix Deymier

Biomedical Engineering



Julie Fosdick

Geosciences



Jasna Jankovic

Materials Science and Engineering



Ying Li

Mechanical Engineering



Fei Miao

Computer Science and Engineering



Clay Tabor

Geosciences



Gaël Ung

Chemistry



Xinyu Zhao

Mechanical Engineering



Prof. Bahram Javidi is a world leader in multi-dimensional optical imaging technologies for disease diagnostics, security, and defense applications.

A Career of Prestigious Awards

- 2021 Emmett N Leith Medal
The Optical Society
- 2019 CEK Mees Medal
The Optical Society
- 2019 William Streifer Scientific Achievement Award
IEEE Photonics Society
- 2019 Fellow, National Academy of Inventors
- 2018 Joseph Fraunhofer Award/
Robert M Burley Prize
The Optical Society
- 2015 The Quantum Electronics and Optics Prize for Applied Aspects
European Physical Society
- 2008 Fellow, John Simon Guggenheim Memorial Foundation
- 2007 Alexander Von Humboldt Foundation Research Award

Transformative Impact on Information Optics Prof. Bahram Javidi

Prof. Bahram Javidi, Board of Trustees Distinguished Professor, Department of Electrical and Computer Engineering, is the 2021 recipient of the Emmett Leith Medal from The Optical Society, awarded for his exceptional innovation and transformative technological impact on the field of information optics. He is also a 2021 finalist for the Berthold Leibinger Prize, recognizing his contributions to disease identification for under resourced healthcare systems.

Javidi's work in optical systems for disease identification has been applied to rapid COVID-19 screening in collaboration with Dr. Bruce Liang, Dean, UConn School of Medicine. Timothy O'Connor, Javidi's Ph.D. student, was first author on a top download on this subject.

Javidi's field-portable digital holographic systems have also been shown to be effective for identifying other conditions, including malaria and sickle cell disease. Dr. Biree Andmariam, Director of the New England Sickle Cell Institute at UConn Health, worked with Javidi on sickle cell disease identification.

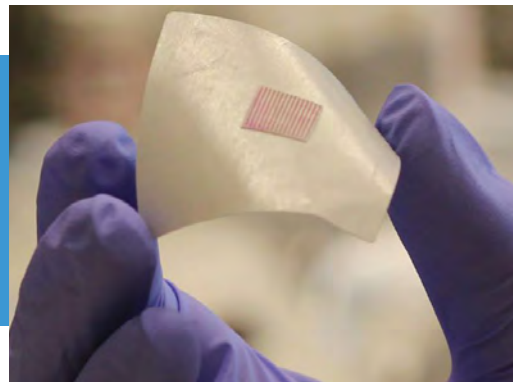
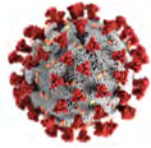


Timothy O'Connor, Ph.D. student, observes multi-dimensional reconstructions of cells and their movements. In this system developed in Javidi's lab, cell images are captured by digital holography and interfaced with augmented reality devices.

COVID-19 RAPID RESPONSE

New Understanding, New Tools

From rapid testing, to face masks, to vaccine hesitancy, UConn researchers have investigated every angle of the SARS-CoV-2 virus and how it impacted people all over the world. Within weeks of the pandemic forcing the university to halt most in-person operations, the OVPR and the Institute for Collaboration on Health, Intervention, and Policy (InCHIP) launched the Rapid Response Program to fund projects studying all aspects of the COVID-19 pandemic, including its social and behavioral implications. Here's a sampling of their work:



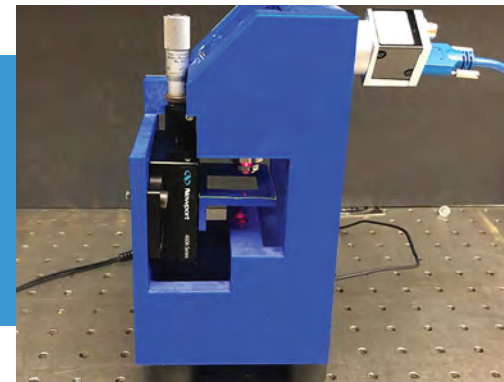
Single-use, self-administered microneedle technology developed by Assistant Professor Thanh Nguyen of the Department of Mechanical Engineering to provide immunization against infectious diseases has recently been validated by preclinical research trials. Nguyen also worked with Associate Professor Steve Szczepanek in the Department of Pathobiology and Veterinary Science to develop a self-administering microneedle for COVID-19 detection.



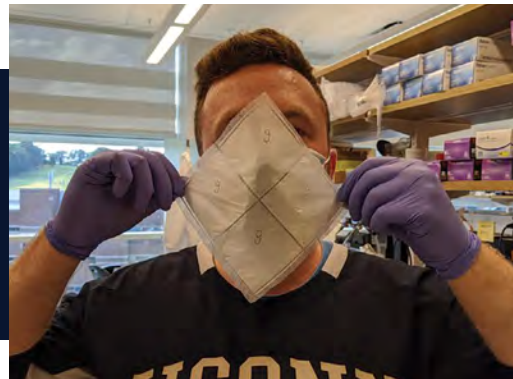
UConn TIP startup Quercus Molecular Design (QMD) applied their knowledge about herpes viruses to SARS-CoV-2 to investigate a potential COVID-19 drug target. QMD founders Board of Trustees Distinguished Professor Sandra Weller of the Department of Molecular Biology and Biophysics, and Dennis Wright, investigated the possibility of combining a drug that targeted SARS-CoV-2's nuclease, with Remdesivir, which was being used to treat COVID-19.



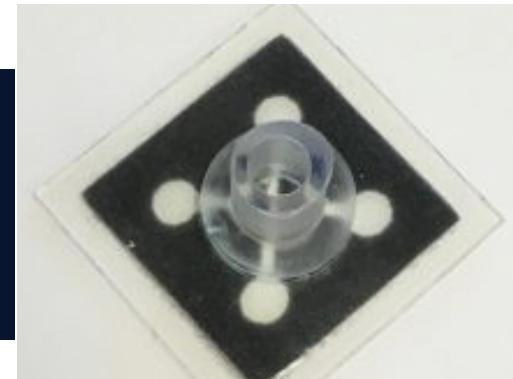
UConn researchers also worked on the significant challenge of COVID-19 vaccine hesitancy. Professor Seth Kalichman, Department of Psychological Sciences, and Professor Lisa Eaton, Department of Human Development and Family Sciences, studied the efforts of anti-vaccine Facebook groups to spread misinformation about COVID-19 vaccines before they had even been developed.



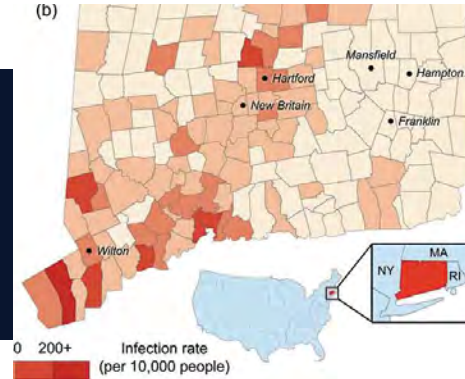
Board of Trustees Distinguished Professor Bahram Javidi's rapid, portable, low-cost COVID-19 diagnostic tool is made of simple components and uses machine learning to identify diseased red blood cells. Javidi was a finalist for the Berthold Leibinger Innovation Award in recognition of his work on field-portable diagnostics for disease detection.



Assistant Professor Thanh Nguyen patented a biodegradable, reusable medical face mask. Nguyen's invention uses piezoelectric electrospun nanofibers rendering the mask a more effective filtration device compared to traditional medical masks.



Associate Professor Changchun Liu, Department of Biomedical Engineering, licensed his CRISPR-based diagnostic platform to Vault Medical Services. Liu's device is a point-of-care option that reliably detects COVID-19 infection and is applicable for other diseases such as high-risk HPV, HIV, and influenza.

