VCU
Research and Innovation

WE ARE THE UNCOMMON

24

Annual Report

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VCU Research and Innovation

P. Srirama Rao, Ph.D.
Vice president for research and innovation

Sponsored funding reaching

$506M

I am thrilled to share another year of extraordinary achievements for VCU's research enterprise. Our collective dedication and innovative spirit have propelled us to new heights, solidifying our position as a leading research institution in the United States and the world. Outlined in this research report are some of the most impactful stories that set VCU apart from our peers and have poised us to break yet another record for sponsored funding, continuing to elevate our overall reputation in the country.

For the first time in VCU's history, our sponsored funding has surpassed the $500 million mark. This achievement is proof that when we invest in our researchers, infrastructure and research processes, we are able to achieve incredible outcomes. Our collective efforts have resulted in an 86% growth over six years, which underscores our unwavering commitment to groundbreaking research and innovation.

Our impact extends far beyond this impressive figure. VCU has again been recognized as one of the top 50 public research universities in the U.S. by the National Science Foundation. Additionally, 19 of our health science schools and departments are ranked among the top 50 for NIH funding among public institutions.

Innovation is at the core of our mission. VCU has been ranked for the second consecutive year by the National Academy of Inventors as one of the top 100 universities in the U.S. for utility patents granted. This achievement reflects our excellence in transforming groundbreaking research into real-world solutions.

Our graduate programs continue to excel, with 10 programs ranked among the top 50 by U.S. News & World Report. This recognition highlights the exceptional quality of our graduate education and the opportunities we provide to our students. Our students are the researchers of the future, they are the individuals who will be responsible for our solutions, our continued successes, the inventions and innovations of tomorrow.

I am immensely proud of the hard work and dedication of our faculty, staff and students. Your passion for discovery and your commitment to making a difference have propelled VCU to new heights. Together, we will continue to push the boundaries of knowledge, address societal challenges and create a brighter future.

Sincerely,

P. Srirama Rao, Ph.D.
Vice president for research and innovation

NATIONAL RANKINGS

VCU ranked in the nation's top 100 for university utility patents for second year

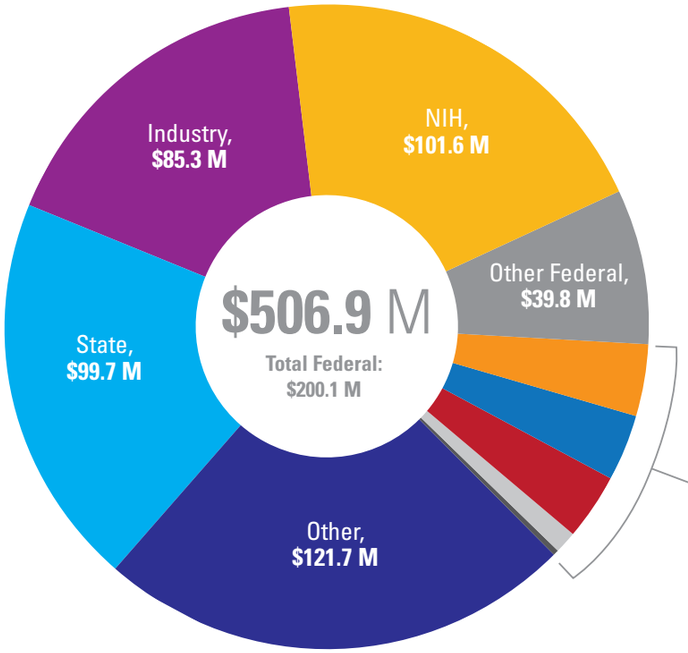
19 health science schools / department ranked in the top 50 for NIH funding for public institutions

Based on externally funded research and development expenditures for FY22, VCU was ranked in the top 50 among public research universities

Several specific research areas featured in the top 100 of the national rankings among all public research universities include:

- **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

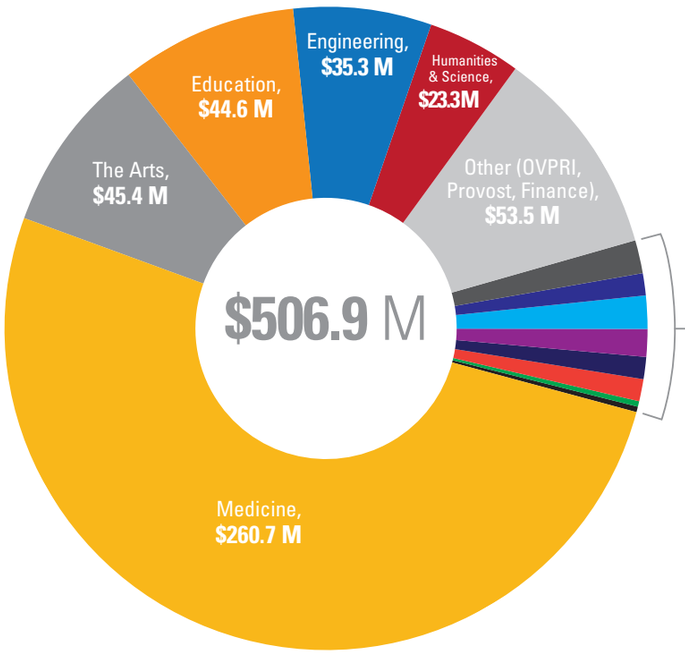
FY2024 Awards by Source



9%
in federal awards over previous year

- College/University, **$18.2 M**
- Department of Health, **$17.1 M**
- Department of Defense, **$16.3 M**
- National Science Foundation, **$6.7 M**
- Other government, **$0.1 M**

