



2018 TESTIMONY TO THE  
MARYLAND GENERAL ASSEMBLY

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**BUILDING  
MARYLAND'S  
FUTURE**  
**POWERING  
ITS PRESENT**

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PRESENTED BY  
WALLACE D. LOH, PRESIDENT  
UNIVERSITY OF MARYLAND

## DRAMATIC RETURNS



In 2017, your flagship university produced dramatic returns on investments by the General Assembly, Governor Larry Hogan, businesses and individual donors.

Our students produced dazzling innovations and achievements and invigorated the state's workforce. Critical research began to define the future. Innovators created new businesses. College Park showed new life and vibrancy. Our new Discovery District opened five major buildings and lured its first Fortune 500 partner. The strategic partnership with the University of Maryland, Baltimore created powerful new research teams and educational opportunities. A historic private investment promised new educational access and quality. Service to the state reached further and with greater impact.

Thank you for your unwavering support of the University of Maryland. We will use it to power Maryland today and build Maryland's tomorrow.

Sincerely,

A handwritten signature in black ink, appearing to read "Wallace D. Loh". The signature is fluid and cursive, with a long horizontal stroke at the end.

**WALLACE D. LOH**

*President, University of Maryland*

# EDUCATING A TOP WORKFORCE

## Academic Success

**85.4%**  
GRADUATION RATE  
(2011 COHORT)

Highest six-year graduation rate in the University System of Maryland (USM)

**10,714**  
DEGREES AWARDED  
(FY 2017)

Bachelor's: 7,293  
Master's: 2,829  
Doctoral: 592

**3,298**  
STEM DEGREES  
AWARDED (FY 2016)

The most in the state



## Graduates' Job Readiness (2016)

**92%**  
PLACEMENT RATE  
(job or advanced education)

**50%**  
WORK IN MARYLAND

**\$52,091**  
MEDIAN SALARY

**80%**  
HAD AT LEAST ONE INTERNSHIP

Source: UMD survey

## Student Profile (Fall 2017)

**40,521**  
TOTAL ENROLLMENT  
Graduate students: 10,653  
Undergraduates: 29,868

**76%**  
MARYLAND RESIDENTS

**43%**  
MINORITY UNDERGRADUATES

**22%**  
UNDERREPRESENTED MINORITY UNDERGRADUATES



## New Freshman Credentials (Fall 2017)

**4.26**  
AVERAGE GPA

**SAT SCORES (COMBINED)**  
1450 (75th percentile)  
1370 (midpoint)  
1300 (25th percentile)

From 34,017 new freshman applications, 4,143 enrolled

## EXPANDING EDUCATIONAL QUALITY, ACCESS AND IMPACT

### Select Rankings

#### KIPLINGER'S PERSONAL FINANCE'S BEST COLLEGE VALUES (2018):

No. 10 among U.S. public institutions (in-state)

#### MONEY MAGAZINE'S BEST COLLEGES (2017):

No. 10 among U.S. public institutions

#### ACADEMIC RANKING OF WORLD UNIVERSITIES (2017):

No. 15 among U.S. public institutions; No. 32 among all U.S. institutions; No. 53 in the world

#### THE PRINCETON REVIEW'S TOP SCHOOLS FOR UNDERGRADUATE ENTREPRENEURSHIP (2018):

No. 8

#### MONEY AND ESSENCE MAGAZINES' BEST COLLEGES FOR AFRICAN AMERICANS (2017):

No. 10

#### U.S. NEWS & WORLD REPORT (2018):

Global: No. 16 among U.S. public institutions

Best U.S. colleges:  
No. 22 among U.S. public institutions

Graduate programs:  
40 in the top 20

No. 1 in U.S. for education counseling; No. 2 for African-American studies

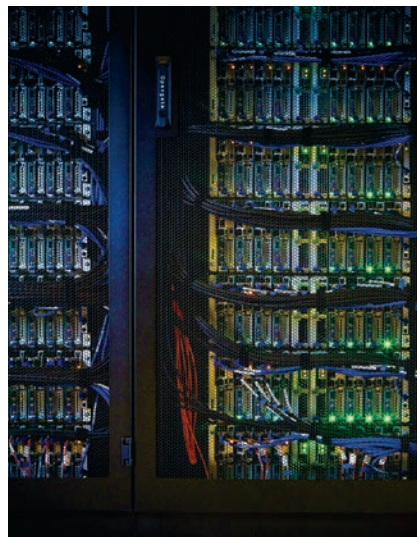


### HISTORIC PRIVATE INVESTMENT: A. JAMES & ALICE B. CLARK FOUNDATION

A private investment of nearly \$220 million—the largest-ever to the university—will support need-based scholarships, endow faculty chairs and support state-of-the-art facilities. The investment includes a challenge grant that will necessitate raising additional private and state funds.

