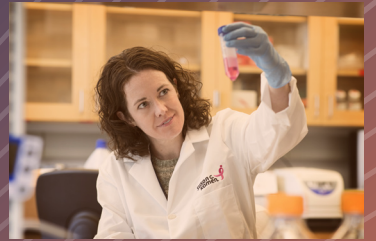
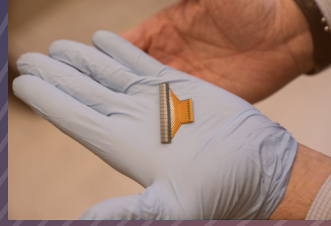


# 2024 ANNUAL RESEARCH REPORT



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# WELCOME

## TO THE UNIVERSITY OF VIRGINIA'S 2024 ANNUAL RESEARCH REPORT

Dear Colleagues,

I am honored to share this year's annual research report from the [Office of the Vice President for Research](#) (OVPR) at the University of Virginia. As a new member of the UVA leadership and research community, I am filled with great pride in joining an outstanding institution that strives to be both Great and Good in all research endeavors.

We are happy to announce that UVA research activity continues to grow through faculty recruitment and increased funding to UVA investigators. UVA received \$549 million in research awards in FY24, and reported \$714 million in research expenditures in FY23. This growth underscores our commitment to pioneering research that changes our understanding, drives innovation, and benefits society.

The OVPR continues to support and invest in our investigators and research infrastructure, with a special focus on the five Grand Challenges—Democracy, Brain and Neuroscience, Environmental Resilience and Sustainability, Digital Technology and Society, and Precision Medicine/Health. To support continued growth, we invested in our research cores, expanding access to important resources and tools for researchers (see more on page 7).

The Paul and Diane Manning Institute for Biotechnology broke ground in the fall of 2023 and we are excited to see it take shape in the coming year. When complete, it will be the largest laboratory building in the state, anchoring a new innovation hub in biotechnology at our Fontaine Research Park.

UVA's commitment to advancing interdisciplinary knowledge and community service is inspiring to both longtime Hoos and newcomers like me, positively impacting lives across Virginia, the nation, and the world. Again, I want to congratulate all who have contributed to a remarkable year, and I look forward to all we will accomplish in the year to come.



Sincerely,

A handwritten signature in black ink that reads "Lori L. McMahon".