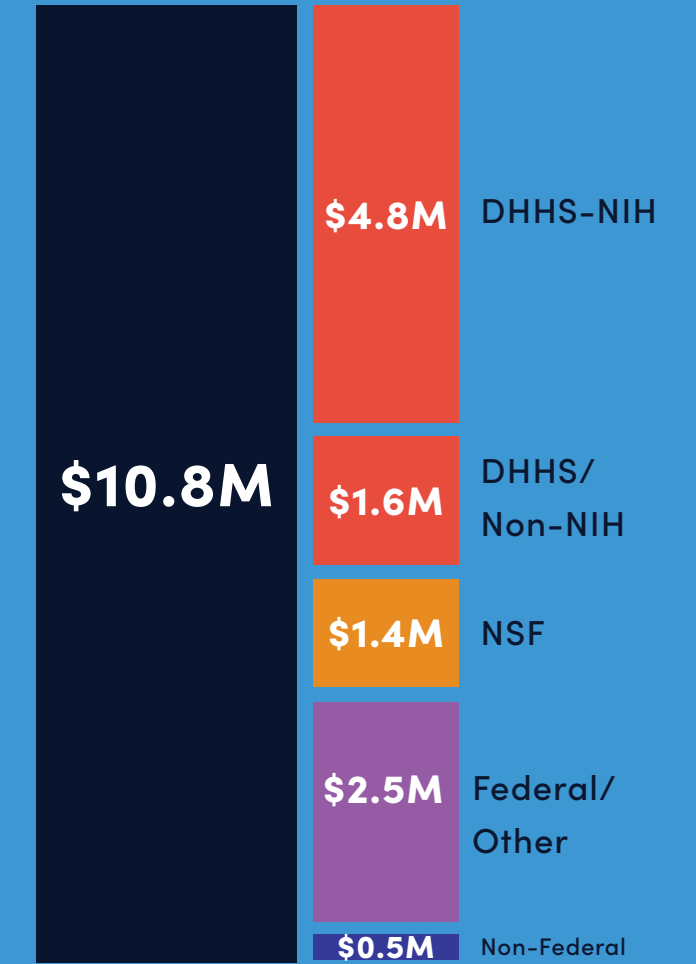


Peter Chen, professor of geography, developed the first-in-the-nation town-level map to predict COVID-19 infection in Connecticut. The model accounts for local conditions by adding in social distancing metrics and residents' travel activities, providing municipalities with an invaluable informational tool.



A group of researchers in the Department of Communication studied People of Color's behaviors and attitudes during the pandemic including mask wearing, social distancing, and experiences of everyday racism. The study included Black, Latinx, and Asian respondents.

Covid-19 Awards by Sponsor



Internal Funding of COVID-19 Research

\$420,000

COVID-19 RAPID RESPONSE

Supporting our community

- Provided support for first responders and the health care community.
- Retooled labs to produce:
 - hand sanitizer
 - face masks
 - face shields
 - ventilator prototype
- Developed tools to monitor community spread.
- Produced inventions and innovations supporting vaccine development and delivery, improvements in PPE, and disease detection.
- Conducted research deepening our understanding of the social and health-behavioral impacts of the pandemic, including racial disparities, vaccine hesitancy, and mental health.



hand sanitizer



face masks



face shields



ventilator prototype

Wastewater COVID Surveillance System Helps Keep UConn Open during Pandemic



UConn's Microbial Analysis, Resources, and Services (MARS) Facility, led by Kendra Maas, developed and implemented a COVID surveillance program that was instrumental in keeping UConn open during the pandemic. The highly effective and novel surveillance system was lauded by the White House's Dr. Deborah Birx during her October 2020 trip to Connecticut. During the 2020-2021 academic year, the MARS facility processed 2,038 wastewater surveillance runs, 20,106 pooled gargle tests for students, and 22,906 saliva screening tests for athletes. Assuming average commercial processing costs per sample, MARS' internal COVID testing saved UConn \$4.5 million. The MARS facility also ran 680 wastewater samples for municipalities, the University of Hartford, and the US Coast Guard Academy.

Caring for Our First Responders

The UConn community mobilized quickly and effectively to combat the COVID-19 pandemic. UConn Health was on the frontlines of patient care, and faculty across the University leveraged their laboratory infrastructure to produce personal protective equipment, such as hand sanitizers and masks.



Thank you UConn Health heroes, for serving on the frontlines of patient care during the pandemic.



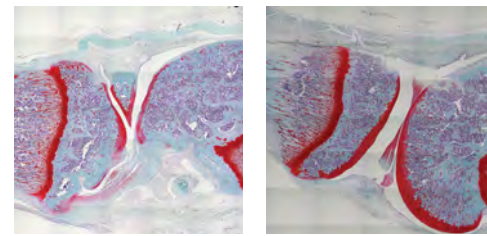
In response to PPE shortages, Professor Jeff McCutcheon, Department of Chemical and Biomolecular Engineering, mobilized his laboratory resources to produce Husky Hand Sanitizer within weeks of the onset of the COVID-19 crisis. The hand sanitizer was donated to local healthcare facilities and charities.



Custom-fitted masks for UConn Health workers: "We use a combination of facial recognition software and 3D printing to create the exact dimensions and make the perfect size," says University Professor Cato T. Laurencin of the School of Medicine. "It's very difficult to make one-size-fits-all, and one size shouldn't fit all."

TRAINING THE NEXT GENERATION OF SCIENTISTS IN REGENERATIVE ENGINEERING

NIH \$800K NIH T32 Award



Images of diseased cartilage (left) and cartilage restored through regenerative engineering (right), which involves stem cell science, advanced material science, developmental biology, and clinical translation.

University Professor Cato T. Laurencin, right, with his advisee Paulos Mengstab, 2021 recipient of a Ph.D. in Chemical Engineering at UConn.

University Professor Cato Laurencin is principal investigator on a new training (T32) grant from the National Institutes of Health to train independent clinical translational and basic scientists in regenerative engineering, a field pioneered by Laurencin.

The T32 grant reflects two of Laurencin's great passions: advancing the field of regenerative engineering and building equity in medicine and the sciences by mentoring a diverse cohort of trainees.

Regenerative engineering seeks to regenerate complex tissues and organ systems through a convergent approach drawing on advanced materials science, stem cell science, physics, developmental biology, and clinical translation.

By becoming experts in regenerative engineering and its foundations, trainees will work towards the alleviation of

human disease and musculoskeletal injuries by means of tissue regeneration.

Disorders of the musculoskeletal system with advancing age or due to injury and trauma are among the most debilitating to the human body and the most costly to the healthcare system. Regenerating tissue is a novel approach to treatments of musculoskeletal disorders and will require the convergence of molecular, cellular, and organismic research through the interdisciplinary integration of biomedical science and engineering. This T32 program will implement a convergence approach to train Ph.D. candidates in regenerative engineering to enable fundamental and translational discoveries.

The T32 program is based at the Connecticut Convergence Institute for Translation in Regenerative Engineering. Dr. Gualberto Ruaño and Dr. Lakshmi Nair are co-investigators on the project.

InCHIP: WORKING COLLABORATIVELY TO PROMOTE PUBLIC HEALTH

The Institute for Collaboration on Health, Intervention, and Policy (InCHIP) was at the forefront of UConn's response to the COVID-19 pandemic. Presented with the largest public health crisis in generations, InCHIP researchers put theory into real-world action, providing critical guidance as the University reopened and adapted to a new reality.

Responding to the pandemic exemplified InCHIP's extensive scientific contributions to UConn. The Institute supports the development of health-related sciences across all UConn campuses, fostering strong interdisciplinary research and aiming to improve public health. Much of the research is focused on social-behavioral sciences, addressing topics such as opioid addiction, HIV/AIDS prevention and treatment, cancer prevention and survivorship, gun violence prevention, food insecurity, and obesity.

Director Amy Gorin, a professor of psychological sciences, says the key to InCHIP's success is the collaboration it fosters among the scientists, which creates mechanisms for new partnerships to emerge.



"We bring researchers together to try and break down disciplinary silos and provide space for important conversations to occur, resulting in innovative solutions," Gorin says.

Gorin was recently honored for her efforts leading InCHIP and her own scientific achievements. She is the recipient of the Connecticut Psychological Association Award for Distinguished Contribution to the Science of Psychology for 2021.