FY2024 Awards by School/College



- Pharmacy, **$8.8 M**
- Nursing, **$6.4 M**
- Health Professions, **$7.8 M**
- Dentistry, **$6.9 M**
- Public Health, **$6.2 M**
- Wilder School of Government, **$4.9 M**
- Social Work, **$1.4 M**
- VP for Health Sciences, **$1.0 M**
- Business, **$0.2 M**

FY24 Sponsored Funding Numbers:

86% increase	over six years and 9% over last year
$506.9 million	sponsored funding
$200.1 million	federal awards
$121.8 million	other (foundation, gifts)
$101.7 million	NIH awards
$99.7 million	state awards
$85.3 million	industry awards

FY24 Clinical Research Numbers:

9,443	total active participants enrolled in clinical research (identified individuals)
1,980	enrolled across all active clinical trials
1,123	clinical research studies
691	active clinical trials at VCU/VCUHS
384	faculty-led, VCU designed clinical studies
123	faculty-led VCU designed clinical trials
32	VCU held active drug / device registrations
5	VCU held new drug / device registrations

NSF HERD Rankings:

No. 1	Visual and performing arts
No. 7	Combined non-science and engineering fields (arts, business, communication, education, humanities, law, social work, and visual and performing arts).
No. 11	Education
No. 30	Health sciences
No. 33	Social work
No. 33	Psychology
No. 38	Funding from Department of Health and Human Services
No. 39	Life sciences
No. 48	Biological and biomedical sciences
No. 55	Combined science and engineering fields
No. 64	Computer and information sciences
No. 90	Engineering

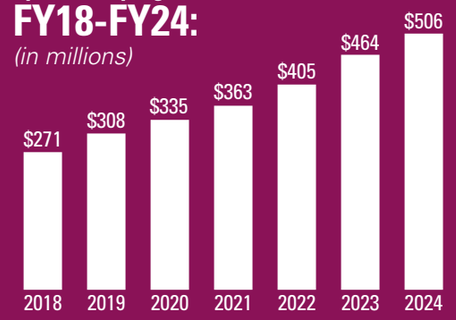
Blue Ridge Institute for Medical Research Rankings among public universities, based on 2024 NIH funding:

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 Professionals	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

VCU surpasses $500 million in sponsored research funding for the first time. This milestone represents the sixth consecutive year of record-setting funding.

Sponsored program awards
FY18-FY24:
(in millions)



86% increase

Faculty Member Highlights

Jose Alcaine, Ph.D., School of Education, Society of Research Administrators International Excellence Award

Amber Balzer, School of Medicine, Virginia Nurses Foundation Leadership Excellence Award

Gonzalo Bearman, M.D., School of Medicine, Society for Healthcare Epidemiology of America Mentor-Scholar Career Award; 2023 Society for Healthcare Epidemiology Career Mentorship Award

Moriah Bellissimo, Ph.D., School of Medicine, Susan G. Komen Career Transition Award

Denise Burnette, Ph.D., School of Social Work, Association for Gerontology Education in Social Work Career Achievement Award

Lane Carasik, Ph.D., College of Engineering, 2023 Early Career Award from the U.S. Department of Energy Office of Science

Kim Case, Ph.D., College of Humanities and Sciences, 2024 Promoting Diversity, Equity, Inclusion and Belonging Award from the Society for the Teaching of Psychology; Faculty Award, 2024 Presidential Awards for Community Multicultural Enrichment

Alexis Crawford, Pharm.D., School of Pharmacy, Virginia Society of Health-System Pharmacists' Pharmacist of the Year

Michael Dickinson, Ph.D., College of Humanities and Sciences, Paul E. Lovejoy Prize

Dave Dixon, Pharm.D., School of Pharmacy, ASHP Foundation 2024 Literature Awards' Pharmacy Practice Research Award

Nina Exner, Ph.D., VCU Libraries, Co-recipient of the Rigor Champions Prize from the National Institutes of Health National Institute of Neurological Disorders and Stroke

Anthony Faber, Ph.D., School of Dentistry, Massey Comprehensive Cancer Center, 2024 National/International Recognition Award

Mary Falk, School of Nursing, American Association of Critical Care Nurses "Starting Now" Award

John Fife, Ph.D., School of Education, University of Oxford Harris Manchester Research Award

Adam Garber, M.D., School of Medicine, 2023 Virginia ACP Chapter, Early Career Physician Award

Dina Garcia, Ph.D., School of Medicine, Fred Hutchinson Cancer Center Inspiring Hispanic/Latinx Scientist; School of Medicine Outstanding Teacher in Health Sciences Education; Public School Teacher of the Year

Karen Gau, VCU Libraries, Co-recipient of the Medical Library Association's Louise Darling Award for Distinguished Achievement in Health Sciences Collection Development

Cait Gibson, Pharm.D., School of Pharmacy, American Association of Colleges of Pharmacy Emerging Teaching Scholar Award

Anika Hines, Ph.D., School of Medicine, Outstanding Early Career Faculty; National/International Recognition Award (NIRA)

Gary Hu, Ph.D., College of Health Professions, 2024 ANA Innovation Award, American Nurses Association

Sally Hunnicutt, Ph.D., College of Humanities and Sciences, Process Oriented Guided Inquiry Learning Impact Award

Heather Jones, Ph.D., College of Humanities and Sciences, 2024 recipient of the Award for Distinguished Contributions to Diversity by the Society of Pediatric Psychology

Alexander Lucas, Ph.D., School of Medicine, Department of Social and Behavioral Sciences Teacher of the Year

Milos Manic, Ph.D., College of Engineering, FBI Director's Community Leadership Award

Kim McKnight, Ph.D., School of Education, Women Education Leaders in Virginia Outstanding Service to Education Award

