



An Inspired Flagship for an Innovative Maryland

*Presented by
Darryll J. Pines
President*

UNIVERSITY
OF MARYLAND

ON THE COVER The towering windowed walls of the E.A. Fernandez IDEA (Innovate, Design and Engineer for America) Factory reflect the surrounding university landscape in myriad colors from the dichroic coating on the glass. The new building houses labs for quantum, robotics and rotorcraft research; a student-run coworking space and business incubator; and a café.





WE ARE EDUCATING a top workforce, inspiring future leaders, producing groundbreaking research and addressing many of society's greatest challenges. All this is being accomplished despite COVID-19 and its lingering effects. Without missing a single step, the University of Maryland is driving innovation and progress at the highest levels to create a generational and lasting impact in the world. We are recruiting academically talented students from every part of the state with one of the largest and most diverse freshman classes in recent history for the Fall 2021 semester. For the first time, the majority of the freshman class comprises students of color.

I am extremely proud of the incredible academic, research and economic achievement occurring in the Discovery District, our dynamic research park located in Prince George's County that brings together a vibrant mix of university stakeholders, corporate partners, government researchers, entrepreneurs and local residents. We owe a huge debt of gratitude to the General Assembly for the tremendous success of the startup IonQ, one of the crown jewels of the Discovery District. Without your support, we likely would not have been able to translate cutting-edge quantum research from the laboratory benchtop to the marketplace to the New York Stock Exchange.

The new National Quantum Lab at Maryland (Q-Lab) is the first of its kind in the nation to enable the scientific community to pursue world-leading research through hands-on access to a commercial-grade quantum computer, giving our faculty and students access to the most powerful computing in the world. UMD also has launched the Quantum Startup Foundry, one of our region's best business incubators for incentivizing quantum entrepreneurs and startups to locate businesses in

College Park. Our research awards and expenditures are the highest ever, which is helping us achieve high-impact results in such vital areas as climate change, clean energy, public health and safeguarding the world's food supply. Our new strategic plan, *Fearlessly Forward*, outlines our vision to reimagine learning, invest in people, take on humanity's grand challenges and partner to advance the public good.

In keeping with our commitment to inclusive excellence, our campus is expanding the ranks of new tenured and tenure-track faculty from underrepresented groups; building a pipeline to academic leadership for Black, Hispanic and American Indian/Alaskan Native faculty in the arts and humanities; taking purposeful steps to confront the historic marginalization of Maryland's Indigenous people; and prioritizing investments that lift up students with disabilities and communities of color.

Buoyed by the success of our \$1.5 billion *Fearless Ideas* campaign, we will continue to devise innovative solutions that move us toward a more equitable, resilient and sustainable future.

Thank you for your continued support of the University of Maryland. I am both gratified and excited by the progress we have made together. I am looking forward to continuing the strong relationship between the university and the General Assembly.

DARRYLL J. PINES

President

*Glenn L. Martin Professor of
Aerospace Engineering*



Rising in the Rankings



Academic Success

88.3%

**SIX-YEAR GRADUATION RATE
(2015 COHORT OF FIRST-TIME
STUDENTS)**

- Highest in the University System of Maryland
- Ranked No. 14 among U.S. public institutions

11,316

**DEGREES CONFERRED
(FY 2021)**

Bachelor's: 8,107
Master's: 2,647
Doctoral: 562

Top Undergraduate Degrees Awarded

1. Computer Science (797)
2. Biological Sciences (534)
3. Information Science (405)
4. Finance (343)
5. Mechanical Engineering (330)
6. Public Health Science (313)
7. Government and Politics (295)
8. Economics (294)
9. Criminology and Criminal Justice (283)
10. Communication (268)

Student Profile (Fall 2021)

41,272

TOTAL ENROLLMENT

Undergraduate students:

30,922

Graduate students:

10,350

75.5%

MARYLAND RESIDENTS

(Undergraduates)

47%

MINORITY UNDERGRADUATES

Freshman Credentials (Fall 2021)

4.34

AVERAGE GPA

SAT SCORES

1490 (75th percentile)

1340 (25th percentile)

1420 (Midpoint)

Out of **50,306** new freshman applications, **6,039** enrolled

Select Rankings

U.S. NEWS & WORLD REPORT

No. 14 among U.S. public institutions ranked as Best Global Schools

No. 20 among Top Public Schools

FORBES' TOP PUBLIC COLLEGES

No. 14

KIPLINGER'S PERSONAL FINANCE

100 Best Values in Public Colleges:

No. 10 for in-state students

**THE PRINCETON REVIEW/
ENTREPRENEURSHIP MAGAZINE**

No. 4 among public universities for undergraduate entrepreneurship

No. 10 overall

**NATIONAL SCIENCE FOUNDATION'S
HIGHER EDUCATION RESEARCH
AND DEVELOPMENT SURVEY
(with the University of Maryland,
Baltimore)**