In addition to leading UConn's response to the COVID-19 pandemic, InCHIP researchers conduct studies and public engagement in mind-body health, eHealth/mHealth, gun violence prevention, aging, HIV, and obesity.



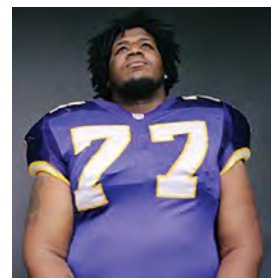
SUPPORTING COMMUNITY WELL-BEING

UConn Researchers Make Their Impact Felt Far Beyond the University's Campuses by Reaching Out to the Community to Improve Lives in Connecticut and Worldwide

Korey Stringer Institute Marks Its 10th Year

*Protecting Athletes, Warfighters,
and Firefighters from the Dangers
of Exertional Heat Stroke*

Korey Stringer, a Minnesota Vikings offensive lineman, tragically passed away from exertional heat stroke in 2001. Since the time of his death, Stringer's wife, Kelci, worked tirelessly to develop an exertional heat stroke prevention institute to honor her husband's legacy.



Her vision was realized in April 2010 when UConn announced

the creation of the Korey Stringer Institute under the leadership of exertional heat stroke expert Professor Douglas Casa, Department of Kinesiology, and in partnership with the NFL and Gatorade.

Under the direction of Casa, the Korey Stringer Institute has grown to be a national leader in exertional heat stroke prevention. The Institute provides research, education, advocacy, and consultation to maximize performance, optimize safety, and prevent sudden death for athletes, warfighters, and laborers.

His advocacy and outreach work has made Casa a consultant to international sports organizations and events, including the Tokyo Olympics and the NFL.



The research Casa has done with his colleagues has contributed to finding ways to maximize performance in challenging circumstances while preventing needless tragedy during sports and other physical activity. In the last year alone, KSI affiliates have published 57 manuscripts and secured \$1.8 million in funding, \$1.4 million of which is dedicated to research.

Gifts and sponsorship help KSI realize its goals. Current supporters include: the NFL, Gatorade, National Athletic Trainers' Association, Mission, Camelbak, Kestrel, Defib Tech, and First Line Technology.



The National Heat Safety Coalition (NHSC) was established by KSI in 2021 with the support of PPE manufacturers Mission and Magid to support research, education, and consultation that aims to protect the health and safety of industrial laborers working in the heat.

Center on Aging: Adding Life to Years

by Combining Bench Science, Clinical Research, and Research in the Community



\$7M NIA

Claude D. Pepper Older
Americans Independence
Center Award

\$1.4M NIA

Geroscience Education
and Training (GET)
Network Award



Two major NIH awards recognize the national leadership of the Center on Aging, its director, Dr. George Kuchel, Citicorp Chair in Geriatrics and Gerontology, and the Center's multidisciplinary faculty in advancing science, clinical practice, and education on aging.

In 2021, UConn received a National Institute on Aging (NIA) Claude D. Pepper Older Americans Independence Center award. A nationwide network of 15 Pepper Centers helps older Americans maintain or restore their independence. UConn is also the lead institution on a research (R25) award to establish an NIA Geroscience Education and Training Network as a complementary "sister" network to the NIA Translational Geroscience Network.

Kuchel's work through the Center on Aging adopts a multidisciplinary approach that combines bench science, clinical research, and community engagement to understand and address the causes and effects of aging. The goal of the Center is to add life to years: to enhance the function and independence of people in later life.

Aging is the biggest risk factor in many diseases, and the number of people with multiple chronic diseases

increases exponentially with age. Geroscience recognizes that, unlike chronological aging (time from birth), biological aging affects individuals variably and can be modified. To that end, Kuchel is also a leader in the emerging field of geroscience, which investigates biological aging so that the impact of aging on chronic diseases and lost function can be decreased. Moreover, through a better understanding of the variability in how individuals age, Kuchel and his colleagues also seek to develop interventions that are more effective by being more precise and better targeted.

The aging process in individuals is influenced by multiple factors, including genetics, biology, lifestyle, and social habits. Kuchel and his colleagues seek to discover new strategies designed to help maintain function in terms of key aspects such as mobility, host defense, memory, and voiding control.

A more individualized approach guided by geroscience that targets the biological hallmarks of aging may slow the onset and progression of multiple diseases and could be transformative for healthcare.

RESPONDING TO ENVIRONMENTAL THREATS

UConn Teams Are Tackling the Growing Threat of Extreme Weather and Its Impact on Our Shorelines and Critical Infrastructure

Resilient Connecticut: Mitigating the Impact of Extreme Weather

The Connecticut Institute for Resilience and Climate Adaptation (CIRCA) was established in 2014 as a joint initiative of UConn and the Connecticut Department of Energy and Environmental Protection (CT DEEP) to coordinate the capacity of the University and other state agencies to help the state and its municipalities address the local consequences of climate change.

In collaboration with state agencies, CIRCA coordinated a proposal to the U.S. Department of Housing and Urban Development's National Disaster Resilience Competition in 2017. The proposal won \$54.2 million, mainly to improve flood protection in Bridgeport. As part of the program, CIRCA received \$8.3 million for the Resilient Connecticut project, which has used regional-scale resilience and adaptation planning to develop projects that reduce flood risk in New Haven and Fairfield Counties and that foster transit-oriented economic development, coastal conservation, and critical infrastructure improvements.

To complement the capacity of the CIRCA staff, six teams of UConn faculty, students, and staff, four councils of governments, and an engineering firm have all been working on the project since 2019. In addition to project proposals, they are developing legal and economic policy options, creating heat stress maps for cities, quantifying changes in river flooding risk, and gathering extensive public input on town and regional priorities.

The 2021-23 budget passed by the Connecticut Legislature provided an additional \$5 million to CIRCA to expand the activities of Resilient Connecticut. CT DEEP recently awarded CIRCA funding for the development of an Environmental Justice Screening Tool that informs decision-making by identifying vulnerable populations that may be disproportionately impacted by programs, policies, or projects and to inform initiatives that create healthy communities.



Since its founding, Professor James O'Donnell of the Department of Marine Sciences has served as the Executive Director of CIRCA.

Removing Microplastics from Wastewater, with Help from Nature

Microplastics, plastic particles that are less than 5 millimeters long, have been found in plants, animals, soils, waterways, and in the air we breathe. Microplastics in our water supply are of particular concern given the potential negative impacts of microplastics on the health of all living organisms, including humans.

A new NSF Emerging Frontiers and Research Innovation (EFRI) project combines scientific expertise, community engagement, and creative thinking to address the problem of microplastics in our water supply. The study investigates the use of zebra mussels (part of the bivalve family) and microplastic-degrading bacteria to filter out microplastics from water processed by wastewater treatment plants.

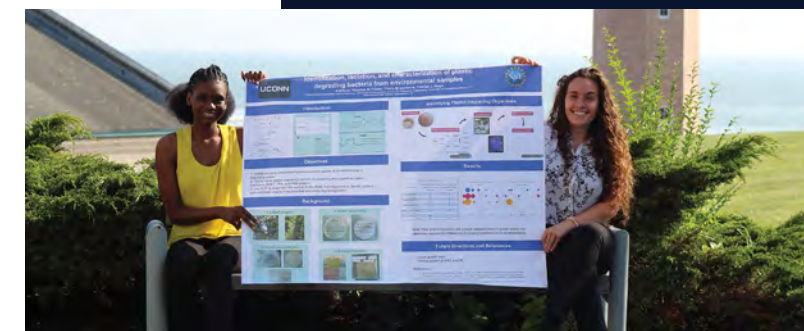
To facilitate adoption of the new technology, the EFRI team will work with community leaders and wastewater treatment facilities to find out what needs to be done to encourage acceptance of the technology and identify any barriers to adoption.

Mystic Aquarium is partnering with the team to reach the public and school children to educate them on the problems surrounding microplastics in the environment.