Luciana de Oliveira, Ph.D., School of Education, New York State Teachers of English to Speakers of Other Languages James A. Lydon Distinguished Service Award

Annie Rhodes, Ph.D., College of Health Professions, Insight Memory Care Best Practice Award

Suzanne Ruder, Ph.D., College of Humanities and Sciences, American Chemical Society 2023 James Flack Norris Award for Outstanding Achievement in the Teaching of Chemistry

Kathleen Rudasill, Ph.D., School of Education, Behavioral-Developmental Initiatives Jan Kristal Memorial Award

Curtis Sessler, M.D., School of Medicine, 2023 Distinguished CHEST Educator Award, American College of Chest Physicians

Patricia Sime, M.D., School of Medicine, American Thoracic Society Recognition Award for Scientific Accomplishments 2024

Morgan Snell, Ph.D., School of Medicine, Health Policy Teacher of the Year

R. Todd Stravitz, M.D., School of Medicine, 2024 Edward A. Wayne Medal

Kevin Sutherland, Ph.D., School of Education, National/International Recognition Award

Colleen Thoma, Ph.D., School of Education, American Association on Intellectual and Developmental Disabilities Presidential Award

Katherine Tossas, Ph.D., School of Medicine, Outstanding Early Career Investigator Award, Massey Comprehensive Cancer Center CPC Program

Tayrn Traylor, Ph.D., School of Education, Virginia Public School Behavior Analysts Network Leadership Award

Shawn Utsey, Ph.D., College of Humanities and Sciences, Riese-Melton Award, 2024 Presidential Awards for Community Multicultural Enrichment

Cecelia Valrie, Ph.D., College of Humanities and Sciences, National Institutes of Health's HEAL Initiative Award for Interdisciplinary Collaboration

Bert Waters, Ph.D., College of Health Professions, 2024 Gordon Streib Distinguished Academic Gerontologist Award, Southern Gerontological Society

Robert Winn, M.D., School of Medicine, 2024 Clinical Research Award, Association of Community Cancer Centers

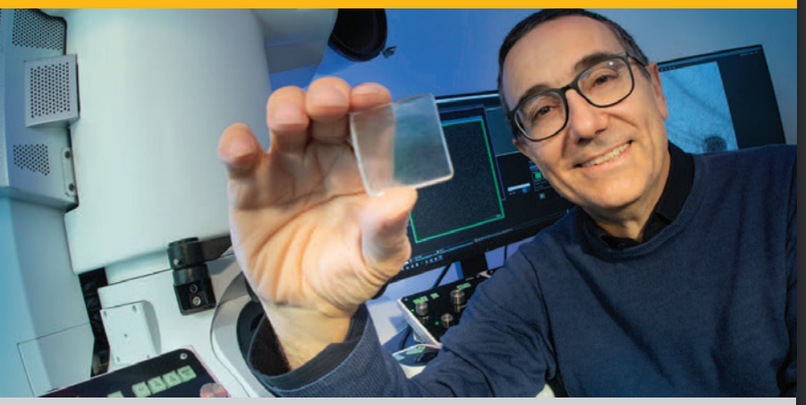
Yaoying Xu, Ph.D., School of Education, National/International Recognition Award

New listing of the world's most-cited scientists includes 11 VCU faculty who rank in the top 50 of their primary discipline

Researcher	2023 Ranking	Career Ranking	Department	College / School
Arun J. Sanyal, M.D.	3	8	Internal medicine	School of Medicine
Kenneth S. Kendler, M.D.	9	2	Psychiatry	School of Medicine
Jasmohan S. Bajaj, M.D.	15	88	Internal Medicine	School of Medicine
W. Greg Miller, Ph.D.	22	45	Pathology	School of Medicine
Russell A. Barkley, Ph.D.	34	9	Psychiatry	School of Medicine
Shawn O. Utsey, Ph.D.	34	44	Psychology	College of Humanities and Sciences
Ashraf S. Gorgey, Ph.D.	49	198	Physical Medicine and Rehabilitation	School of Medicine
Jonathan M. Bloom, Ph.D.		46	Art History	School of the Arts
Steven H. Woolf, M.D.	95	47	Family Medicine	School of Medicine
Lindon Eaves, Ph.D., D.Sc.*	159	20	Human and Molecular Genetics	School of Medicine
Richard A. Glennon, Ph.D.	234	48	Medicinal Chemistry	School of Pharmacy

**Dr. Lindon Eaves passed away March 8, 2022*

TechTransfer and Ventures



VCU Innovator of the Year is 'proof of pathway' to success for physicists

Massimo Bertino, Ph.D., a professor in the Department of Physics in the College of Humanities and Sciences and director of the Nanoscience and Nanotechnology Ph.D. Program, received the 2024 Innovator of the Year award for his groundbreaking aerogel research. Traditionally expensive and dangerous to produce, Bertino's method simplifies aerogel creation, making its production safer and more cost effective. His innovation, licensed by ThermaGEL Innovations, bypasses hazardous processes, enabling large-scale commercialization of superior insulation. Bertino's work, protected by VCU TechTransfer and Ventures, marks a significant advancement in sustainable manufacturing. His award highlights physics' practical impact and VCU's commitment to translational research, showcasing a "viable pathway to success."

VCU ranked in nation's top 100 for university utility patents for second year

VCU has been recognized as a top 100 university for utility patents granted by the National Academy of Inventors for the second consecutive year. This continued recognition highlights VCU's commitment to solving real-world problems with new, innovative technologies.

VCU's new Startup Accelerator will propel university research that has market potential

VCU has launched a new Startup Accelerator program to support faculty entrepreneurs and turn their research into innovative businesses. This program provides coaching, mentoring and resources to help researchers develop their ideas and bring them to market.