No. 10 among public institutions

No. 16 overall nationally





Scholarship Success

46

MAJOR
NATIONAL
AND
INTERNATIONAL
AWARDS

15 National Science Foundation Graduate Fellowships

8 Critical Language Scholarships

6 Hollings NOAA Scholarships for study of environmental science and policy

4 Fulbright grants for international exchange

3 Gilman Scholarships for study abroad

3 Goldwater Scholarships honoring STEM excellence

2 Ford Predoctoral Fellowships

1 Carnegie Scholarship for postgraduate study

1 Churchill Scholarship for study at the University of Cambridge

1 Gates Cambridge Scholarship for study at the University of Cambridge

1 Marshall Scholarship for study in the United Kingdom

1 Pickering/Rangel/Public Policy and International Affairs program foreign policy scholarship



↑ **Pavan Ravindra '21**, a biochemistry and computer science dual-degree student, was awarded a 2021 Winston Churchill Scholarship to pursue a master's degree in chemistry at the University of Cambridge. Ravindra excelled in the classroom and in his independent research efforts, with two published papers and an algorithm that is being used by other researchers in academia and industry.

Educating a Workforce of Visionary Leaders

MAKERSPACES

➤ *Make*: magazine teamed with *Newsweek* to name UMD one of the Best Maker Schools in Higher Education. Students working in the Advanced Fabrication Lab in A. James Clark Hall and 16 other “makerspaces” across campus have access to cutting-edge design software and fabrication technology like 3D printers and laser cutters.

OFF THE GRID

➔ UMD students and alums will build the first-ever experimental sustainable community in the northwestern Nevada desert—part art installation, part eco-friendly habitation—that both thrives off and replenishes the land. The centerpiece of the community, known as “Ripple,” will be a geodesic dome that collects and purifies water for surrounding rings of sustainable gardens. Solar and wind energy will fuel the project.



← FUTURE OF TRAVEL

A UMD team is among 10 finalists selected from around the nation to participate in the University Nanosatellite Program competition sponsored by the Air Force Research Lab to design and test small satellites as training for the next generation of spacecraft development and space professionals.

Building a Culture of Inclusive Excellence



➤ **Heritage Community:** UMD kicked off Native American Indigenous Heritage Month in November with a ground blessing ceremony and naming of the first new dining hall built on campus in nearly 50 years, Yahentamitsi, in honor of the Piscataway, the Indigenous people of Maryland.

The new **TerrapinSTRONG** onboarding initiative embodies the vision that the university strives to create an inclusive environment where every member of the UMD community feels that they belong and are empowered to reach their full potential. More than 12,000 people have enrolled in the TerrapinSTRONG program.

➤ **TerpsEXCEED** is the first program of its kind at a Maryland public university for students with intellectual and developmental disabilities, providing support from faculty, staff and peer mentors so they can independently participate in the campus community.

UMD has committed more than \$40 million over the next 10 years to **FAMILE** (Faculty Advancement at Maryland for Inclusive Learning and Excellence), a diversity initiative program to recruit and increase the number of underrepresented tenured or tenure-track faculty.

The interactive **Inequality Research Hub** in the College of Behavioral and Social Sciences highlights full-time faculty members who are actively engaged in inequality research and fosters new collaborations between students and faculty performing research on topics including race/ethnicity, gender, socioeconomic status, sexual orientation and immigration status.

Five new cultural centers in Cole Field House will provide gathering spaces for Latinx; Asian Pacific Islander Desi American; Native American and Indigenous; Multiracial and Biracial students; and students with disabilities to ensure that every UMD student feels a sense of belonging on campus.

Expanding the Pipeline: A \$3 million grant from The Andrew W. Mellon Foundation is supporting a joint effort between UMD; the University of Maryland, Baltimore County; and Morgan State University to expand the pipeline of women faculty and Black, Hispanic and American Indian/Alaskan Native faculty in the ranks of academic leadership in the arts and humanities.



Re-envisioning How We Live and Learn



↑ ARTS FOR ALL

UMD is bolstering its campus-wide culture of innovation through the new Arts for All initiative that partners the arts with the sciences, technology and other disciplines to develop reimagined curricular and experiential offerings that nurture dialogue, problem solving and action.

Transforming the Campus



↑ **Pyon-Chen Hall** opened in August 2021, housing 450 first-year students, including some of the cohort of the University Honors living-learning program. It was named for two trailblazing alums, Pyon Su (1891) and Chunjen Constant Chen (M.A. 1919).



↑ The E.A. Fernandez **IDEA Factory** (Innovate, Design and Engineer for America) is a 60,000-square-foot privately funded addition to the Jeong H. Kim Engineering Building. Its unique spaces and labs will enable students, faculty and staff to address 21st-century challenges while also serving as venues to translate basic research into invention and invention into product.