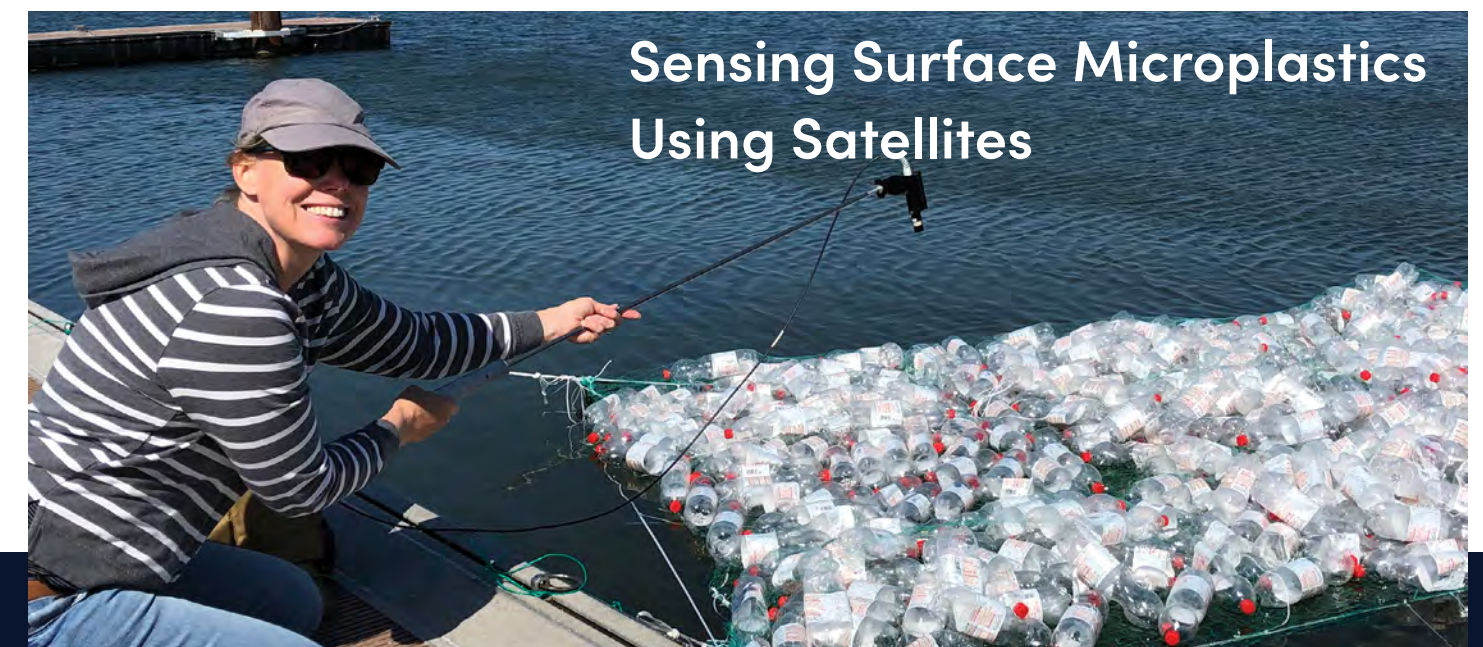
"If the project is successful, not only will we develop innovative microplastic wastewater treatment technology, but we will also quantify drivers and barriers to adoption of this new technology with the ultimate goal of increasing its uptake," says Associate Professor Christine Kirchhoff, of the Department of Civil and Environmental Engineering.

The project is led by Associate Dean Leslie Shor of the School of Engineering, who is also an associate professor in the Department of Chemical and Biomolecular Engineering.

\$2M EFRI Award



Manchester High School sophomore Paris Brazemore (left) and UConn undergraduate Katrina Frazer present at the EFRI Research Experience and Mentoring Poster Symposium at UConn's Avery Point campus, August 2021.



Professor of marine sciences and geography, Heidi Dierssen, received a \$575,000 grant from NASA to study remote stretches of ocean color across hot spots that they suspect may be related to accumulated plastics. Dierssen will collaborate with a visual artist on the project to advance community understanding of this problem.

ADVOCATING FOR DIVERSITY AND INCLUSION

UConn Health graduate students, faculty, and staff protest at the Connecticut Legislature in support of the Black Lives Matter movement. The UConn community as a whole responded in myriad ways to address the challenges posed by inequity and injustice in our society, including disparities in health outcomes experienced by racial and ethnic minorities.



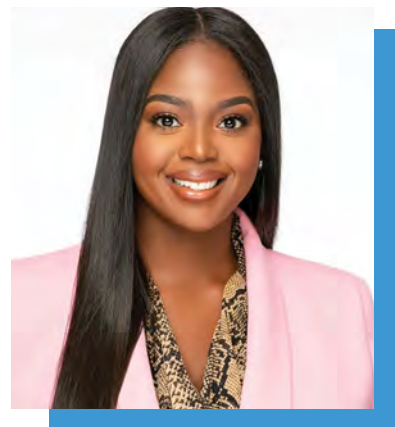
UConn Ph.D. student Carnisha Gilder is using her research to address health disparities as they relate to obesity, weight loss, and weight maintenance.

Gilder started her UConn research experience while she was an undergraduate at Cornell University. She participated in a summer program in which she gained hands-on research experience, sparking a passion.

In Detroit, where she was born and raised, Gilder saw the impact of health disparities in her own community. In Michigan, 41.8% of African American adults are obese compared to only 32.8% non-Hispanic White adults. Obesity disproportionately impacts African Americans, meaning the health consequences associated with obesity, including diabetes and heart disease, do too.

Gilder, a recipient of the Dr. Radenka Maric Fellowship for Graduate Students, is working closely with Professor Tricia Leahey and Associate Professor Tania Huedo-Medina of allied health sciences, and InCHIP Director Amy Gorin. Gilder is the lead interventionist on an NIH-funded behavioral weight loss trial. In total, Gilder's trials have helped more than 500 people.

Gilder's research has identified the kinds of support—



Carnisha Gilder, Ph.D. student

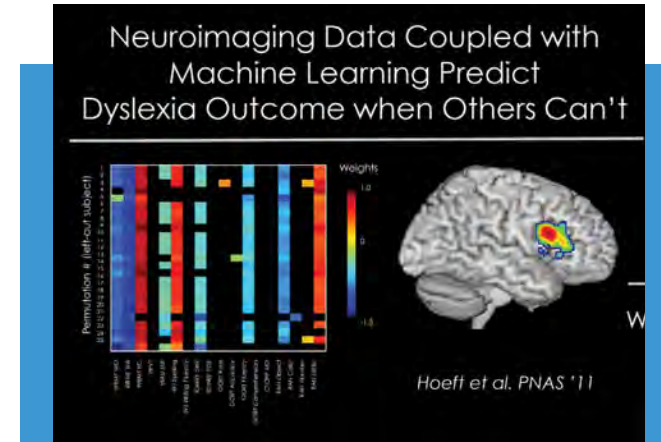
affectionate and autonomous — that are most potent for African Americans. Knowing this helps researchers design more targeted and more effective interventions.

After completing her degree, Gilder hopes to continue her work as an interventionist or work with weight loss companies to make their programs more accessible to minority groups.

"It's been an amazing experience and I feel equipped and prepared to do amazing things in my career," Gilder says. "And that's because of the foundation I got at UConn's graduate school."



Supporting Neurodiverse Learners Through Basic Science, Community Engagement, and Advocacy



Fumiko Hoeft, a professor in the Department of Psychological Sciences and director of the Brain Imaging Research Center (BIRC), has performed pioneering research on the neurological mechanisms underlying conditions like dyslexia. Her work is paving the way for: 1) developing new biological theories of the causes of dyslexia, 2) understanding how the brains of underrepresented minorities, such as ESL students, develop during learning, 3) testing the utility of EdTech on how we can screen and prevent COVID learning loss, 4) understanding the socio-emotional and mental health impact of being a neurodiverse learner, and 5) creating personalized reading interventions by using a child's brain structure, function, and chemistry to predict which interventions will work best for them.

Through programs like Bridging Reading And Intervention with Neuroscience (B.R.A.I.N.) Camp, co-led by Hoeft and Associate Professor Devin Kearns from the Neag School of Education, BIRC's research has a direct impact on children struggling with reading. Early intervention can make all the difference in how a student does academically long-term and beyond. B.R.A.I.N. Camp provides 3rd and 4th grade students with five weeks of evidence-based interventions, predicts who will respond to intervention, and tracks their progress using MRIs and EEGs. Some students came from as far as Virginia to take part in this program.