**Lori L. McMahon, PhD**  
Vice President for Research  
University of Virginia

# Research By The Numbers



**\$2.76B**  
Research  
Proposals  
Submitted FY24



**\$714.4M**  
Total R&D  
Expenditures FY23



**\$549M**  
Sponsored  
Funding for FY24

## TOTAL AWARDS BY SOURCE FY24:

As of 7/15/24

**HEALTH & HUMAN SERVICES (DHHS/NIH)**  
\$258,530,000

**FOUNDATIONS**  
\$42,070,000

**STATE & LOCAL**  
\$44,440,000

**NATIONAL SCIENCE FOUNDATION (NSF)**  
\$40,660,000

**DEPARTMENT OF DEFENSE (DOD)**  
\$43,950,000

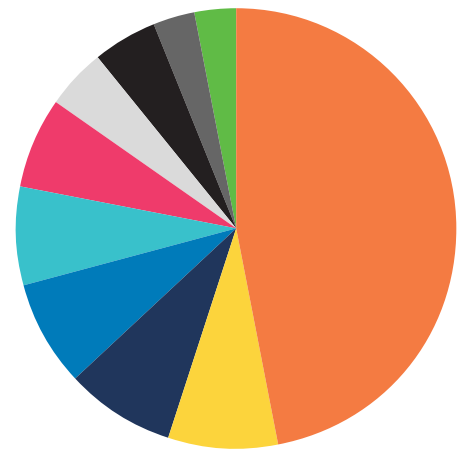
**OTHER FEDERAL**  
\$35,520,000

**INDUSTRY & SUBCONTRACTS**  
\$25,390,000

**DEPARTMENT OF EDUCATION**  
\$25,260,000

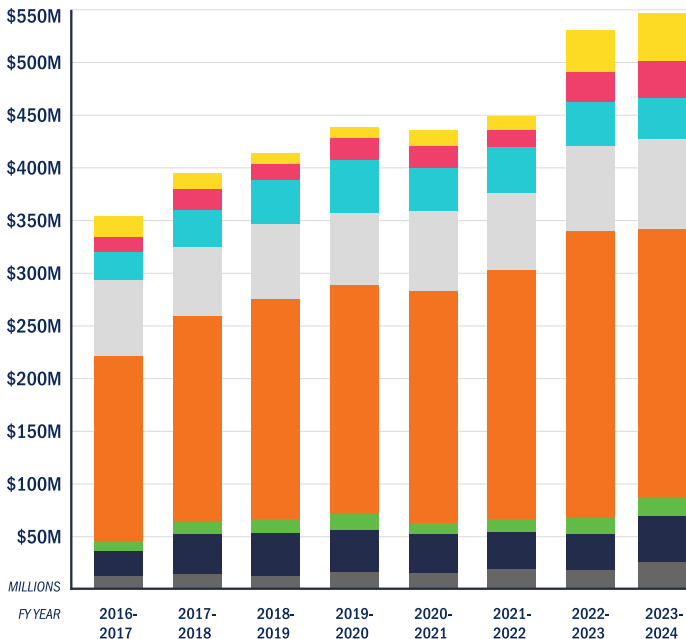
**FOREIGN GOVERNMENTS**  
\$16,820,000

**DEPARTMENT OF ENERGY (DOE)**  
\$15,940,000

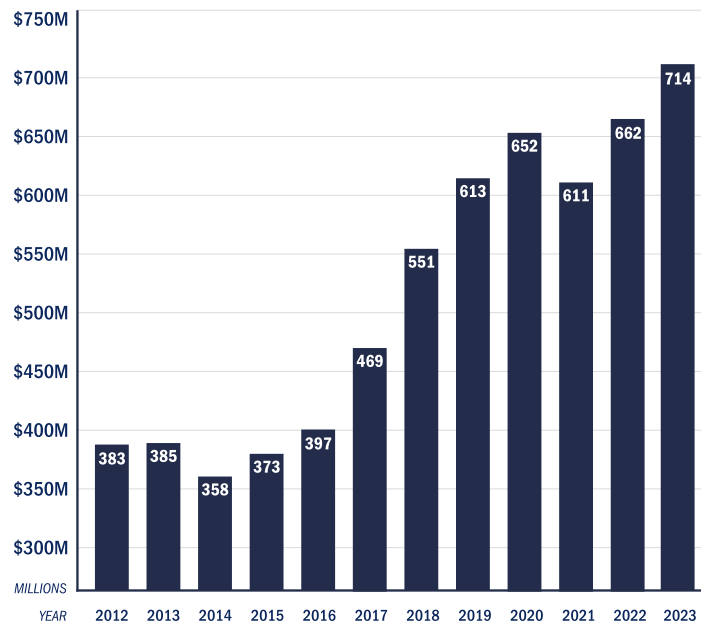


## SPONSORED RESEARCH AWARDS: FY16 - FY24

STATE NSF DHHS/NIH DOD  
OTHER FEDERAL NON-FEDERAL DOE EDUCATION(ED)



## UNIVERSITY R&D EXPENDITURES: 2012 - 2023



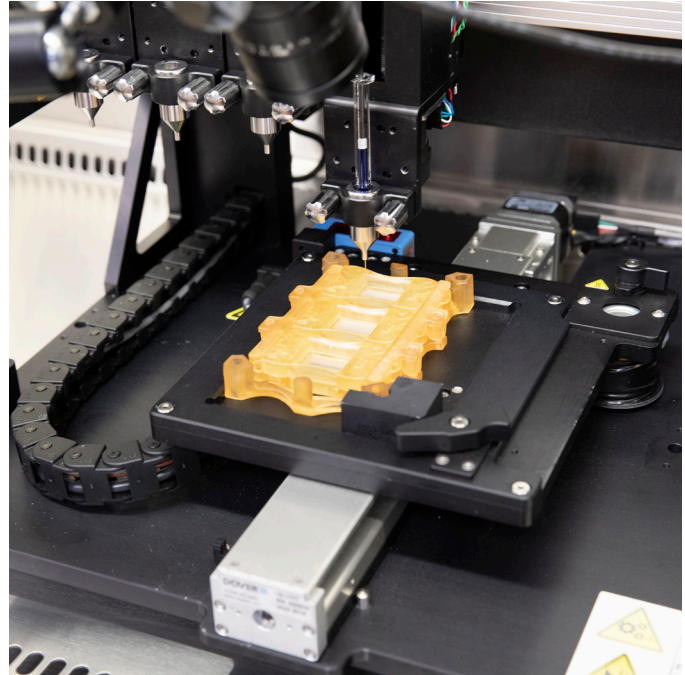


# Grand Challenges

Since 2021, the University has committed over \$200 million toward research in the five strategic research focus areas. With these substantial investments, UVA aims to move the needle in addressing the world's urgent challenges. These investments have helped hire new faculty, fund new research projects, and create new research cores—centralized shared research resources for scientific and clinical investigators.