↑ **Jones-Hill House**, a world-class facility in Cole Field House, is the new home for Terps Football. Amenities include a 24,000-square-foot strength and conditioning space, a state-of-the-art locker room, hydrotherapy facilities, and advanced physical assessment and diagnostic technology.

Doing Good In and Out of the Classroom

DO GOOD AMBASSADORS

Sixteen students were selected to serve in the second cohort of Do Good Ambassadors, a professional development and community-building program that engages passionate, inspired and innovative Terps to do good in their communities and careers and the world.

COMMUNITY-POLICE RELATIONS

The UMD Police Department is the first law enforcement agency in Maryland to partner with Lights On!, a community-driven program that will lead to better interactions and goodwill with the public. Instead of a ticket, campus police officers will give College Park drivers with burned-out lightbulbs or taillights a free voucher to get them fixed at participating auto shops.



↑ A DECADE OF GOOD DEEDS

Terp students, parents, employees and alums, along with community residents, businesses and nonprofits, replanted and pruned local trails and completed park cleanups, schoolyard beautification projects and invasive plant removals in 14 locations in College Park during Good Neighbor Day, which celebrated its 10th anniversary in October 2021.

Solving Grand Challenges

Ensuring a Sustainable Climate

TEACHING CLIMATE CHANGE IN THE K-12 CLASSROOM

Doug Lombardi, associate professor in Human Development and Quantitative Methodology, conducts research on strategies and teaching tools to support deep learning about scientific topics that pose local, regional and global challenges such as causes of current climate change and the availability of freshwater resources.

CLIMATE CHANGE FINANCE AND RISK MANAGEMENT

Finance professor **Clifford Rossi** explores the interconnectedness of climate change and the economy and studies potential policy decisions and implications for climate change finance and risk management in both the private and public sectors.

METHANE MONITORING AND CONVERSION

Russell Dickerson, professor in Atmospheric and Oceanic Studies, is measuring and monitoring methane in the atmosphere. **Eric Wachsman**, distinguished university professor of Materials Science and Engineering, and colleagues have developed a process for converting powerful greenhouse gas into a range of valuable commodity chemicals without releasing climate-changing emissions.

→ CLIMATE CHANGE AS ART

Art professor and interdisciplinary artist **Cy Keener** uses environmental sensing and kinetic sculpture to record and represent phenomena in the natural world such as rain, wind and ocean waves.





↑ MEASURING CLIMATE CHANGE FROM SPACE

Whether utilizing lasers on the International Space Station or satellites orbiting the Earth, Geographical Sciences researchers **Ralph Dubayah**, **Inbal Becker-Reshef** and **Sinéad Farrell** are quantifying the impact of climate change on everything from tree canopies to agriculture and Arctic sea ice.

CLIMATE CHANGE COMMITMENT

UMD will accelerate its Climate Action Plan goal to become a net-zero carbon-neutral campus by 2025 through a combination of sustainability measures and the strategic purchase of carbon credits. As part of this commitment, **President Darryll J. Pines** also announced plans to replace the university-owned fleet—over 1,070 fossil-fuel vehicles—with an all-electric fleet by 2035.



Creating an Equitable Future

← ANTI-BLACK RACISM INITIATIVE

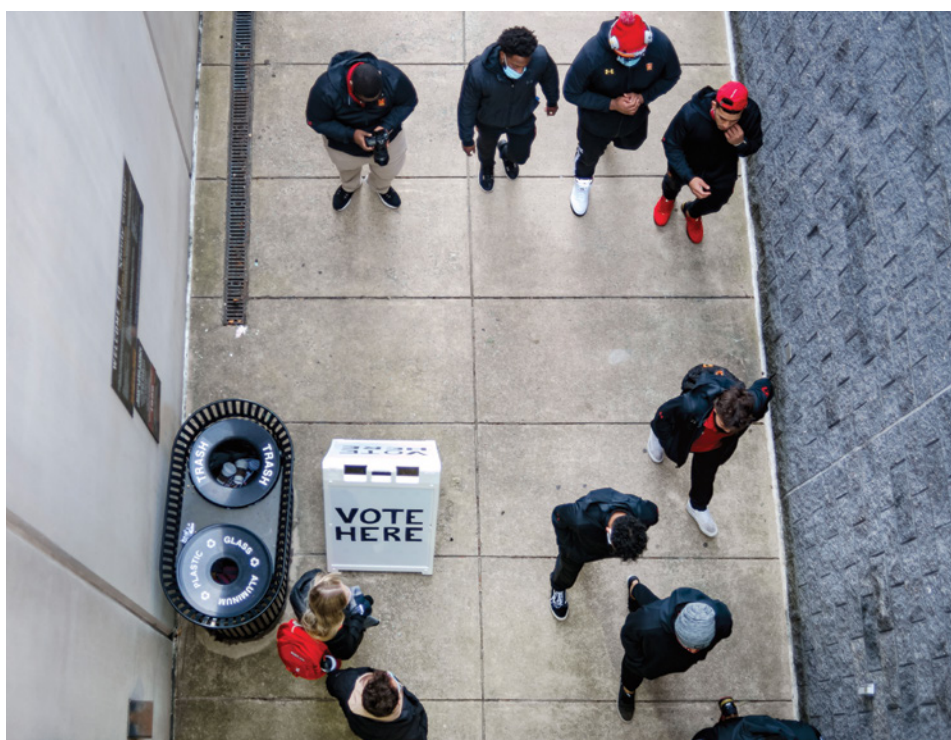
Sociology professor **Rashawn Ray** and a team of faculty, staff and students have developed best practices for recruiting, retaining and supporting faculty members, staff and students as part of the College of Behavioral and Social Sciences' Anti-Black Racism Initiative.

