The University of Maryland Strategic Partnership: MPowering the State (MPower) is an innovative, structured collaboration connecting world-class strengths in research, technology, and education at the University of Maryland, Baltimore (UMB) and the University of Maryland, College Park (UMCP).

MPower: A powerful model for successful collaboration.
RESEARCH POWERHOUSE

MPower uses collaboration as its most powerful tool to drive transformative change on the challenging issues facing the state and the nation. Maryland has national standing as a state that fosters powerful and flourishing research. In Fiscal Year 2022, researchers at the University of Maryland attracted nearly $1.3 billion in federal, state, and local research grants and contracts. In FY21, the UMB-UMCP collaboration ranked 17th overall nationally and 10th among all public universities in research and development spending by the National Science Foundation.

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ENHANCED EDUCATION

A global world requires new skills bridging a range of disciplines. MPower connects students to accomplished faculty and academic resources at UMB and UMCP. MPower’s interdisciplinary programs tap into complementary academic offerings at both campuses, expanding opportunities and producing a high-tech workforce for a future in practice and research.

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ECONOMIC FORCE

MPower advances innovation and the commercialization of university research findings through UM Ventures. Since its inception, technology transfer activities have increased dramatically, including the launch of 145 startups, with many high-profile successes. New funding strengthens targeted, strategic, and economic development priorities across the state — like job creation and retention efforts in Baltimore City and Prince George’s County.

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SERVICE CHAMPION

MPower challenges collaborative research teams to tackle critical issues such as mitigating the public health and economic crises brought on by a global pandemic, preparing for future diseases, addressing racial and social justice, combating the opioid epidemic, expanding outreach to victims of human trafficking, exploring novel approaches to traumatic brain injury, and delivering legal support to the state’s farmers.

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To learn more about our impact and our future, please visit mpower.maryland.edu.
INSTITUTE TO TRANSFORM MEDICINE USING BIG DATA, ARTIFICIAL INTELLIGENCE TECHNOLOGIES

MPower is leading a transformative partnership to revolutionize health care, bringing together the expertise from UMB and UMCP in partnership with the University of Maryland Medical System (UMMS), Montgomery County, and collaborators from the Universities at Shady Grove and the University of Maryland, Baltimore County. The University of Maryland Institute for Health Computing will leverage recent advances in artificial intelligence and computing to create a premier learning health care system that evaluates both de-identified and secure digitized medical health data to diagnose, prevent, and treat diseases in patients across Maryland. To be based in North Bethesda, the institute will catalyze a clinical data science ecosystem and tap into industry as well as federal partners like the National Institute of Standards and Technology, National Institutes of Health, Food and Drug Administration, Walter Reed National Military Medical Center, and Naval Medical Research Center.

UMB President Bruce Jarrell, Montgomery County Executive Marc Elrich, UMMS President and CEO Mohan Suntha, and UMCP President Darryll Pines sign the paperwork to establish the University of Maryland Institute for Health Computing.

SIX NEW PROFESSORS NAMED TO PRESTIGIOUS MPower PROFESSORSHIP PROGRAM

In November 2022, six professors — three from UMB and three from UMCP — were named MPower Professors and awarded $150,000 each, over three years, to recognize, enable, and foster strong collaborations between faculty who work together on the most pressing issues of our time. This annual recognition is designed to strengthen faculty collaborations and accelerate the pace of research and impact on the lives of Marylanders. The professors include leaders recognized for their significant collaborations in the fields of arts and humanities, computer science, dentistry, engineering, medicine, and public health.

NEW FUND TARGETS PRINCE GEORGE’S COUNTY

The Discovery Fund is a new early-stage investment fund targeting the development and location of university-created or -sponsored technology companies in Prince George’s County. The first round of support is earmarked to build a network of quantum businesses tied to groundbreaking UMCP research. With support from the University of Maryland Center for Economic and Entrepreneurship Development, the fund also invests in high-growth areas such as advanced data computing and information technologies, augmented and virtual reality, biomedical devices, cybersecurity, data analytics, and neuroscience. In FY22, investments were made to Ion Storage Systems and QC82.
The University of Maryland Strategic Partnership: MPowering the State creates and supports focused, strategic research collaborations that ignite innovation and high-impact discoveries and make Maryland more competitive. UMB and UMCP cultivate partnerships with governments and businesses, creating jobs and underscoring Maryland’s distinction as a top research innovator in the nation.