### CYBER SMART

**Meeting cyber workforce needs:** The College of Information Studies, ranked in the nation's top 10 by *U.S. News & World Report*, launched a Bachelor of Science degree to meet the growing demand for highly skilled professionals in government, health care, education and technology.



#### **Growing our computer science major:**

The university's most popular major is ranked No. 9 among public universities' computer science programs and has more than doubled its number of undergraduates—to 3,100—in the past four years.

#### **Preparing next-generation cyber leaders:**

The Advanced Cybersecurity Experience for Students (ACES) program in the Honors College received \$5 million in scholarships from the National Science Foundation.

**DIVERSITY**

**DIVERSE ISSUES IN HIGHER EDUCATION "TOP MINORITY DEGREE PRODUCER" (2017):**

Undergraduate (all minorities): No. 9 for agriculture; No. 12 social science; No. 18 engineering; No. 19 computer science

Undergraduate (African Americans): No. 2 social sciences; No. 4 agriculture and languages; No. 8 engineering

Graduate (all minorities): No. 1 math

Graduate (African Americans): No. 6 engineering (doctorate); No. 4 engineering (master's)

**ALLIANCE FOR SCIENCE TECHNOLOGY AND RESEARCH IN AMERICA:** Most African-American engineering graduates: No. 7

**ASSOCIATION OF AMERICAN MEDICAL COLLEGES:** Produced most African-American medical school students in Maryland

**CAMPUS PRIDE AND BEST COLLEGES 2017:** Best Colleges for LGBTQ Students: No. 2 among U.S. public institutions; No. 7 overall

**To increase faculty from underrepresented minorities:** Hired two senior faculty, recruited six postdoctoral fellows; and launched intensive program to attract, recruit and retain tenure-track faculty



**DO GOOD INITIATIVE**

The School of Public Policy, home to our campuswide Do Good Initiative, launched an undergraduate degree program to prepare students for public leadership, sustainability and nonprofit leadership.

The Do Good Initiative won the inaugural Voinovich Public Innovation Challenge in recognition of its unique approach.

**Scholarship Success**

**103** MAJOR NATIONAL AWARDS

**11** BOREN SCHOLARSHIPS  
For study of critical foreign languages

**15** FULBRIGHT SCHOLARSHIPS  
For international educational exchange

**1** GATES-CAMBRIDGE SCHOLARSHIP  
For global study at Cambridge University

**23** GILMAN SCHOLARSHIPS  
U.S. Department of State

**4** HOLLINGS SCHOLARSHIPS  
National Oceanic and Atmospheric Administration

## SETTING THE STANDARD

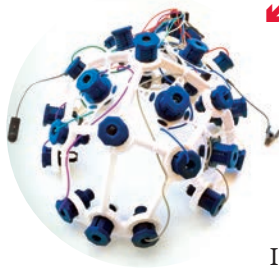


### ↑ Top U.S. Team in International Solar Decathlon

An interdisciplinary student team designed and built a solar-powered, energy-efficient home designed to improve sustainability. It placed second overall and first among American entries in the U.S. Department of Energy's Solar Decathlon.

### Cybersecurity Club Captures National Honor

A team of five undergraduates from computer science and engineering won the annual Capture the Flag competition, beating more than 500 other teams of students and industry professionals at breaking codes and exploiting online vulnerabilities.



### ↙ Students' Device Detects Alzheimer's Early

An undergraduate engineering team's noninvasive, low-cost device to detect Alzheimer's disease before symptoms appear won top honors in a National Institutes of Health competition.

### Students Win U.S. Department of Homeland Security Competition to Curb Violent Extremism

A College of Behavioral and Social Sciences team won the Peer to Peer Challenging Extremism Initiative for a social media campaign to steer individuals away from radicalization.



↑ **National Soil Judging Champs—Again**  
College of Agriculture and Natural Resources students took first place in the National Soil Judging Contest for the second time in the past five years.



### ↑ Multiple Sclerosis Work Wins Bioengineering Innovation Prize

Doctoral student Lisa Tostanoski won the prestigious Lemelson-MIT Student Prize for her work developing new biomaterials to combat autoimmune diseases.