HELPING REFUGEES

A new program led by research professor **Robert Koulisch** is helping refugees in Prince George's County learn English, navigate public transportation and gain financial literacy. Fifteen students in the MLAW Migrant Assistance Program are receiving training to provide services to people from Afghanistan, Haiti and Central America through the nonprofit organization Solutions in Hometown Connections.

↓ STRENGTHENING DEMOCRACY

Alexandra Marquez '20 was named Standout Undergraduate Student by the ALL IN Campus Democracy Challenge, a coalition of 850 higher education institutions across the country that empowers colleges and universities to achieve excellence in nonpartisan student democratic engagement.



Faculty and Staff Honors and Awards



UMD President **Darryll J. Pines** was named a "Top 50 leader in Higher Education" by the National Diversity Council at the 17th annual National Diversity and Leadership Conference.



Research professor and physicist **Alessandra Buonanno** was elected to the National Academy of Sciences for her role in the recent discovery of gravitational waves.



Van Bailey, director of Bias Incident Support Services, was featured in *Out Magazine's* OUT100 list as one of the LGBTQ+ policy makers and advocates changing the world.

Ming Lin, a distinguished university professor of computer science, was elected as a fellow by the National Academy of Inventors, joining the ranks of some of the nation's most prestigious and creative academic inventors.

Donna Hammer and **Amanda Preperato** received the 2021 Board of Regents' Staff Awards, the highest honor bestowed by the Board of Regents for the achievements of exempt and non-exempt staff employees at USM institutions.

Minta Martin Professor and Department of Mechanical Engineering Chair **Balakumar Balachandran** won both the 2021 J.P. Den Hartog and 2021 Lyapunov Awards from the American Society of Mechanical Engineering.

Bioengineering professor **William E. Bentley** received the 2021 Daniel I.C. Wang Award for Excellence in Biochemical Engineering from the Institute of Chemical Engineers' Society of Biological Engineering.

English professor **Tita Chico** was listed on The Daily Record's "Power 30 Higher Education in the State of Maryland."

Minta Martin Professor of Physics **Mohammad Hafezi** was elected a fellow of the American Physical Society.

Amy J. Nelson, research associate at the Center for International and Security Studies at Maryland, was appointed a Brookings Institution Rubenstein Fellow.

Mirosław J. Skibniewski, professor of construction engineering and project management in the Department of Civil and Environmental Engineering, was elected to the National Academy of Construction.

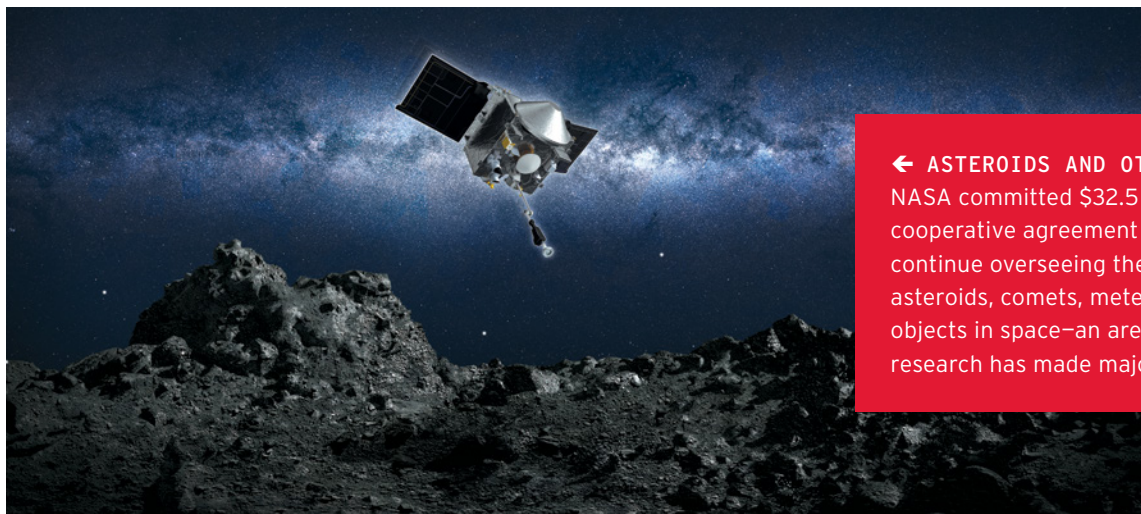
Laura Stapleton, interim dean of the College of Education, was appointed to the Blueprint for Maryland's Future Accountability and Implementation Board, which plans to close student achievement gaps and transform the state's education system over the next decade.