In each area, UVA is taking a coordinated approach through institutes such as the Environmental Institute, Brain Institute, and Karsh Institute of Democracy, as well as various centers and labs, to amplify the impact of faculty work. The Grand Challenges Research Investments complement research across the University and have created new opportunities for faculty and others in the UVA research community to work together across disciplines.

**This year we funded initiatives in Digital Technology and Society and Precision Health:**



## PRECISION HEALTH

### PRECISION HEALTH INITIATIVE

Their work aims to improve outcomes and reduce disparities for communities and populations, ranging from reducing cancer in rural communities to developing scalable digital interventions to support young people.



## PRECISION HEALTH

### THE PAUL AND DIANE MANNING INSTITUTE OF BIOTECHNOLOGY



## DIGITAL TECHNOLOGY & SOCIETY

### DIGITAL TECHNOLOGY AND DEMOCRACY

Housed within the Karsh Institute of Democracy, their work focuses on how digital technology can support democracy, particularly in the age of artificial intelligence.



## DIGITAL TECHNOLOGY & SOCIETY

### DIGITAL TECH AND YOUTH DEVELOPMENT

Their work explores how digital technology can contribute to healthy development in young people, with a focus on addressing the youth mental health crisis.

# The Paul and Diane Manning Institute of Biotechnology



The Paul and Diane Manning Institute of Biotechnology, founded in 2023, will catalyze innovation and stimulate collaboration throughout the state by bringing together world class researchers in biotechnology who will bring life-changing and life-saving treatments to those who need them the most. The new institute is made possible, in large part, by a \$100 million donation from philanthropists Paul and Diane Manning, for whom the institute is named.

Launched in January 2023, UVA broke ground on a state-of-the-art, 350,000-square-foot facility in Fontaine Research Park in December 2023. The building will include laboratory space, expanded research facilities, core facilities and an area for researchers and partnering biotechnology companies.

Through the institute, UVA will build on its expertise in biotechnology, and the University's ability to manufacture gene and cell therapy solutions at a large scale to support the growth of clinical trials.

The Manning Institute is anticipated to attract pharmaceutical and biotech companies to what is expected to become a major hub for research and manufacturing centered around UVA's new state-of-the-art biotech facility.



# Strategic Investments

To be a truly great research institution and continue to grow, the University of Virginia must invest in its infrastructure. After a year-long process involving input from faculty and staff, investments were made to help strengthen our research enterprise.

Some key areas of investment include research cores, data systems, research staff, new and renovated research spaces, and investments in sponsored programs.

## RESEARCH CORES

Created by Grand Challenges and the Strategic Research Infrastructure Initiative, the new Research Cores aim to facilitate cross-school collaborations and empower researchers to help solve some of the world's most pressing problems.

### **CLINICAL DATA WAREHOUSE**

The initiative focuses on providing researchers with access to electronic health records and other clinical datasets to develop predictive algorithms, fostering community research involvement.

