



VCU

Research and Innovation

UNLIMITED IMPACT

Annual Report **23**



P. Srirama Rao, Ph.D.
Vice President for Research and Innovation

It has been another record-setting year for VCU's research enterprise. On the back of last year's breakthrough into the top 50 of sponsored research for public universities, we have increased our sponsored funding to \$464.6 million - marking a 71% increase since 2018. This increase in funding has moved us to 47th in these annual rankings.

Our funding increases have led the institution to new heights in national rankings. This year, VCU tied for No. 19 among all public universities for most innovative universities in the U.S. Thanks to our innovation and sponsored research rankings and an unyielding commitment to diversity and inclusion, we are now one of the few universities recognized for being a Diversity Champion, the highest accolade within the Higher Education Excellence in Diversity Award.

Through transformative research on all of our campuses - including Doha, Qatar - VCU continues to affirm its commitment to engaging with our communities, reducing disparities and lifting lives. From addressing housing insecurity among LGBTQ+ youth and monitoring inequities through the RVA Eviction Lab, to harnessing the power of virtual reality to develop more effective teaching techniques and nondiscriminatory policing practices, the university's research portfolio is truly tackling society's biggest challenges. This focus on impactful research has also led to continued growth in the STEM fields, including in addressing environmental and information technology challenges.

#47

**National ranking
among U.S. public
research universities**

This past year, VCU positioned itself in the national manufacturing conversation through our membership in the Virginia Alliance for Semiconductor Technology. This partnership is bolstered by the resources in our Virginia Microeconomics Center - a research and education center that provides technical support and access to more than 8,000 square feet of cleanroom space for a particle-free environment and a suite of micro- and nano-fabrication state-of-the-art tools. Efforts through the center will help strengthen manufacturing, supply chains and national security and invest in research and development, science and technology and the national workforce.

Our efforts have also earned landmark recognitions and renewals as we continue to advance research in the health areas of cancer, cardiovascular, neurosciences, pain addiction and metabolic diseases. VCU's Massey Comprehensive Cancer Center achieved comprehensive designation from the National Cancer Institute (NCI) - the highest level of recognition from the NCI, placing us among an elite group of cancer centers influencing a new standard of care through research, education and community engagement. This designation, combined with our funding renewal for the VCU C. Kenneth and Dianne Wright Center for Clinical and Translational Research and the School of Medicine's Medical Scientist Training Program, makes us just one of 18 U.S. public institutions to hold all three honors. These efforts have contributed to our \$211.6 million of federal awards over the past year. Meanwhile, impactful funding like the Bill & Melinda Gates Foundation's renewal of its pledge to the Medicines for All Institute and the large founding gift for the Stravitz-Sanyal Institute for Liver Disease & Metabolic Health have supported our year-over-year growth of external funding - this year totaling more than 14%.

With a continued focus on local, national and global impact, our efforts and excellence in innovation and research have moved us to 86th on the National Academy of Inventors' rankings for utility patents granted. Led by the efforts of our TechTransfer and Ventures team, VCU has played a pivotal role in the launching of seven new start-ups, the issuing of 25 patents and garnering more than \$3 million in licensing revenue. These discoveries and inventions span the arts, humanities, social sciences as well as the STEM and health fields and will further allow our dedicated and talented faculty, fellows, staff and students to take creative inventions, ideas and innovations into the public domain.

As we now enter the fourth year of our One VCU Research Strategic Plan we have made significant and continued increases in internal investment in each of our strategic research initiatives. These strategic investments are aimed at advancing the overall research and infrastructure across our campuses. These institutional investments have returned year-over-year of continued growth, knowledge creation, discovery, societal impact - aiding in our quest to improve the human condition. And our work is not yet finished - thanks to the tireless commitment of our research faculty, staff, trainees and administrators, over the coming years we will continue to investment in our strategic research initiatives, climb the rankings and ensure that VCU's research enterprise continues to position itself as **UNlimited**.

P. Srirama Rao, Ph.D.
Vice President for Research and Innovation

NATIONAL RANKING

among public universities

VCU was ranked No. 47 among the nation's top public research universities.

Based on externally financed research and development expenditures for FY22, VCU was **ranked No. 47** among public research universities. Several specific research areas featured in the top 100 of the national rankings among all public research universities and include:

VCU national rankings

- 1** Visual and performing arts
- 7** Non-science / engineering fields (humanities, social sciences, art)
- 11** Education
- 30** Health sciences
- 33** Psychology
- 33** Social work
- 38** Biological and biomedical sciences
- 39** Life sciences
- 64** Computer and information sciences
- 90** Engineering

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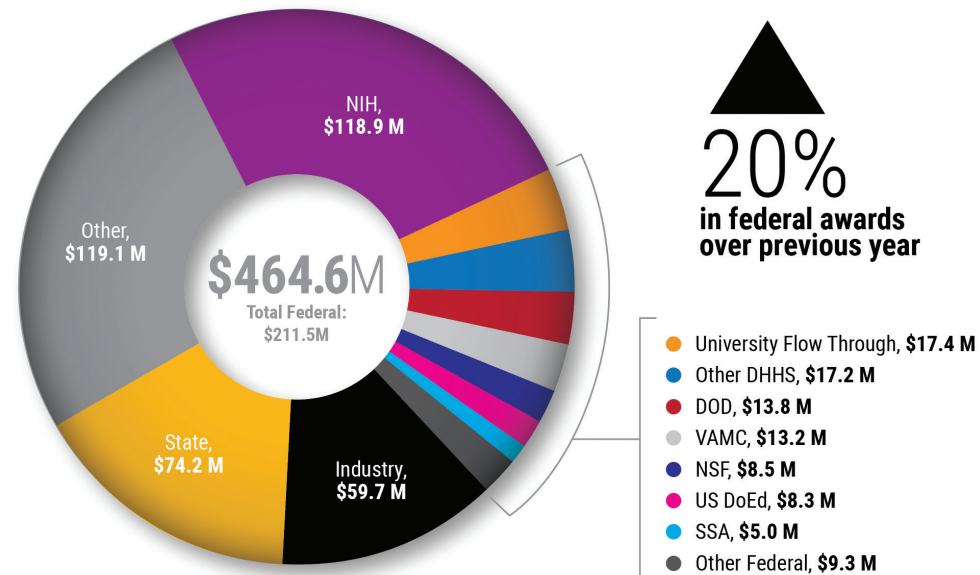
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EXTERNAL SPONSORED FUNDING

