



**VCU**

Research and Innovation

**WE  
ARE THE  
UNCOMMON**

**2025 ANNUAL REPORT**

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**VICE PRESIDENT FOR RESEARCH AND INNOVATION**



I'm exceptionally proud and thrilled to share the achievements of VCU's research enterprise for the 2025 fiscal year. Our collective commitment to discovery and innovative spirit hasn't just continued, it has accelerated, further cementing our status as a preeminent research institution both nationally and globally. This report outlines the impactful stories and comprehensive metrics that demonstrate how our dedication to research ranging from Arts, Humanities, Social Sciences, Engineering and Health Sciences fields being conducted on our three campuses, Monroe Park, Health Sciences and VCUArts Qatar, are pushing the boundaries of knowledge creation and transforming lives.

### THE VCU RESEARCH AND INNOVATION ENTERPRISE HAS CROSSED \$500M IN BOTH SPONSORED FUNDING AND RESEARCH EXPENDITURES FOR THE FIRST TIME.

Each year since 2018, VCU has broken its previous record for sponsored funding, with this year an all time high of \$568 million. This milestone is proof that when we strategically invest in our people, the most innovative ideas that lead to new knowledge creation and inventions, and our infrastructure, we build a future of sustained growth and capability. Even more significantly, we have now doubled our sponsored funding over the past seven years, achieving an astonishing 109% increase over seven years.

For the first time, VCU has crossed the \$500 million mark in research expenditures, doubling in just five years. The total of \$524 million for fiscal year 2024 ranks VCU at No. 46 among public universities, according to the annual NSF HERD survey, the nationally recognized and authoritative measure for quantifying research impact at U.S. colleges and universities, solidifying our standing among the highest achieving universities in the country.

In addition, our excellence in health sciences has broadened with 22 VCU health sciences schools and departments ranking in the top 50 for National Institutes of Health research funding among public institutions.

Innovation remains central to our mission. With over \$4.3 million in licensing revenue and 171 patents filed, the unique ability of VCU researchers to translate fundamental discoveries into tangible, real-world results is allowing them to make and discover tomorrow's solutions to today's problems. VCU led the Commonwealth with the most licenses to startups as well as licensing and royalty revenue as detailed in the most recent AUTM report. And that talent driving VCU's innovation is world-class: we are proud that 167 of our faculty are ranked in the top 2% of most-cited researchers globally, validating the high impact of their scholarly output.

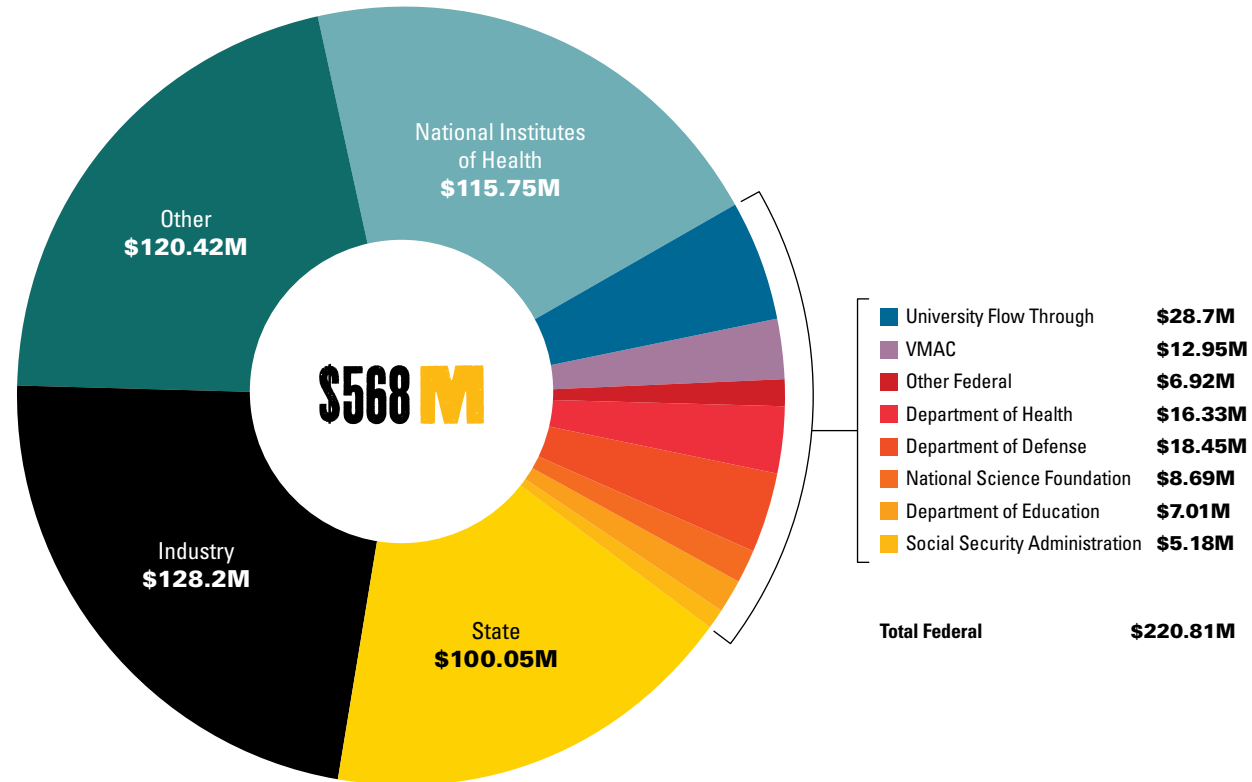
I am so pleased to recognize the hard work and dedication of our entire research community, our faculty, staff and students. The passion for discovery, the expertise and commitment to making a tangible difference are the true engines of VCU's continued success. Together, we will continue to push the boundaries of knowledge, elevate our reputation and shape a brighter future through transformative research and innovation.

Sincerely,

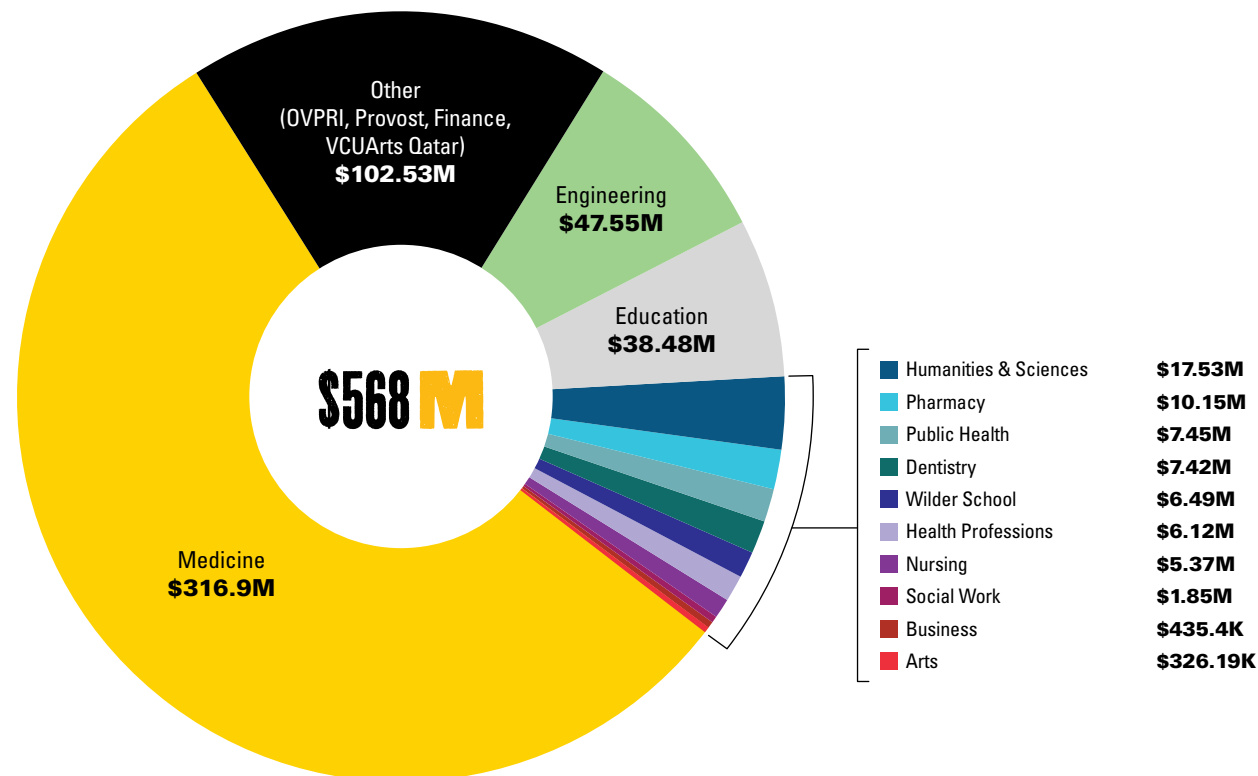
**P. Srirama Rao, Ph.D.**

Vice president for research and innovation

## AWARDS BY SOURCE



## AWARDS BY SCHOOL/COLLEGE



## CLINICAL RESEARCH NUMBERS

- \$154.3M** in clinical research and clinical trials
- 12,000+** total active participants enrolled in clinical research (identified individuals)
- 1,447** enrolled across all active clinical trials
- 1,197** clinical research studies
- 735** active clinical trials at VCU/VCUHS
- 400** faculty-led, VCU designed clinical studies
- 112** faculty-led VCU designed clinical trials
- 32** VCU held active drug / device registrations
- 5** VCU held new drug / device registrations

## NSF HERD RANKINGS

National Science Foundation's Higher Education Research and Development (HERD) Survey rankings (FY24 data)

- No. 1** Visual and performing arts
- No. 7** Non-science/engineering fields - humanities, social sciences, art
- No. 13** Education
- No. 27** Health sciences
- No. 28** Social work
- No. 36** Life sciences
- No. 38** Psychology
- No. 43** Biological and biomedical sciences
- No. 54** Combined science and engineering fields
- No. 88** Engineering
- No. 91** Computer and information sciences