### Outstanding Faculty

Computer science Assistant Professor Tom Goldstein and Visiting Assistant Professor Jon Froehlich received 2017 Sloan Fellowships. American studies Associate Professor Jason Farman received Sloan Foundation funding for research on how communication technologies have changed people's perception of time.

Professors Min Wu (electrical and computer engineering) and Iqbal Hamza (animal and avian sciences) were named 2017 American Association for the Advancement of Science fellows.

Anil K. Gupta, Ralph J. Tyser Professor of Global Strategy and Entrepreneurship, and writing partner Haiyan Wang '95 ranked 28th among the "world's most influential living management thinkers" by 2017 Thinkers50.

### Journalism Students' Series Wins Awards

The multimedia investigative project "In Poor Health" documented health disparities in Baltimore, winning awards from the Society of Professional Journalists, the New York Academy of Medicine and the National Association of Black Journalists.

### Outstanding Academic Achievement

Eldafil Osman '17, a gifted biomedical scholar at UMD, is pursuing his biochemistry Ph.D. with a prestigious Gates Cambridge Scholarship.

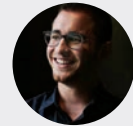
Gregory Ridgway '17, a music, physics and mathematics triple major, won a National Science Foundation graduate research fellowship to study at the Massachusetts Institute of Technology, where he is pursuing his ambition to become a theoretical physicist.



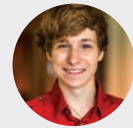
### Five recent Terps made Forbes magazine's "30 Under 30" lists



**Tian Li M.S. '15, Ph.D. '16** is a post-doctoral researcher developing energy-efficient "transparent wood."



**Jake Rozmaryn** promotes clean-tech energy.



**Erik Martin '16** builds programs to help people from all backgrounds design video games.



**Natalya Gallo '11** measures fisheries and climate change.



**Marian Cheng '10** and her sister own two restaurants in New York City.

## HIGH-IMPACT RESEARCH AND INNOVATION

### Research Success

**\$514,747,497**  
TOTAL RESEARCH AWARDS

Federal: \$361,545,199 (70.2%)

State: \$44,985,537 (8.8%)

Corporations/Foundations/  
Other: \$108,216,761 (21.0%)

**\$492,833,699**  
TOTAL RESEARCH EXPENDITURES

#### SOME MULTIMILLION-DOLLAR RESEARCH GRANTS

Age-related hearing loss

Hepatitis C vaccine development

Link between exercise and Alzheimer's disease

Increasing poultry production, advancing animal welfare

DNA screening to detect biological threats

Safe, low-cost, high-energy lithium-ion batteries

Big-data collection ethics

Leadership programs to support Middle East and North African women

#### NEW GRANT-FUNDED CENTERS

"Lablet" to develop proactive cybersecurity

Center for Engineering Complex Tissues



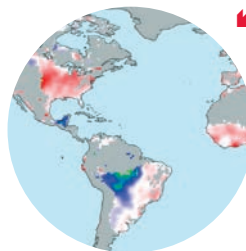
### RESEARCH TIPPING POINTS

**↑ Energy:** UMD researchers are developing an array of safer, more effective lithium-ion batteries. To reduce overheating, one team replaced metal parts with a specially designed material derived from wood. Another developed a safer water-based chemistry for its batteries.

**Computing:** Physicist Christopher Monroe leads one of the world's top teams racing to develop a quantum computer. In 2017, the capabilities of its device increased dramatically. Team members used it to explore problems stretching current computing technology to its limits.

**Cybersecurity:** Research by the Supply Chain Management Center has shown that using the National Institute of Standards and Technology's voluntary Cybersecurity Framework can reduce the number and types of breaches—the first statistical evidence of its efficacy.

**Machine Intelligence:** A UMD-led team of computer scientists developed an algorithm that can learn to correct flaws in damaged digital images. The algorithm, an artificial neural network, mimics the way people learn through exposure to many uncorrupted images.



**↙ Climate Change:** UMD researchers have a high-profile role in tracking planetary changes. For example, atmospheric scientists found "hotspots" of airborne ammonia, a pollutant, over major agricultural areas across the planet. Geographical scientists used space lasers to track Amazon rainforest growth in the dry seasons.



**Food Security:** A College of Agriculture and Natural Resources scientist, working with an international research team, has developed an improved method for gene editing plants—one that delivered 100 percent of the desired mutations in rice.