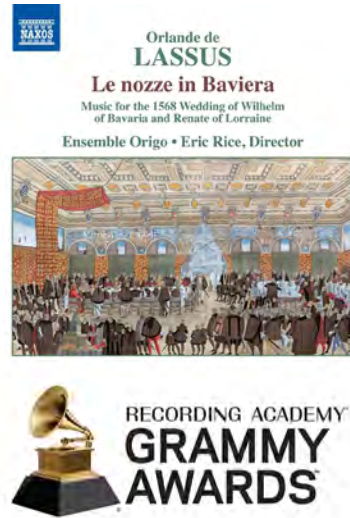
Beyond understanding the biological foundations of dyslexia and investigating real-world applications of her research through programs like B.R.A.I.N. Camp, Hoeft's approach emphasizes advocacy. Hoeft is working with the Connecticut Task Force for Dyslexia and national advocacy organizations to promote awareness and develop policies that ensure that neurodiverse children have full access to educational opportunities that respond to their personal learning characteristics.



Professor Fumiko Hoeft has received many awards for her research, including the Science Educator Award from the Society for Neuroscience, the Translation award from the International Mind, Brain & Education Society (IMBES), the Transforming Education through Neuroscience Award from the Learning and the Brain Foundation., and the Norman Geschwind Memorial Lecturer Award from the International Dyslexia Association.

INNOVATING THROUGH THE ARTS

At UConn, creativity doesn't stop with our world-class music and visual arts programs. Our researchers, faculty, and students push the bounds of achievement and innovation every day, working within and across disciplines to solve real-world problems and enhance the human experience. From Grammy-winning concerto arrangements to a collaboration of theater and engineering students working to develop simulator prototypes for NASA, UConn is redefining what creativity is and how we use it to achieve excellence and a better world.



This year, the debut recording of Ensemble Origo, directed by UConn musicologist and conductor Eric Rice, associate professor and head of the Department of Music, was released on Naxos, the world's leading classical label. *Le Nozze in Baviera*, a set of four musical vignettes by Orlande de Lassus from a 1568 wedding celebration, is one of the many multimodal projects through which Rice uses performance, musicological research, and emerging technology to teach the musical cultures and performance practices of medieval and Early Modern Europe.

Professor Kenneth Fuchs, of the Department of Music and a leading American composer, continues to extend UConn's influence in the music world. Five of his original compositions have been recorded by the London Symphony Orchestra, one of which - "Spiritualist" -

Concerto for Piano and Orchestra" - earned Fuchs and his long-time collaborator and Juilliard classmate, JoAnn Falletta, a Grammy in the Classical Compendium category. Another composition, "American Rhapsody," a work for violin and orchestra, was performed by Department of Music faculty members Solomiya Ivakhiv, violinist, and Sophie Shao, cellist, as part of the Jubilee 100th Concert season of the National Symphony Orchestra of Ukraine in Kyiv.

Faculty from the Krenicki Arts and Engineering Institute received a grant from NASA to develop two reduced gravity simulator prototypes for NASA missions to the moon and Mars. A multi-disciplinary team of theater and engineering students will conduct the research during the 2021-22 academic year, led by UConn faculty and NASA technical experts acting as mentors.

PROMOTING HUMAN RIGHTS ON GLOBAL AND LOCAL SCALES

Our commitment to social justice transcends academic boundaries at UConn, where researchers are seeking solutions to societal challenges through innovation and interdisciplinary partnerships. From exploring the impact of engineering and supply chains on human beings, to developing a new model of prevention and punishment for hate crimes, UConn researchers are pursuing answers to the vexing questions of our time to better our state, nation, and the world.

Kathryn Libal, director of UConn's Human Rights Institute and associate professor of social work and human rights, is part of a team of researchers looking at the role of community sponsorship as a successful model of refugee resettlement.



Kathryn Libal

Over a third of local resettlement agencies have shut their doors as a result of the high-profile anti-immigration policies implemented by the Trump administration. Libal and co-investigator Scott Harding, an associate professor in the School of Social Work, believe capacity can be restored through community sponsorship, a model that partners resettlement organizations with faith-based and secular community teams and volunteers to help connect refugees to resources, find employment, learn English, and establish connections. Libal and Harding's findings are included in the recently published book, *Strangers to Neighbors: Refugee Sponsorship in Context*, by McGill-Queens University Press.

Richard Wilson, a professor of anthropology and law, was tapped along with **Jason Chang**, associate professor of history and Asian American studies, by Connecticut Governor Ned Lamont to serve on the newly formed Connecticut Hate Crimes Advisory Council.

Wilson is the Gladstein Distinguished Chair of Human Rights and the founding director of UConn's Human Rights Institute. Wilson's current research focuses on incitement and hate speech on social media. Chang studies transnational Asian diasporas in the Americas using local, regional, and national frames of analysis. His first book looks at regional histories of Chinese migration and integration into Mexican society.



Asylum seekers from El Salvador and Honduras arrive in the US. The number of refugees permitted entry into the US shrank to new lows under the Trump administration. (Photo by ED JONES/AFP via Getty Images)



Jason Chang



Richard Wilson



Shareen Hertel

The Engineering for Human Rights Initiative, a collaboration of UConn's Human Rights Institute, School of Engineering, and other organizations, aims to bridge the gap between STEM students and the good their work can do for people. **Shareen Hertel**, a professor of political science and human rights, helped spearhead the initiative, which draws social scientists into collaborative teaching and research with engineers. Hertel is an expert on labor rights and the global supply chain and the author of *Tethered Fates: Companies, Communities, and Rights at Stake*, published recently by Oxford University Press.

Technology Incubation Program

FY 2021

62

TIP companies

284

employees

\$71M

funds raised

12

companies raised over \$1M

\$956M

funds raised 2003-2021

\$934M

revenue 2003-2021

UConn Intellectual Property

FY 2021

100+

patent applications filed

\$1.2M

licensing revenue

28

patents issued

62

MTAs

91

invention disclosures

10

licenses or options

INNOVATING FOR A STRONG ECONOMY

Introducing TIP Digital

Expanding on the success of its Technology Incubation Program in Farmington and Storrs, UConn opened a new TIP center focused on data science in Stamford in January. The program already has a dozen companies using the promise of machine learning to address persistent problems with novel solutions.

TIP Digital embraces a hybrid approach. Some companies are in-person at the 5,685-square-foot facility in Stamford, while other members are entirely remote. TIP Digital provides startups with support to get

their company off the ground using UConn's world-class resources and connect them to the University's talented faculty and staff. In turn, these companies contribute to the fast-growing economy in Stamford, creating jobs and opportunities.

One of TIP Digital's first companies, WaveAerospace, is an aerospace company that uses novel technology solutions to build aircraft that can fly in conditions that would ground most other aircraft.



The UConn Technology Incubation Program (TIP) received the 2021 Randall M. Whaley Award from the International Business Innovation Association (InBIA), recognizing their outstanding achievement as an entrepreneurial technology center.



AT&T Partners with UConn to Bring 5G to UConn Stamford and TIP Digital

UConn Stamford Is One of the First Campuses in the Region to Have the New Technology

UConn and AT&T are collaborating to advance academic programs in data science, entrepreneurship, and innovation by bringing 5G+ millimeter wave and multi-access edge (MEC) technology to the Stamford campus. The partnership makes UConn Stamford one of the region's first campuses to use the advanced capabilities in its academic and entrepreneurial activities, and to provide the technological foundation to establish and expand other capabilities.

With the support of CTNext and StamfordNext, AT&T's collaboration with UConn Stamford will bring 5G capabilities to bolster the UConn Stamford Data Science Initiative, which includes the Stamford Start-up Studio, the UConn Technology Incubation Program (TIP Digital) in Stamford, and the work of a soon-to-be hired team of data science research faculty.