Maryland women's basketball head coach **Brenda Frese** was named National Coach of the Year by the Associated Press and was also voted National Coach of the Year by ESPN and The Athletic.

👉 **Min Wu**, professor in the Department of Electrical and Computer Engineering and associate dean of engineering, was named president-elect of the IEEE Signal Processing Society, the first woman of color to be elected for the position.



Transforming Research into High-Impact Results



← ASTEROIDS AND OTHER OBJECTS

NASA committed \$32.5 million to extend a cooperative agreement with UMD, allowing it to continue overseeing the space agency's data on asteroids, comets, meteorites and other small objects in space—an area of study where UMD research has made major contributions.

Research Success

EARTH FROM A DISTANCE

The Global Land Analysis and Discovery (GLAD) Lab received a \$12.75 million grant from the Bezos Earth Fund to create satellite systems to track Earth's changing physical landscape and related economic activity and land use from the year 2000 onward in a first-of-its-kind system.

EXPANDING ENVIRONMENTAL JUSTICE

A group led by **Sacoby Wilson**, associate professor of environmental health, is leading the expansion of the Maryland Environmental Justice Screen Tool's capabilities to quantify and respond to issues that affect the health of children and rural communities.

↘ BREATH OF AIR

Donald K. Milton, M.D., environmental health professor, leads the UMD StopCOVID study and a five-year, \$15 million UMD-University of Maryland, Baltimore collaboration to understand influenza transmission, funded by the National Institutes of Health.

NATURE VS. NURTURE?

Scott Juntti, assistant professor of biology, was awarded \$1.9 million by the National Institutes of Health to study how hormones affect the circuitry of the brain and the genes involved in behavior, by studying fish—rarely used to examine the role of lived experience vs. biology in behavioral studies.

RAPID MATERIALS DESIGN

A UMD team led by materials science and engineering professors **Yifei Mo** and **Liangbing Hu**, in collaboration with researchers at Northwestern and Lehigh universities, has been awarded \$1.8 million from the National Science Foundation to introduce advanced materials at twice the speed and a fraction of the cost of typical procedures.



\$668.5M

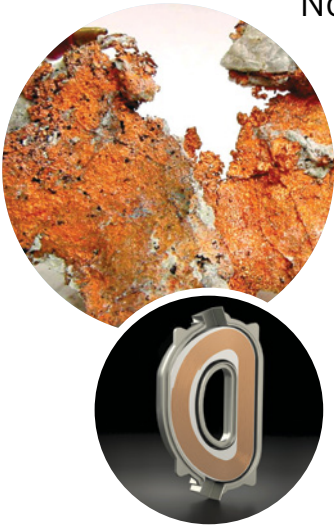
TOTAL RESEARCH
AWARDS, A NEARLY
\$50 MILLION JUMP
FROM LAST YEAR'S
PREVIOUS RECORD

\$535.6M

TOTAL RESEARCH
EXPENDITURES

Aligning Creativity and Research

Notable grants to UMD include:



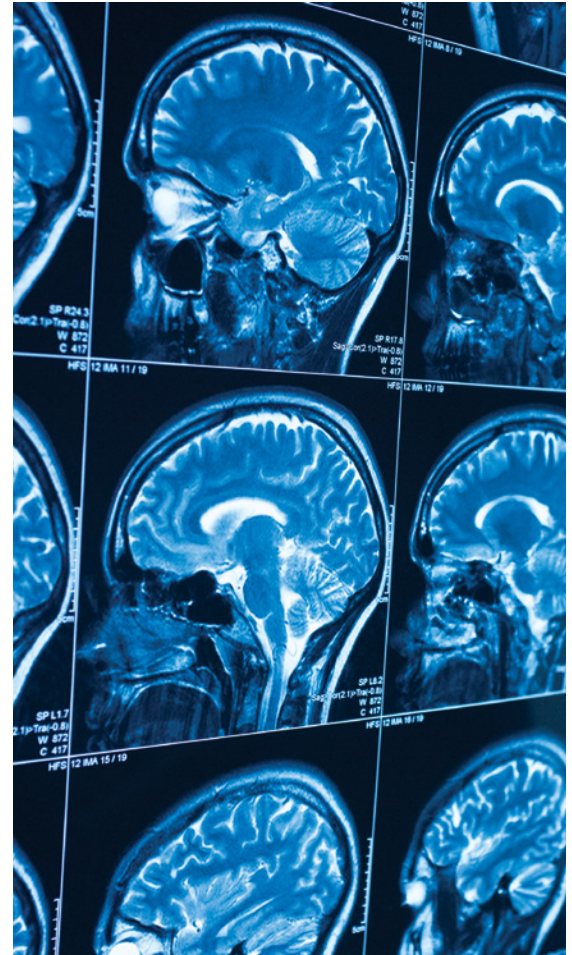
← A **\$1.5 million** award from the National Institutes of Health will fund a University of Maryland researcher's ongoing exploration of the role of copper in the body's adaptive response to cold, and its likely connection to an individual's metabolism and fat-burning abilities.