## BLUE RIDGE INSTITUTE FOR MEDICAL RESEARCH RANKINGS AMONG PUBLIC UNIVERSITIES, BASED ON 2024 NIH FUNDING:

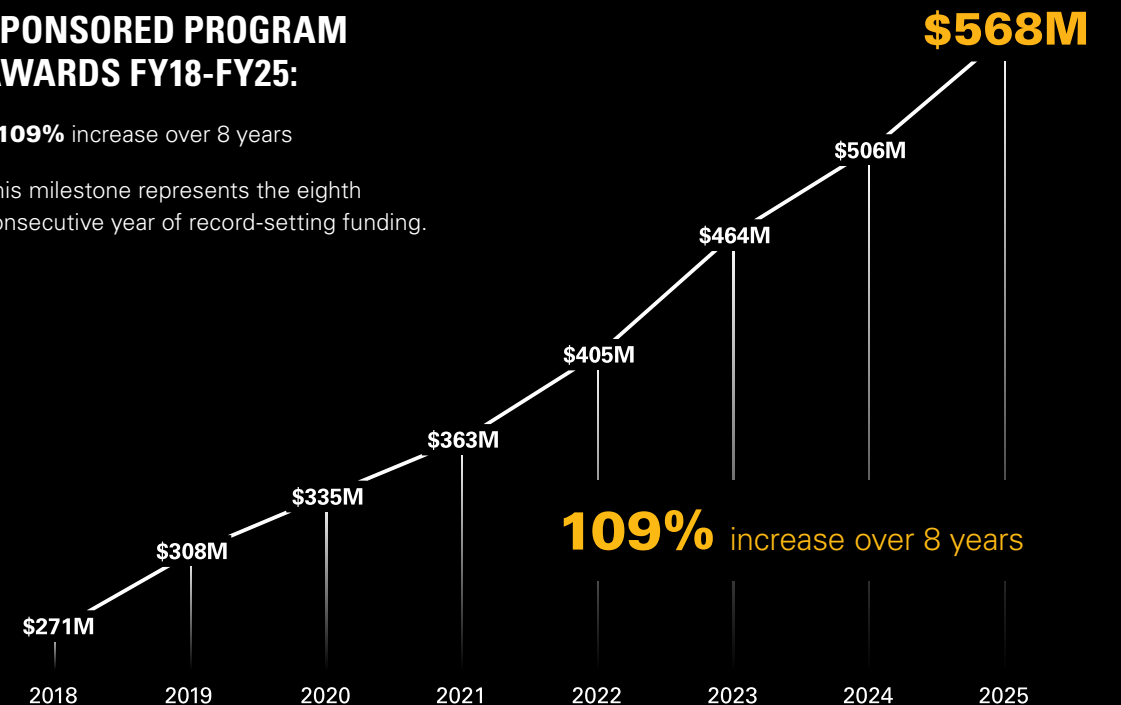
Colleges and Schools	Ranking
School of Dentistry	9
School of Pharmacy	25
School of Nursing	28
School of Public Health	34
School of Medicine	35
College of Health Professions	36

Department / Unit	Ranking
Family Medicine	4
Pharmacology	11
Psychiatry	13
Genetics	15
Anatomy / Cell Biology	21
Biochemistry	25
Obstetrics and Gynecology	25
Surgery	27
Emergency Medicine	28
Neurosurgery	28
Neurology	30
Microbiology	33
Pathology	35
Pediatrics	37
Internal Medicine	40
Physiology	43

## SPONSORED PROGRAM AWARDS FY18-FY25:

▲ **109%** increase over 8 years

This milestone represents the eighth consecutive year of record-setting funding.



**FACULTY MEMBER HIGHLIGHTS**

**Jurga Adomaityte, M.D.**, Internal Medicine, School of Medicine, Outstanding Teacher Awards in Undergraduate Medical Education

**Irfan Ahmed, Ph.D.**, Computer Science, College of Engineering, NSA / DHS Center for Academic Excellence in Cybersecurity (CAE) Community Service Award

**Alex Ambrose, D.O.**, Psychiatry, School of Medicine, Outstanding Teacher Awards in Undergraduate Medical Education

**Ananda Amstadter, Ph.D.**, Psychiatry, School of Medicine, Virginia Commonwealth University National / International Recognition Award (NIRA)

**Christine Lee Bae, Ph.D.**, School of Education, Virginia Commonwealth University National / International Recognition Award (NIRA)

**Dipankar Bandyopadhyay, Ph.D.**, School of Public Health, Massey Comprehensive Cancer Center, 2024 Fellow of the American Association for the Advancement of Science

**Paula Bos, Ph.D.**, Pathology, School of Medicine, Virginia Commonwealth University National / International Recognition Award (NIRA)

**Michael Broda, Ph.D.**, School of Education, American Educational Research Association (AERA), Dr. Carlos J. Vallejo Memorial Award for Lifetime Contributions to Social Justice in Education, Virginia Commonwealth University National / International Recognition Award (NIRA), AERA 2025 Publications Reviewer Award

**Christopher A. Brooks, Ph.D.**, World Studies, College of Humanities and Sciences, and Naomi Hodge-Muse, Bill Fisher Award for Best First Book: Nonfiction Gold Award from the Independent Book Publishers Association

**Gretchen Brophy, Pharm.D.**, School of Pharmacy, Clinical Pharmacy and Pharmacology Designated Seat on the Society of Critical Care Medicine Council

**Beth Bukoski, Ph.D.**, School of Education, Virginia Commonwealth University Charles P. Ruch Award for Excellence in Teaching

**Kevin Byrd, D.D.S., Ph.D.**, Massey Comprehensive Cancer Center, School of Dentistry, Philips Institute for Oral Health Research, Sunstar Foundation World Perio Research Award

**Casey Cable, M.D.**, Internal Medicine, School of Medicine, CHEST 2024 Critical Care Network Rising Star Award

**Lane B. Carasik, Ph.D.**, College of Engineering, Department of Energy (DoE) Early Career Research Award, American Society of Mechanical Engineers (ASME) Rising Star Award

**Jason A. Carlyon, Ph.D.**, Internal Medicine, School of Medicine, Distinguished Mentor Award

**Staci Carr, Ph.D.**, School of Education, AERA 2025 Review of Research Award

**Carlos E. Castano, Ph.D.**, College of Engineering, American Society of Mechanical Engineers (ASME) Rising Star Award, Engineering Directorate's Civil, Mechanical and Manufacturing Innovation Division National Science Foundation CAREER award

**Andrene J. Castro, Ph.D.**, School of Education, AERA 2025 Publications Reviewer Award

**Nauman Chaudary, M.D.**, Internal Medicine, School of Medicine, American College of Chest Physicians Distinguished CHEST Educator Award

**Ericka Crouse, Pharm.D.** School of Pharmacy, American Association of Psychiatric Pharmacists Fellow

**Cana Curtis**, Office of Medical Education, Educational Innovation / Educational Research Award

**Luciana de Oliveira, Ph.D.**, School of Education, American Educational Research Association Second Language Research Special Interest Group Leadership Through Research Award, Virginia Commonwealth University Outstanding Term Faculty Award, Virginia Commonwealth University National / International Recognition Award (NIRA)

**William L. Dewey, Ph.D.**, School of Medicine, NIH National Institute on Drug Abuse (NIDA) Lifetime Achievement Award, Virginia Commonwealth University Award of Excellence

**Dave Dixon, Pharm.D.**, School of Pharmacy, ACCP Ambulatory Care PRN Outstanding Paper Award, ASHP Foundation 2024 Literature Awards' Pharmacy Practice Research Award

**Kelley Dodson, M.D.**, School of Medicine, Outstanding Teacher Awards in Undergraduate Medical Education

**Har Doshi, M.D.**, School of Medicine, Outstanding Teacher Awards in Undergraduate Medical Education

**Sharyn Dougherty, Ph.D.**, School of Public Health, 2025 Department of Social and Behavioral Sciences Teacher of the Year

**Kenneth Ellenbogen, M.D.**, Internal Medicine, VCU's University Award of Excellence

**Patrick Fadden, M.D.**, Internal Medicine, School of Medicine, Educational Innovation / Educational Research Award

**Moshe Feldman, Ph.D.**, School of Medicine, Educational Innovation / Educational Research Award

**Rebecca Forrest, M.D.**, Internal Medicine, School of Medicine, "Residency Program Director Award"

**Bernard Fuemmeler, Ph.D.**, Family Medicine and Population Health, School of Medicine, Virginia Commonwealth University National / International Recognition Award (NIRA)

**Brian Fuglestad, Ph.D.**, Massey Comprehensive Cancer Center, Eli Lilly and Co. 2024 Young Investigator Award

**Adam Garber, M.D.**, Internal Medicine, School of Medicine, Educational Innovation / Educational Research Award

**Dina Garcia, Ph.D.**, School of Public Health, 2024 Outstanding Undergraduate Faculty Mentor Award, Virginia Commonwealth University State of the Research Address

**Aaron Goldberg, M.D.**, School of Medicine, Outstanding Teacher Awards in Undergraduate Medical Education, Ob-Gyn

**Fabio Gomes, Ph.D.**, Chemistry, College of Humanities and Sciences, Ralph E. Powe Junior Faculty Enhancement, Oak Ridge Associated Universities

**Jean-Venable "Kelly" Goode, Pharm.D.**, School of Pharmacy, Kappa Epsilon / Merck Vanguard Leadership Award

**Katherine Griffin, M.D.** Family Medicine, School of Medicine, Outstanding Teacher Awards in Undergraduate Medical Education

**John D. Grizzard, M.D.**, Internal Medicine, School of Medicine, Irby-James Award for Excellence in Clinical Teaching

**Daniel Gutierrez, Ph.D.**, School of Education, American Counseling Association Fellow, Virginia Commonwealth University National / International Recognition Award (NIRA)

**Kurt Hauser, Ph.D.**, Pharmacology and Toxicology, Anatomy and Neurobiology, School of Medicine, Virginia Commonwealth University National / International Recognition Award (NIRA)

**Jeffrey H. Haynes, M.D.**, Internal Medicine, School of Medicine, MCV Physicians Distinguished Clinician Award

**Jennifer Haynes, M.D.**, Neurology, School of Medicine, Outstanding Teacher Awards in Undergraduate Medical Education

**Corrine Hill, M.Ed.**, School of Education, Virginia Commonwealth University Award of Excellence

**Jawed Iqbal, M.D.**, Pediatrics, School of Medicine, Outstanding Teacher Awards in Undergraduate Medical Education

**Kendra Johnson, Ph.D.**, School of Education, Virginia Commonwealth University Excellence in Community Engagement Award

**Jon Kaminer, M.D.**, Family Medicine, School of Medicine, Outstanding Teacher Awards in Undergraduate Medical Education

**Saul Karpen, M.D., Ph.D.**, Internal Medicine, School of Medicine, American Gastroenterological Association Council Liver Biliary Section Research Mentoring Award

**Ken Kendler, M.D.**, Psychiatry, School of Medicine, American Association for the Advancement of Science Inductee

**Adam Khader, M.D.**, Surgery, School of Medicine, Outstanding Teacher Awards in Undergraduate Medical Education

**Jawwad Khan, M.D.**, Ob-Gyn, School of Medicine, Outstanding Teacher Awards in Undergraduate Medical Education

**Kyeongmo Kim, Ph.D.**, School of Social Work, Gerontological Society of America 2025 Fellow in the Social Research, Policy and Practice Section

**Cynthia Kirkwood, Pharm.D.**, School of Pharmacy, Rufus A. Lyman Award for a February 2024 paper from the American Journal of Pharmaceutical Education

**Daniel Komorowski, M.D.**, School of Medicine, Outstanding Teacher Awards in Undergraduate Medical Education,

**Charles Kramer, M.D.**, Psychiatry, School of Medicine, Outstanding Teacher Awards in Undergraduate Medical Education

**Jessica G. LaRose, Ph.D.**, School of Public Health, 2025 David Wheeler Award for Translational Team Science, VCU Massey Comprehensive Cancer Center