VCU

commercialization efforts

106
invention disclosures

169
patents filed

29
patents issued

28
licenses and options

13
licenses to start-ups

8
new start-ups

$3.7 million
in licensing revenue

Enriching the human experience

aims to improve human life through technology, education and culture.
It focuses on:
Technological advancements; educational innovations; cultural enrichments

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

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

Achieving a just and equitable society

aims to create a more just and equitable society by addressing systemic inequalities and promoting social justice.
It focuses on:
reducing inequality and discrimination; community-engaged research

Transdisciplinary project using robotics to advance concussion recovery

Peter Pidcoe, P.T., D.P.T., Ph.D., and graduate student researchers are using a robotic arm to study how concussions impact a person's vestibulo-ocular reflex, which is responsible for eye movement stability. The project aims to develop a method to assess concussion severity and recovery time. Watch the team work and hear from Dr. Pidcoe firsthand about this concussion recovery project.

Enriching the
human experience

Controlled cruelty: New study from VCU finds aggression can arise from successful self-control

David Chester, Ph.D., an associate professor of social psychology at VCU's Department of Psychology, has found that aggression can be a result of successful self-control, challenging the traditional view that aggression is due to poor self-control.

Chester's study suggests that aggressive individuals often have strong self-control, allowing them to plan and execute their harmful actions, rather than acting on belligerent impulses, as one would typically assume for aggressive individuals. Existing therapies and interventions teach individuals to inhibit their impulses, which could coincidentally teach individuals how best to implement their aggressive tendencies, rather than improve their self-control. These findings can provide a new framework for understanding the complexities of aggression, opening up new avenues for research into its causes and potential treatments.

Global study on forgiveness was rooted in the work of VCU professor emeritus Everett Worthington

Research shows forgiveness is learnable. A study by Everett Worthington, Ph.D., emeritus professor in the Department of Psychology in VCU's College of Humanities and Sciences, found that people can significantly improve their ability to forgive through a workbook-based program. Through completion of a workbook, individuals noticed a reduction in their depression, anxiety and an overall increase in their well-being. Worthington's research provides a scalable and effective method for promoting forgiveness on a broader societal level, giving individuals the tools to learn how to forgive more efficiently.

With a game show as his guide, VCU researcher uses AI to predict deception

Xunyu Chen from VCU's School of Business used data from a game show to teach a computer how to analyze facial, verbal and movement cues to detect deception, resulting in high accuracy in predicting lies in high-stakes scenarios. This research extends the understanding toward deception and trust behaviors that could lead to substantial consequences from a scientific and quantitative perspective. Researchers and practitioners can use findings from this research to analyze human behaviors in presidential debates, business negotiations and court trials, to predict deception and the protection of self-interest.

Is napping good for you? If you do it the right way, VCU researcher says.

Natalie Dautovich, Ph.D., associate professor in the Department of Psychology in VCU's College of Humanities and Sciences, examines daily processes, including sleep, that anchor well-being across adulthood. Her findings suggest that short, mid-afternoon naps can enhance alertness, cognitive function and mood, however, excessive or poorly timed naps can disrupt nighttime sleep. Short afternoon naps (20 minutes or less) can boost energy, focus, and mood, but napping too much or too late in the day can also interfere with sleep.

What will it take for artificial intelligence to be safe and secure? VCU expert considers election integrity and other threats that lie ahead

VCU's College of Engineering's Milos Manic, Ph.D., is exploring the impact of AI on elections, focusing on the public trust in social and traditional media that can sway existing voters' opinions. Manic's work highlights the challenge of real-time AI fraud detection and the potential for AI to manipulate public opinion. Manic's research suggests that human vulnerabilities and inherent trust in media outlets plays a more significant role in cyberwars than the technology itself. With more advances in AI technology, it is becoming increasingly important to understand human vulnerability to combat these deceptions.

Achieving a just and equitable society

"We did not get to a national teacher shortage overnight and we can't change it overnight. As long as we stay very reflective, meticulous and thoughtful, not only will we recruit the best talent, we will also retain them."

VCU's School of Education teacher residency program better prepares new teachers for the classroom

RTR is a school-based teacher preparation program that integrates research and practice to equip residents with the knowledge, skills and experience to be effective in high-needs and hard-to-staff classrooms. Despite overwhelming research that teacher quality is the most important school-based factor in student achievement — and that teacher impact on student learning is cumulative and long-lasting — some students are taught by the least prepared, least experienced and least effective teachers. RTR addresses this issue by preparing and retaining high-quality teachers to ensure that every student gets a quality education. Hear from the executive director of RTR program, Kim McKnight, Ph.D., to learn more about the program and what it offers future teachers.

Unequal distribution of pharmacies in Virginia leaves vulnerable populations at risk, study shows

Xueming "Jimmy" Chen and I-Shian "Ivan" Suen from VCU's L. Douglas Wilder School of Government and Public Affairs conducted a study on pharmacy accessibility in Virginia which unveiled there are pharmacy deserts in rural areas, highlighting the need for policy changes to improve access to medications. This new study, "An Analysis of Spatial Disparity of Pharmacies, in Virginia, USA," identified financial incentives, telehealth options and increased transportation services as changes that could rectify healthcare access in rural areas, leading to potential future research on accessibility and equity of urban amenities.

Achieving a just and equitable society

With nearly $1M federal grant, VCU School of Dentistry researcher examines the impact of Virginia's new Medicaid dental policies

Shillpa Naavaal, an associate professor in the Department of Dental Public Health and Policy, is studying the impact of Virginia's new Medicaid dental coverage for adults. She aims to understand how this policy change affects access, utilization and disparities in oral health care among Medicaid beneficiaries, which will provide data to improve dental care policies and services for Medicaid recipients in Virginia, significantly improving these patients' oral health outcomes.