### **RESEARCH DATA ENCLAVE**

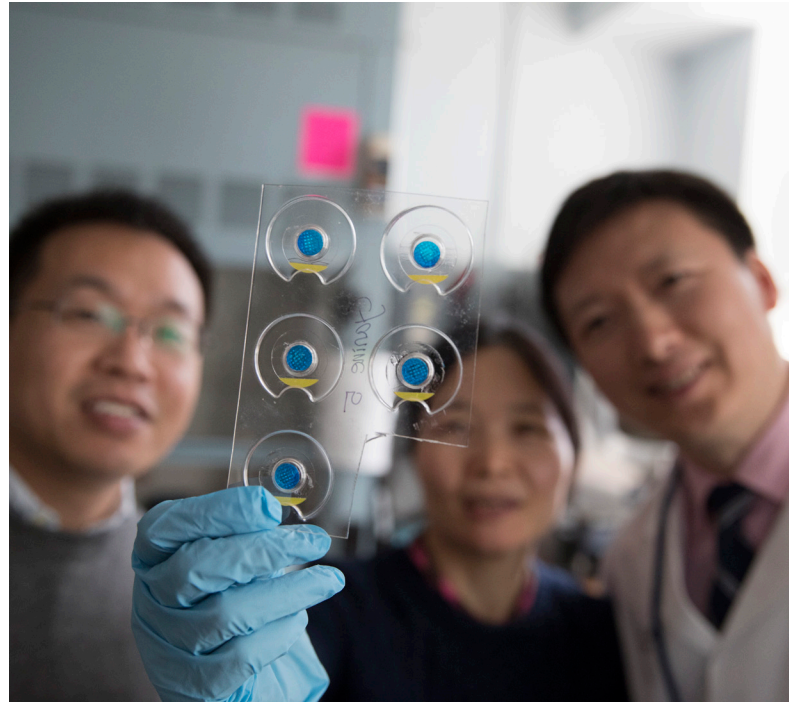
The Research Data Enclave (RDE) is a pioneering initiative poised to revolutionize health research by providing a customizable platform for integrated and harmonized data.

### **DIGITAL TECHNOLOGY CORE**

The Digital Technology Core will not only centralize and integrate digital technology services but will also serve as a connector for investigators, fostering collaboration and innovation.

### **CLINICAL TRIALS CORE**

The goal is to assist and strengthen clinical researchers as they facilitate and execute high-quality human subject research across UVA.



### **BIOMARKER AND NEUROIMAGING CORE**

This core facility will provide cutting-edge technologies and expertise to investigators studying brain-related disorders and conditions.

### **ANIMAL EEG & ELECTROPHYSIOLOGY CORE**

This core facility will enable research into brain activity in animals, providing access to cutting-edge instrumentation, expert guidance on experimental design and techniques, as well as training opportunities.

### **DATA ANALYTICS CENTER**

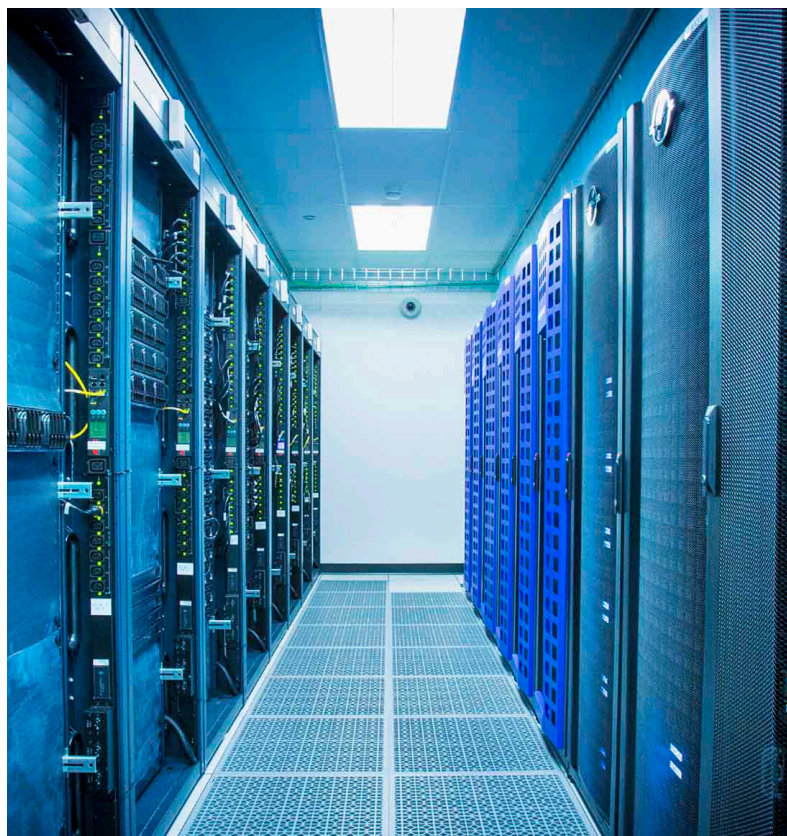


# AI & Data Analytics

## AI RESEARCH AT UVA

Advances in machine learning have transformed research across many disciplines, and a significant number of UVA's faculty are now doing research that involves artificial intelligence and machine learning (AI). UVA's core AI research aims to develop the science, technology, and ethics underlying AI tools and their use, while also leveraging AI to advance other fields such as the sciences, humanities, and medicine. Many UVA researchers are among the leaders in these areas, and individual units at UVA have made substantial investments in AI research, primarily through faculty hiring.