**Sarah Lineberry, Ph.D.**, School of Education, Virginia Commonwealth University Community Engagement Awards of Excellence

**Fantasy Lozada, Ph.D.**, Psychology, College of Humanities and Sciences, Presidential Early Career Award for Scientists and Engineers

**Ka Un Lao, Ph.D.**, Chemistry, College of Humanities and Sciences, National Science Foundation's CAREER

**Juan Lu, M.D., Ph.D.**, School of Public Health, 2025 School of Public Health Teacher of the Year

**Kim McKnight, Ph.D.**, School of Education, Schaberg Chair of Practice, 2025 Dominion Energy Richmond History Makers Creating High Quality Educational Opportunities Award, Virginia Commonwealth University Community Engagement Awards of Excellence

**Sandy Mullen Mitchell, Pharm.D.**, School of Pharmacy, American Association of Psychiatric Pharmacists Fellow

**Meredith Mitchell, M.D.**, Pediatrics, School of Medicine, Outstanding Teacher Awards in Undergraduate Medical Education

**David Naff, Ph.D.**, School of Education, Virginia Commonwealth University Excellence in Community Engagement Award, Virginia Commonwealth University Community Engagement Awards of Excellence

**Gretchen N. Neigh, Ph.D.**, Internal Medicine, School of Medicine, Professional Achievement Award

**FACULTY MEMBER HIGHLIGHTS**

**Youngman Oh, Ph.D.**, Pathology, School of Medicine, National Academy of Inventors Inductee

**Oxana Palesh, Ph.D.**, Massey Comprehensive Cancer Center, National Cancer Institute Outstanding Contributions Certificate

**Lauren Pamulapati, Pharm.D.**, School of Pharmacy, Board of Pharmacy Specialties' 2025 Rising Star Award

**Kennerly (Clint) Patrick, D.O.**, Internal Medicine, School of Medicine, Outstanding Teacher Awards in Undergraduate Medical Education

**Kimberly S. Pedram, M.D.**, Internal Medicine, School of Medicine, Enrique Gerszten, M.D., Faculty Teaching Excellence Award

**Robert Perera, Ph.D.**, School of Public Health, 2025 Department of Biostatistics Teacher of the Year

**Katherine Peterman**, School of Public Health, 2025 School of Public Health Staff of the Year

**Seb Prohn, Ph.D.**, School of Education, Virginia Commonwealth University Community Engagement Awards of Excellence

**Elizabeth Prom-Wormley, Ph.D.**, School of Public Health, 2025 Department of Epidemiology Teacher of the Year

**Jason Reed, Ph.D.**, Physics, College of Humanities and Sciences, National Academy of Inventors Inductee

**Fadi Salloum, Ph.D.**, Massey Comprehensive Cancer Center, State Council of Higher Education Dominion Energy Outstanding Faculty Award

**Devanand Sarkar, Ph.D.**, Human and Molecular Genetics, School of Medicine, Virginia Commonwealth University National / International Recognition Award (NIRA)

**Arun J. Sanyal, M.D.**, Internal Medicine, Lifetime Contribution Award from Dr V. Mohan's Diabetes Specialities Centre

**Curtis N. Sessler, M.D.**, Internal Medicine, School of Medicine, American College of Chest Physicians Distinguished CHEST Educator Award

**Christine Spence, Ph.D.**, School of Education, Virginia Commonwealth University National / International Recognition Award (NIRA)

**Kurt Stenhagen, Ph.D.**, School of Education, Spring 2025 Charles P. Ruch Award for Excellence in Teaching

**Richard K. Sterling, M.D.**, Internal Medicine, School of Medicine, Teaching Excellence

**Kamden Strunk, Ph.D.**, School of Education, American Counseling Association, Fellow (2025), University of Central Florida Outstanding Alumni Award (2025), Virginia Commonwealth University's Outstanding Mentor Award (2025), Virginia Commonwealth University National / International Recognition Award (NIRA)

**Yue Sun, Ph.D.**, School of Dentistry, Philips Institute of Oral Health Research, VCU Massey Comprehensive Cancer Center, VCU Massey Comprehensive Cancer Center Best Basic Science Paper of the Year Award

**Dewey Taylor, Ph.D.**, Mathematics, College of Humanities and Sciences, 2025 M. Gweneth Humphreys Award, Association for Women in Mathematics

**Maria Thomson, Ph.D.**, School of Public Health, 2025 Social and Behavioral Sciences Department Service Award

**Nolan Wages, Ph.D.**, School of Public Health, 2024 Virginia Commonwealth University National / International Recognition Award (NIRA)

**Lauryn Walker, Ph.D., R.N.**, School of Public Health, 2025 Department of Health Policy Teacher of the Year

**Xuwei Wang, Ph.D.**, Chemistry, College of Humanities and Sciences, State Council of Higher Education Dominion Energy Outstanding Faculty Award

**Cesley Watkins**, Internal Medicine, School of Medicine, "Program Coordinator Award"

**Paul Wehman, Ph.D.**, School of Education, 2025 National Distinguished Career Award from the Association for Rehabilitation Research, Policy and Education, Virginia Commonwealth University Distinguished Teaching Award

**Angela West**, School of Education, Virginia Commonwealth University Community Engagement Awards of Excellence

**Dayanjan "Shanaka" Wijesinghe, Ph.D.**, School of Pharmacy, 2024-2025 AACP Biological Sciences Section Innovation in Teaching Award

**Dayanjan "Shanaka" Wijesinghe, Ph.D., Lauren M. Caldas, Pharm.D., and Krista L. Donohoe, Pharm.D.**, School of Pharmacy, 2024 AACP Laboratory Instructors Special Interest Group's Laboratory Innovation and Teaching Excellence Award

**Darren S. Witte, M.D.**, Internal Medicine, School of Medicine, Leonard Tow Humanism in Medicine Award presented by The Arnold P. Gold Foundation

**Rashida H. Woods, M.D.**, Emergency Medicine, School of Medicine, "Fellowship Director Award"

**Marcie Wright, Ph.D.**, School of Public Health, 2024 Outstanding Term Faculty Award, VCU's Annual Faculty Convocation

**Yaoying Xu, Ph.D.**, School of Education, Virginia Public School Behavior Analyst Network (VAPSBAN) Leadership Award, The Carlos J. Vallejo Memorial Award, Virginia Commonwealth University Division of Community Engagement Excellence in Community Engagement



# UNIVERSITY NATIONAL RANKINGS

167 VCU RESEARCHERS IN WORLD'S TOP 2%

Stanford University's prestigious list of "World's Top 2%" scientists is based on a 2% or above percentile rank of approximately all scientists worldwide. Virginia Commonwealth University researchers are prominently highlighted on this list, with 167 VCU scholars recognized as being in the world's top 2% of researchers based on career-long impact and recent year impact metrics.

## 2025 TOP 500 (OVERALL)

**Arun J. Sanyal, M.D.**, Department of Internal Medicine, School of Medicine

**Kenneth S. Kendler, M.D.**, Department of Psychiatry, School of Medicine

## 2025 TOP 50 (SPECIALTY)

**Arun J. Sanyal, M.D.**, Department of Internal Medicine, School of Medicine

**Kenneth S. Kendler, M.D.**, Department of Psychiatry, School of Medicine

**John D. Milliman, Ph.D.**, Department of Physics, College of Humanities and Sciences

**Jasmohan S. Bajaj, M.D.**, Department of Internal Medicine, School of Medicine

**Warren Greg Miller, Ph.D.**, Department of Pathology, School of Medicine

**Shawn O. Utsey, Ph.D.**, Department of Psychology, College of Humanities and Sciences

**Russell A. Barkley, Ph.D.**, Department of Psychiatry, School of Medicine

## CAREER TOP 500

**Kenneth S. Kendler, M.D.**, Department of Psychiatry, School of Medicine

## CAREER TOP 50 (SPECIALTY)

**Kenneth S. Kendler, M.D.**, Department of Psychiatry, School of Medicine

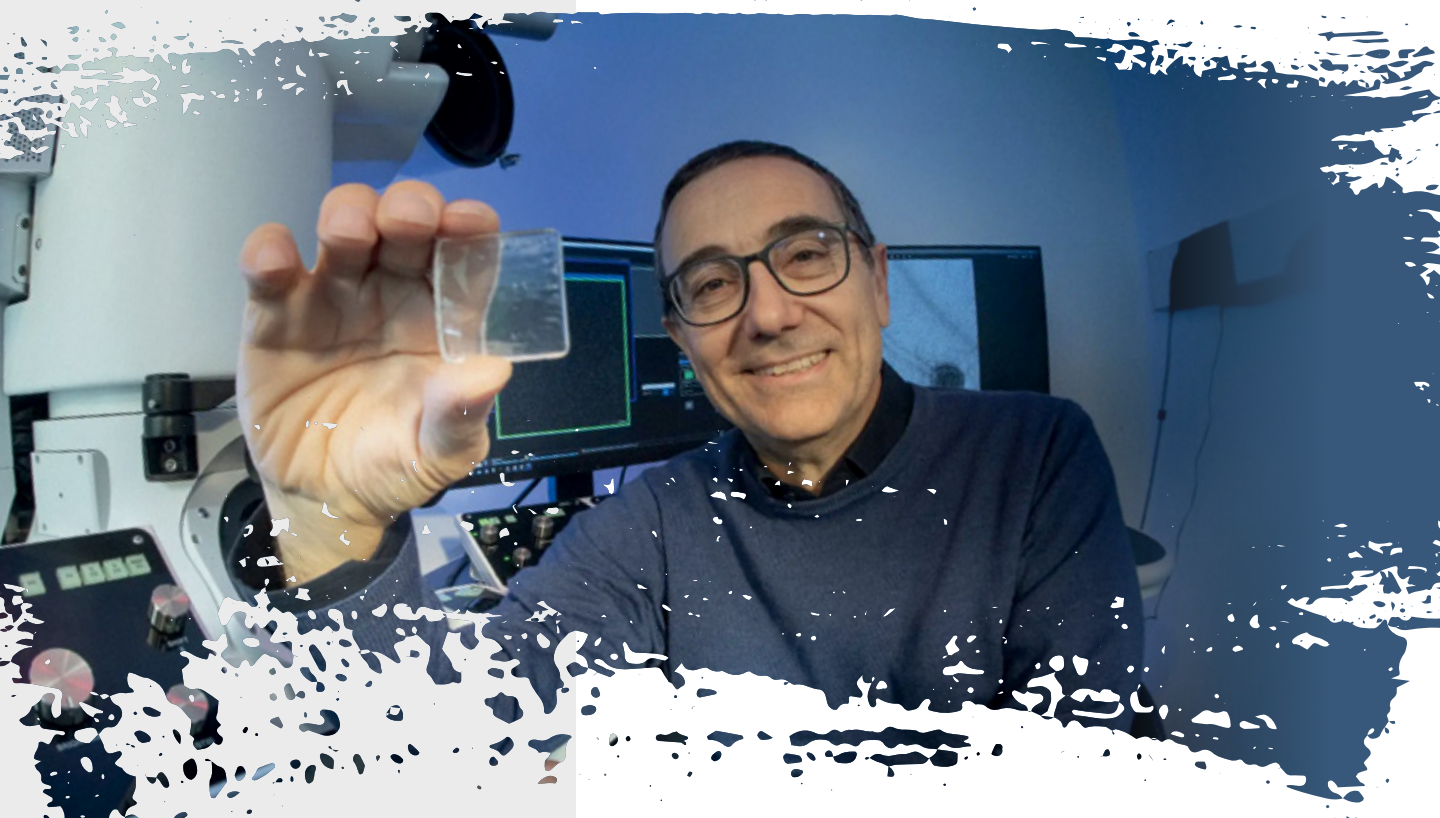
**Arun J. Sanyal, M.D.**, Department of Internal Medicine, School of Medicine