VCU-led dementia registry project becomes established in Virginia law

The Virginia Memory Project, a partnership between VCU and the Virginia Department of Health, aims to improve understanding of dementia in the state. The project collects data through a registry and provides resources to individuals and caregivers affected by memory loss. Now an official state law, this project allows for better data collection and resource allocation for dementia patients and caregivers, improving the quality of life for individuals with dementia and their caregivers, while advancing the overall understanding and treatment of this condition.

Women have a higher genetic risk for PTSD, according to study by VCU and Swedish researchers

Ananda B. Amstadter, Ph.D., a professor at VCU's School of Medicine, led a study on genetic risk for PTSD and found that women have a higher genetic risk for PTSD than men. The research team analyzed data from twins and siblings to determine the role of genetics in PTSD development; their findings suggest sex hormones may play a role in sex-specific pathways of risk. These findings could inform strategies for PTSD prevention and intervention following a traumatic event, as well as help address stigmas related to women's mental health.

Answer to untrustworthy academic research findings? VCU professor outlines steps to address 'crisis of confidence.'

In light of recent cases of plagiarism and academic fraud at institutions across the country, Sven Kepes, professor of management in VCU's School of Business, is seeking to solve the answer to untrustworthy academic research findings. Factors like personal characteristics, insufficient training and a reward system focused on quantity over quality contribute to questionable research practices, which Kepes hopes to address. In Kepes's article, he proposes that better training, a revised reward system, improved peer review and open science practices could reduce the frequency and impact of misconduct, questionable research practices and errors.

Substance use disorders are underdiagnosed and undertreated among formerly incarcerated Virginians, new VCU-led study finds

Peter Cunningham, Ph.D., from VCU's School of Population Health found that while many formerly incarcerated individuals in Virginia qualify for Medicaid, a small percentage receive substance use disorder diagnoses or treatment. Cunningham and research team found there were a number of barriers that might contribute to these gaps in addiction treatment, such as the instability many formerly incarcerated adults experience after their release, as well as limitations in access to Medicaid services set by federal policies. This research provides a foundation for improving this vulnerable population's access to essential healthcare services.

"Our drug prevents most of the adverse effects of the disease … Our drug will become a first line treatment and become a functional cure."

VCU School of Pharmacy professor Martin Safo, Ph.D., is researching a therapy that could be useful for treating sickle cell disease

Sickle cell disease is a hereditary blood disorder, affecting over 75,000 people in the United States and millions of people worldwide. In SCD, a mutation in the ß-globin protein of hemoglobin causes deoxygenated sickle hemoglobin to form insoluble polymers inside red blood cells which deform into rigid shapes or sickle red blood cells that occlude capillaries and small blood vessels. Martin Safo and research team are using structure-based drug design, including X-ray crystallography, molecular modeling, synthesis and biological evaluation to discover hemoglobin allosteric effectors and/or covalent modifiers that may be useful for treating SCD. Hear from Dr. Safo firsthand about this drug therapy and how it will treat individuals who are affected by sickle cell disease.

New study shows liver patients see benefits after going meatless for one meal

VCU gastroenterologist Jasmohan Bajaj, M.D. and research team found that a single meatless meal can lower harmful ammonia levels in people with liver cirrhosis. Bajaj found that substituting one meat-based meal with a vegan or vegetarian option significantly reduced ammonia production, which can lead to cognitive decline and other serious complications. This simple dietary change could potentially benefit patients with cirrhosis without requiring drastic long-term dietary modifications.

Optimizing health

When cells touch, their genetics change – and in pinpointing how, VCU researchers may open a new front in understanding cancer

Rajan Gogna, Ph.D., an assistant professor in the VCU School of Medicine's Department of Human and Molecular Genetics is leading a study to develop an innovative method to track how neighboring cells influence each other's gene expression. Published in the Proceedings of the National Academy of Sciences, this study is the first to uncover genetic changes due to cell interactions. Using RNA sequencing and AI, researchers identified genetic signatures from small cell clusters, confirming their model with eye lens and neural progenitor cells. This approach can be applied to cancer research, potentially improving understanding of cancer cell interactions and aiding the development of targeted therapies.

Recent albuterol shortage sparks VCU study on improving the manufacturing process

James Ferri, Ph.D., from VCU's Department of Chemical and Life Science Engineering is leading a research project to improve the manufacturing process for albuterol. Ferri and research team are investigating the manufacturing challenges causing a shortage of liquid albuterol in the U.S. Their $5 million FDA-funded project aims to streamline albuterol production through continuous manufacturing methods. By transitioning from batch processing to continuous flow, they seek to enhance efficiency, reduce costs and decentralize production, ensuring stable drug supply amid disruptions. This research not only addresses immediate shortages but also pioneers advanced manufacturing techniques in pharmaceuticals, promising broader impacts on drug availability, quality and sustainability in the healthcare sector.