← **Biomedicine:** To develop more effective, targeted therapies for multiple sclerosis and other autoimmune diseases, UMD bioengineers are using nanoscale devices to pinpoint precisely how the body mistakes its own cells for foreign invaders.

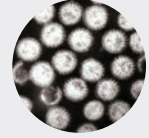


↑ **Social Impact:** Sociologists Rashawn Ray and Kris Marsh, experts on race and bias, lead an ongoing collaboration with the Prince George's County Police Department. They help cadets and officers confront “implicit biases”—unrecognized, instinctive stereotypes—to foster fairer and safer policing. The successful program will expand to other Maryland departments through the use of UMD virtual-reality technology.

## FILLING THE INNOVATION PIPELINE

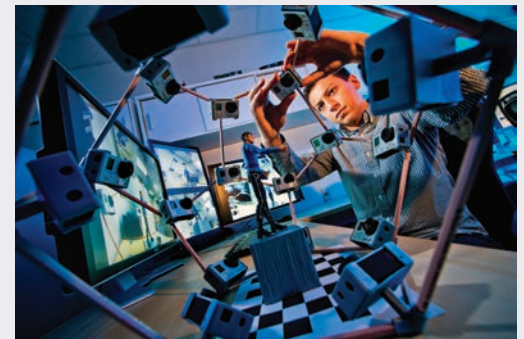
### 2017 UMD Inventions of the Year

- A vaccine to protect against severe intestinal viral infections
- A wireless power-transfer method to eliminate recharging cords
- An index and framework to assess the degree of cyber disruption



## NEW INNOVATION CENTERS

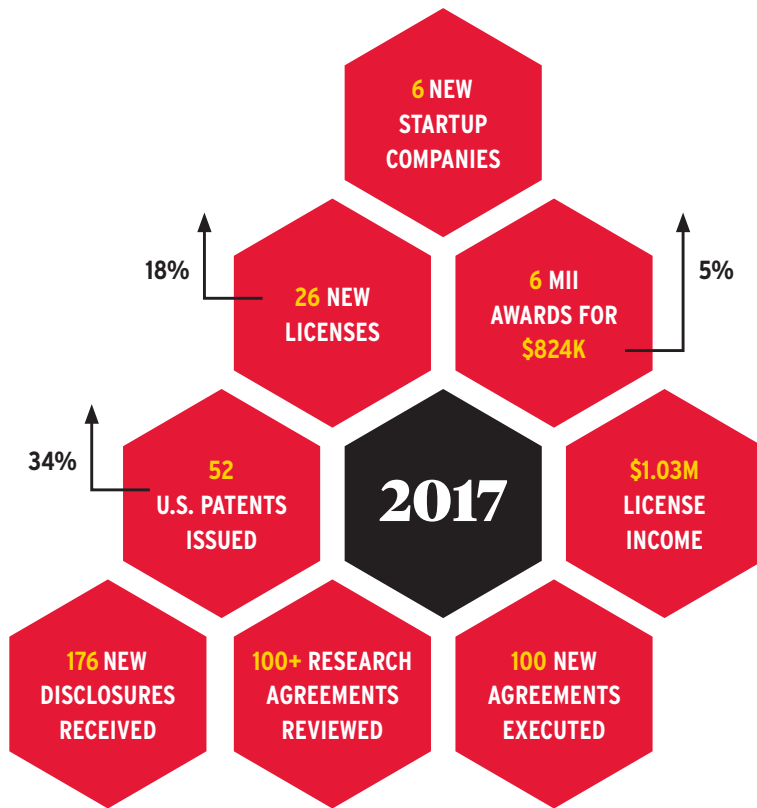
↓ **Mixed/Augmented/Virtual Reality Innovation Center (MAVRIC):** Funded jointly by the U.S. Department of Commerce and UMD, the center will serve as a major East Coast hub for immersive media innovation.



**Maryland Energy Innovation Institute:** With new state funding, the institute will work to translate promising battery, fuel cell, solar and wind technologies into commercial clean-energy solutions.