**Russell A. Barkley, Ph.D.**, Department of Psychiatry, School of Medicine

**Lindon J. Eaves, Ph.D., D.Sc.\*** Human and Molecular Genetics, School of Medicine

**Warren Greg Miller, Ph.D.**, Department of Pathology, School of Medicine

\*Dr. Eaves passed away March 8, 2022




# VCU INNOVATOR OF THE YEAR

## IS 'PROOF OF PATHWAY' TO SUCCESS FOR PHYSICISTS

**M**assimo Bertino, Ph.D., a professor in the Department of Physics at the VCU College of Humanities and Sciences, is the first physicist to be named Innovator of the Year in the 17-year history of the award. Bertino developed a safer, cheaper method to produce the world's best insulators, aerogels, which are thinner, lighter and superior to conventional materials. Dr. Bertino's aerogel company, ThermaGEL Innovations, is working to commercialize the insulation products at a larger, more sustainable scale. The large-scale manufacturing of these advanced, energy-efficient aerogels is expected to significantly reduce greenhouse gas emissions and improve global energy efficiency and building safety, proving that transformative innovation flourishes across all scientific disciplines. "VCU, and TechTransfer and Ventures specifically, has really given us the experts and guidance to help us understand what is required to bring our aerogel materials to market," Bertino said. "VCU has given me the freedom to realize my dreams."



 **\$4.3M**  
licensing revenue

 **171** Patents filed

 **111** invention disclosures

 **20** Patents issued

 **17** licenses to start-ups

 **8** new start-ups



## AT THE HUGE CONSUMER ELECTRONICS SHOW, A TINY INNOVATION FROM VCU GETS A SPOTLIGHT

**S**upriyo Bandyopadhyay, Ph.D., a professor in the College of Engineering's Department of Electrical and Computer Engineering and in the College of Humanities and Sciences' Department of Physics, is on the cutting edge of developing next-generation, low-power "nano-antennas," which could change how many communication devices are built and used.

Bandyopadhyay's ultra-small antennas overcome the size limitations of traditional antennas by using magnetic (spin) and acoustic waves to generate radio signals. This innovative design allows for devices that are smaller,

smarter and significantly more energy-efficient. The technology was spotlighted at the Consumer Electronics Show (CES) by the Canadian startup Seta Connectivity, which is commercializing the designs. This tiny technology's potential impact is vast, promising to revolutionize industries from medical implants that communicate without needing battery replacements to ultra-efficient on-chip wireless systems and stealth devices. The antennas can even perform "beam steering" with a single miniature unit, a feat that currently requires large, multi-antenna systems.



## VCU INVENTOR GIVES LAWMAKERS A LOOK AT THE VIRTUAL REALITY TREATMENT THAT IS SERVING VETERANS' MENTAL HEALTH

**J**arrold Reisweber, Psy.D., affiliate assistant professor in VCU's Department of Psychology in the College of Humanities and Sciences, as well as a clinical psychologist at the Central Virginia Veterans Affairs Health Care System, visited Washington D.C., to showcase The Retreat, a VR program to address mental health and substance use disorders in veterans.

The Retreat, a self-directed therapy program developed with Lighthouse XR, immerses veterans in a serene, virtual lakeside cabin to teach basic concepts of Cognitive Behavioral Therapy (CBT). Dr. Reisweber

demonstrated the technology to lawmakers to advocate for its use in combating the opioid crisis. The goal is to extend the therapeutic reach of practitioners, essentially turning one-hour sessions into 11 hours of self-guided practice. Data shows that veterans using the headsets are 43% more likely to complete treatment, often engaging with the program late at night, suggesting they are turning to The Retreat instead of substances. The technology is a high-tech, engaging way to complete therapy "homework," and is already in use at multiple VA facilities.

## ENRICHING THE HUMAN EXPERIENCE

aims to improve human life through technology, education and culture.

**It focuses on:**  
Technological advancements; educational innovations; cultural enrichments.

## SUPPORTING SUSTAINABLE ENERGY AND ENVIRONMENTS

aims to create a more sustainable future by addressing environmental challenges and promoting clean energy solutions.

**It focuses on:**  
Renewable energy and environmental innovation; environmental education and outreach; sustainable materials and infrastructure.

## OPTIMIZING HEALTH

aims to improve human health through research, technology and innovation.

**It focuses on:**  
Disease reduction and wellness; technological advancement and data science; drug and device development.

## ADVANCING SOCIETAL WELLBEING

aims to examine the factors that influence the well-being of individuals, communities, and society as a whole.

**It focuses on:**  
Identifying solutions for societal challenges contributing to social determinants of health, the conditions in which people are born, grow, live, work and age.

Enriching the human experience

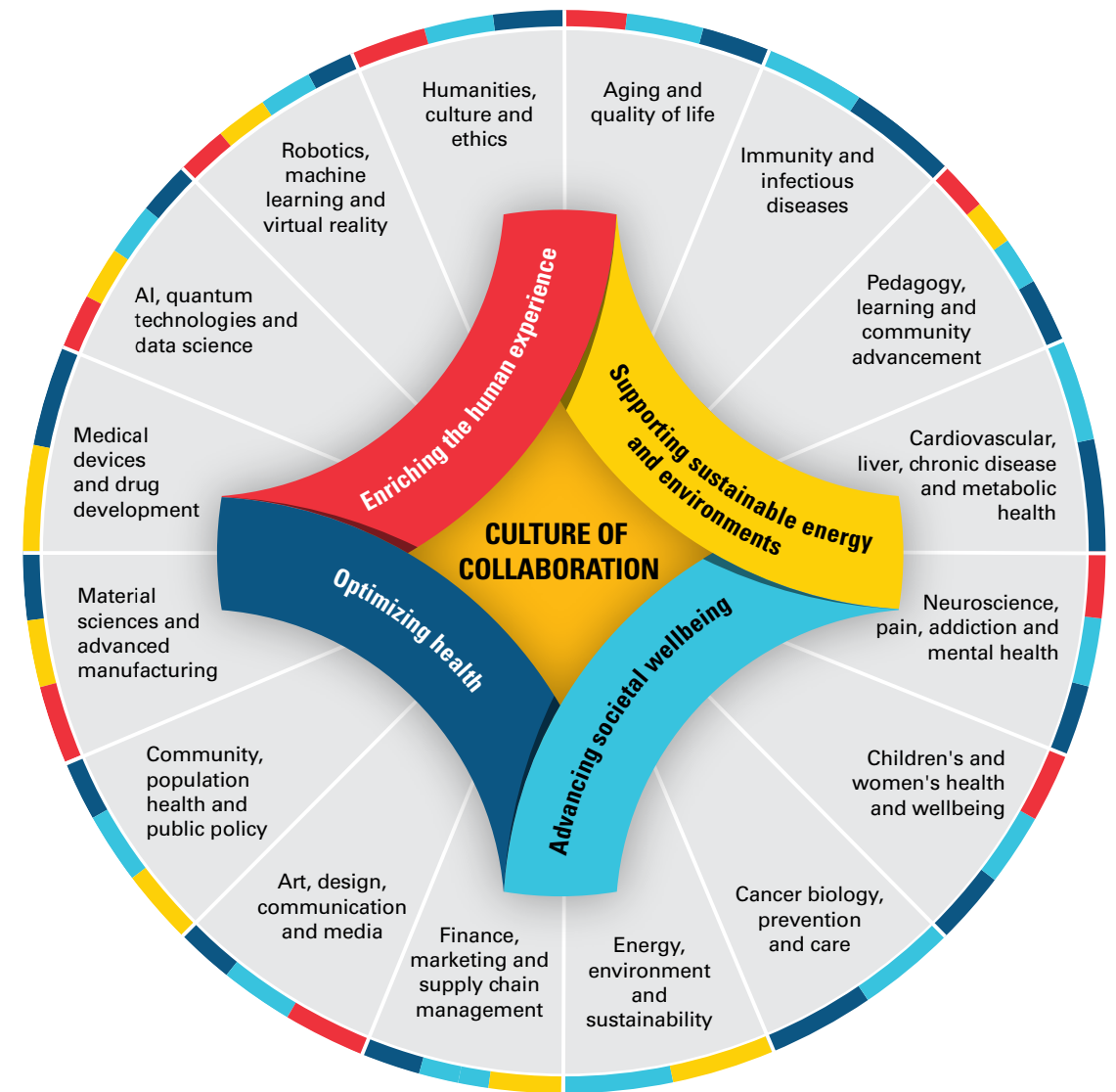
Supporting sustainable energy and environments

Optimizing health

Advancing societal wellbeing



# RESEARCH CLUSTERS



Denotes affiliation with Strategic Research Priorities

At VCU, we believe in a transdisciplinary approach to address societal and global challenges. When we're working together, we're able to achieve more, we're able to break down roadblocks and barriers, supporting one another in our venture to solve the most vexing issues. We strive to advance human discovery and make tomorrow better.

Building on our VCU Research Strategic Priorities Plan initiatives, sixteen research clusters encapsulate all of the work our researchers are doing.

### Cluster Areas:

- Aging and quality of life
- Immunity and infectious diseases
- Pedagogy, learning and community advancement
- Cardiovascular, liver, chronic disease and metabolic health
- Neuroscience, pain, addiction and mental health
- Children's and women's health and wellbeing
- Cancer biology, prevention and care
- Energy, environment and sustainability
- Finance, marketing and supply chain management
- Art, design, communication and media
- Community, population health and public policy
- Material sciences and advanced manufacturing
- Medical devices and drug development
- AI, quantum technologies and cybersecurity
- Robotics, machine learning and virtual reality
- Humanities, culture and ethics



## TO COMBAT SEXUAL VIOLENCE AMONG COLLEGE STUDENTS, VCU RESEARCHER TURNS TO VIDEO GAMES

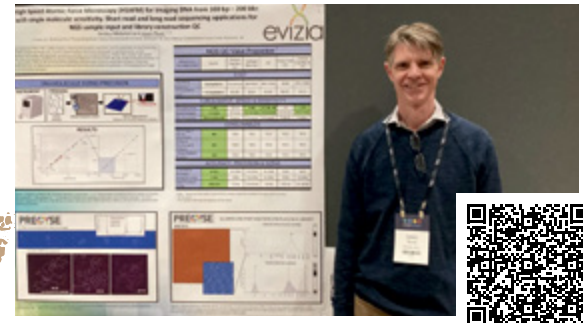
**A**drienne Baldwin-White, Ph.D., assistant professor in VCU's School of Social Work, is developing interactive training scenarios that could engage students more deeply to combat sexual violence than traditional formats.