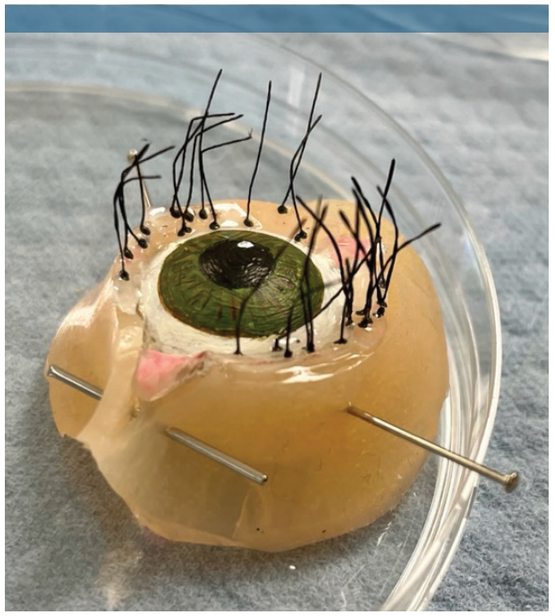
VCU-led study finds discrimination over time leads to poor sleep

Discrimination adversely affects sleep quality, as revealed by a recent longitudinal study led by Natalie D. Dautovich, Ph.D., an associate professor in the Department of Psychology of VCU's College of Humanities and Sciences. Published in Sleep Health, the research highlights that chronic discrimination heightens sleep problems over a decade. Individuals facing discrimination experience difficulties falling asleep, increased nighttime awakenings and overall poorer sleep quality due to heightened social anxiety and distrust. The study underscores how social disconnection and anxiety disrupt the ability to relax and achieve restorative sleep. Dautovich emphasizes that feeling safe and socially connected is crucial for healthy sleep, shedding light on the broader impacts of discrimination on physical and mental well-being.

The opioid epidemic cost Virginians $5 billion in 2021, new data shows

Rajan Gogna, Ph.D., an assistant professor in the VCU School of Medicine's Department of Human and Molecular Genetics is the lead author in new research that shows the opioid epidemic's financial toll on Virginia is far greater than previously estimated. Updated data reveals nearly 150,000 Virginians struggled with opioid addiction in 2021, costing the state over $5 billion. This research can lay the groundwork for providing crucial data that informs future comprehensive and effective responses to the opioid crisis in Virginia.

Optimizing health



3D-printed hairs: Ph.D. candidate, professor developing tiny sensors to detect flow and environmental changes

VCU doctoral candidate Phillip Glass and advisor Daeha Joung, Ph.D., are developing 3D-printed cilia sensors inspired by human mechanosensing. These sensors, made from polycaprolactone and graphene, detect various stimuli like touch, pressure and temperature. Their innovation lies in sensing "sliding" forces, similar to the sensation of clothing against skin. These eyelash-like cilia sensors can inspire future applications such as surgical robots and prosthetics to industrial machines measuring air and water flow. The team is now seeking partners to commercialize these versatile mechanosensors.

VCU researcher to be awarded grants totaling more than $6.3M to fight pediatric cancers

Anthony Faber, Ph.D., of VCU School of Dentistry and Massey Comprehensive Cancer Center, was awarded over $6.3 million in grants for developing targeted therapies for neuroblastoma and synovial sarcoma, rare cancers in children and young adults. Funded by the National Cancer Institute and the Department of Defense, the research focuses on transcriptional modifiers. When cells replicate, a process of transcription takes place where a segment of DNA, which contains the information needed for cellular replication, is copied into RNA. The proteins that help monitor and control this process are known as transcriptional modifiers. In cancer, these proteins are often erroneously altered, leading to the development of cancer. Faber's team will explore ferroptosis inducers and SUMOylation inhibitors, drugs showing promise against these cancers. The goal is to complement existing treatments and advance these drugs to clinical trials, leveraging collaborations with global experts to offer new hope to patients.

How does exercise affect the health of women and men differently?

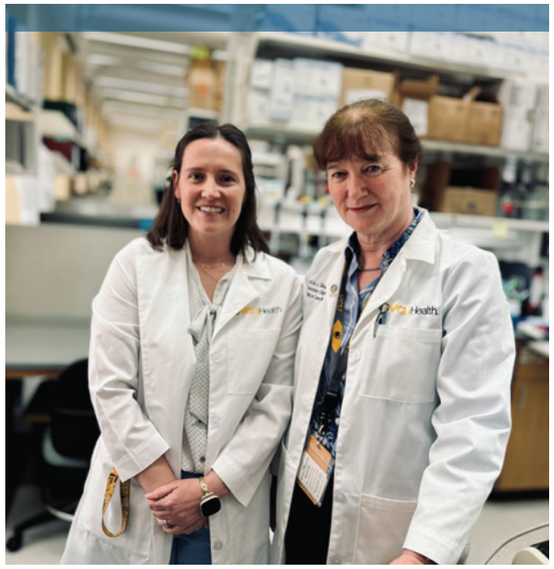
Danielle Kirkman, Ph.D., an assistant professor in the VCU Department of Kinesiology and Health Sciences in the College of Humanities and Sciences suggests women may benefit more from exercise than men in new research study. Women achieved similar health benefits with less exercise compared to men in the study, which suggests that sex differences in hormones and physiology plays a role in how exercise affects everyone differently. This research contributes to a better understanding of the relationship between exercise, sex and longevity. Although the current exercise guidelines aren't tailored to the different genders, this research could lead to the development of sex-specific exercise guidelines, optimizing health benefits for all genders.

Drug candidate shows promise in easing chronic pain, new study finds

Aron Lichtman, Ph.D., and Hamid Akbarali, Ph.D., both professors in VCU School of Medicine's Department of Pharmacology and Toxicology, are a part of a team of experts developing a potential new drug to treat chronic pain. The drug targets a specific enzyme involved in inflammation, reducing pain without affecting brain reward pathways, unlike opioids. This non-addictive approach could offer a safer and more effective treatment option for millions suffering from chronic pain reducing the overall medical reliance on opioids.

VCU researchers awarded $3M to study early signs of dementia

Lana Sargent, Ph.D., interim associate dean for practice and community engagement at the School of Nursing, and Jane Chung, Ph.D., an associate professor in the School of Nursing's Department of Family and Community Health Nursing are co-leading a study that is researching the link between mobility and dementia in older adults. The team believes changes in physical activity patterns may be early indicators of cognitive decline. By tracking participants' movements using wearable devices, they aim to identify potential predictors of dementia and develop early intervention strategies, transforming the way dementia is diagnosed and treated.