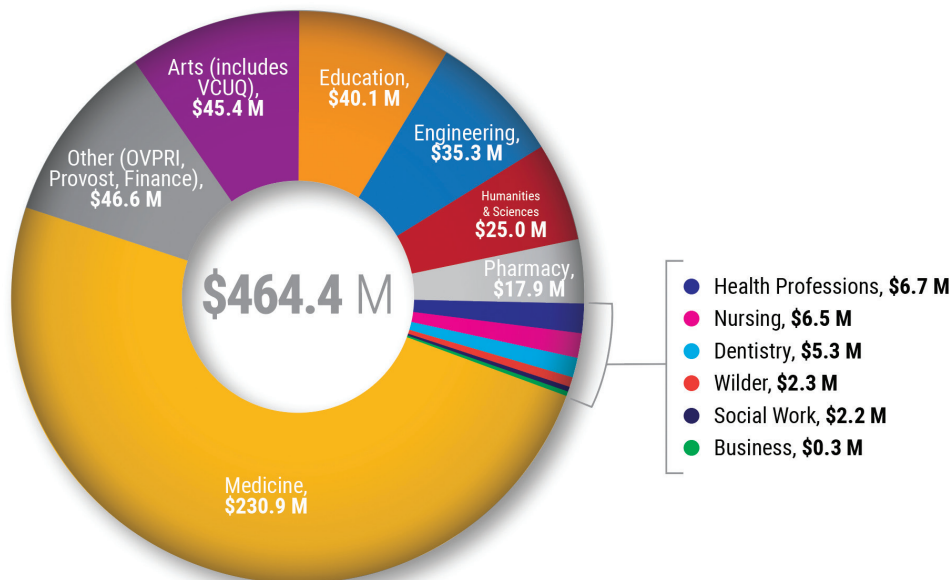
Year after year, VCU research breaks our own external sponsored funding records

CLINICAL RESEARCH

- \$92.6 million** total active participants enrolled in clinical research (identified individuals)
- 5,500+** enrolled across all active clinical trials
- 1,929** faculty-led, VCU designed clinical studies
- 364** faculty-led, VCU designed clinical studies
- 129** faculty-led VCU designed clinical trials
- 32** VCU held active drug / device registrations
- 4** VCU held new drug / device registrations
- 718** active clinical trials at VCU/VCUHS
- 1,073** clinical research studies



20%
in federal awards
over previous year



FY23 NUMBERS:

14.6% increase over previous year

\$464.6 million - Sponsored program awards

\$74.2 million - State awards

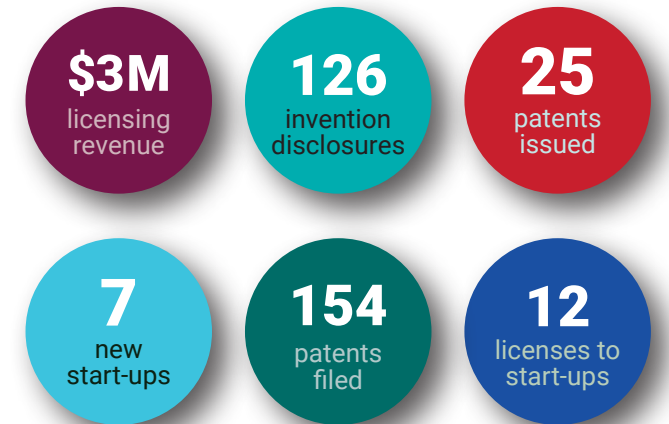
\$59.7 million - Industry awards

\$211.6 million - Federal awards

\$118.9 million - NIH awards

\$119.1 million - other (foundation, gifts)

VCU TECHNOLOGY COMMERCIALIZATION IMPACT FY2023



BLUE RIDGE INSTITUTE FOR MEDICAL RESEARCH RANKINGS AMONG PUBLIC UNIVERSITIES, BASED ON 2022 NIH FUNDING

Pharmacology	12
Family Medicine	13
School of Dentistry	14
Psychiatry	14
School of Nursing	16
School of Pharmacy	16
Genetics	17
Emergency Medicine	26
Surgery	26
Pathology	27
Biochemistry	28
Microbiology	30
Pediatrics	33
Anatomy/Cell Biology	34
School of Medicine	35
Neurology	38
Internal Medicine	40
Obstetrics and Gynecology	41
Physiology	44
Physiology	44

INVENTOR OF THE YEAR:

Curtis N. Sessler, M.D., FCCP, FCCM is the Orhan Muren Distinguished Professor of Medicine and the associate chair for faculty development for the Department of Internal Medicine. He is part of a team that developed and validated the Richmond Agitation Sedation Scale (RASS) - an assessment tool for use in ICUs which has been translated into numerous languages and used worldwide since 2002. For his work on the RASS, he was named the 2023 Billy R. Martin VCU Innovator of the Year.

MORE THAN EVER, STARTUPS AT VCU ARE TURNING IDEAS INTO BUSINESSES

VCU TechTransfer and Ventures is helping commercialize university inventions by licensing them to existing companies or startups. These ventures bridge the gap between academic science and the marketplace by providing a mechanism to grow the intellectual property, attract funding and mature university technologies. Just in the last year, VCU TechTransfer and Ventures facilitated the launch of seven new startup companies. Learn more and get started at innovationgateway.vcu.edu

FY 2023: FACULTY HONORS & AWARDS

Calvin Bradley, Jr.,
College of Health Professions, Department of Patient Counseling, Pediatric Chaplains Network President elect

Mark Crosthwaite, M.Ed.,
College of Health Professions, Department of Radiation Sciences Society of Nuclear Medicine and Molecular Imaging's (SNMMI) honor

Stephan Davis, DNP,
College of Health Professions, Department of Health Administration, American Academy of Nursing fellow

Tracey Gendron, Ph.D.,
College of Health Professions, Department of Gerontology and Virginia Center on Aging, American Society on Aging Ageism and Culture Award for Success in Diminishing Ageism

Alena Hampton, Ph.D.,
College of Health Professions, Department of Rehabilitation Counseling, National Academies of Practice Distinguished Fellow in Psychology

Jiale "Gary" Hu, Ph.D.,
College of Health Professions, Department of Nurse Anesthesia, American Academy of Nursing fellow

Leland "Bert" Waters, Ph.D.,
College of Health Professions, Virginia Center on Aging, Department of Gerontology President elect of the National Association for Geriatric Education Southern Gerontological Society

Waganesh Zeleke, Ph.D.,
College of Health Professions, Department of Rehabilitation Counseling Fulbright Scholar

Carolyn Eastman, Ph.D.,
College of Humanities and Sciences, Department of History, Library of Virginia's 2022 Literary Award for Nonfiction

David Edwards, Ph.D.,
College of Humanities and Sciences, Department of Statistics, elected 2023 Fellow of the American Statistical Association (ASA)

Samy El-Shall, Ph.D.,
College of Humanities and Sciences, Department of Chemistry, program director of the Chemical Structure, Dynamics and Mechanisms Program in the Division of Chemistry at the National Science Foundation

Puru Jena, Ph.D.,
College of Humanities and Sciences, Department of Physics, Indian Chemical Society's Professor A. K. Chandra Memorial Award