UNIVERSITY OF MARYLAND RESEARCH RANKINGS

No. 10
among all public U.S. research universities

No. 17
in the nation

for research and development spending

National Science Foundation | Higher Education Research and Development Survey
Fiscal Year 2021, Released December 2022

$1.3 BILLION
FY22 UMB and UMCP combined awards from federal, state, and local research grants and contracts
SELECTED RESEARCH PARTNERSHIPS

SEED GRANT CHALLENGE DRIVES IMPACTFUL, STRATEGIC RESEARCH

MPower awarded more than $3 million in seed grant funding to 17 collaborative, cross-campus research teams led jointly by UMB and UMCP researchers. The new research seeks solutions to the state’s most critical and high-profile issues. Selected teams demonstrate collaboration and high potential to provide a significant influence in six research areas of paramount importance to the state and the nation:

- Artificial Intelligence and Medicine
- Cybersecurity and Homeland Security
- Neuroscience and Aging
- Pandemic Readiness, Resilience, and Mitigation
- Racial and Social Justice
- Violence and Crime Reduction

"These seed grant awards highlight the outstanding interdisciplinary and high-impact research that faculty in Baltimore and College Park are conducting to address the most complex challenges society is facing."

— GREGORY F. BALL, PhD
VICE PRESIDENT FOR RESEARCH

COVID-19 CARDIAC REGISTRY:

Researching COVID-19’s link to student-athletes’ heart health.

The University of Maryland is part of a consortium of Big Ten colleges conducting important national research about COVID-19’s effect on student-athletes. With funding support from MPower, College Park’s expertise in sports medicine, kinesiology, and epidemiology is joined with Baltimore’s proficiency in cardiology, radiology, and epidemiology. The Maryland team led the effort to perform core laboratory readings of cardiac magnetic resonance studies and to analyze that data. Results provide critical information about the seriousness of the illness, which may be used to predict which athletes will have severe cardiac consequences from COVID-19.

ROBERT E. FISCHELL INSTITUTE FOR BIOMEDICAL DEVICES:

Bringing together skilled scientists, medical doctors, health practitioners, and bioengineers to research, design, and build lifesaving biomedical devices and train the next generation of innovators.

The institute catalyzes the transformation of basic research into clinical practice and commercial success. The institute’s staff and a network of experts facilitate prototyping and manufacturing, as well as venture creation, intellectual property creation, and successful passage of a product through various clinical, regulatory, and reimbursement hurdles. In FY22, the institute increased cross-campus collaborations, brought new medical devices from concept to reality, and supported students with the translation of their ideas into medical devices. In an innovative move, the institute financed the addition of students to already successful teams to both support and provide new ideas. In its first year alone, this “Young Investigators” program yielded $4.8 million in new funded grants from a $150,000 investment.
INSTITUTE FOR BIOSCIENCE AND BIOTECHNOLOGY RESEARCH (IBBR):

*Discovering and accelerating the development of and manufacturing of therapeutics, modern medicines, and vaccines for patients in Maryland and throughout the world.*

Located in Montgomery County, in the heart of Maryland’s biotechnology corridor, IBBR continues its strong partnership with UMB, UMCP, and the National Institute of Standards and Technology (NIST). IBBR’s leadership in the use of state-of-the-art analytical and structural biology instrumentation and high-end computation is accelerating the discovery, development, and manufacturing of therapeutics, modern medicines, and vaccines. IBBR serves as a research and development core between UMB and UMCP that offers sophisticated state-of-the-art instrumentation and tools, and in-house faculty scientists bringing proficiency in high-end instrumentation.