VCU researchers explore a promising pathway to treating fibrosis

Postdoctoral fellow Maggie Freeberg, Ph.D., and Patricia Sime, M.D. (pictured above), chair of the Department of Internal Medicine at the School of Medicine, are part of a multidisciplinary team studying treatment and a possible cure for fibrosis. Building on Nobel Prize-winning research, the team is investigating the role of a protein called Piezo2 in lung scarring. By blocking this protein, they aim to develop drugs that can prevent or reverse fibrosis in the lungs and potentially other organs.

Supporting sustainable energy and environments

"Wetlands are both part of the solution to climate change, they consume carbon by pulling it out of the atmosphere, but they also emit methane and … warm the atmosphere."

Data gathered at Rice Rivers Center provides new insight into how ecosystems respond to climate change

Christopher Gough, Ph.D., an associate professor in the Department of Biology in the College of Humanities and Sciences, is leading a project at VCU Rice Rivers Center that will collect data on methane and carbon dioxide emissions. The "flux tower" collects data in real-time and is publicly available for researchers across the country, providing them with a valuable resource to study climate change. By analyzing how these emissions vary with environmental conditions, researchers can better understand the role of wetlands in the global carbon cycle and develop strategies to mitigate climate change leading to future interventions and informed policy to diminish climate change and protect wetland ecosystems. Hear from Dr. Gough and visit VCU's Rice Rivers Center to learn more about the flux tower.

Supporting sustainable energy and environments

Supporting Endangered Atlantic Sturgeon in the Chesapeake Bay

Matt Balazik, Ph.D., research faculty at VCU Rice Rivers Center, is researching the current Atlantic sturgeon population in the James River. Although the adult sturgeon population seems healthy, there is a concerning lack of juvenile sturgeon. Balazik and team are investigating potential causes for this decline, and found that it could be due to blue catfish predators, habitat loss and overall water quality issues. Their work aims to understand why the sturgeon population isn't rebounding quickly and strategies for their protection, which will lead to a broader understanding of the Atlantic sturgeon and identify effective plans to protect this endangered species.

Barrier islands and dunes protect our coastline – but how are environmental changes affecting them and adjacent land?

Julie Zinnert, Ph.D., an associate professor in the Department of Biology in the College of Humanities and Sciences, is studying the impact of dune dynamics on the ecosystems of Virginia's barrier islands. Zinnert and team found that higher dunes protect inland habitats from disturbances like flooding and erosion and affects the overall health of the island ecosystem. The team's research provides valuable insights for predicting how barrier islands will respond to climate change and the sea levels rising.

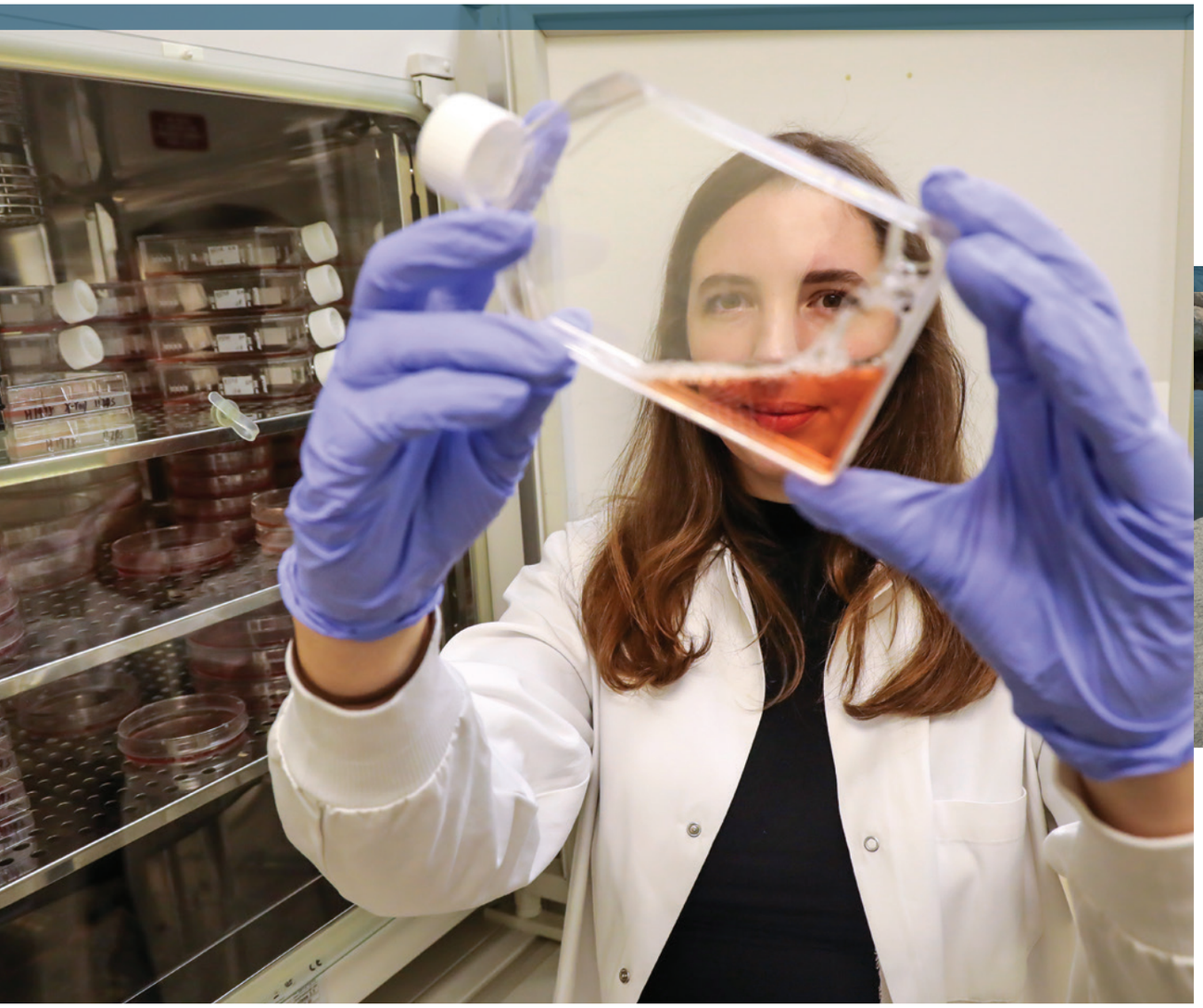
Hotter weather caused by climate change could mean more mosquitos, according to VCU-led study