TIP Digital

Since January 2021

17

companies accepted into TIP Digital

109

employees

\$3.1M

raised since joining TIP Digital

7

companies generating revenue

680

residents engaged in TIP Digital virtual programming

15

serial entrepreneurs introduced into the UConn ecosystem

10

new venture capital firms introduced into the UConn ecosystem

MEET OUR ENTREPRENEURS

Torigen

Ashley Kalinaukas, CEO and Founder



"We recognize the instrumental role pets play in our families, and are determined to extend the lives of companion animals despite a cancer diagnosis."

Torigen's breakthrough technology has veterinarians surgically excise the cancerous tumor in each patient and prepare a personalized vaccine. The treatment is developed in three days before it's sent back to the veterinarian for administration. Since the company's inception in 2013, Torigen has raised over \$6 million in funding and is projected to raise an additional \$10 million by the end of 2021. The company has grown from one person to twenty people, including an established team of researchers and veterinarians.

"We are really proud of Torigen," says Paul Parker, director of TIP. "The way Ashley and her team have used our resources to grow the company and better the lives of pets and their owners is a testament to what a supportive environment can do for small businesses."

Treating cancer in pets remains a challenge despite advancements in cancer treatments for humans. Torigen, a company in UConn's Technology Incubation Program (TIP), aims to bridge this gap by creating personalized cancer immunotherapies. Ashley Kalinaukas, CEO, founder, and UConn alumna, is passionate about the cause and found ways to keep her company advancing despite the challenges of COVID in 2020:

UConn Researchers Enable Conservation at Home

Native Star Plant Cultivars Support Pollinator Health

UConn has established a trademark for a series of cultivars of native, novel plant species developed by experts in plant breeding and horticulture Professor Mark Brand and Associate Professor Jessica Lubell-Brand of the Department of Plant Science and Landscape Architecture.

These plant cultivars provide gardeners with options that support native pollinators. These plants have better performance than traditional cultivars without the threat of taking over landscapes in the way invasive plants can. They also support native pollinators.

There are currently six Native Star plants in the American Beauties Native Plants® program, a national effort

to promote native plant use. Brand and Lubell-Brand collaborate with local Connecticut nurseries to sell these plants and promote native plant use.



DIANT Pharma

Antonio Costa and Diane Burgess, Founders

UConn TIP company DIANT Pharma, founded by Assistant Research Professor Antonio Costa and Board of Trustees Distinguished Professor Diane Burgess, has created a groundbreaking continuous manufacturing technology for pharmaceutical nanoparticles.

Supported through more than \$5 million in funding from the Food and Drug Administration, Burgess and Costa have been developing this technology since 2013 and formed DIANT Pharma Inc. in 2019.

DIANT Pharma's technology avoids many of the traditional pitfalls of nanoparticle manufacturing. It is much more efficient since it can run for longer, while constantly processing raw material into the finished product. In batch manufacturing, the system can only create a set volume of product at a time, dictated by the size of the facility's



containers. Furthermore, the system monitors for quality at all times and can quickly identify a problem, whereas with batch manufacturing, if there is a problem, the entire batch, potentially hundreds of liters of product, may need to be discarded.

This technology could help encourage pharmaceutical companies to keep manufacturing in the U.S. by providing a cost-competitive alternative to offshore manufacturing.

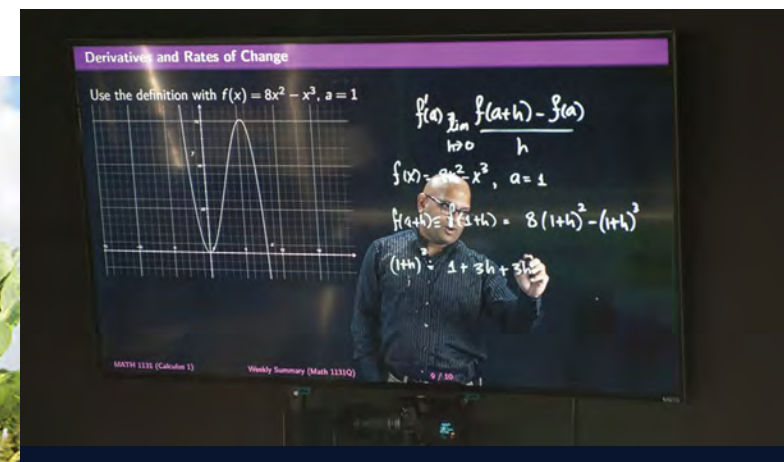
STEMIFY

Amit Sakvar, Founder

Amit Sakvar, associate professor in residence of mathematics, created a startup company, Stemify, that uses AI to help students succeed in math-heavy courses. After

realizing struggling in entry-level mathematics courses dissuaded many students from pursuing careers in STEM, Savkar teamed up with Connecticut-based entrepreneur Bill Moschella to develop a user-friendly platform that harnesses the power of artificial intelligence to identify and address individual students' knowledge gaps.

When students are completing assignments, Stemify's unique AI technology kicks in to identify micro-level knowledge gaps. The technology directs students to videos and resources providing specific, real-time feedback, much in the same way a professor or teaching assistant would in class or office hours.



PARTNERSHIPS IN INNOVATION



Partnering with Industry and USAF to Improve Aerospace Manufacturing

Over the last three years, Innovation Partnership Building (IPB) at UConn Tech Park has been awarded \$13.4 million across two separate contracts with Air Force Research Labs. These contracts support over 30 graduate students, 3 post-doctoral researchers, and 20 faculty from the School of Engineering and the Department of Physics across 15 individual projects.

Led by IPB Executive Director Pamir Alpay, professor of materials science and engineering, Project Daedalus aims to provide transformative capabilities for manufacturing technologies to the AFRL, equipment manufacturers, and the supply chain to reduce scrap rates, increase yield and performance, and minimize failures.

In 2018, Phase 1 was awarded at \$5.4 million for seven different projects, including materials data for manufacturing, modeling machined components, composites manufacturing, casting development, additive manufacturing

development, and Gaussian-based uncertainty quantification. The recently awarded Phase 2 contract for \$8 million includes additional experimental projects that investigate heat treatments of aerospace gears, ceramic investment casting, in-situ sensor development for additive manufacturing, and materials performance under extreme use conditions.

In addition, systems engineering projects are being pursued to positively influence manufacturing by advancing prognostics, diagnostics, and health management of components; by improving agile manufacturing; by creating applications for the industrial internet of things, and by expanding the understanding of manufacturing lifecycles.

A number of Project Daedalus projects were developed in collaboration with industry partners, including Aero Gear, GKN Aerospace, Sikorsky, Collins Aerospace, and Pratt and Whitney.

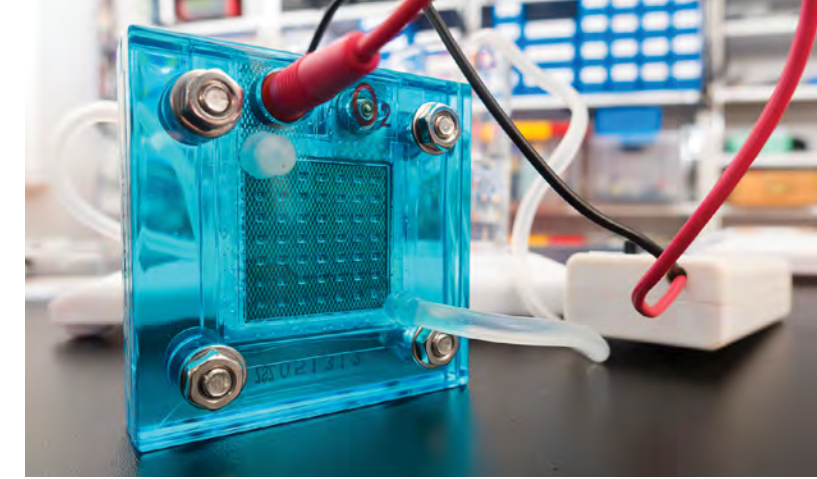
UConn-Technion Collaboration in Green Energy

Researchers are seeking solutions to critical world problems through the UConn-Technion Energy Collaboration Initiative. Born out of a philanthropic gift from alumnus Ed Satell '57 (BUS), the Initiative facilitates the exchange of faculty and students between UConn and Technion-Israel Institute of Technology in Haifa.