← The Quantum Technology Center at UMD has received **\$1.5 million** to study quantum diamond magnetometers in collaboration with Commonwealth Fusion Systems, a Massachusetts Institute of Technology spinoff commercializing fusion energy.



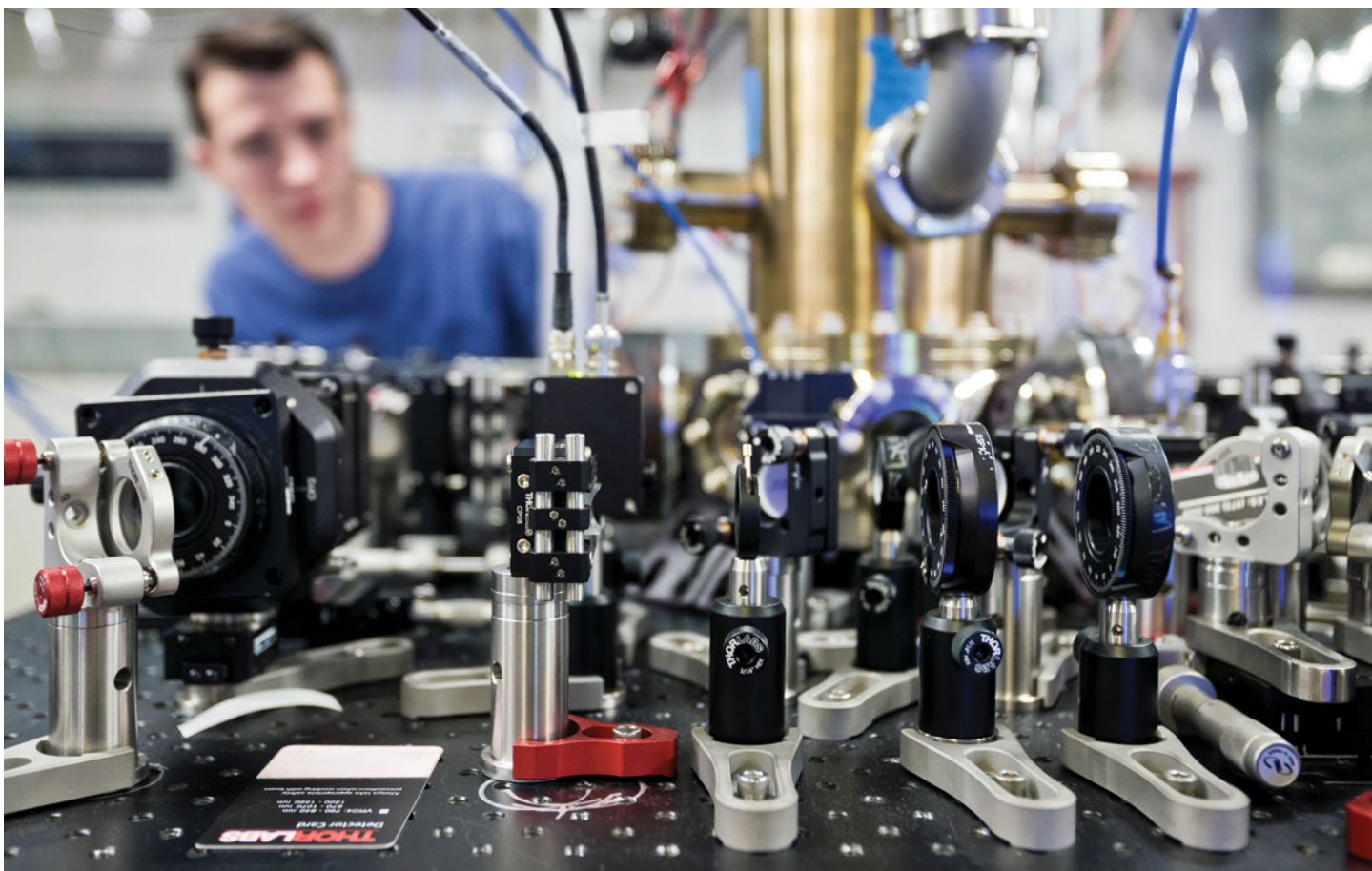
↑ UMD received a five-year, **\$2 million** grant from the U.S. Small Business Administration to launch the Mid-Atlantic Veterans Business Outreach Center to serve as a regional epicenter for training, consulting and technical assistance for aspiring veteran entrepreneurs and veteran-owned small businesses.