Brooke Newman, Ph.D.,
College of Humanities and Sciences, Department of History, MacDowell creative fellowship

Josh Sieber, Ph.D.,
College of Humanities and Sciences, Department of Chemistry, National Science Foundation Faculty Early Career Development (CAREER) Award

Arnethea Sutton, Ph.D.,
College of Humanities and Sciences, Department of Kinesiology and Health Sciences, National Cancer Institute's Early Investigator Advancement Program

RaJade Berry James, Ph.D.,
L. Douglas Wilder School of Government and Public Affairs, National Association for Schools of Public Policy and Affairs President elect

MK Abadoo,
School of the Arts, Department of Dance, 2022 Dance/USA Artist fellow

Sonali Gulati,
School of the Arts, Department of Photography + Film, Thomas Edison Film Festival Director's Choice Award

Catherine Roach, Ph.D.,
School of the Arts, Department of Art History, The National Humanities Center fellow

Doug Davis, Ph.D.,
School of Business, Department of Economics, Southern Economics Association Distinguished fellow

Shilpa Naavaal,
School of Dentistry, Oral Health Services Research Core, National HPV Roundtable Emerging Leader fellow

Christine Bae, Ph.D.,
School of Education, Department of Foundations of Education, American Psychological Association (APA) Richard E. Snow Award

Luciana de Oliveria, Ph.D.,
School of Education, Department of Teaching and Learning, James A. Lydon Distinguished Service Award

Kathleen Rudasill, Ph.D.,
School of Education, American Psychological Association Division 7: Developmental Psychology fellow

Albert Arias, M.D.,
School of Medicine, Institute for Drug and Alcohol Studies, American Psychiatric Association Psychiatric Society of Virginia chapter president elect

Caitlin E Martin, M.D.,
School of Medicine, Institute for Drug and Alcohol Studies (SOM OB/Gyn) Outstanding Early Career Faculty Award; Sidney H. Schnoll Early Career Scholarship Award; NIH/NIDA Young Investigator Travel Award

Gretchen Neigh, Ph.D.,
School of Medicine, Department of Anatomy, Yale University Innovation to Impact Fellows award

Jasmin Vassileva, Ph.D.,
School of Medicine, Department of Psychiatry, NIDA INVEST Prevention Drug Use Fellowship for Postdoctoral Training

Leigh Ann Breckenridge, D.N.P.,
School of Nursing, Department of Family and Community Health Nursing, Daisy Award

Jane Chung, Ph.D.,
School of Nursing, Department of Family and Community Health Nursing, Betty Irene Moore Fellowship for Nurse Leaders and Innovators

Kimberly Clark,
School of Nursing, Department of Adult Health and Nursing Systems, Virginia Nurses Foundation Leadership Excellence Award

Kimberly Davis,
School of Nursing, Department of Family and Community Health Nursing, Daisy Award

Stephan Davis, D.N.P.,
School of Nursing, Office of the Dean, American Academy of Nursing fellow

Stephan Davis, D.N.P.,
School of Nursing, Office of the Dean, Association of University Programs in Health Administration (AUPHA) Teaching Excellence Award for Diversity, Equity, Inclusion, Belonging (DEIB) and Social Justice award

Terry Jones, Ph.D.,
School of Nursing, Department of Adult Health and Nursing Systems, American Academy of Nursing fellow

Patricia Kinser, Ph.D.,
School of Nursing, Department of Family and Community Health Nursing and the Office of Research, Scholarship and Innovation, Vice Chair of the Board of Health for Virginia

Ingrid Pretzer-Aboff, Ph.D.,
School of Nursing, Department of Adult Health and Nursing Systems, American Academy of Nursing fellow

Lana Sargent, Ph.D.,
School of Nursing, Department of Adult Health and Nursing Systems and Office of Practice and Community Engagement, NurseTRUST E3 fellow

Denise Burnette, Ph.D.,
School of Social Work, Fulbright Specialist, Mongolia

Maurice Gattis, Ph.D.,
School of Social Work, Fulbright Scholar, South Africa

Rakesh Kukreja, Ph.D.,
Ph.D., Massey Cancer Center, Department of Internal Medicine, American Physiological Society (APS) Carl J. Wiggers Award

Robert A. Winn, M.D.,
Massey Cancer Center, director and Lipman Chair in Oncology, Association of American Cancer Institutes, president

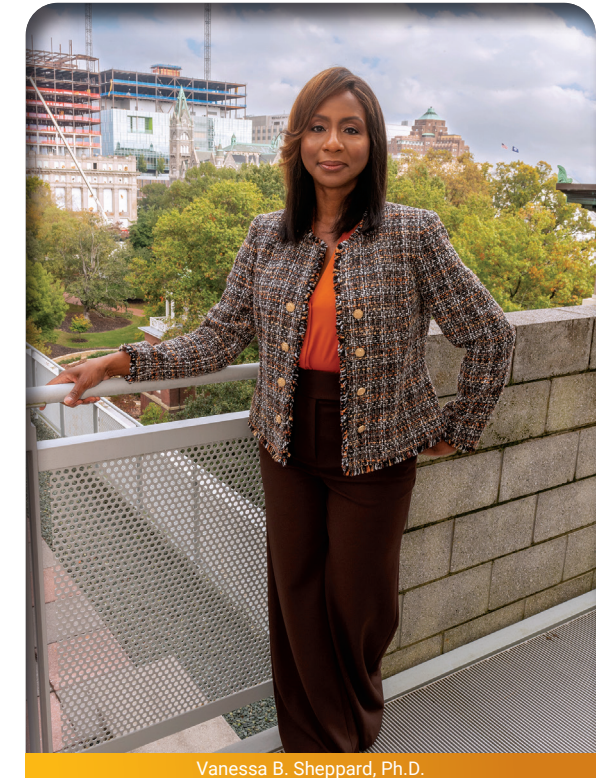
Radha Dalal, Ph.D.,
VCUarts Qatar, Department of Art History, College Art Association Board of Directors

Emily Hurst,
VCU Libraries, Medical Library Association Award for the Academic Health Sciences Librarian of the Year

Nia Rogers,
VCU Libraries, American Library Association Documents to the People Award

VCU MASSEY CANCER CENTER'S VANESSA B. SHEPPARD, PH.D., HONORED AS AMERICAN CANCER SOCIETY'S RESEARCHER OF THE YEAR

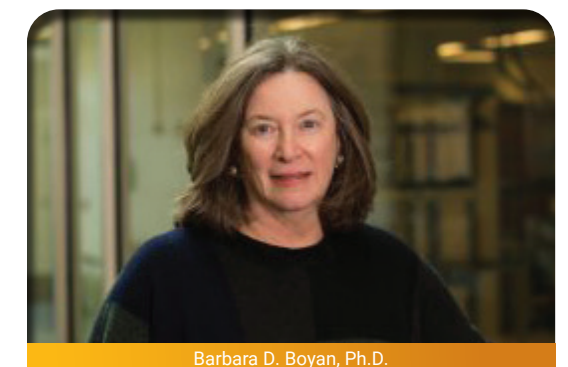
Vanessa B. Sheppard, Ph.D., associate director for community outreach and engagement and health disparities research at VCU Massey Cancer Center, was named the American Cancer Society's 2022 Researcher of the Year Award for her advances in cancer research. The award recognizes an investigator who, in addition to their innovative, impactful research, has benefited from an American Cancer Society (ACS) extramural grant. Sheppard's research focuses on disparities within breast cancer outcomes and addressing those disparities by developing approaches to improve survivors' quality of life or cancer care delivery.