Faculty at UConn's Center for Clean Energy Engineering (C2E2) work with Technion's energy faculty to provide a platform to advance sustainable energy research. Research focuses on fuel cells, an integral part of world-wide clean energy initiatives.

Fuel cells, which are common in electric vehicles, use hydrogen and a catalytic layer to produce sustainable energy without emitting harmful greenhouse gases. The current catalytic layer is incredibly expensive since it is made from platinum. The cost of platinum means that highly efficient fuel cells are still prohibitively expensive in most cases. If scientists could reduce or eliminate the use of platinum, fuel cells would become much more affordable and easier to manufacture.

The UConn-Technion project is a potential game changer for fuel cell technology as it lays the groundwork for



replacing platinum with lower cost, more abundant metals like nickel and iron. An increasing number of startups and larger companies in the automotive industry are interested in this technology. The success of UConn and Technion's efforts could help propel this technology toward the mainstream.

UConn and Technion are both recognized leaders in energy engineering and education and are committed to advancing the global adoption of clean and efficient energy technologies. UConn's Office of Global Affairs facilitates the partnership.

This research is being carried out within the framework of the UConn-Technion Energy Collaboration initiative, supported in the United States by the Satell Family Foundation, the Maurice G. Gamze Endowed Fund (at the American Technion Society), Larry Pitt and Phillis Meloff, and in Israel by The Eileen and Jerry Lieberman UConn/Israel Global Partnership Fund and the Grand Technion Energy Program (GTEP).

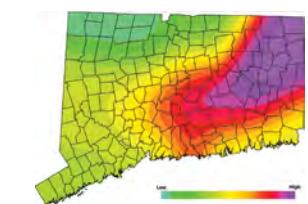
Keeping the Lights On During Extreme Weather Events

UConn's Storm Outage Prediction Model was developed by a team of faculty led by Board of Trustees Distinguished Professor Manos Anagnostou to predict the impact of severe weather on Connecticut's grid. The model generates a dynamic picture of the coming storm and predicts, on a town-by-town basis, the potential locations and severity of weather-related outages.

The model's Storm Outage Forecast is used by Eversource to help avoid and

shorten outages by determining the number of crews needed with strategic deployment before a storm arrives. The model helps ensure faster storm response and accelerated restorations.

The Storm Outage Prediction Model is housed in the Eversource Energy Center, which develops new technologies and science-based solutions for the distribution of reliable power and the management of risks associated with extreme weather and security events.



EVERSOURCE
Energy Center



UConn Tech Park:
**Over \$120M in Industry
 and Federal Partnerships**

Thermo Fisher Scientific Center for Advanced Microscopy and Materials Analysis

One of the world's foremost facilities for electron microscopy

- \$25M**
ThermoFisher
SCIENTIFIC

\$19.9M

NATIONAL INSTITUTE FOR UNDERSEA VEHICLE TECHNOLOGY
- \$17.5M**
EVERSOURCE

\$13.4M

U.S. AIR FORCE
AFRL
THE AIR FORCE RESEARCH AND DEVELOPMENT
- \$12.2M**

CONNECTICUT CENTER FOR APPLIED OPERATIONAL TECHNOLOGIES

\$10M

Raytheon Technologies
- \$9M**

ENGINEERING FABRICATION INSPECTION & MANUFACTURE EVALUATION

\$7.5M

PREST & WHITNEY
 REPENDABLE ENGINES
- \$7.5M**

COMCAST

\$3.2M

synchroNY
BANK
- \$3.2M**


Collins Aerospace


\$2.2M





A \$25M industry/university partnership, the Thermo Fisher Scientific Center for Advanced Microscopy and Materials Analysis (CAMMA) is one of the world's foremost facilities for electron microscopy. Its microscopy instruments include the Titan Themis for sub-angstrom analysis of materials, pictured above, and the Talos 200 S/TEM for simultaneous quantitative energy dispersive spectroscopy and analysis to uncover chemical composition of materials. This equipment is available for collaborative research with industry partners including applications for clean energy materials and the testing of additively-manufactured components such as those found in medical devices and polymeric materials for biomedical applications.


**UConn's Areas of
 Research Strength**


- 


Genomics
- 

Neuroscience
- 

Energy
- 

Manufacturing
- 

Cyber Security
- 

Health Behavior
- 

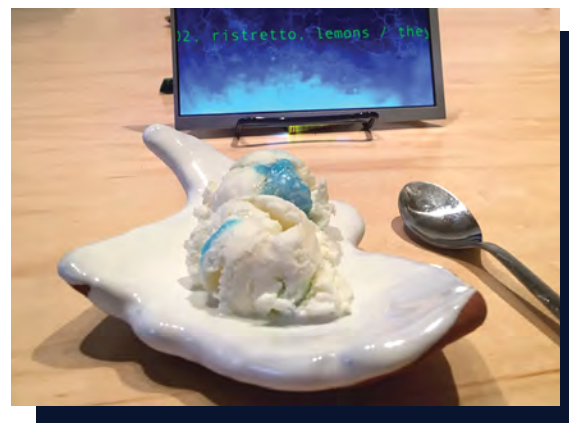
Materials

FUNDING CREATIVITY AND INNOVATION ACROSS THE SPECTRUM

UConn Research Supports Our Faculty and Students through Creative Internal Funding Programs Designed to Spur Creativity across the Disciplines

Contemplating Climate Change

In the Time of Clouds, an installation developed by Sue Huang, assistant professor of digital media and design, with support from a SCHARP grant, responds to rising carbon dioxide concentrations in our atmosphere that could result in a future without clouds. The project explores cloud forms and documents their influence on our collective imagination before they disappear. The project amalgamates social media chatter about clouds and live video streams from public observatory cameras to create an atmospheric triptych of poetry, ice cream, and ceramics. The “cloud” flavored ice cream used in the exhibition was designed in collaboration with Dennis D’Amico, associate professor of dairy foods, Department of Animal Science, and produced at the UConn Dairy Bar.

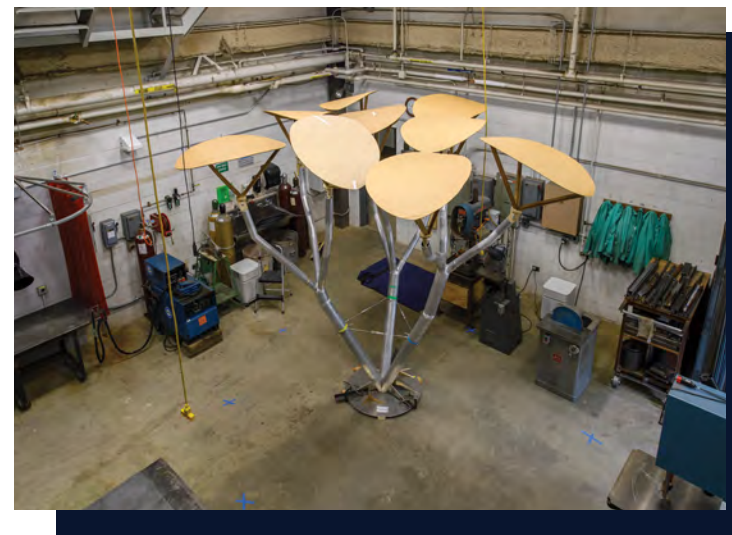


Developing Digital Tools to Support Archivists in Under-Resourced Communities

Professor Mark Healy of the Department of History is using his SCHARP funding to develop an open source document scanning system that will dramatically lower the costs of book and large-format document scanning. The technical systems and workflows developed by Healy and his team will empower archival professionals, especially in underserved communities across the global south and in poorer areas of the global north, to preserve rare and ephemeral materials for use by scholars worldwide. Healy’s work is focused on improving BiblioHack, which uses low-cost, readily available materials, off-the-shelf cameras, and open source software to replicate the expensive proprietary systems commonly in use at larger and better resourced institutions. This tool will support important scholarship by making records and resources on under-researched societies widely available.