UMD will lead a **\$4.8 million** Andrew W. Mellon Foundation grant to fund the new Black Communication and Technology Lab, a multi-institutional project working toward an equitable digital future through research on topics like racial inequality, disability justice and Black digital spaces. UMD hopes to introduce students in Prince George's County high schools to the field of Black digital studies and encourage future scholarship.



↑ A **\$1.7 million** grant from the University of Maryland Strategic Partnership: *MPowering the State* will allow researchers from College Park and University of Maryland, Baltimore to focus on health-related study design, implementation, training awards and scientific findings that benefit the community.

A two-year, **\$5 million** award from the National Science Foundation will allow UMD to lead a multi-institutional team to develop quantum interconnects—crucial technology to connect quantum computers and pave the way for a quantum internet.



Creating an Innovation Pipeline

↑ QUANTUM STARTUP FOUNDRY

The university's Quantum Startup Foundry (QSF) is centralizing the resources needed to support entrepreneurs and startups and accelerate quantum technologies' time to market. Strengthening UMD's status as the linchpin of the regional "Capital of Quantum," QSF offers the perfect landing and launch spot for quantum companies.

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

UMD will receive **\$1.14 million** in matching funds from the state of Maryland E-Innovation Initiative to enhance expertise in artificial intelligence and machine learning.

↓ NATIONAL SECURITY

Located in UMD's Discovery District, the Applied Research Laboratory for Intelligence and Security (ARLIS) is one of 14 designated University Affiliated Research Centers in the nation, and the only one dedicated to solving intelligence and security problems through artificial intelligence, information engineering and human systems.



UMD Startups to Watch in 2022



↑ **AmpX** is providing holistic, end-to-end solutions for the transition to clean energy and an improved technology ecosystem.

AquaLith manufactures next-generation batteries and battery materials.

Capitol Percussion & Backline, founded by **Jaovon Gilliam**, principal timpanist of the National Symphony Orchestra and lecturer in UMD's percussion program, provides rental percussion instruments to performing venues throughout the region.

STARTUPS FOUNDED BY UMD STUDENTS

AlgenAir LLC: creator of the world's first organic air purifier that uses algae to clean the air we breathe.

Cybrary: the leading cybersecurity professional development platform.

Curu: helping lenders and loan marketplaces grow their new accounts by recovering rejected applicants.

Hazel Analytics: a fast-growing technology company developing innovative products that transform how organizations use food safety data.



↑ IONQ JOINS THE NEW YORK STOCK EXCHANGE

On October 1, 2021, IonQ, a leading quantum computing company founded in part on technologies developed in the UMD Department of Physics, joined the New York Stock Exchange. College Park Professor **Chris Monroe** is IonQ's co-founder and chief scientist, and many Terp alums hold positions in the company.



↑ **Startup Shell** is a student-run incubator that provides a pipeline and network for student startups to scale beyond the campus. Since its inception, it has spurred over 60 ventures. It will be housed in the IDEA Factory.

Reinvigorating Greater College Park

ECONOMIC DEVELOPMENT

- **\$2+ billion** private-public investment to reinvigorate the Baltimore Avenue corridor
- **75** homes purchased through the College Park City-University Partnership homeownership program
- The **95,000-square-foot** College Park City Hall, a joint venture with the city, UMD and Terrapin Development Company, opened in December 2021 →

DISCOVERY DISTRICT

- **2 million** square feet of office and research and development space
- **6,500+** employees
- **4** federal agencies
- **60+** private companies and nonprofit organizations



↑ **Discovery Point/Parcels B&C:** Terrapin Development Company, in partnership with Brandywine Realty Trust, will develop about five acres next to The Hotel at the University of Maryland, right at the gateway to the Discovery District, into a dynamic, mixed-use innovation hub.



AMENITIES TO COME

Student housing projects are under construction in proximity to campus by Aspen-Maryland, Core Spaces, Gilbane and Landmark Properties.

The Purple Line light-rail line will extend from New Carrollton in Prince George's County to Silver Spring and Bethesda in Montgomery County. Five of the 21 stations will be located on or around the UMD campus. With direct connections to Metrorail, Amtrak and MARC, the Purple Line will provide more accessible and reliable transportation for students, faculty and staff.