Dr. Baldwin-White's work stems from the finding that typical college sexual violence prevention trainings are often ineffective and fail to engage students. She believes that video games offer a more appealing and effective approach to educating vulnerable students about gender-based violence and promoting active intervention.

Her initial online game, "Once Upon a Party," uses realistic, text-message-based scenarios, allowing players to practice appropriate bystander intervention by choosing how to respond to friends' messages about sexual harassment or assault at a party. The narratives are drawn from actual conversations Dr. Baldwin-White had with college students to ensure realism and relatability.

Building on this, she is developing a second, animated game, "Student Body," in collaboration with VCU computer science students. This game uses a "choose your own adventure" format and significantly expands representation to reflect campus diversity, incorporating narrative arcs featuring LGBTQ+ identities and people of color and also includes training on human trafficking.

Commercialized through her company, Noble Tech, the goal is to keep the games short, focused (about 30 minutes), and low-cost to ensure broad adoption across various institutions. Dr. Baldwin-White's ultimate ambition is for these engaging tools to significantly reduce violence on campuses, thereby achieving positive academic and mental health impacts and reducing the institutional costs associated with responding to sexual violence.



## VCU-BORN STARTUP EVIZIA LANDS \$2.2M NIH GRANT FOR COMMERCIALIZATION OF ADVANCED DNA SEQUENCING MICROSCOPE

**J**ason Reed, Ph.D., a physics professor in VCU's College of Humanities and Sciences, developed an instrument that uses high-speed atomic force microscopy, a technology initially used in semiconductor manufacturing quality control.

Dr. Reed's technology is the foundation for his VCU-born startup, Evizia. The company recently secured a \$2.2 million Small Business Innovation Research grant from the National Institutes of Health, through the National Human Genome Research Institute, to optimize the manufacturing of its advanced microscope system. This platform, called PRECYSE, addresses critical shortcomings in next-generation DNA sequencing.

Current molecular sizing techniques, like electrophoresis, use indirect imaging, which is unreliable for larger molecules, can miss data and often leads to costly quality control issues in DNA sequencing. PRECYSE solves this by providing direct, high-resolution feedback on sample quality before sequencing begins.

The instrument uses a tiny, nanometer-sized probe to rapidly scan biomolecules, creating a three-dimensional topographical map. This map is then analyzed by machine learning software to obtain precise molecular sizing. This process offers a faster, more accurate alternative to older methods.

The PRECYSE platform is designed for wide adoption in bio-labs, being compact and featuring a built-in stability system to withstand standard lab environments. Furthermore, its sample preparation is simpler and eliminates the need for toxic consumables, reducing both complexity and cost. Evizia plans to use the grant to scale up production and is exploring future applications in genetic analysis, such as the detection of mutated inherited disease genes and cancer-related structural rearrangements. By eliminating "blind spots" in DNA visualization, PRECYSE aims to significantly increase the quality of next-generation sequencing and support the development of new diagnostics and therapeutics.



## INFANT MORTALITY RATES DECLINING, BUT SUDDEN UNEXPECTED INFANT DEATH IS ON THE RISE

**N**ew research from VCU and Children's Hospital of Richmond at VCU shows SUID is increasing across the board, with the highest rates among Black, Native Hawaiian and Native American infants.

The study was led by **Elizabeth Wolf, M.D.**, a pediatrician at Children's Hospital of Richmond at VCU and an associate professor in the VCU School of Medicine's Department of Pediatrics. Key contributors included **Steven Woolf, M.D.**, director emeritus of the VCU Center on Society and Health, and **Anabel Sen, M.B.B.S.**, a student in Epidemiology from the VCU School of Public Health, among others.

Published in the Journal of the American Medical Association Pediatrics, the study found that while the overall U.S. infant mortality rate decreased by 24.2% between 1999 and 2022, mortality from SUID rose significantly by 11.8% from 2020 to 2022. A prior study had noted the rise primarily in Black infants, but this new data confirms the increase is now more generalized across infant populations.

The research highlights stark racial and ethnic disparities in SUID. The mortality rate for Black infants is 10 times higher than for Asian infants and three times higher than for white infants. These disparities may be linked to factors like unsafe sleep positioning, prematurity, tobacco exposure and infant feeding practices, which require further investigation.

Causes for the SUID increase are complex, but the authors suggest a possible link to the rise of COVID-19 and other respiratory viruses, increased parental opioid use and the negative influence of social media on infant sleep practices (e.g., showing infants in unsafe positions or environments like adult beds and swings).

To reduce the risk of SUID, Dr. Wolf and collaborators emphasize strengthening public health messaging on safe sleep and tightening regulations on unsafe infant products. They also advocate for broader strategies like expanding health insurance access, providing doulas for prenatal and postnatal support, supporting breastfeeding through lactation support and paid parental leave and ensuring infants receive all recommended vaccines on time.



## VCU-LED RESEARCH CONSORTIUM IDENTIFIES DISTINCT LONG COVID SYMPTOMS IN CHILDREN AND TEENS

**D**espite extensive research, there is still a significant lack of understanding on the impact long COVID has on children and adolescents. But a nationwide study with contributions made by nurse scientists at the Virginia Commonwealth University School of Nursing is helping to set new standards in diagnosing and treating this condition.

**Patricia Kinser, Ph.D.**, interim dean of the School of Nursing and **Amy Salisbury, Ph.D.**, associate dean of research, scholarship, and innovation in the School of Nursing, are leading a multi-institutional research consortium focused on long COVID pediatric patients as part of the Researching COVID to Enhance Recovery (RECOVER) initiative, a nationwide study funded by the National Institutes of Health.

The study, published in the Journal of the American Medical Association, provides crucial insights after surveying over 5,000 participants aged 6 to 17, recruited from more than 60 U.S. health care and community settings. Researchers identified 14 symptoms that were significantly more prevalent in participants with a history of COVID-19 infection.

A key advancement was identifying distinct symptom patterns, or phenotypes, across age groups. School-age children primarily presented with neurocognitive problems, pain and gastrointestinal symptoms. In contrast, adolescents more frequently experienced changes in smell or taste, pain and fatigue or malaise.

These findings represent a significant leap forward, allowing researchers and clinicians to refine diagnostic tools and develop targeted management guidelines for pediatric long COVID. The guidelines help identify children and adolescents at high risk and address the resulting decline in their overall health and quality of life.

As the RECOVER-Pediatrics study continues, future work will explore the long-term progression of symptoms and their impact on quality of life. The initiative also plans to investigate potential genetic factors that may predispose individuals to more severe or persistent symptoms, ultimately driving the development of personalized treatment approaches tailored to the unique needs of young patients.

## VCU RECEIVES \$6 MILLION FROM DEPARTMENT OF DEFENSE

### TO STUDY TREATMENT FOR LONG-TERM CONCUSSION SYMPTOMS

**James Burch, Ph.D.**, a professor in VCU's School of Public Health, and **William Walker, M.D.**, a professor in the School of Medicine, received a \$6 million grant from the Department of Defense for a four-year study, named HERO (HRV Biofeedback for Enhancing Autonomic Resilience and mTBI Outcomes), focused on treating ongoing symptoms of mild traumatic brain injury (mTBI), or concussion. The research will specifically evaluate the effectiveness of Heart Rate Variability (HRV) biofeedback for veterans and service members who suffer from issues like poor sleep, fatigue, dizziness and trouble with memory or concentration after a concussion.

HRV biofeedback is a technique that teaches patients to control their breathing in a specific pattern (e.g., five seconds in, five seconds out) to regulate their heart rate. By monitoring their heart rate on a screen, patients learn to actively improve the function and resiliency of their body's autonomic nervous system, which is often disrupted after a concussion.

Researchers hypothesize that HRV biofeedback will be more effective than current educational treatments because it actively helps the nervous system return to a healthier state. The study's major goals include determining which patients, such as those with multiple concussions or co-occurring PTSD, benefit most from the treatment, and if women respond differently.

The treatment's potential is significant because it's low-cost, non-pharmacological and non-surgical. As Dr. Burch notes, once patients learn the technique, they gain a valuable tool they can use anytime they feel stressed.

"What's really neat is we're not in this to keep people bound to the medical system," said Dr. Burch. "When we show people this technique, they can use it whenever they need. Whenever they're stressed out – at a stoplight, standing in line or just dealing with trauma – they can use this breathing technique."

If successful, HRV biofeedback could become a common treatment, potentially helping to lower the risk of associated conditions like dementia for veterans and civilians alike.



## 13% OF PATIENTS WITH DEMENTIA MAY INSTEAD HAVE COGNITIVE DECLINE FROM CIRRHOSIS

**R**esearch team at VCU School of Medicine and Richmond VA Medical Center delve further into the connection between dementia and liver health.

A new analysis led by VCU and the Richmond VA Medical Center suggests that approximately 13% of individuals diagnosed with dementia may instead be suffering from a reversible cognitive decline caused by advanced liver disease, known as hepatic encephalopathy. This finding, recently published in the American Journal of Medicine, corroborates and extends the research group's earlier work which found a similar link in U.S. veterans.

Hepatic encephalopathy is a serious nervous system disorder triggered by cirrhosis, or the severe scarring of the liver. When the liver fails to properly filter the blood, toxins build up and travel to the brain, causing confusion and cognitive impairment that can be difficult to differentiate from true dementia.

The new study examined the health records of nearly 69,000 nonveteran patients diagnosed with dementia and found that almost 13% had high scores on the FIB-4 index, a noninvasive tool used to estimate the level of liver scarring.

**Jasmohan Bajaj, M.D.**, a gastroenterologist with the VCU Stravitz-Sanyal Institute for Liver Disease and Metabolic Health and the Richmond VA Medical Center, was a contributing author and corresponding author on the study. Dr. Bajaj emphasized the importance of using simple screening tools: "This important link between dementia and liver health emphasizes the importance of screening patients for potentially treatable contributors to cognitive decline."

The research strongly recommends that clinicians treating patients with dementia, even those without a prior cirrhosis diagnosis, should assess them for liver disease using tools like the FIB-4 index. Early detection of cirrhosis and subsequent treatment can readily rid the body of toxins, potentially reversing or halting the cognitive impairment and improving patients' lives. Dr. Bajaj added, "Early detection of liver issues... could help ensure that patients get access to targeted and appropriate therapies."



Photo: AJEONG\_JM,  
Wikipedia Commons



## CELEBRITY ENDORSEMENTS CAN DRIVE ADVOCACY BY FANS, VCU RESEARCHER FINDS

**Baobao Song, Ph.D.**, assistant professor in VCU's Richard T. Robertson School of Media and Culture in the College of Humanities and Sciences, found that endorsements and advocacy campaigns from the South Korean boy band, BTS, and other celebrities could change fans' advocacy behavior, or willingness to take action as well as change their behaviors.