Vanessa B. Sheppard, Ph.D.



Sarah Spiegel, Ph.D.



Barbara D. Boyan, Ph.D.

TWO VCU FACULTY RANKED AMONG 2022'S TOP FEMALE SCIENTISTS IN NATION AND WORLD

Sarah Spiegel, Ph.D., professor and chair of the Biochemistry and Molecular Biology Department at the VCU School of Medicine, and Barbara D. Boyan, Ph.D., executive director of the Institute for Engineering and Medicine and Alice T. and William H. Goodwin, Jr. Professor in the VCU Department of Biomedical Engineering were recognized by Research.com among the top female scientists nationally and globally in 2022.



VCU Research Strategic Priorities Plan

Enriching the human experience	Achieving a just and equitable society	Optimizing health	Supporting sustainable energy and environments
<ol style="list-style-type: none"> 1. Supporting the development and advancement of future technologies, such as AI, machine learning and cybersecurity 2. Advancing human performance 3. Improving quality of life 4. Promoting arts and culture 5. Endorsing advancements in education - quenching the thirst for knowledge 	<ol style="list-style-type: none"> 1. Eliminating health-related inequities 2. Addressing racial, ability, age and gender disparities 3. Advocating for social justice 4. Advancing cultural understanding 5. Promoting inclusivity 	<ol style="list-style-type: none"> 1. Understanding and eradicating cancer, cardiovascular and metabolic disorders 2. Helping populations overcome substance abuse and drug addiction 3. Supporting the development, advancement and access to medical devices, new drugs, diagnostics and new technologies 4. Advancing pharmaceutical manufacturing 5. Developing personalized medicines / treatments 	<ol style="list-style-type: none"> 1. Cultivating new ways to harness, store and secure energy 2. Attaining environmental justice by addressing environmental health disparities (urban heat islands) 3. Restoring and sustaining natural habitats 4. Addressing climate change through carbon sequestration 5. Restoring and preserving cleaning aquatic ecosystems (coral reefs, oysters)



2020 - 2021

- **Developed plan** with feedback and insights from 300+ faculty, students and community members
- **Implementation of plan:** aligned key initiatives to individual schools and colleges to determine projections for return on investment by FY 2028
- **July 1, 2021:** Launch of plan
- **October 20, 2021:** Enterprise-wide launch Q&A with President Michael Rao, Ph.D.
- **December 1, 2021:** Largest-scale internal RFA release in VCU history
 - Requests for Applications (RFAs) released from OVPRI:
 - Quest Fund
 - Accelerate Fund
 - Breakthroughs Fund
 - Arts, Humanities and Social Sciences Fund
 - Commercialization Fund

VCU Research and Innovation is inclusive and

IMPACTFUL.

Who we are

A vibrant public research university, VCU brings together dedicated researchers, educators, practitioners and entrepreneurs to improve the human condition

What we do

Create new knowledge and empower meaningful change and impact through exceptionally creative, collaborative and community-engaged research

Why we do what we do

With our shared vision of humanity and a commitment to addressing the needs of all people, we work collaboratively to amplify VCU's impact on society through excellence across all disciplines, knowledge creation and transdisciplinary research

FY 2023 PROGRESS

2022 - 2023

- **June 30, 2022:** >\$4.4 million awarded for single and multi-principle investigator-led interdisciplinary research teams addressing societal grant challenges under each of the found strategic priorities
- **July 1, 2022:** Appointment of advisory council comprised of faculty, staff, students and community partners
- **September 15, 2022:** VCU breaks record with more than \$400M for sponsored research
- **December 16, 2022:** VCU breaks into top 50 of public research universities in the U.S.
- **February 1, 2023:** NSF director visit: Launched VCU's NSF initiative under the strategic plan
- **May - April 2023:** Research weeks
- **June 30, 2023:** Second round of internal funds awarded ~\$4 million



VCU

Research and Innovation



Man and machine: Bridging the gap through dance

A groundbreaking collaborative effort between VCUarts professor Kate Sicchio, Ph.D., and VCU College of Engineering professor Patrick Martin, Ph.D., explores the intersection of dance and robotics. With funding from a VCU Breakthroughs grant, the duo are expanding on previous research exploring dancers and robots improvising together on stage, moving beyond pre-planned choreography. Drawing inspiration from choreographer William Forsythe's methods, the team is working on teaching engineers to express human movement through robot arms. The synergy between art and technology creates a unique collaboration and recent performances

showcase the project's advancements, with live coding guiding both dancers and the robot in an improvisational dance.



Kate Sicchio, Ph.D.



Patrick Martin, Ph.D.

Virtual VCU worlds used to train, teach and treat in the real one

The College of Humanities and Sciences' Department of Mathematics and Applied Mathematics has transformed a computer lab into a unique virtual classroom using high-end Alienware gaming systems and Meta Quest VR headsets. These VR headsets will not be used for gaming, but to help students wrap their heads around complex math concepts with virtual objects and 3D environments. This mode of learning seeks to enhance students' understanding of challenging mathematical concepts by providing tangible, interactive tools in a 3D virtual environment. This innovative approach can make complex subjects more accessible and engaging for students, potentially redefining the future of education at VCU.

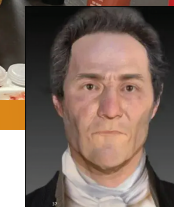


19th-century 'Connecticut vampire' receives forensic facial reconstruction

The Virtual Curation Laboratory in the School of World Studies in the VCU College of Humanities and Sciences specializes in 3-D scanning of historical remains, offering insight into past burial practices and belief systems. This 3-D scanning technology served as a catalyst for unveiling a forensic reconstruction for "JB55" (later discovered through a DNA analysis to be identified as John Barber), who was believed to be a vampire in Griswold, Connecticut, during "The Great New England Vampire



Emily Pitts, VCU anthropology student



Panic." VCU's technology provided a 3-D digital model of Barber's skull, allowing the digital facial reconstruction. "Being able to hold and touch an object or manipulate a 3-D scan is invaluable in teaching about and engaging people with history and archaeology," said VCU anthropology major and contributor of the project, Maddie Martin.