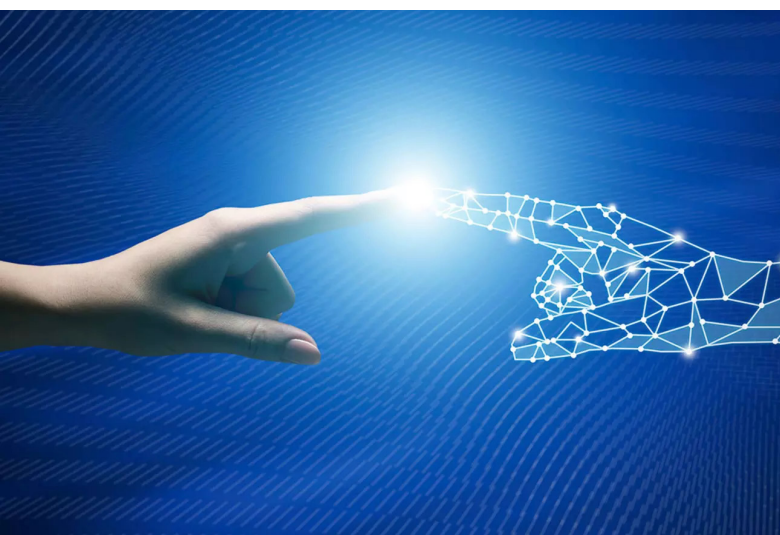
[UVA Darden's Artificial Intelligence Initiative: Humans, Machines and the Future of Business](#) aims to generate interdisciplinary research, foster dialogue, and support education that provides the intelligence and insights that decision-makers will need to address this important challenge. Launched by the LaCross family's 2022 initial \$6.5 million bequest, the initiative has powered early faculty work in this domain.



Recent investments have been made to expand access to research computing, build a new facility at Fontaine Research Park, and hire Research Computing staff for the new Data Analytics Center.

## DATA ANALYTICS CENTER

The [Data Analytics Center](#) is UVA's new hub for the management and analysis of large research data. Staff specialize in key domain areas such as image processing, text analysis, bioinformatics, computational chemistry and physics, neural networks, and more. They assist researchers and can do everything from answering basic computational questions to being embedded in projects.



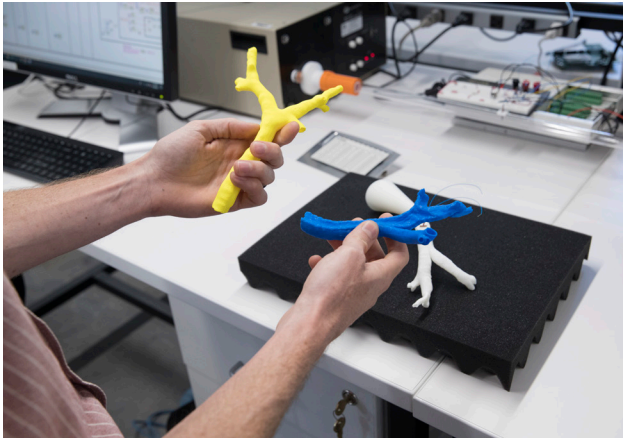
# Innovation and Entrepreneurship

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In October 2023, UVA launched a new, cross-University [entrepreneurship initiative](#) to make it easier for students, faculty, staff, alumni and investors to navigate the entrepreneurial ecosystem.

Entrepreneurship resources across Grounds include [Licensing & Ventures Group](#), [UVA's iLab](#), an initiative of the [Batten Institute for Entrepreneurship](#),

[Innovation, and Technology](#) at the Darden School, and the McIntire School of Commerce's [Galant Center for Innovation and Entrepreneurship](#). In 2022, UVA became a part of the [I-Corps Mid-South Innovation Hub](#), a consortium whose aim is to enhance innovation capacity, support promising research, generate economic value and create opportunities for diverse communities.



## DEVICE DETECTS BREATHING PROBLEMS BEFORE IT'S TOO LATE

Dr. Shirang Gadrang, an internal medicine physician at UVA Health, has invented a device called ARK (Analysis of Respiratory Kinematics) for labored breathing that will do what a sphygmomanometer does for checking a person's blood pressure or a thermometer does for taking someone's temperature.