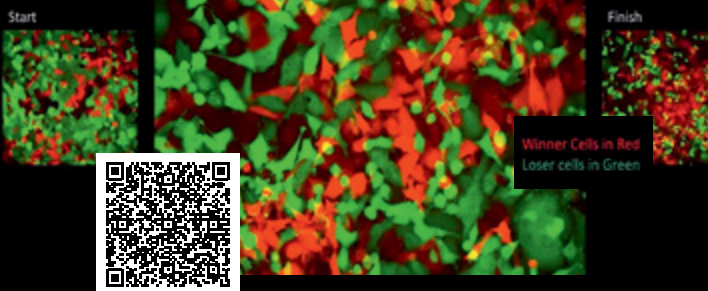
Dr. Song's research investigates how celebrity endorsements and corporate social responsibility efforts can be translated into real-world action by dedicated fanbases. She focused on the BTS ARMY, an international fandom known for its high level of engagement and activism. For example, ARMY members quickly matched BTS's \$1 million donation to Black Lives Matter in 2020. This unique attachment drives fans to participate, believing, "I want to see them succeed. I want the fandom to succeed."

The study specifically assessed how BTS's ongoing partnership with the United Nations on Sustainable Development Goals influenced fans' intentions to engage in related volunteering and advocacy work. Dr. Song and co-author Minhee Choi, Ph.D., conducted interviews and surveyed 424 Gen Z and millennial U.S. adults who self-identified as BTS fans.

The survey results strongly supported the idea that celebrity advocacy shapes fans' behavioral intentions. This effect is driven by three key factors: Interdependence between fans and the celebrity; the fans' individual identification within the fandom; and the fandom's norms and participatory culture.

These findings offer valuable insights for organizations seeking to partner with celebrities to advance social causes. Dr. Song advises that the partnership's success hinges on whether the celebrity has a strong personal connection and high interdependence with their fanbase, making fans genuinely motivated to follow the celebrity's lead in taking actual behavioral action to support the cause. This research demonstrates the considerable influence highly engaged fandoms can wield in promoting social change.

## VCU RESEARCHERS' IMPACT STORIES



## GENETIC CODE DEPLOYS CANCER MAFIA, NEW TARGETED DRUG GIVES THEM AN OFFER THEY CAN'T REFUSE

A group of scientists at VCU Massey Comprehensive Cancer Center have revealed a new genetic code that acts like a cancer ringleader, recruiting and deploying a gang of tumor cells to incite a biological turf war by invading healthy organs and overpowering the normal cells. This discovery could unveil an entirely different understanding of the origins of cancer within the body, as well as offer groundbreaking insight into new treatment strategies that could target the growth of tumors in their earliest stages.

The research, published in Nature Biotechnology, was co-authored by **Esha Madan, Ph.D.**, and **Rajan Gogna, Ph.D.**, both assistant professors in the VCU School of Medicine. Dr. Madan explained that cancer cells "gaslight the human body," altering the host cell's genome to lower its fitness, giving the cancer a distinct advantage. The key lies in a previously unknown protein, the Flower gene, which expresses itself as two fitness codes: Flower-Win and Flower-Lose. Cancer cells overexpress the Flower-Win code, signaling their dominance and effectively acting as a "local bully" to overpower normal cells, which typically express Flower-Lose.

The VCU team has already patented a targeted solution: a monoclonal antibody administered intravenously. This drug works by masking the expression of the Flower-Lose code on healthy cells, enabling the body to resist the invaders and continue its "neighborhood watchdog routine." This treatment has already shown effectiveness in models of ovarian cancer, significantly reducing tumor growth and improving survival.

Study co-author **Robert A. Winn, M.D.**, director of Massey Comprehensive Cancer Center, noted that these findings could "forge the path for new treatments that are able to target tumors in the first, most curable stages of disease." The ultimate goal is to investigate the efficacy of this antibody in clinical trials, with the hope that the implications will be universal to treating all cancer types.

CANCER BIOLOGY, PREVENTION AND CARE



## AI METHOD CAN HELP BRANDS SAVE TIME AND MONEY IN REFINING THEIR ADVERTISING

A new method using artificial intelligence can help businesses save time and money in refining their advertising visuals, according to **César Zamudio, Ph.D.**, associate professor in the VCU School of Business and a specialist in marketing analytics. Visual stimuli, such as color and size, are fundamental to marketing experiments that reveal how consumers think and behave. However, Zamudio notes, "for decades, researchers have struggled to create high-quality ad images for experiments – they either looked unprofessional or were too expensive to make."

In a recent Journal of Advertising article, Zamudio and co-authors explored the use of image generative AI (iGenAI) for faster and less costly production of visual stimuli. They introduced RAISE (Rapid Artificial Intelligence Stimuli for Experiments), a new methodology that requires no programming and relies on commercially available tools. Zamudio stated that RAISE generates ad images quickly, cheaply, and at the same quality as traditionally created ads. Five studies involving nearly 1,800 participants confirmed this, showing participants could not differentiate between the AI-generated and researcher-generated stimuli.

This innovation could help small businesses level the playing field. "Instead of spending weeks and thousands of dollars on ad visuals, managers can use AI to generate high-quality drafts in minutes, allowing teams to focus on what truly matters — strategy, storytelling and brand-building," Zamudio said. For consumers, this could result in more relevant, personalized ads that closely match their interests. As AI becomes a more prominent tool, the researchers also addressed ethical concerns, proposing four AI safeguards within the RAISE methodology to ensure content remains transparent, fair and responsible.

FINANCE, MARKETING AND SUPPLY CHAIN MANAGEMENT



## VCU STUDENTS EMBRACE THE CALL OF THE WILD

Two new environmental studies field courses at VCU are showcasing the power of hands-on learning, reflecting the mission of the university's new School of Life Sciences and Sustainability. These experiential courses took students far from campus to focus on crucial environmental issues and build professional skills.

The Buffalo National River seminar was co-led by **James Vonesh, Ph.D.**, a professor and assistant director in the Center for Environmental Studies. Dr. Vonesh emphasized the course's role in developing "the next generation of river stewards" as part of the River Management Society's River Studies and Leadership Certificate program. Students on this hybrid online / field trip traveled to the Buffalo National River in Arkansas, where they developed outdoor leadership skills, including canoeing, rafting and river safety, while collecting data to compare the health of the Buffalo River with rivers in their home regions. This work contributed to student posters presented at national symposiums.

The Wilderness and Wildlife course was taught by avian ecologists **Lesley Bulluck, Ph.D.**, an associate professor in the Center for Environmental Studies, and **Dan Albrecht-Malinge**. This course's objective was to combine student learning in three distinct areas: natural history, human history and outdoor adventure. During a five-day trip to the South Carolina low country, students spotted 92 species of birds and camped in diverse ecosystems, including coastal marsh and longleaf pine savannas, to gain a "much more powerful and meaningful experience ecologically." Dr. Bulluck highlighted that camping and enduring challenges also led to significant team building and the development of resilience both in the students and as a reflection on the regional ecosystems.

Both courses highlight VCU's commitment to creating a pipeline for students interested in careers with federal agencies, nonprofits and park services.



ENERGY, ENVIRONMENT AND SUSTAINABILITY



# RICHMOND'S HISTORIC PUMP HOUSE 'WORKS' AGAIN, THANKS TO VCU AND VR

Richmond's historic Pump House, a defunct utility building and event space in Byrd Park, is now "working" again thanks to a multi-year collaboration between VCU students and the Friends of Pump House nonprofit, which used virtual reality to transport visitors to the building's heyday.

Since 2021, students from VCU's College of Engineering and School of the Arts have been instrumental in this effort. The collaboration began with a College of Engineering capstone team that modeled and animated the pumps and conducted extensive archival work to determine the original machinery in use between 1905 and 1924, preserving and uncovering significant details about Richmond's engineering history. Subsequent capstone groups modeled the generators and steam engine, and developed the final VR application using the Unity program.

**John Leonard, Ph.D.**, a computer science professor and faculty advisor for the project, noted the collaboration offers students "the perfect focal point for sharing their

newly acquired skills and expertise with the community."

The immersive VR tour, which features the basement pump room with its cranking pistons and spinning turbines, as well as the second-floor ballroom, allows visitors to experience the Gothic Revival structure as it operated a century ago. This project not only brings the past alive for visitors but provides VCU students with invaluable real-world client experience and team-based professional work, translating academic skills into a tangible community resource. The VR effort supports the nonprofit's larger goal of fully restoring the 1883 building for future use within the James River Park System.



"The Starry Night" by Vincent van Gogh. (Google Art Project)



## THE VAN GOGH MASTERPIECE 'THE STARRY NIGHT' IS MORE ART THAN SCIENCE, RESEARCHERS REPORT

Alongside colleagues at the University of Washington, **Mohamed Gad-el-Hak, Ph.D.**, the Inez Caudill Eminent Professor in VCU's Department of Mechanical and Nuclear Engineering, published a report, "Is There Hidden Turbulence in Vincent van Gogh's 'The Starry Night'?", asserting that the painting's captivating swirls do not follow the rules of flow physics, despite recent claims to the contrary.

The report, which appeared in the Journal of Turbulence, was a rebuttal to a prior paper in Physics of Fluids that received considerable attention for positing that the eddies in Van Gogh's 1889 masterpiece adhere to Kolmogorov's theory of turbulent flow. This theory, developed by 20th-century mathematician Andrey Kolmogorov, primarily applies to the velocity field in fluid flows and was later extended by Obukhov and Corrsin to scalar fields like fluid density or temperature.

Dr. Gad-el-Hak studied the nuances of this theory under Stanley Corrsin. Dr. Gad-el-Hak's objection stems from a foundational error in the earlier study's application of the theory to the painting. As outlined in the report, the assumed atmospheric flow field does not meet the theory's required assumptions.

The impact of the research is to correct a flawed scientific conclusion that was widely publicized, ensuring that Van Gogh's "The Starry Night" is understood as a fascinating and iconic work of abstract art rather than a hidden, perfectly rendered scientific model of turbulence. The VCU-led findings conclude that the previous claim that the painting accurately reproduces the size, distance and intensity of real-world turbulent whirls is "totally flawed."



## CHATBOTS, AVATARS AND MORE: VCU RESEARCHERS DELVE INTO AI'S POTENTIAL IN PUBLIC HEALTH

VCU researchers, led by **Sunny Jung Kim, Ph.D.**, assistant professor of social and behavioral sciences in the VCU School of Public Health, conducted a systematic review examining how AI-powered interactive technologies can enhance public health, specifically in cancer prevention and control as well as substance use. The findings, published in Translational Behavioral Medicine, highlight both the promise and the critical concerns associated with the use of AI-Mediated Communications (AIMC) such as chatbots and virtual agents.

The review found that interventions using AIMC showed promise in improving health behaviors like substance use recovery, physical activity and dietary habits, often with high retention rates. From the patient perspective, these technologies offer instant, personalized support and information, thereby breaking down barriers to care such as high costs, social isolation and stigma. Fully developed, evidence-based AI has the potential to revolutionize public health by providing personalized messaging, scalable outreach and real-time feedback, ultimately fostering health equity.