How saying 'Yes, and ...' is helping veterans who are experiencing homelessness

Head of improv with the VCU School of the Arts Department of Theatre and director of applied health improv with the Center for Interprofessional Education and Collaborative Care, Elizabeth Byland's "Applied Improv to Impact Homelessness" project has grown into a weekly meeting at Liberation Veteran Services, offering improvisation techniques to strengthen self-advocacy and problem-solving skills for veterans transitioning back to civilian life. This project aims to reduce the stigma of homelessness among healthcare practitioners by focusing on the universal rule of "Yes, and ..." in improv, teaching participants to listen, affirm, acknowledge others

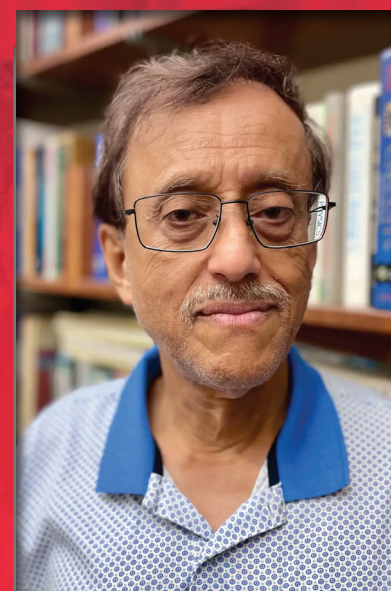


and contribute mindfully to the present moment. The classes explore relevant topics like navigating waiting periods, offering a reprieve from anxiety and fostering an ability to focus on the present.



VCU Engineering professor is shaping electronics design in inventive ways

Supriyo Bandyopadhyay, Ph.D., professor of electrical and computer engineering in VCU's College of Engineering, is pioneering new technologies that could revolutionize electronics design. His innovations include hardware "matrix multipliers" for AI algorithms and tiny antennas that utilize nanomagnets. The matrix multipliers enhance energy efficiency, compactness and resilience against cyberattacks in AI applications. These nonvolatile multipliers use magnets to store data even when powered off. The tiny antennas break the theoretical limits of radiation efficiency, making them ideal for applications like medical implants and ultra-small listening devices.





Teachers perceive more conflict with Black boys, closer relationships with white girls

A study led by Kathleen Rudasill, Ph.D., interim dean of VCU's School of Education and a professor in its Department of Foundations of Education, found that teachers, regardless of their race, perceived more conflict with Black boys and less conflict with white girls in their classrooms. The study analyzed nationally representative survey data from 9,190 participants, revealing disparities in teacher perceptions of their relationships with students at the start of formal school. This research highlights the systemic racism and white privilege in the U.S. educational system and suggests that anti-racism training, cultural competence interventions, and educational programs can help reduce racial disparities in teacher-student relationships.



Investigating the British monarchy's ties to slavery

Through an international collaboration with the British media outlet The Guardian, Brooke Newman, Ph.D., associate professor in the Department of History in VCU's College of Humanities and Sciences explores the British monarchy's historical ties to slavery and the slave trade. The project, "Cost of the Crown," features Newman's research which details the monarchy's involvement in enslavement and suffering and the inheritance of wealth from coerced labor. Buckingham Palace expressed public support for this research into the monarchy's connection to the transatlantic slave trade, a first-time acknowledgment of the troubling history, the Guardian noted.



VCU-led project to reduce homelessness among LGBTQ+ youth, pregnant and parenting youth receives major grant

Maurice N. Gattis, Ph.D., and M. Alex Wagaman, Ph.D., associate professors in the School of Social Work and iCubed scholars in the Intersections in the Lives of LGBTQ+ Communities core at VCU, have been awarded a Virginia Housing Trust Fund Homeless Reduction Grant to support a project aimed at reducing homelessness among LGBTQ+ youth, pregnant and parenting youth, and young people at the intersection of these groups. The project will implement a shared housing model for these populations in the counties of Charles City, Chesterfield, Goochland,



Maurice N. Gattis, Ph.D.



M. Alex Wagaman, Ph.D.

Hanover, New Kent, Powhatan and the city of Richmond. The project's goal is to develop a pilot test that could be used throughout Virginia to address homelessness among these target populations.



Jean E. Lokerson (left) prepares a learning disabilities simulation program, January 7, 1975.

VCU Libraries receives \$65,000 Mellon Foundation grant to expand the Social Welfare History Project

VCU Libraries received a grant from the prestigious Mellon Foundation to expand the Social Welfare History Project, aiming to enhance the project's scholarship and accessibility to Special Collections and Archives materials. The Social Welfare History Project, which receives over 3,000 daily visits and is widely cited by scholars, aims to broaden public knowledge and provide equitable access to resources. Through this funding, the project will amplify understanding of social justice and human health equity and support the processing of the Jean Lokerson papers, a collection focusing on policy and program development for individuals with learning disabilities.



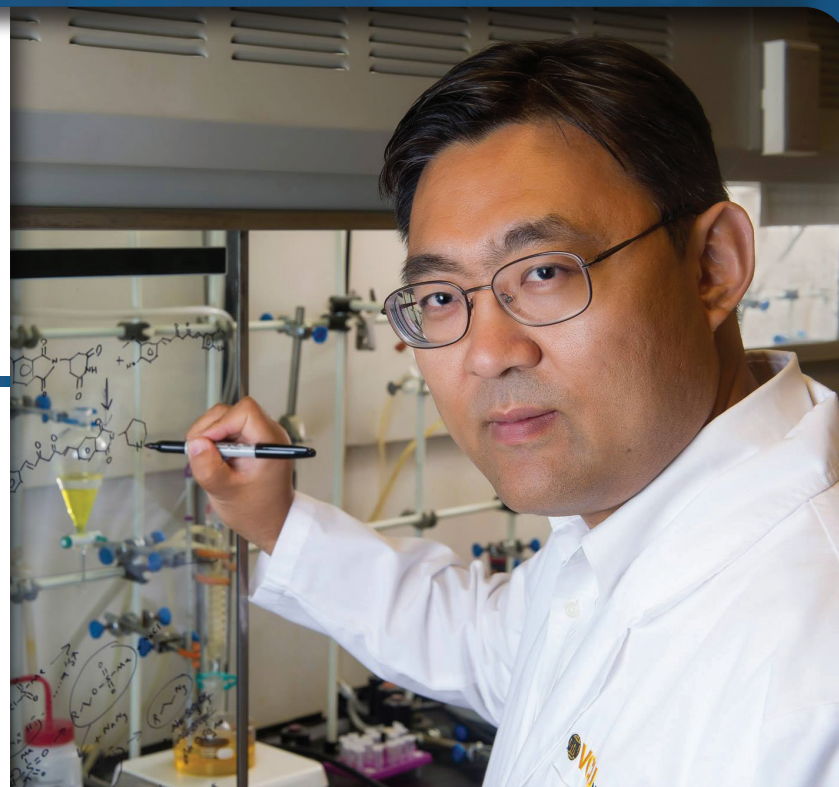
Telisha Woodfin (left), Richmond-based business, Elsie Harper-Anderson, Ph.D., (right)

Growing equity and opportunity for entrepreneurs in former 'Black Wall Street of the South'

Elsie Harper-Anderson, Ph.D., associate professor at the L. Douglas Wilder School of Government and Public Affairs, aims to understand the unique challenges underrepresented minority business owners face within the "entrepreneurial ecosystem," examining factors like race, social networks and more. The study involves 40 Richmond-based entrepreneurs with diverse backgrounds. By capturing their experiences and perspectives through weekly journals and interviews, Harper-Anderson intends to highlight the disparities that impact these entrepreneurs and seeks to inform policy and support for disadvantaged entrepreneurs, fostering economic and social equity.