A study led by Virginia Commonwealth University researchers, published in Ecology, found that rising temperatures reduce the effectiveness of mosquito predators, like dragonfly nymphs, leading to increased mosquito populations. Warmer environments accelerate mosquito larvae development, narrowing the time predators can control them. The study, conducted in riverine rock pools at Belle Isle, showed more mosquito larvae in warmer pools despite predator presence. This study can inform policy decisions related to habitat management, conservation efforts and climate adaptation strategies to mitigate negative impacts on ecosystems.

VCU co-author of 'A Darwinian Survival Guide' reframes climate change – and the paths forward – through the lens of evolution

"A Darwinian Survival Guide: Hope for the Twenty-First Century," co-authored by VCU professor Salvatore Agosta, Ph.D., and Daniel R. Brooks, Ph.D., reframes climate change through evolutionary principles. The book argues that humanity veered from its evolutionary path 15,000 years ago, leading to the current climate crisis. Agosta and Brooks propose that embracing Darwinian principles—coping with change by changing—can help avert the worst outcomes. Their book aims to urge society to apply evolutionary principles to climate strategies, offering new approaches to coping with environmental changes, emphasizing adaptability and resilience.

Student research at VCU



How I found my research: Krista Dalton studies the genetics of cancer to give pediatric patients a brighter future

Krista Dalton, a postdoctoral researcher at VCU's Philips Institute for Oral Health Research, is researching neuroblastoma, a severe pediatric cancer often driven by MYCN gene alterations, or changes in MYCN genes that can lead to abnormal cell growth and proliferation, often resulting in cancer. With a newly completed Ph.D. in oral health research, Dalton's goal is to uncover therapeutic options that reduce cancer-related mortality and enhance patient quality of life. Inspired by her volunteer work with pediatric cancer patients at Connor's Heroes, Dalton is driven by a strong support system of mentors, and finds fulfillment in the impact of her neuroblastoma research.

How I found my research: Jennoa Fleming studies the small wonders of the rock pools to understand our future on Earth

Jennoa Fleming, a senior at VCU studying environmental science in Life Sciences and minoring in biology in the College of Humanities and Sciences is researching the ecology of rock pools along the James River, focusing on interactions among macroinvertebrates and how cigarette waste affects snails. Initially on a pre-med track, Fleming was inspired by her high school experience in a VCU-led river project, which shifted her career path to ecology. Supported by mentors like James Vonesh, Ph.D., a professor in the Center for Environmental Studies at VCU who studies the rock pools and Catherine Hulshof, Ph.D., an associate professor of biology, she now leads SEEDS, a student group promoting diversity in ecology.

The sound of science: VCU students compose electronic music that incorporates environmental data gathered at VCU Rice Rivers Center

VCU students are turning environmental data into music. The Data Sonification class converts data from the Rice Rivers Center into sound, exploring how listening to data can reveal patterns and emotions. By collaborating with scientists and transforming complex environmental data into auditory experiences, students are able to combine art and science to create a new way of understanding the environment, making complex scientific concepts more understandable and memorable for students.

Research Weeks

Research Weeks 2024: UNlimited Impact

Highlighted by a keynote address from Rochelle Walensky, M.D., former director of the Centers for Disease Control and Prevention, as well as the State of the Research address delivered by P. Srirama Rao, Ph.D., vice president for research and innovation, the Research Weeks 2024 programming celebrated VCU's groundbreaking discoveries and continued quest to improve the human condition.

VCU Research Weeks is designed to showcase and amplify the impact of VCU's research, scholarship and creative work. The program showcased over 40 events campuswide celebrating the contributions of VCU faculty, students, trainees and staff and the diverse research portfolio at VCU.

VCU celebrates 'one of the best' years for its growing and renowned research enterprise

To kick off Research Weeks, vice president for research and innovation P. Sriram Rao, Ph.D., gave his annual State of the Research address, where he drew a detailed picture of VCU's growing stature, record accomplishments and where he sees VCU in the future.

Hundreds of posters reveal one compelling story of VCU student research

Undergraduate and graduate symposiums highlighted projects that touch on an array of disciplines, notable history and scientific potential.

Former CDC leader Rochelle Walensky highlights the connection of research, public health and trust

In the keynote address for VCU Research Weeks, former CDC leader Rochelle Walensky, M.D., highlighted the importance of connection of research, public health and trust. "Research was instrumental in what I did," Walensky said in her address at the Institute for Contemporary Art at VCU. "It was how I got to the policy table. It was things that made me angry, that allowed me to move the needle forward, that allowed for policies to change because I could do science that would move those policies."

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VCU Research Excellence: by the numbers

$506 million in sponsored funding

$200.1 million in federal awards

Top 100 for university utility patents

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

Top 50 for public research universities

691 active clinical trials at VCU/VCUHS