A Rising UMD Tide Lifts All Boats



MENTAL HEALTH

Computer scientist **Aniket Bera** is bridging the gap between the high demand for mental health services and a low supply of practitioners with a virtual “friend,” an artificial intelligence-driven virtual conversational assistant that understands the subtleties of emotion.

FERMENTATION SCIENCE

A fermentation science major is increasing knowledge around this ancient way to prepare and preserve food-giving students the know-how to turn it to newer uses like climate-friendly biofuels and pharmaceutical development, while benefiting a range of homegrown craft food and drink industries.

SEARCH AND RESCUE

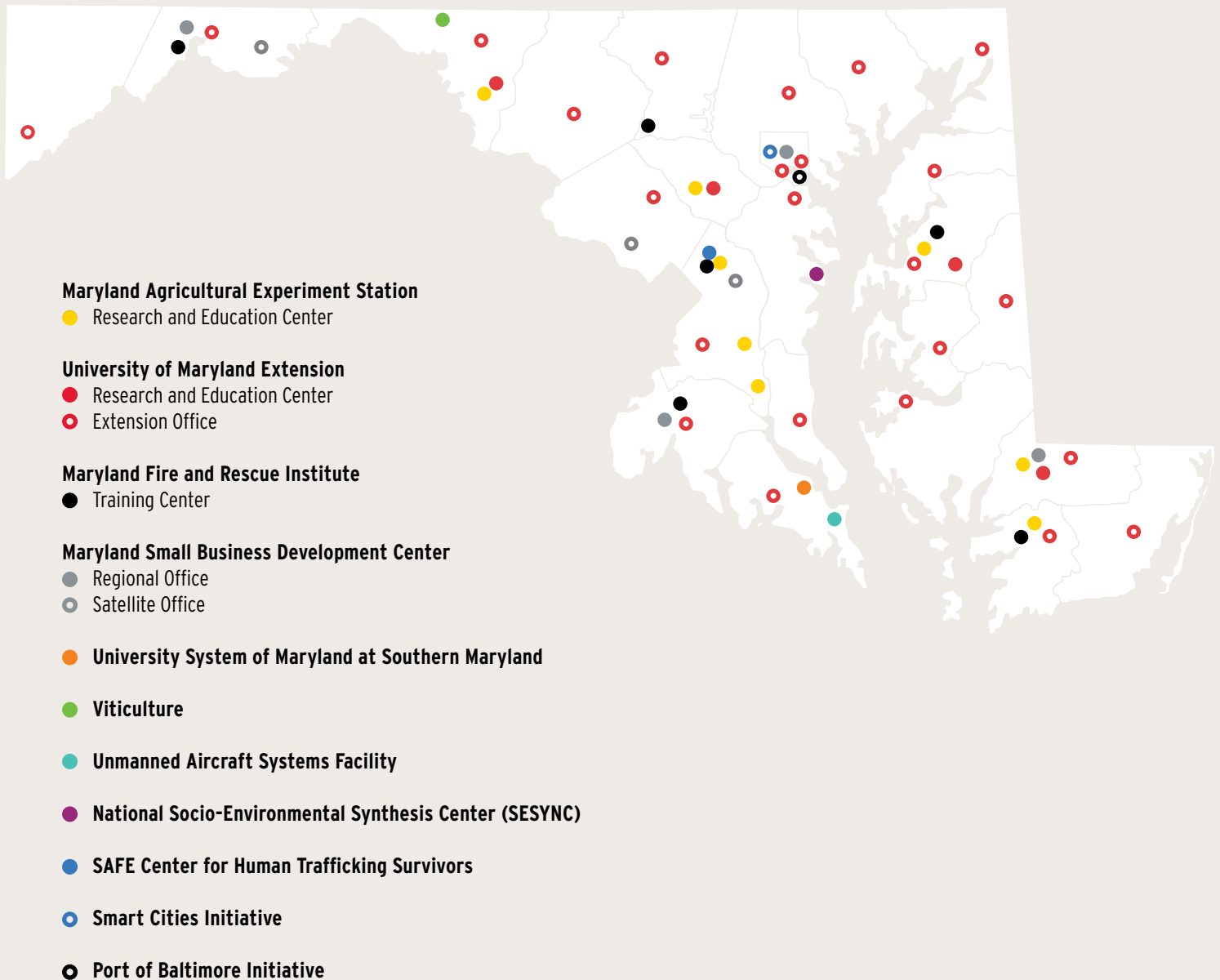
UMD drone experts are working with federal agencies to refine international satellite-aided search and rescue capabilities to better zero in on small lifeboats adrift in stormy seas.

CONSERVING WATER

As the effects of climate change drastically reduce the quantity and quality of freshwater available around the world, researchers **Amy Sapkota** and **Masoud Negahban-Azar** are developing ways to conserve and reuse water safely.



From viticulture, aquaculture and crops to drones, small business and first responders, UMD's impact reaches every jurisdiction in Maryland.





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