MARYLAND CENTER FOR ADVANCED MOLECULAR ANALYSIS (M-CAMA):

*Advancing the research and development of new drugs and medical treatments for disease.*

Located within IBBR in Rockville, the center positions the University of Maryland as a national leader in the use of cryo-electron microscopy (cryo-EM) technology to drive scientific innovation and discovery. Recognized as a breakthrough tool in developing drugs and medical treatments, cryo-EM impacts biomedical research through its ability to deliver imaging that transforms understanding of biology and drug interactions in the human body at atomic resolution. The center’s cutting-edge instrumentation has provided an important research tool for studying the coronavirus and how it infects human cells, to block its entry with the use of novel therapeutics and vaccines. Working in partnership with NIST, the center offers scientific leadership with deep expertise with this technology, to guide and assist users from any University System of Maryland (USM) school, as well as industry partners.

FUNDING SUPPORT FOR CLINICAL AND TRANSLATIONAL RESEARCH:

*MPower investment helps researchers access resources for clinical training, engage in pilot research, and strengthen bioinformatic infrastructure.*

A three-year MPower grant supports clinical and translational research collaborations at UMB and UMCP. It gives researchers in College Park access to resources at UMB’s Institute for Clinical & Translational Research (ICTR), as a partner institution. Investigators can tap resources through ICTR, including expert patient- and community-centered services; biostatistical support for study design, implementation, and interpretation; and pre- and postdoctoral training awards. The MPower funding also upgrades the bioinformatic infrastructure at UMB to facilitate seamless, clinical research between the campuses.
The University of Maryland Strategic Partnership: **MPowering the State** fuels the state’s reputation as an international, intellectual, and commercialization leader by consistently pushing novel discoveries and inventions to market.

**UM Ventures** combines the technology transfer and commercialization efforts at UMB and UMCP to patent, license, and commercialize discoveries. Entrepreneurial resources are designed to support faculty, staff, and students as they launch startups based on their ideas. Faculty-invented products and services include agricultural products, software, clean technology, nanotechnology, sensors, medical devices, diagnostics, and therapeutics.

**University research** yields discoveries with commercial potential, creating economic impact.
RECENT UM VENTURES SUCCESSES

**Breethe**, a UMB startup developing a portable artificial lung, was acquired by Abiomed in 2020 and is the fourth UM Ventures-backed startup to have a successful exit via acquisition. In 2022, Johnson & Johnson acquired Abiomed to strengthen its medical device unit. This deal should offer additional commercialization support for the Breethe technology.

UMB startup **CoapTech**’s medical device, the PUMA-G System, is the world’s first and only ultrasound gastrostomy system, allowing physicians to place gastrostomy tubes at the point of care using solely ultrasound imaging. PUMA-G is being sold and utilized at multiple sites in the United States and Europe.

**Hazel Analytics**, a startup based on technology developed at UMCP and the University of California, Los Angeles, specializes in the use of data-driven technology solutions to improve food safety and public health, and monitors regulatory compliance at over 300,000 locations in the United States and Canada. In March 2022, Hazel Analytics partnered with Yelp, an online platform for crowd-sourced reviews of restaurants. Hazel Analytics now collects or estimates hygiene scores for Yelp’s nearly 700,000 pages, using data from health departments in 48 U.S. states as well as Toronto and Vancouver, British Columbia.

**KaloCyte**, a UMB-based preclinical startup working to develop a dried, bio-inspired artificial red blood cell, is redefining future emergency treatment for victims of traumatic blood loss. The technology is being further developed in partnership with the University of Maryland School of Medicine where KaloCyte co-founder Allan Doctor, MD, leads the Center for Blood Oxygen Transport and Hemostasis.

**Ion Storage Systems (ION)**, a UMCP startup, is developing a solid-state lithium-ion battery. In summer 2022, the company announced the initial closing of its $30 million Series A fundraising round. Investors included Toyota Ventures, Tenaska, and Bangchak Corporation. The funds will enable ION to expand its facility in Maryland to commission and qualify a battery cell manufacturing line capable of producing 10 megawatt hours per year of next-generation solid-state batteries. Production will initially be allocated to qualifying commercial cells for its first market customers. The Series A round will also accelerate the development projects ION has with multiple customers and partners in the consumer electronics, automotive, and stationary storage markets.