However, the study identified critical concerns regarding the use of AI in this context. The most significant is the need to ensure AIMC systems are trained with clinically valid and accurate health information, as incorrect or misleading responses could be harmful. Researchers must also prioritize privacy, data safety and confidentiality when handling sensitive information exchanged with AI agents. To ensure equitable access and better represent diverse populations, future research needs to implement recruitment strategies that address the finding that participants in earlier studies were predominantly female. Dr. Kim's team is currently building on these findings by developing an evidence-based chatbot prototype to support cancer survivors, with plans for a longitudinal clinical trial.



## PRE-MED STUDENT ZACHARY HODGEN IS EXAMINING WHAT WORMS CAN TELL US ABOUT THE AGING PROCESS

The rising third-year student at Virginia Commonwealth University is double-majoring in biology and political science in the College of Humanities and Sciences. As part of his pre-med studies, Hodgen is spending part of the summer in a research lab at the University of Virginia School of Medicine, where he has trained his eye on worms that might offer insight into human biology.

Hodgen is focusing on *C. Elegans* worms. Though too small to be seen without magnification, they are excellent research subjects because they share many similarities with humans and mature rapidly, growing from egg to adult in just three days, which makes their maturation process easy to study. In the lab, Hodgen isolates the worms' ribosomes, or small protein factories in cells, and examines them under an electron microscope to observe how they change appearance in young versus old worms. This ribosomal appearance closely mirrors how human ribosomes look at the same ages.

Hodgen, who is also an Emergency Medical Technician with the Staunton-Augusta Rescue Squad, received support from VCU's Internship Funding Program for his summer experience. He admitted he initially thought research would not be "his cup of tea," but the internship has solidified his path toward medicine by providing a crucial perspective. He has gained valuable insights into the "behind the scenes" of research and development that precedes new drugs and patient solutions.

The research experience has also helped him develop crucial skills like being more detail-oriented and a better problem-solver. For Hodgen, understanding research is like "understanding the first leg of the race in helping patients," making him grateful for the wealth of knowledge this experience has provided to him as an aspiring doctor.



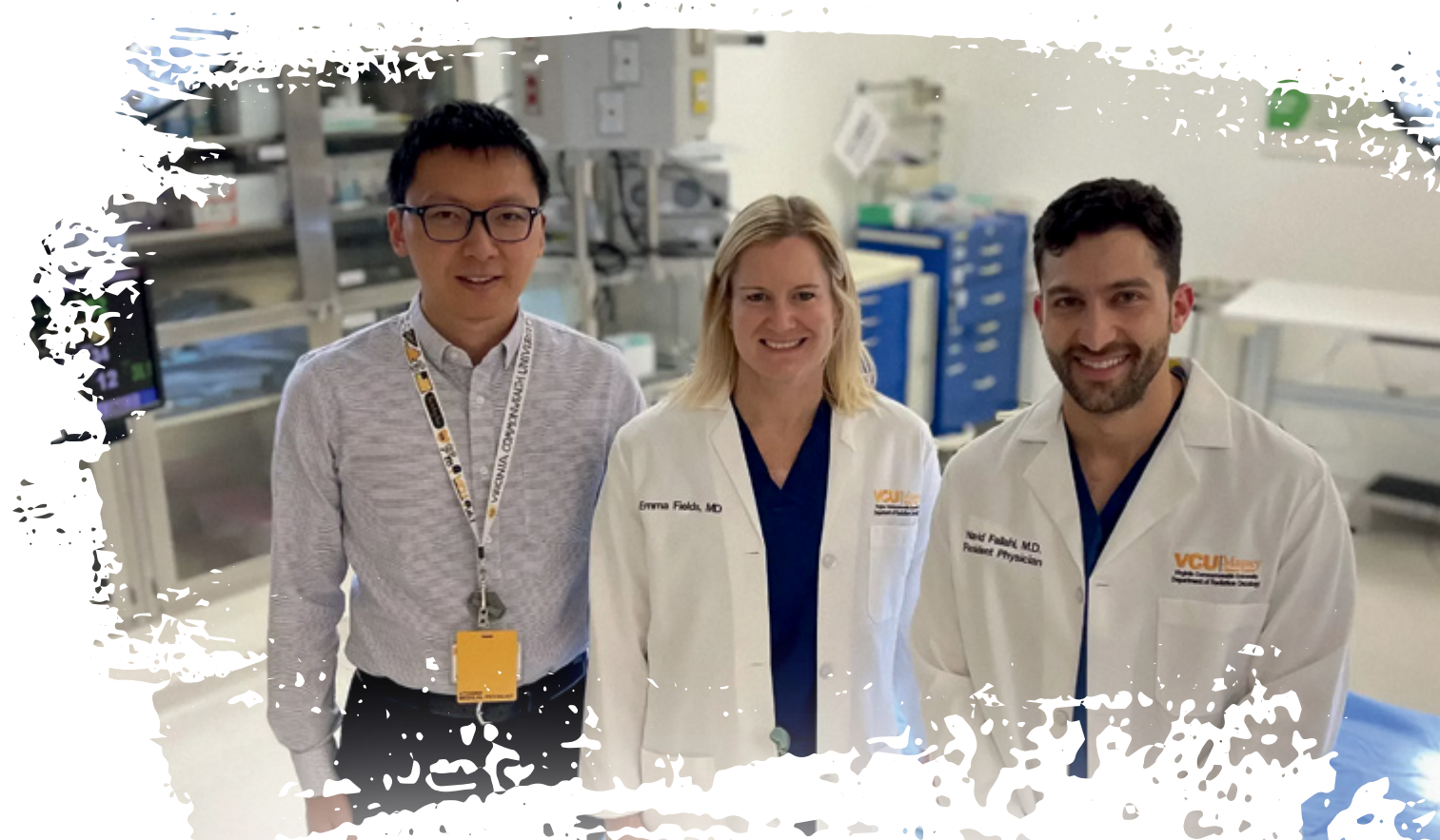
## VCU STARTUP WINS \$800K GRANT TO PROPEL ITS INFECTION-FIGHTING SURGICAL GEL

VCU startup Pascal Medical Corp., co-founded by **Barbara Boyan, Ph.D.**, the Alice T. and William H. Goodwin Jr. Professor of Biomedical Engineering and former Dean of the College of Engineering, has been awarded an \$800,000 Virginia Catalyst grant to propel the development of its infection-fighting surgical gel. Dr. Boyan, who is a National Academy of Inventors fellow and a serial entrepreneur, emphasized the innovation's potential, "we have an opportunity to change the way surgeries are done. That's what makes this work so exciting."

Pascal's core innovation is "ClickGel," an antibiotic-releasing hydrogel based on the principles of "click chemistry," which won the 2022 Nobel Prize. The material is injected during surgery, where its molecules quickly "snap" together to form a strong, fast-setting and highly adaptable sealant. This is particularly crucial for delicate procedures like brain and spinal surgery, where a surgeon may cut the dura, the protective tissue layer, and where infections are notoriously difficult to treat.

The hydrogel's ability to conform to the surgical site, not interfere with healing and deliver antibiotics directly to the wound is a major advancement over traditional surgical sealants. The company is collaborating with Monique van Hoek, Ph.D., a microbiology professor at George Mason University, to test ClickGel's potential against difficult pathogens like MRSA (methicillin-resistant *Staphylococcus aureus*).

The new Virginia Catalyst funding is a "game-changer" that provides validation of Pascal's commercialization plan and will allow the company to complete crucial studies needed for submission to the Food and Drug Administration to approve clinical trials. This effort exemplifies VCU College of Engineering's "Engineering for Humanity" mission to translate lab innovations into products that directly improve patient outcomes.



# VCU TEAM HAS DESIGNS ON A GAME-CHANGER IN WOMEN'S CANCER TREATMENT

A transdisciplinary team at VCU is developing a game-changing radiation device for treating uterine and cervical cancers, highlighting a major step toward customizable women's health care. The idea was sparked by **Navid Fallahi, M.D.**, a fourth-year clinical resident at the VCU School of Medicine, who recognized that rigid, existing brachytherapy devices often fail to account for the anatomical variations in women, leading to suboptimal radiation delivery.

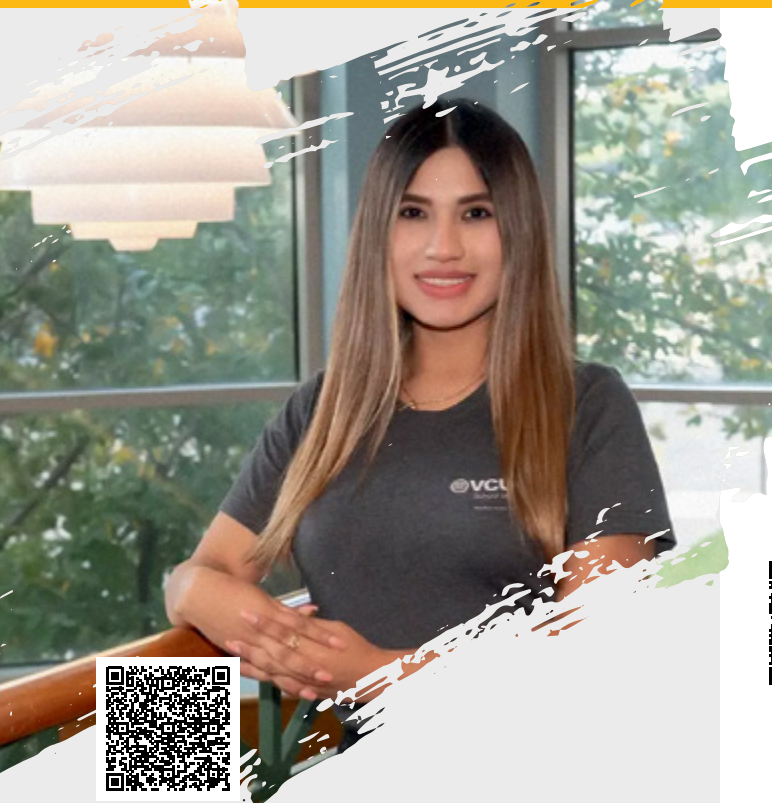
Brachytherapy is an internal treatment where a radioactive source is placed directly on or near the cancerous area, but current devices' "one-size-fits-all" design can increase radiation exposure to healthy tissues. Fallahi, advised by **Emma Fields, M.D.**, a professor and the radiation oncology residency program director at the School of Medicine and Massey Comprehensive Cancer Center, developed the concept for a steerable

tandem applicator. This innovative device features a flexible, jointed design that can be adjusted to each patient's anatomy, ensuring precise placement and minimizing impact on surrounding tissues.

The project quickly gained momentum thanks to support from VCU's innovation ecosystem, including a Commercialization Fund award from VCU's TechTransfer and Ventures office that allowed the team to begin prototyping. The ultimate goal is to obtain Food and Drug Administration clearance and commercialize the device, which has strong market potential among universities, clinics and large radiation oncology companies. As Brittney Ritchie, a licensing manager at TechTransfer and Ventures, noted, this represents a "huge step in a positive direction for women's health" by moving away from standardized treatments toward highly tailored care delivery.