ECONOMIC IMPACT

**\$3.16 BILLION**  
Annual economic impact on state



**Small Business Development Center (2017)**

**11,000**  
ENTREPRENEURS SERVED

**208**  
BUSINESSES LAUNCHED

**1,200**  
NEW JOBS CREATED

**\$50M**  
CAPITAL PROVIDED

**81**  
JOBS CREATED THROUGH ELLICOTT CITY RECOVERY ASSISTANCE

HOSTED FIRST ANNUAL HISPANIC BUSINESS CONFERENCE

**Maryland Industrial Partnerships**

30 years of impact, matching business with University System of Maryland researchers:

**\$34.9B**  
CUMULATIVE SALES GENERATED

**7,150**  
CONTINUING JOBS SUPPORTED

**\$166.1M**  
TAX REVENUE GENERATED IN 2017



**SUCCESSFUL STARTUPS**

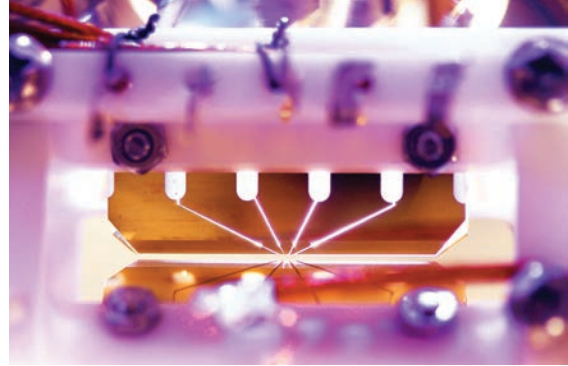
↑ **Living Canopies:** The company, started by College of Agriculture and Natural Resources faculty, constructs umbrellas partially made of plants and flowers.

➔ **IonQ:** This UMD startup is developing an early-stage quantum computing device. It has raised \$20 million from investors, has 18 employees and continues to hire.

➤ **MF Fire:** Started by UMD alums with technology they developed as students, the company makes ultra-clean wood stoves, and became the first startup to receive funding from USM's Maryland Momentum Fund.



➤ **Otomagnetics:** Started by UMD bioengineers, the company is developing a cancer drug delivery system to prevent children from losing their hearing in chemotherapy.



## TRANSFORMING THE CITY AND CAMPUS



The ongoing initiative to revitalize College Park has created vibrant economic and community development, fueled by \$2 billion in private and public investment.

**THE ASSOCIATION OF PUBLIC AND LAND-GRANT UNIVERSITIES** recognized UMD with its Economic Engagement Connections Award and its Place Award for community, social and cultural development.

**UMD's Discovery District**—a 150-acre hub of academic, research and economic development— thrived in the past year. Its anchor, the new Hotel at the University of Maryland, has been a game changer, stimulating new investment. Five new buildings are open or rising to accommodate a range of innovators, businesses and research partners that want to collaborate with UMD faculty and students. Among the new tenants:

**Capital One**, a Fortune 500 company, will be the first major private tenant. Its innovation lab will partner with UMD faculty and students to fill the talent pipeline in data analytics, cybersecurity and machine learning.

**IIC Technologies**, a geospatial consultant, will move to be closer to UMD faculty, students and clients, bringing 25 jobs.



↑ **College Park Academy:** This new facility for the UMD-affiliated public charter academy supports a blended learning pathway to higher education.

**UMD Fearless Flight Facility:** The A. James Clark School of Engineering created the region's first netted outdoor flight laboratory to spur innovation in flight control, sensing, autonomy and unmanned aircraft systems.

On campus, public-private investment in new facilities is transforming the work of students, faculty and researchers.

➔ **A. James Clark Hall**, the new home for bio-engineering, promises to stimulate research and innovation by faculty and students.



⬆ **The Edward St. John Learning and Teaching Center** has become a student favorite for its inviting study spaces, classrooms and labs. Its technology is changing how faculty teach.

➤ **The Brendan Iribe Center for Computer Science and Innovation** will open in late 2018, providing a hub for research and innovation in fields like virtual and augmented reality.

⬇ **The renovated Cole Field House** debuted its new athletic training facility and broke ground on a new brain research and clinical facility in partnership with the University of Maryland, Baltimore.



# FOOTPRINTS... EXPANDING STATEWIDE UMD SERVICE



**The UMD-led Smart Cities initiative** will bring to West Baltimore high-tech improvements such as free public internet, smart streetlights and innovative transportation hubs. Morgan State University, the University of Baltimore and Johns Hopkins University will participate.

**The SAFE Center for Human Trafficking Survivors** and Prince George's County Police Department secured a \$1.3 million federal grant to fight human trafficking in the county and provide support to victims.

**After a yearlong assessment** of rural health care challenges on Maryland's Eastern Shore, a School of Public Health report offers a blueprint for combating transportation challenges and a shortage of providers.