Shijun Zhang, Ph.D., awarded \$1.9 million grant from National Institute on Aging to study neuroinflammation in Alzheimer's disease.



VCU School of Pharmacy's Department of Medicinal Chemistry professor Shijun Zhang, Ph.D., is researching ways to identify and monitor neuroinflammation in Alzheimer's disease (AD), a condition that currently has no cure. Neuroinflammation is a significant factor in AD - finding a biomarker to help diagnose and track the disease's progress is essential. The study focuses on a specific protein complex called the NLRP3 inflammasome, which plays a crucial role in regulating the body's immune responses and inflammation. By developing small molecules that inhibit NLRP3, the research team aims to create positron emission tomography (PET) radiotracers that can be used to visualize and measure neuroinflammation in AD. This research could provide valuable tools for understanding, diagnosing and treating Alzheimer's disease.



Risk of death from liver disease is twice as high in lower-income countries, new research suggests

VCU's School of Medicine's Department of Internal Medicine professor and physician at the Richmond Veterans Affairs Medical Center, Jasmohan Bajaj, M.D., connected with researchers from around the globe to investigate how the risk of death from the late-stage liver disease cirrhosis varies across countries and what underlying factors are behind such inequities. The study showed that hospitalized cirrhosis patients in lower- or lower-middle-income countries have a risk of death more than twice as high as those in high-income countries due to limited access to diagnostic and therapeutic resources. The study collected and analyzed data from nearly 4,000 cirrhosis patients across 25 countries, highlighting the need for preventive healthcare and improved access to resources and diagnostics to reduce cirrhosis-related mortality worldwide.



With \$1.52M grant, VCU chemistry professor seeks a solution to benefit chemo and dialysis patients



A team led by VCU's College of Humanities and Sciences' Department of Chemistry assistant professor Xuewei Wang, Ph.D., was awarded a \$1.52 million four-year grant from the National Heart, Lung and Blood Institute to develop a solution for preventing infections and complications in patients receiving chemotherapy, dialysis and other treatments that are administered through central venous catheters (CVCs). CVCs are medical implant devices that allow healthcare providers to deliver medication into the bloodstream without repeated needle sticks into a vein. Although this mode of administering medications is essential and effective, CVCs come with the threat of infection and thrombosis risks. Wang's team is working on a catheter lock solution that will release controlled amounts of nitric oxide, which can act as a natural anti-platelet and antimicrobial agent to reduce infectious and thrombotic complications associated with CVCs. This research could pave the way for a new generation of inexpensive lock solutions for people who receive their medications via CVCs.



VCU Alcohol Research Center is awarded an NIH grant to fund research training on the 'most dangerous drug in the world'

The VCU Alcohol Research Center (ARC) received a \$2 million grant from the National Institute on Alcohol Abuse and Alcoholism (NIAAA) to support the training of graduate and postdoctoral researchers in alcohol-related studies. VCU ARC, one of 20 NIAAA-funded research centers in the U.S., focuses on understanding the genetics of alcohol use disorder and contributing to the development of future therapeutics. The T32 funding will support Ph.D. candidates and postdoctoral fellows, allowing them to attend scientific conferences and purchase materials for independent projects, helping them become well-rounded scientists in alcohol research.



Michael F. Miles, MD, Ph.D., Director and co-founder, VCU Alcohol Research Center

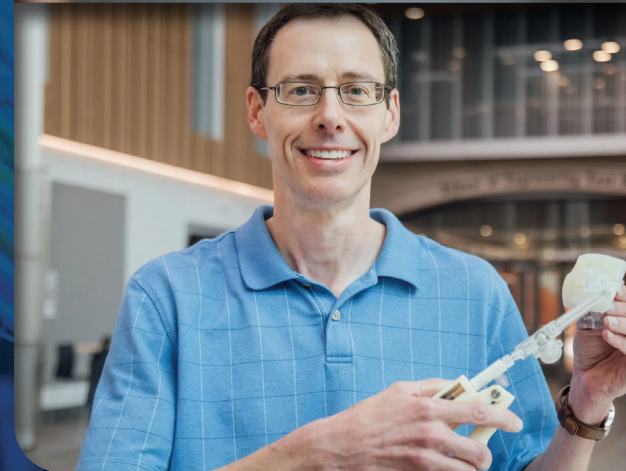


Having a hand in science: Families join VCU project to study long COVID in children

A team of clinical researchers at VCU's School of Nursing is leading a research consortium to understand how long COVID impacts younger populations, including infants, children, teenagers and young adults. This initiative is part of the Researching COVID to Enhance Recovery (RECOVER) program, a nationwide study funded by the National Institutes of Health that seeks to better understand the long-term health impacts of COVID-19. By enrolling more than 200 kids and adolescents around Virginia, the researchers aim to better understand the long-term health effects of COVID-19 in younger populations to aid in the development of effective treatments for long COVID in children and young adults.



RECOVER project participant Rylee Joyce prepares to have her blood drawn for lab tests by Laura Stevens, RN, clinical research nurse coordinator.



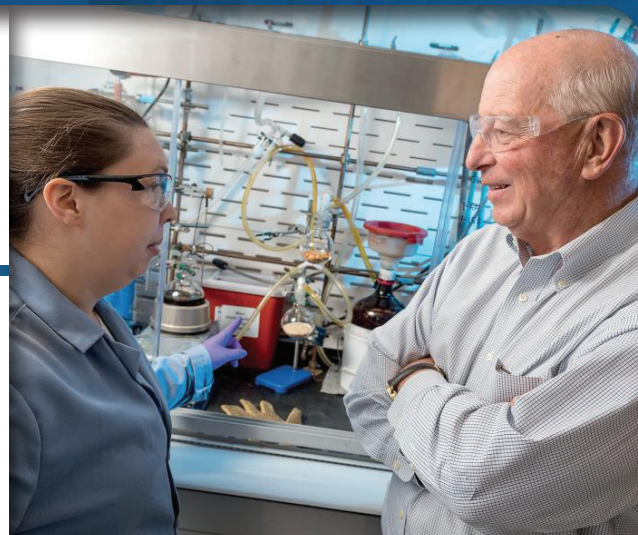
VCU researchers developing affordable, noninvasive treatment for RDS in newborns

Worth Longest, Ph.D., the Louis S. and Ruth S. Harris Exceptional Scholar Professor in the Department of Mechanical and Nuclear Engineering in the College of Engineering, and their research team are developing a noninvasive treatment for respiratory distress syndrome (RDS) in newborns. RDS occurs in babies who lack natural surfactants that reduce surface tension in the lungs and enable the exchange of oxygen and carbon dioxide. The team is working on a powdered lung surfactant and administration device which would be capable of being delivered anywhere with minimal equipment and at a low cost. The project is backed by a \$3 million grant from the Bill & Melinda Gates Foundation and is set to be completed in 2025.