*How I found my research is an occasional series featuring VCU students sharing their journeys as researchers.*



**HOW I FOUND MY RESEARCH: JOSSELYN VALENZUELA HELPS PREGNANT MOTHERS NAVIGATE DEPRESSION**

**J**osselyn Valenzuela, a graduate student in the VCU School of Social Work, serves as the bilingual research coordinator for the Mindful Moms Study, which studies the impact of mindfulness activities and social connectedness with people who are experiencing depression while pregnant.

Based in the School of Nursing, Valenzuela focuses on the Spanish-speaking participants in the study. Valenzuela first started working for the study as a research assistant when she was still an undergraduate in the School of Social Work. Valenzuela eventually earned her bachelor's degree in May and remained at VCU to pursue a master's degree in clinical social work.

When asked about her research path, Valenzuela emphasized that keeping an open mind and finding a topic that is genuinely interesting is her main advice to future researchers. "This path has opened unexpected opportunities and been profoundly rewarding. As a bilingual social worker, I find it crucial to engage with the community and advocate for underserved populations, especially pregnant moms and their unique journeys. Embrace the journey, as research can be transformative and impactful!"



**HOW I FOUND MY RESEARCH: HANNAH KHAN STUDIES THE CONNECTION BETWEEN BRAIN HEALTH AND MOVEMENT**

**H**annah Khan's research journey began when she was an undergraduate student in VCU's School of Nursing and received an intriguing email about a research fellowship. Unsure of what exactly the program entailed, she applied and to her surprise, was accepted. Khan's fellowship opened a world of opportunities and introduced her to the research process and the concept of research literacy, inspiring her to explore how, exactly, people understand research and what improvements can be made to improve the study participant experience. Her fellowship and the introduction of the concept of research literacy is what inspired her to pursue her Ph.D. in biobehavioral research in the School of Nursing.

Now serving as a research coordinator for the RAMS Study in the School of Nursing, Khan is building on what drew her into the research process by taking it a step further: she wants to tear down research barriers by forging partnerships with underserved populations in the Richmond community. "This research is vital for improving health outcomes and emphasizes community engagement to include historically underserved populations in research," said Khan.

The work the RAMS Study Team and Khan are doing is helping build a better tomorrow by equipping all older adults with the tools necessary to detect and manage cognitive decline in its earliest stages.



**HOW I FOUND MY RESEARCH: FOSUA ADU-GYAMFI LEARNS FROM UNDERGRAD EXPERIENCES AT BOTH VCU AND THE NATIONAL CANCER INSTITUTE**

**F**osua Adu-Gyamfi, a senior biology major with a chemistry minor in the College of Humanities and Sciences, found her research path through an unexpected email. Initially just looking to boost her résumé, she replied to an email from a Ph.D. student seeking an undergraduate assistant. This led her to a pivotal role in the lab of Dr. M. Imad Damaj in the Department of Pharmacology and Toxicology, where she now serves as an undergraduate research assistant.

Her research focuses on alcohol use disorder, specifically evaluating the role of Diacylglycerol-beta on alcohol consumption in mice. This VCU experience, combined with guidance from the Maximizing Access to Research Careers (MARC) program, became a launchpad for major opportunities, including a summer cancer research internship at the National Cancer Institute and presentations at prominent national research conferences. Adu-Gyamfi discovered a deep fulfillment in the research process, embracing its potential to advance the world "one question at a time."



**HOW I FOUND MY RESEARCH: BY STUDYING GRIEF, DIANE DIAZ HOPES TO TRANSFORM 'PAIN INTO PURPOSE'**

**D**iane Diaz's research journey is deeply personal, rooted in her experiences with grief, cultural displacement and military life. A doctoral student in the VCU School of Education, specializing in counselor education and supervision, Diaz was inspired to pursue this work after her personal loss and witnessing the systemic failure of the military to provide adequate grief support.

Her academic focus explores the intersection of "grief-pain" and spirituality among BIPOC military service women. This line of inquiry, which she considers her "advocacy in action," aims to understand how these women cope with stress and loss in a historically patriarchal system. Diaz believes her work is crucial because it can shape strength-based, culturally responsive interventions and influence policy systems that have long marginalized women of color in uniform. For her, research is a "communal, spiritual, and liberating" process that transforms personal pain into purposeful action.



# VCU RESEARCH WEEKS CELEBRATES THE POWERHOUSE RESEARCH COMMUNITY

AT VIRGINIA COMMONWEALTH UNIVERSITY

Throughout the month of April, we showcase the groundbreaking work of our researchers and celebrate the breadth of VCU's research enterprise through a series of events hosted by schools and departments across all three of the university's campuses: this is VCU Research Weeks.

This year, we welcomed distinguished speakers from across the nation, who shared their expertise and insights on a range of research topics. From AI and Data Science to the evolutionary and cognitive roots of human social behavior, VCU Research Weeks offered over 50 events across campus. Read on to discover the 2025 Research Weeks highlights.

"On the heels of the most successful year in the history of the VCU research and innovation enterprise, I am thrilled to join our university community to recognize the efforts that helped us cross \$500 million in sponsored funding and rank as a top 50 public research university for the third consecutive year," Rao said. "VCU's research is not only finding answers to questions that many either cannot or will not answer, but it is saving lives and acting as a catalyst for economic and social impacts at home in Richmond and across Virginia and the nation. Perhaps now more than ever, it is crucial that we take the time to celebrate the incredible research accomplishments and discoveries of our faculty, staff, students and postdocs."

## SYMPOSIUMS SHOWCASE HOW STUDENTS ARE RISING STARS IN VCU'S VIBRANT RESEARCH COMMUNITY

VCU's Research Weeks 2025 highlighted the university's commitment to discovery with two major student showcases: the 28th annual Graduate Student Research Symposium and the 17th annual Poster Symposium for Undergraduate Research.

These events displayed the impressive breadth of academic work across campus. The undergraduate event featured presentations from almost 300 students, while the graduate symposium included work from over 100 students.

The symposiums collectively demonstrated the vibrant research community at VCU, with projects ranging from environmental concerns and urban design to critical advancements in human health treatments and innovative solutions for industrial processes. The presentations affirmed that obstacles are an inherent and valuable part of the research process, which is vital for improving as a scholar.



## VCU RESEARCH REMAINS STRONG, GROWING – AND 'ABOVE ALL' IMPACTFUL, VP RAO SAYS IN ANNUAL ADDRESS

Research is a cornerstone of Virginia Commonwealth University, from internationally recognized breakthroughs to undergraduate classroom projects. **P. Srirama Rao, Ph.D.**, VCU's vice president for research and innovation, delivered the 2025 State of the Research address, outlining a compelling need for the advancement of VCU's results-driven research enterprise amid current challenges to federal research funding. "This is not the time to slow down, but to continue and double down on what we are doing," declared Rao.

"The work that we do here matters, because it doesn't just stay in the classrooms or the laboratories," he said. "The scientific advances in all fields, including arts, humanities, social sciences, engineering and medicine, go to places where they matter the most – the communities we serve – locally, nationally and globally."



## FROM POTATO CHIPS TO CATHETER TIPS, VCU COLLEGE OF ENGINEERING STUDENTS SHOW OFF THEIR CREATIVE SOLUTIONS

The VCU College of Engineering's 2025 Capstone Design Expo showcased over 90 inventive projects by senior and multidisciplinary student teams, all focused on solving practical, real-world challenges.

Awarded with the People's Choice Award, students **Kyia Hill, Elna Manoj, Valentina Santos Agreda and Rachel Scardina**, with instructor **Henry Donahue, Ph.D.**, showcased their prosthetic finger and specialized glove for a veteran golfer with an amputated index finger. Combating grip instability and painful vibrations when golfing, the biomedical engineering team's glove's padding reduced vibrations and featured an opening that allows direct contact of the prosthetic with the residual limb. The team also modified the golf club, and it used oscillation testing and an accelerometer to measure shaft frequencies and vibration.

Awarded with the Excellence in Design award, students **AJ Critz, Craig Lyle, Joseph Lee and Chris Treblic**, with instructor **Da-ren Chen, Ph.D.**, developed a naval defense technology dynamometer for the Naval Surface Warfare Center's Dahlgren Division, streamlining testing and reducing the need for expensive at-sea simulations. This Mechanical and Nuclear Engineering team solved the Dahlgren Division's bottleneck in capacity, durability and usability by designing a dynamometer that can handle more horsepower and operate reliably in high radio-frequency environments, allowing for fast swaps of outboard motors.

The first place Excellence in Design award was given to students **Josiah Dieffenbach, Ian Gildea, Jaden Casey and Cedric Wilson**, with instructor **Gennady Miloshevsky, Ph.D.** for a device that improves speed and safety of producing potato chips. The mechanical and nuclear engineering project team designed a pneumatic potato-halving device that automatically cuts oversized potatoes into manageable halves, improving the speed and safety of the current process.



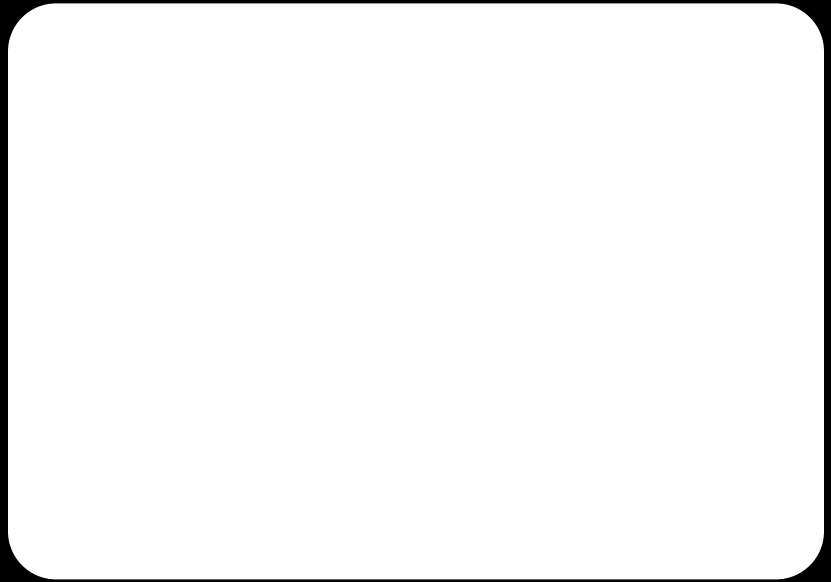


# VCU

## Research and Innovation

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# VCU RESEARCH EXCELLENCE: BY THE NUMBERS

**\$568M** in sponsored funding

**\$220M** in federal awards

**735** active clinical trials at VCU/VCUHS

**167** in world's top 2% of most cited researchers

**#46** for public research universities

**19** VCU health sciences departments and schools ranked in top 50 for NIH funding for public institutions

Heroes can be found across VCU, often working quietly and sometimes hidden in plain sight. They may be filling vials in a lab, grading papers at a desk or setting off on a boat in the James River at dawn. They have different passions, different areas of expertise and different challenges they seek to solve, but all of them are boldly tackling problems that others can't or won't.



Read more about VCU's  
**Uncommon Heroes**