**Pathotrak**, a startup based on UMCP technology, uses a patented process to enable food safety testing to occur in six hours instead of 22 to 48 hours, thus reducing the amount of time labs have to incubate food samples to test them for pathogens. Pathotrak uses microfiltration to create an environment where pathogens can reproduce quickly, allowing for faster testing. The company received Association of Official Agricultural Chemists performance tested certification for its kits’ ability to detect salmonella and E. coli, and it plans to start selling its kits to testing facilities in 2023.
THE CENTER FOR MARYLAND ADVANCED VENTURES

The Center for Maryland Advanced Ventures (CMAV), created by law in 2016, facilitates technology transfer and amplifies the impact of university-based research. Strategic initiatives and programming work collaboratively with existing programs offered by UM Ventures, TEDCO (Maryland Technology Development Corporation), and the Maryland Department of Commerce to advance commercialization, support entrepreneurship, and drive economic growth. Some of the programs and initiatives include:

- Seed Grants
- UMB Institute for Clinical & Translational Research
- The Baltimore Fund
- Medical Device Development Fund
- Specialized Wet Lab and Prototyping Facilities
- Life Sciences Intellectual Property (IP) Fund
- Business Development Support
- Chesapeake Digital Health Exchange @ UMB Digital Health Pre-Accelerator
- Maryland Momentum Fund

BALTIMORE FUND ➔ Creating Jobs in Baltimore City
The Baltimore Fund encourages university-created or -sponsored technology companies to locate and expand in Baltimore City. Since the fund’s creation, awards have supported companies from seven Maryland public higher education institutions. In FY22, the Baltimore Fund brought UMCP’s I-CORPS program to Baltimore City to support and train entrepreneurs as they develop their research or technology-based business ideas.

MARYLAND MOMENTUM FUND ➔ $16 Million Early-Stage Investment Fund
The University System of Maryland (USM) Maryland Momentum Fund invests in Maryland-based, USM-affiliated startup companies, helping them bridge from early success to next stage of growth, often a large investment round, commercial launch, or commercial expansion. The full-time managing director is based at UMB and funded by CMAV, which also provides additional support and operational expenses for the fund.

640+ JOBS CREATED OR RETAINED IN BALTIMORE CITY
62 ENTITIES BENEFITED FROM BALTIMORE FUND GRANTS AND INVESTMENTS
$10.6 MILLION INVESTED IN 28 COMPANIES REPRESENTING EIGHT USM INSTITUTIONS
$91.1 MILLION MATCHED FROM 150+ UNIQUE CO-INVESTORS
140 NEW JOBS CREATED

2017 TO DATE
ENHANCED EDUCATION

Through the University of Maryland Strategic Partnership: MPowering the State, joint educational offerings fuse the strengths and complementary missions of UMB and UMCP to attract talented students, create a pipeline for student advancement, and meet workforce demands and students’ needs for flexible training.

20+ Joint Academic Collaborations at UMB and UMCP, including dual-degree offerings, new degrees and certificates, guaranteed pathways to admission, and student enrichment programs.

1,305 UMCP students have participated in the MLAW: Undergraduate Programs in Law, taught by faculty at UMCP and UMB’s Francis King Carey School of Law.

897 Bioengineering undergraduates have worked with UMB medical faculty in capstone and clinical experiences courses.

203 Master of Science in Law degrees have been conferred in specialties including cybersecurity law and health care law.

235 UMB and UMCP students have participated in summer research projects with accomplished faculty at the opposite campus and with leadership at the Maryland Department of Health.
SELECTED EDUCATIONAL COLLABORATIONS

**Bioengineering Joint Academic Programs**
- UMB and UMCP’s leadership in bioengineering and medicine creates tremendous opportunity for learning for students and faculty at both institutions.
  - UMCP undergraduates team with faculty physicians at UMB to experience firsthand the robust link between engineering and human health.
  - Students are exposed to the medical field and clinical settings, see the direct application of medical devices in a hospital setting, and then imagine and create their own engineering designs from concept to product.
  - A joint PhD program in Bioengineering — the MPower Graduate Fellowship — spans both institutions and offers students an opportunity to create and deliver engineering solutions to challenging clinical problems related to medicine, pharmacy, or dentistry.