ARK has the potential to measure more than 10 novel physiometers of labored breathing, helping kids with pneumonia, asthma and more.

"Even though I created ARK for the gap I saw in my own work, what's really exciting is it's a broadly applicable technology with more uses beyond just my field," Gadrang said.

## INVENTION REDUCES PATIENT DISCOMFORT

Dr. Timothy Showalter, a UVA School of Medicine professor and clinician at the UVA Cancer Center, invented a product for women with cervical cancer called the BrachyGel Vaginal Hydrogel Packing System that received U.S. Food & Drug Administration clearance last year as the first product of its class. It replaces gauze during radiation therapy, reducing patient discomfort during treatment procedures. It is expected to be in at least 50 hospitals by the end of the year, with international distribution starting soon after.





# Global Research

## MAKING CARS SAFER

A project to help design seat belts and airbags that will provide the highest level of safety for reclined riders in an automobile crash, with funding from Hyundai Motor Corporation.



UVA's research stretches around the globe and is having an impact internationally. Here are just a few of our many research projects around the world.

## PERSONALIZED TREATMENTS FOR HEART DISEASE

Researchers are integrating AI tools and federated datasets to identify personalized treatments for cardiovascular diseases, made possible with funding from the European Commission (as part of the Horizon Europe program).



## EDUCATION OF CHILDREN WITH AUTISM

A project to better understand the educational landscape for children with autism in Kenya, with funding from the Spencer Foundation.



## HOW DOES GRATITUDE DEVELOP?

Researchers examine the development and socialization of gratitude in the US and India, made possible with a John Templeton Grant.



# Significant Discoveries



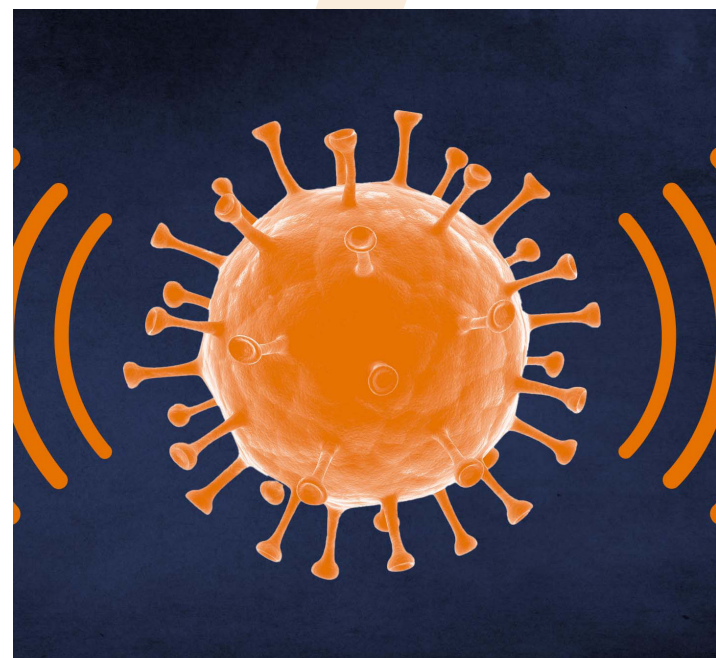
## NEW ARTIFICIAL INTELLIGENCE RISK-ASSESSMENT TOOL IMPROVES HEART-FAILURE CARE

A powerful new tool created by UVA researchers improves existing risk assessment tools for heart failure by harnessing the power of machine learning (ML) and artificial intelligence (AI) to determine patient-specific risks of developing unfavorable outcomes with heart failure.



## UNKNOWN FACTOR IN HIV TRANSMISSION IS IDENTIFIED

UVA researchers have identified what they believe is a critical factor in HIV transmission, a protein the virus makes and how that protein interacts with the RNA of the virus influences whether HIV is passed on.