↪ **The College of Education** and D.C.'s Phillips Collection are helping Prince George's County Public Schools teachers integrate the visual arts into their classrooms.

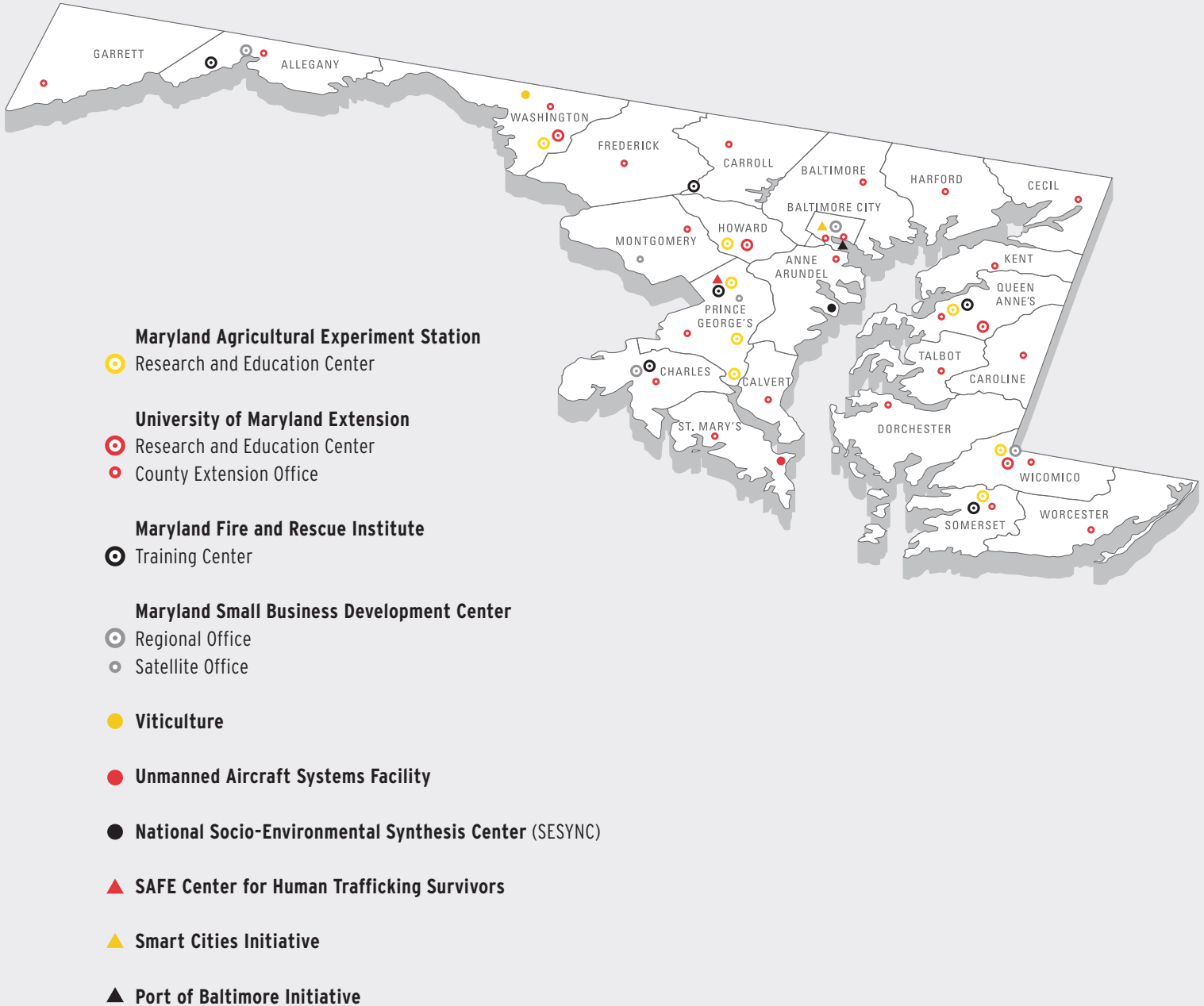
↑ **The College of Agriculture and Natural Resources** is partnering with state and federal agencies to develop innovative, sustainable technology to clean the Port of Baltimore.

**The College of Information Studies** is partnering with the Maryland State Archives to make its Legacy of Slavery collection more accessible to the public and researchers.

↓ **The College of Education** launched the Center for Education Innovation and Improvement to help Maryland school systems improve pre-K-12 education.



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





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