**MLAW: Undergraduate Programs in Law**
- The MLAW programs offered at College Park were one of the first and are now the longest continuing collaborative education program between UMCP and UMB. The programming gives students early exposure to ideas, mentors, and professional opportunities in law not normally available to undergraduates.
  - Faculty from the UMCP College of Behavioral and Social Sciences as well as the UMB Carey School of Law teach a variety of subjects such as immigration and crime, global environmental law, health law, and structural racism and housing.

**Policing and Public Safety Administration**
- Launched in fall 2020, this master’s degree and certificate program in public safety leadership and administration targets personnel in law enforcement, first response, social services, and other public safety professions. The degree was developed jointly by the UMCP College of Behavioral and Social Sciences and UMB’s Carey School of Law.

**University of Maryland Center for Economic and Entrepreneurship Development (UMCEED)**
- Established by law in 2016, UMCEED increases workforce readiness by creating educational degree programs in high-impact fields such as neuroscience, virtual and augmented reality, biomedical devices, data analytics, cybersecurity, quantum technologies, advanced data computing, and information technologies.
  - The Visiting Fellows in Neuroscience Program offers cross-campus training in neuroscience to graduate students at UMB and UMCP. Two cohorts of students have worked with research groups at the opposite campus to acquire new techniques and broaden their training. A third cohort will be added in spring 2023.
  - The Colleges of Behavioral and Social Sciences and Computer, Mathematical, and Natural Sciences (CMNS) launched a new undergraduate neuroscience major at UMCP in fall 2020, and by fall 2022, 300 students were enrolled. The neuroscience major offers rigorous training in the interdisciplinary study of brain and behavior designed to prepare students for a broad range of career paths, including scientific research, medicine, clinical psychology, allied health professions, and science-related government, nonprofit, and private sector employment.
  - In 2021, UMCP’s College of Arts and Humanities and CMNS launched the new bachelor of science and bachelor of arts degree in immersive media design. A unique collaboration between science, technology, engineering, and math (STEM) fields and the arts and humanities, the degree prepares students to be leaders in production of augmented reality, virtual reality, and immersive media design disciplines. First degrees are expected in May 2024.

**UM Scholars**
- This dynamic 10-week research program connects students from UMB and UMCP to faculty mentors to work on projects designed to expand students’ knowledge and open their eyes to other fields.
  - More than 200 students have reaped the benefits of tailored faculty mentoring on topics such as health science, public health, law, and social work.
  - Summer 2022 programs included student placements at the Maryland Department of Health’s Office of Population Health Improvement.
IN THEIR OWN WORDS

Since 2012, more than 200 students have conducted a summer research project, connecting to accomplished faculty at the opposite campus.

This project gave me much more insight and experience into the world of public health and how intertwined it is within the career of a physician, which are skills I know I can carry into my future practice.

— Mary Carbonell, Doctor of Medicine/Master of Public Health Candidate | Class of 2026, University of Maryland School of Medicine

This summer was a great experience to really learn how scientific research works and to be a part of that process. It changed my perspective on research and the degree I want to pursue in my profession.

— Salim Muhammed, BS General Biology Candidate | Class of 2023, College of Computer, Mathematical, and Natural Sciences

This summer, I grew to respect the thorough process of research. This experience made me newly appreciate the background work that goes on in health care that can be often overlooked.

— Manmeet Sandhu, BS Public Health Science Candidate | Class of 2023, School of Public Health

“The UM Scholars Program has made me excited about research and eager to do more of it in the future.

— Edgar J. Fields, Master of Social Work Candidate | Class of 2023, University of Maryland School of Social Work

My experience in UM Scholars was eye-opening! I participated in research, worked alongside postdocs, and connected with physician-scientists who are bridging the gap between research and patient care.

— Hawi Kebede, BA General Biology Candidate | Class of 2023, College of Computer, Mathematical, and Natural Sciences

It was rewarding to be able to apply everything I have been learning in pharmacy school to a real-life project on virus and live vaccines.

— Shelley R. Wang, PharmD Candidate | Class of 2025, University of Maryland School of Pharmacy

The UM Scholars Program has built my confidence and competency in being able to use research skills to improve my practice.