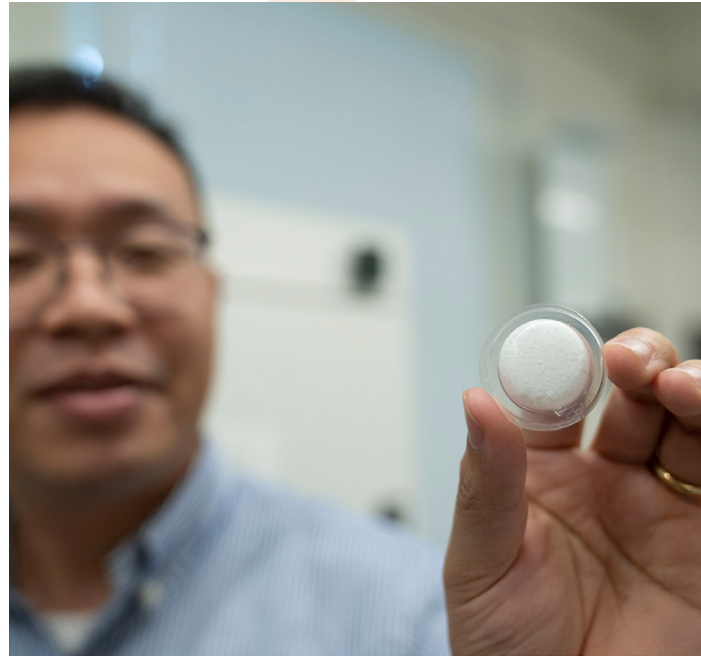






## **DISCOVERY COULD MAKE FOOTBALL SAFER**

UVA researchers have designed a “liquid nanofoam system” that can be used for all sorts of padding, that in a football helmet impact test was more effective at absorbing and diffusing impacts and retains its effectiveness despite being subjected to repeated blows.



## **FERMENTED-FOOD BACTERIA CAN GUARD AGAINST DEPRESSION AND ANXIETY**

UVA researchers have discovered how *Lactobacillus*, a bacterium found in fermented foods and yogurt, helps the body manage stress and may help prevent depression and anxiety. The findings open the door to new therapies to treat anxiety, depression and other mental health conditions.



# Significant Discoveries



## A SEARCH FOR THE MOST HEAT-RESISTANT SUBSTANCES EVER MADE

Funding from the DOD is helping UVA Researchers “read the rocks” in a search for substances they can use to develop high-temperature materials for use in energy production, hypersonics, and additive manufacturing.



## UVA DISCOVERY COULD EASE JET LAG AND IMPROVE CHEMOTHERAPY

A UVA research team used miniature “guts in a dish” and advanced computer modeling to look at how the microbes in our guts regulate the body’s biological clock helping us battle sleep disorders, combat jet lag, fight off foodborne illness and even improve chemotherapy outcomes.







## WITH UVA DISCOVERY, WE MAY BE ONE GOOD SOLUTION CLOSER TO SOLVING CLIMATE CHANGE

A team at UVA has discovered that seagrass beds can capture and retain carbon for centuries – even in situations where the seagrass dies off – offering new optimism for using nature-based solutions to fight climate change.



## RECORDS UNCOVERED BY UVA HISTORY PROFESSOR LED TO INVESTIGATIVE JOURNALISM PROJECT ON NATIVE TRIBAL WATER RIGHTS

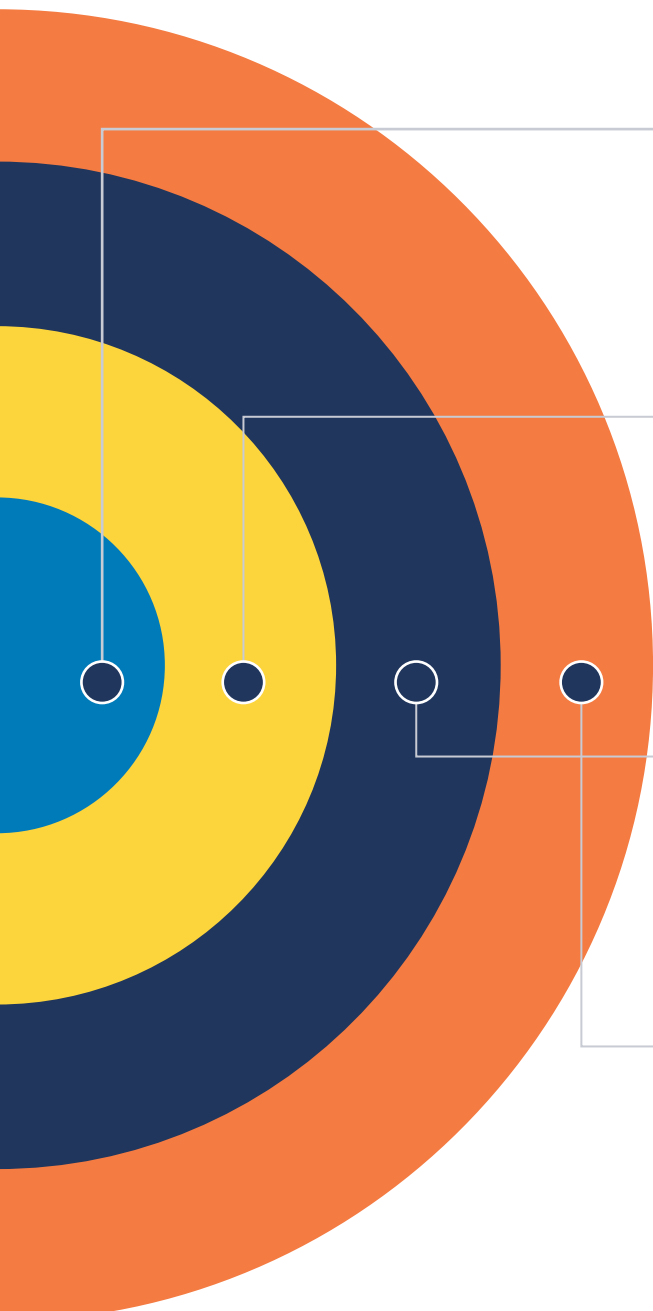
UVA History professor's research puts a spotlight on Arizona and California's efforts to block — and the efforts of the Department of Justice staff to protect — native tribal water rights following the 1964 Supreme Court ruling.