Richmond-Petersburg regional coalition, including VCU, awarded \$53 million in Build Back Better Regional Challenge

A coalition in the Richmond-Petersburg region, including VCU, will receive nearly \$53 million as part of the Alliance for Building Better Medicine, with the total investment reaching nearly \$77.8 million through public and private contributions. The funding will boost the region's advanced pharmaceutical manufacturing and research and development cluster, addressing the nation's need for affordable essential medicines. This initiative, including Medicines for All (M4All), supports academic pathways, training, and workforce development, aiming to create high-paying jobs, especially for underserved communities.



Cheryl Peck, Ph.D., (left), former M4All postdoctoral research associate, Frank Gupton, Ph.D., (right)



Studying potential therapies for limb girdle muscular dystrophy

Nicholas Johnson, M.D., an associate professor, division chief of neuromuscular, and vice chair of research in the department of neurology at VCU Health is developing reliable assessments and markers for limb girdle muscular dystrophy R1 (LGMDR1) to advance therapeutic development. LGMDR1 causes progressive muscle weakness and currently does not have an FDA-approved treatment. Johnson's study plans to validate the NorthStar ambulatory assessment and muscle MRI as tools for LGMDR1 trials, with the goal of establishing validated assessments, including inclusion criteria and biomarkers, urgently needed for upcoming clinical trials due to significant progress in LGMDR1 therapeutic development.





Prolonged periods of extreme heat are becoming more common due to climate change, costing the U.S. approximately \$1 billion in health care costs every summer, according to a new report.

VCU faculty shared extreme heat healthcare costs research to Rep. Jennifer McClellan and NASA Deputy Administrator Pamela Melroy

A new report from an interdisciplinary group of VCU faculty, staff and students published by the Center for American Progress, explores the health care costs of extreme heat. The study used climate data and health care claims data from Virginia to estimate the increase in health care utilization and costs associated with extreme heat events. The researchers found that heat events lead to increased ambulatory care visits, emergency department visits and hospital admissions, a total of nearly \$1 billion in additional health care costs every summer. The report calls for action on climate change and community resilience to extreme heat.



2023 Symposium on Sustainable Energy and Environment attendees

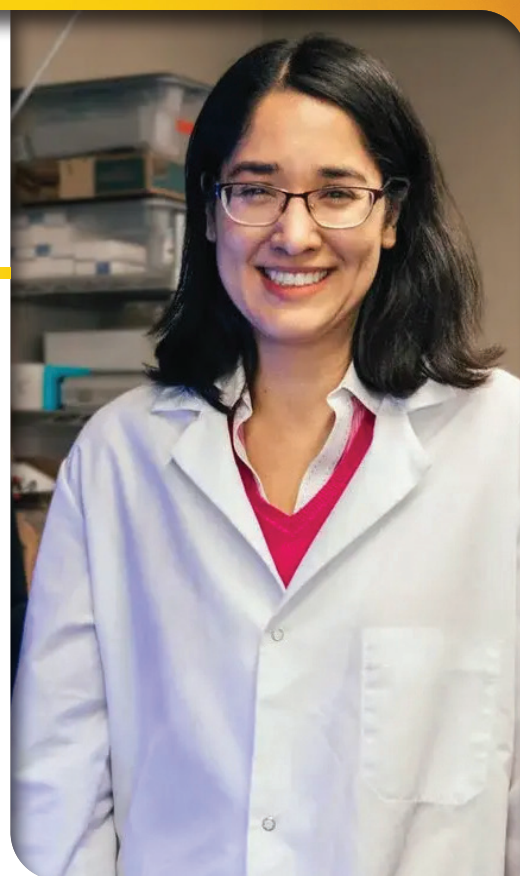
VCU launches Institute for Sustainable Energy and Environment



VCU launched the Institute for Sustainable Energy and Environment (ISEE) as part of the One VCU Research Strategic Priorities Plan and its initiative to support sustainable energies and environments. The ISEE focuses on addressing the challenges of climate change by bringing together transdisciplinary researchers across VCU's campuses to support their research related to the creation of sustainable energy systems and ecologies and supporting renewable energy and green alternatives.

Like humans, coral reefs have a healing process – and VCU researchers are working to understand it

Nastassja Lewinski, Ph.D., associate professor of chemical and life science engineering in VCU's College of Engineering is working to understand the healing process of coral reefs in hopes of aiding in the restoration and preservation of these ecosystems. Coral reefs are the foundation of many aquatic ecosystems and are among the ocean's most vulnerable inhabitants. While natural processes, like animal predation and storms, frequently damage corals, human impact, like ship collisions and climate change, can destabilize these environments beyond their ability to recover. With support from the VCU Accelerate Fund, Lewinski's research focuses on the mechanics of coral healing and the cellular dynamics of the healing process, with the goal of developing a nanoparticle drug-delivery system that could promote faster wound healing in corals, which could contribute to the conservation of these delicate but vital ecosystems.



Researchers strive to predict satellite resilience to weapons of mass destruction in space