— Vi T. Bùi, Master of Social Work Candidate | Class of 2023, University of Maryland School of Social Work
SERVICE CHAMPION

The University of Maryland Strategic Partnership: MPowering the State brings together top thinkers from multiple branches of expertise in health, science, law, and social science to redefine challenges and devise solutions that make a positive impact in Maryland and on society at large.

AGRICULTURE LAW EDUCATION INITIATIVE (ALEI):
Educating and serving Maryland family farmers through expert information and training that help navigate complex legal issues such as estates and trusts, regulatory compliance, farm food safety, and other aspects of agriculture law.

ALEI reaches the state’s agricultural community through publications, social media, trainings, and formal classroom education. Undergraduate students at UMCP and law school students at UMB benefit from classes taught by legal specialists on agriculture and law. For the past eight years, ALEI has hosted a popular annual conference on the intricacies between agriculture and environmental law and legal issues impacting Delmarva’s communities. In response to COVID-19, the conference moved online, but it returned in person in October 2022 with a large audience and added an online option to reach even more participants.

SUPPORT, ADVOCACY, FREEDOM, AND EMPOWERMENT (SAFE) CENTER FOR HUMAN TRAFFICKING SURVIVORS:
Combating human trafficking through direct services, research, advocacy, and training.
The SAFE Center is the first systematic, university-based program to serve victims of human trafficking with comprehensive legal, social, economic empowerment, mental health, and medical services. Since its founding in 2016, it has served several hundred survivors of human trafficking and their families. In 2022, the center instituted programs in economic empowerment, survivor leadership, and trafficking prevention. Ten UMB and UMCP schools and colleges are engaged, and well over 100 students have served internships at the center, helping to provide client services, develop programs and curriculum, conduct outreach, and provide research. The SAFE Center maintains leadership roles on state and county human trafficking task forces and is an essential partner to Maryland government agencies, law enforcement, private industry, and nonprofit organizations. The center receives considerable funding from federal, state, and local government grants, as well as from private sources. In October 2022, the center, in partnership with University of Maryland Capital Region Health, was awarded a three-year grant from the U.S. Department of Justice’s Office for Victims of Crime to establish a comprehensive human trafficking response and referral pathway in five units at the UM Capital Region Medical Center in Prince George’s County.

Eighth Annual Agricultural and Environmental Law Conference speakers Shakisha Morgan, JD, and state Sen. Malcolm Augustine provide information on Maryland’s new Partition of Property Act.
LEADERSHIP

Bruce E. Jarrell, MD, FACS
PRESIDENT, UMB

Darryll J. Pines, PhD, MS
PRESIDENT, UMCP

JOINT STEERING COUNCIL

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PROVOST AND EXECUTIVE VICE PRESIDENT, AND DEAN,
GRADUATE SCHOOL, UMB

RECENT PROGRAMS AND INITIATIVES

Agriculture Law Education Initiative (ALEI)

Bioengineering Capstone Design Course

Bioengineering Clinical Experiences for Undergraduates

Bioengineering Joint PhD

Center for Brain Health and Human Performance at Cole Field House

Clinical and Translational Research Collaboration Support

COVID-19 Cardiac Big Ten Collaboration

COVID-19: Seed Grants and Medical Device Challenge

Cross-Institution Academic Degree Pathways to Multiple Schools and Colleges

Institute for Bioscience and Biotechnology Research (IBBR)


Joint Research and Innovation Seed Grant Program

Maryland Blended Reality Center

Maryland Center for Advanced Molecular Analysis (M-CAMA)

Maryland Center of Excellence in Regulatory Science and Innovation (M-CERSI)

Master of Science in Law

MLAW: Undergraduate Programs in Law

MPower Professorships

National Institute for Innovation in Manufacturing Biopharmaceuticals (NIIMBL)

Policing Partnership: Master of Professional Studies in Public Safety Leadership and Administration

Robert E. Fischell Institute for Biomedical Devices

SAFE Center for Human Trafficking Survivors

Social Work Program Expansion at Shady Grove

University of Maryland Center for Economic and Entrepreneurship Development (UMCEED)

University of Maryland Institute for Health Computing

UM Scholars

UM Ventures/Center for Maryland Advanced Ventures (CMAV)