A Solar Tree Takes Shape on Campus

Fueled by an OVPR STEAM grant, an interdisciplinary team has collaborated to design and build a solar tree for the UConn campus. The project leverages the expertise of faculty in Engineering and Fine Arts to create an installation that is aesthetically pleasing, useful, and can teach students of all ages about solar energy and environmental stewardship. The solar panels and the housings for the electric components take the form of the leaves, branches, and trunk of a living tree. As they collect energy from the sun, the solar panels—the tree’s leaves—shade people sitting on benches below. Solar power collected and stored by the tree can be used to charge cell phones and other electronic devices.



Office of the Vice President for Research
Invests in Our Faculty

F&A Cost Returns to Faculty, Departments, Centers, and Schools

\$2.6M	Grants to support faculty research and creative projects
\$6.9M	Commitments, including start-up packages
\$9.6M	Indirect cost returns to schools, departments, and faculty
\$3M	Fringe benefit buydown
\$12.2M	Support for research centers and institutes

\$34.3M

Seed funding programs in support of research and creative projects

- COVID-19 Rapid Start Funding
- COVID-19 Research Seed Funding
- Scholarship Facilitation Fund
- Research Excellence Program
- SPARK Technology Commercialization Fund
- CARIC: Convergence Awards for Research in Interdisciplinary Centers
- SCHARP: Scholarship and Collaboration in the Humanities and Arts
- STEAM Innovation Grant
- OVPR Research Bridge Funding

EXCEPTIONAL RESEARCH ENVIRONMENT

UConn offers world-class facilities that support the research, creative, and scholarly activities of our faculty. UConn is home to over 80 centers and institutes conducting research that span humanistic, scientific, agricultural, social, and political disciplines. Additionally, UConn's campuses house over 100 unique research cores, where one can find everything from facilities for soil nutrient analysis to facilities for custom equipment design and fabrication.



The Jackson Laboratory for Genomic Medicine (JAX), housed on the UConn Health campus in Farmington, works to discover the genetic basis for preventing, treating, and curing human disease. UConn's partnership with JAX offers many opportunities for collaboration between JAX scientists and UConn students, faculty, and clinicians.



Science 1, now under construction at the UConn Storrs campus, will be the new home of the Institute of Materials Science. At 200,000 square feet, Science 1 will be one of UConn's largest and most technologically advanced facilities, supporting large, multi-disciplinary initiatives and engagements with researchers from industry and government labs.



The Innovation Partnership Building (IPB) is UConn's premier center for state-of-the-art equipment, cutting-edge research, and cross-disciplinary industrial partnerships. The IPB serves a nexus of intellectual, physical, and cyber assets intended to foster industry-academic partnerships for research, innovation, technology commercialization, and job growth for Connecticut.

UConn

Facts and Figures

- 1** Great university
- 6** Campuses
UConn Health, Farmington
UConn Main Campus, Storrs
Regional campuses: Avery Point, Hartford, Stamford, Waterbury
- 14** Schools & colleges
- 24,371** Undergraduates
- 8,298** Graduate/professional students
- 1,597** Full-time faculty, Storrs/Regional
- 547** Full-time faculty, UConn Health

\$3.5 Billion UConn 2000 Capital Program

Since FY96, \$3.5 billion in State GO bonds have been authorized and \$3.3 billion expended to transform UConn's research and education infrastructure

FY20:

- 109 new projects initiated
- 220 active projects with budgets totaling \$1.3B and expenses of \$1.0B

\$ 5.1 Billion UConn's annual economic impact on Connecticut

OUR STUDENTS

PERSEVERANCE, PUBLIC SERVICE, & ACHIEVEMENT

Whether Overcoming Obstacles or Championing Human Rights, Our Students Exemplify the Best of UConn, Leveraging Every Opportunity to Build a Better Future for Themselves, Their State, and the World.



Berk Ata Alpay, '21 (ENG, CLAS), is a STEM, Holster, and University Scholar at UConn and a 2019 Goldwater Scholarship recipient, graduating this spring with a dual degree in computer science and math. Alpay began his research career at UConn's Eversource Energy Center and, in the summer of 2019, interned at the Fritz Haber Institute of the Max Planck Society in Berlin, Germany. He is currently conducting computational biology research in UConn's Aguiar Lab and the Marks Lab at Harvard Medical School. He has published two papers under the guidance of his mentors – professors Emmanouil Anagnostou, David Wanik, and Derek Aguiar. Alpay plans to pursue a doctorate in the fall of 2021, either in systems biology at Harvard or computer science at Stanford.



Monique Domingo, a Ph.D. candidate in management at UConn with an emphasis in organizational behavior, is a first-generation American of Mexican and Filipino heritage and one of 10 recipients of the new Dr. Radenka Maric Graduate Fellowship. Domingo came to UConn from California determined to complete her Ph.D. not only for herself but for those who follow in her footsteps. A family crisis and doubts about her financial ability to pursue a doctorate tested that resolve, but through grit, perseverance, and the support of her family and academic mentors, Domingo has prevailed. Domingo is interested in how leadership, especially female leadership, can influence outcomes at work. Her research looks at leadership as a system of effectiveness in teams and how those systems are impacted by different events, especially those involving high stress. Domingo is also exploring how leaders, especially women leaders, emerge and respond to such events.



Sage Phillips, '22 (CLAS), is one of a handful of students nationally this year to receive both a Truman and Udall scholarship. A young Panawahpskewi (Penobscot) woman of the Wabanaki people, she is the founding president of UConn's Native American & Indigenous Students Association and is the student coordinator for Native American Cultural Programs (NACP). Phillips plans to pursue a joint J.D. and M.A. in American Indian law. She is currently collaborating on a project through Greenhouse Studios exploring UConn's legacy as a land grant university and its ties to the displacement of indigenous tribal communities in the western U.S.



Noah Sobel-Pressman, '21 (BUS), leveraged his interest in venture capitalism and entrepreneurship to develop Get Seeded, a program allowing students to pitch ideas to an audience of peers for a chance to receive up to \$1,000 in seed funding and feedback on the concept. A management major from West Hartford with a minor in data analytics and Chinese, Sobel-Pressman developed Get Seeded with the Connecticut Center for Entrepreneurship and Innovation, the Peter J. Werth Institute, and other partners. He also helped establish the Student Venture Fund, a program allowing students to invest real money in real startups, with support from the Werth Institute.

OUR COMMUNITY INVESTS IN UCONN'S FUTURE

Our alumni and donors have made an indelible impact on UConn research. This past year UConn received three very special gifts, among many others. Thank you to all of our community members who work together to advance UConn research and improve lives.

Neag Foundation Gift Supports Transformative Research at UConn School of Medicine

In 2021, UConn School of Medicine received a gift of \$7 million from the Neag Foundation to fund high-risk/high-reward research with the potential to change medicine and improve human health globally. The gift established the Carole and Ray Neag Innovation Professorship, which will support School of Medicine faculty specializing in transformational research, and the Carole and Ray Neag Innovative Research Awards, which will fund cutting-edge and high-risk research. The research awards will enable scientists to pursue outside-the-box, potentially groundbreaking research not supported by traditional sources of research funding. These unconventional ideas could lead to new therapies and treatments for cardiovascular disease, cancer, viral infections, and more. They could also potentially help prepare for the possibility of future pandemics.



Alumni Betsy and Mark Vergnano Launch the Vergnano Institute for Inclusion

"It is an incredible honor for Betsy and me to be a part of, and build upon, a storied and impactful program that is focused on advancing diversity, equity, and inclusion through our alma mater," says Mark Vergnano. "The Vergnano Institute for Inclusion will provide crucial support for scholars that opens doors, shifts industry paradigms, and creates a competitive workforce of diverse talent within engineering."



Gary and Dr. Phillis Gladstein Support Human Rights Institute with \$1M Gift and Challenge Match

The Gladsteins' support for the Human Rights Institute spans 22 years. Their sponsorship of a postdoctoral researcher in human rights in 1998 laid the foundation for UConn's Human Rights Institute, now one of the premiere human rights institutes in the world.

For information on joining our circle of donors visit:
<https://www.foundation.uconn.edu/send-your-gift/>





UConn

UNIVERSITY OF CONNECTICUT

STORRS

AVERY POINT

HARTFORD

STAMFORD

WATERBURY



UConn Health

UConn Research
uconn.edu/research