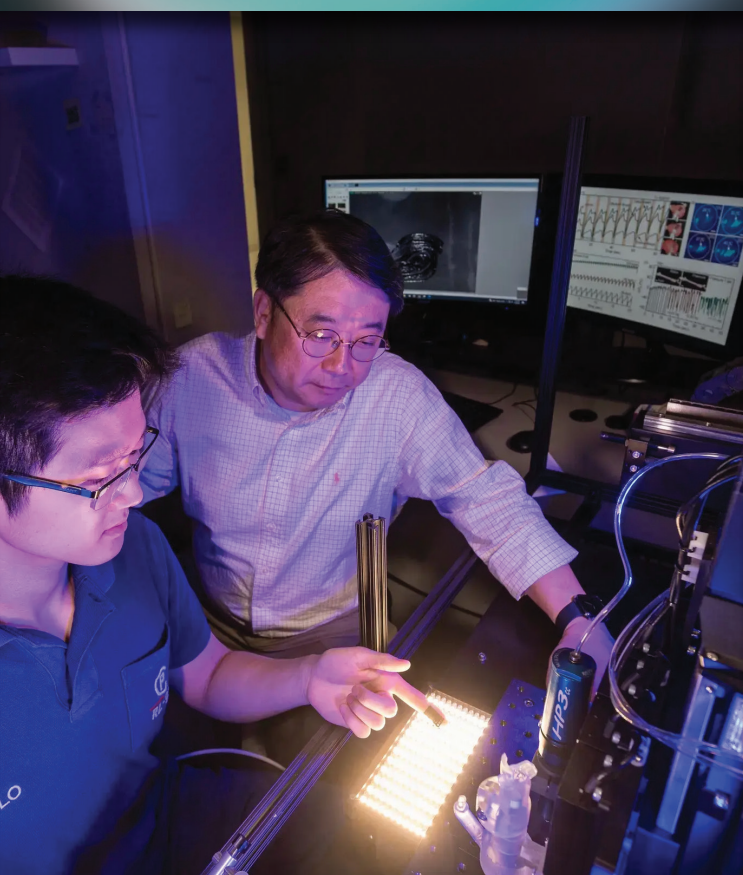
Gennady Miloshevsky, Ph.D., associate professor of mechanical and nuclear engineering in VCU's College of Engineering, is utilizing computational physics to predict satellite resilience to weapons of mass destruction in space. Through funding by the Defense Threat Reduction Agency, an agency of the U.S. Department of Defense, Miloshevsky will focus on the effects of nuclear detonations on Earth's orbiting satellites, aiming to understand warm dense plasma, a transient state occurring during nuclear bursts, and develop computational models to simulate temperature, pressure and radiation. His work involves quantifying material properties, predicting X-ray interactions with satellite surfaces and studying shock generation and material blow-off in space. This research is crucial due to the ban on nuclear testing, necessitating computer simulations for understanding weapon effects.

STUDENT RESEARCH AT VCU



Mural by VCUarts student reveals the invisible danger of heat island effect

VCU School of the Arts sophomore Sirena Pearl used heat-absorbing and solar-reflective materials in mural painting to depict a sustainable city with cooler temperatures and an urban heat island with warm temperatures. The mural, featured on a VCU parking deck, was created to conceptualize and visualize the urban heat island effect, which makes cities hotter than surrounding areas due to the absence of natural land cover like trees and the presence of heat-absorbing surfaces like concrete. Pearl's work aims to make the invisible heat island effect visible and raise awareness about it.



Biology major Andy Shar discovers 3D printable ink that 'everyone was looking for,' physics professor says

Through collaboration with mentor Daeha Joung, Ph.D., assistant professor in the Department of Physics at VCU's College of Humanities and Sciences, sophomore Andy Shar discovered a 3D printable ink that conducts electricity while being strong, flexible and stretchable. This innovation is particularly valuable for the development of customizable patient health monitoring devices and electronic skin for detecting motion, monitoring cardiac and respiratory health and potentially regenerating spinal cord tissues.



From surf, turf and sky, NASA and VCU's Rice Rivers Center deliver an immersive summer experience for undergraduates

NASA's Student Airborne Research Program, known as SARP-East, was brought to the East Coast for the first time with the help of VCU faculty and the VCU Rice Rivers Center team. SARP-East engages undergraduate students from colleges nationwide in a real-world NASA research campaign focused on environmental and earth sciences. Students participate in data collection both on the ground and in the sky, providing them with hands-on research experiences and opportunities to work with high-tech tools. The data generated will inform environmental policies related to issues like environmental justice, climate change and public health outcomes.



Integrative Life Sciences Ph.D. student Mindy Priddy



VCU students Mindy Priddy (left) and Gwendolyn Verity (right)

New resource brings together two of VCU's research gems – the Mid-Atlantic Twin Registry and Spit for Science – to promote more study into human health

VCU is consolidating its valuable research registries, the Mid-Atlantic Twin Registry (MATR) and Spit for Science (S4S) cohort, into the new Cohort and Registry Administration Core (CARA). This centralized resource, managed by the OVPRI, aims to enhance visibility, prestige and promote further innovative health research projects. CARA will support existing registries at VCU and foster the creation of new ones, facilitating research on chronic disease and cancer risk. The core offers services including study design, administration, data analysis, grant funding support and collaborative connections to strengthen health research.



From L-R: Ram Gupta, Ph.D., Robyn McDouggle, Ph.D., Amy Salisbury, Ph.D., and Ezra Medina



From L-R: Danielle Nilson, Ryan Reikowsky, Tina Cunningham, J.D.

Research administrator appreciation

On National Research Administrator Day, VCU celebrated the unsung heroes of research administration. These professionals play a pivotal role in supporting research, grant management and compliance. Behind the scenes, they ensure the smooth execution of research projects. Their expertise and dedication are essential to VCU's research mission, contributing to record-breaking research funding year after year. The event highlighted the growing recognition of research administrators' importance in the research community, emphasizing their critical role in driving research excellence.



VCU College of Engineering Convergence Lab Initiative

VCU's College of Engineering secured a \$9 million grant from the Department of Defense for research and development in electro-optics, infrared, radio frequency and edge security technologies. The Convergence Lab Initiative, led by electrical and computer engineering professors, will bring together experts in these fields to address pressing defense challenges. The initiative aims to bridge academia-industry gaps, support interdisciplinary research and prepare the next generation of technology leaders research community, emphasizing their critical role in driving research excellence.



From L-R: Ümit Özgür, Ph.D., Nibir K. Dhar, Ph.D.; and Erdem Topsakal, Ph.D.



Winn Diversity in Clinical Trials Scholars program opens doors for medical students to witness clinical trials firsthand and advocate for participation

VCU's Massey Comprehensive Cancer Center hosted four medical students as part of the Robert A. Winn Clinical Investigator Pathway Program (Winn CIPP). This intensive six-week summer service-learning externship allowed the students to collaborate on research with experienced mentors and gain valuable experience in clinical trial design, implementation and operation. The program focused on understanding and addressing health disparities in clinical trials, including the impact of financial situations on patient care and the encouragement of participation among patients with limitations. The program is part of the Robert A. Winn Diversity in Clinical Trials Award Program, aimed at developing community-oriented clinical trialists. It aspires to build a national network of individuals committed to clinical trial diversity.



From L-R: Amy Tran, Shem Kentish, OreOluwa Aluko, and Franck Mbuntcha Bogni.



Shem Kentish (left) and Amy Tran (right) present their research on prostate cancer therapeutics





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VCU RESEARCH EXCELLENCE

by the numbers

\$464
million
in sponsored funding

\$211.6
million
total federal funding

47 *for public
research
universities*

20 *most innovative
universities*

87 *for
patents*

Device featured on cover:
Virtual reality training mechanism to help surgeons prepare for 'blind' surgery, the midurethral sling procedure, that is widely performed to treat female urinary incontinence.
Inventor: Lauren Siff, M.D.