# The Office of the Vice President for Research

The [Office of the Vice President for Research](#) (OVPR) is responsible for advancing research at UVA, as well as the various compliance and support areas. The OVPR works to catalyze, support and safeguard UVA research.

What does the OVPR do for researchers? The office is a resource, and we are here to help advance UVA researchers' work—everything from finding funding, applying for grants, doing human subject or animal research, making sure labs are safe, or getting a patent for inventions.



## SEED FUNDING

- 3Cavaliers
- P2PE STEM
- Grand Challenges
- Pan-U Institutes
- SIF Projects
- School & Central Seed Funds
- Venture Fund
- Licensing & Ventures Seed Fund



## OPERATIONAL EXCELLENCE

- Human Subject Protection Program
- Center for Comparative Medicine
- Animal Care & Use
- Environmental Health & Safety
- Radiation Safety
- Export Controls
- Sponsored Programs
- Data Security
- Foreign Influence
- Licensing & Ventures



## GROW RESEARCH

- Creation of Large & Complex Proposals
- Award Nominations
- Coordinate with State & Federal Agencies
- Limited Submissions
- Data Analytics



## IMPACT & COMMUNICATE

- Sponsored Research
- Philanthropic Support
- Quantity & Quality of Publications
- Faculty Recognition
- National Academy Members
- Translation of Discovery & Knowledge
- Research-Enabled Student Outcomes
- Peer Recognition (Ranking)



# New Research Programs

Recent strategic investments, as well as grant funding, has allowed the OVPR to launch key programs to help the University better serve our researchers, as well as the wider community.



**KELVIN MOORE**  
*First UVA Sanford H. Feldman Laboratory Animal Medicine Residency Resident*

The 3-year **Sanford H. Feldman Laboratory Animal Medicine Residency Program** at UVA was developed in 2023 and is the very first program of its kind in Virginia. In a unique partnership between academia and industry, it was made possible by a generous gift from Charles River Labs. The program will both help fulfill the need for more trained laboratory vets and expand the diversity in the field.

## NEW RESEARCH ADMINISTRATOR TRAINING PROGRAM

To meet the need for new research administrators in our rapidly growing research offices, the School for Continuing Education launched a new online program to train participants who want to move into the field.

## RESEARCH NAVIGATORS

Funded by the Strategic Research Infrastructure Initiative at UVA, Research Navigators are now in place to build a bridge between the UVA community and UVA's research resources. The Research Navigators offer one-to-one concierge service to faculty and staff.

Two Research Navigators have been hired to support Sponsored Programs and Research Development, with more to follow.



College and Graduate School  
of Arts & Sciences

Darden School of Business

Frank Batten School of  
Leadership and Public Policy

McIntire School of Commerce

School of Architecture

School of Continuing and  
Professional Studies

School of Data Science

School of Education and  
Human Development

School of Engineering  
& Applied Science

School of Law

School of Medicine

School of Nursing



Office of the Vice President  
for Research