

2017



UNIVERSITY OF MARYLAND
STRATEGIC PARTNERSHIP
MPOWERING THE STATE



UNIVERSITY OF MARYLAND STRATEGIC PARTNERSHIP: *MPOWERING THE STATE*



UNIVERSITY OF MARYLAND, BALTIMORE



UNIVERSITY OF MARYLAND, COLLEGE PARK

To read more on the University of Maryland Strategic Partnership: *MPowering the State*, visit mpower.maryland.edu.

The University of Maryland Strategic Partnership: *MPowering the State* is a collaboration between the state of Maryland's two most powerful public research institutions: the University of Maryland, Baltimore (UMB) and the University of Maryland, College Park (UMCP). It leverages the sizable strengths and complementary missions of both institutions to advance interdisciplinary research, create opportunities for students, and solve important problems for the people of Maryland and the nation. Working together, UMB and UMCP achieve *innovation* and *impact* through *collaboration*.

The University of Maryland Strategic Partnership Act of 2016 strengthened and formalized the structured relationship between UMB and UMCP, which began in 2012. The law deepens the alliance and energizes UMB and UMCP to pursue even greater transformative change and impact, far surpassing what each institution could do independent of each other.

JOINT RESEARCH, COMMERCIALIZATION, TECHNOLOGY TRANSFER

Cross-university collaboration grows the innovation economy in Maryland and fuels the state's reputation as an international intellectual and commercialization leader. As a collaborative resource for research and the generation of intellectual ideas, the University of Maryland Strategic Partnership: *M*Powering the State creates and supports complementary, multidisciplinary collaborations that ignite innovation and high-impact discoveries. We are actively transitioning research from the lab to the marketplace.

UM VENTURES

UM Ventures combines the entrepreneurial resources and offices at UMB and UMCP to commercialize university inventions and launch successful university startups. Faculty invented products and services include agricultural products, software, medical devices, sensors, and drugs. UM Ventures' successes are adding jobs in Maryland: the number of startups created quadrupled in the past five years, and doubled from fiscal year 2015 to 2016.

	FY16	GROWTH FY 2011 to 2016
Invention Disclosures	331	61%
Licenses	56	100%
Startups	20	300%

IMPACT: *UM Ventures brings scientific discoveries and inventions to the marketplace and guides the formation of startup companies, fostering economic development and creating jobs.*

See more about UM Ventures on page 13.

CENTER FOR SPORTS MEDICINE, HEALTH AND HUMAN PERFORMANCE (CSMHHP)

The center showcases the power of the UMB and UMCP partnership by integrating research in neuroscience and biomechanics associated with sports injury and recovery. Based at legendary Cole Field House in College Park, the center will have more than 40,000 square feet of research and clinical space, and an orthopaedic clinic, directed by the University of Maryland School of Medicine at UMB, that will serve student-athletes, veterans, and the surrounding community.

IMPACT: *The center advances the study of sports-related conditions, including orthopaedics and neuroscience, and specifically, the science of prevention, response, and recovery from traumatic brain injury.*

See more about the center on page 9.





SARAH MURTHI AND AMITABH VARSHNEY | CENTER FOR HEALTH-RELATED INFORMATICS AND BIOIMAGING (CHIB)

INSTITUTE FOR BIOSCIENCE AND BIOTECHNOLOGY RESEARCH (IBBR)

IBBR is a University System of Maryland joint research enterprise in biotechnology designed to generate innovative solutions with medical and public health applications. IBBR enhances collaboration among UMB, UMCP, and the National Institute of Standards and Technology (NIST) and uses a rich network of interrelationships with other federal laboratories, corporate partners, and state agencies to advance scientific innovations and create commercialization relationships in Maryland.

IMPACT: *This unique partnership with NIST fosters cross-disciplinary team approaches to scientific discovery and translational development. It is also focused on creating commercialization relationships and initiatives that serve the expanding economic base of biosciences and technology in the state of Maryland.*

CENTER FOR HEALTH-RELATED INFORMATICS AND BIOIMAGING (CHIB)

With a focus on bioinformatics, CHIB uses “big data” computing capabilities to manage, process, and analyze massive amounts of clinical, genetic, and diagnostic imaging data in personalized medicine. CHIB researchers are fostering innovations in bedside patient imaging, using new augmented and virtual reality technologies that will result in multiple invention disclosures. CHIB, through its collaborative activities with other UMB and UMCP investigators, has successfully contributed more than \$55 million to the total funding attributable to *MPowering the State* initiatives.

IMPACT: *CHIB matches computing resources at UMCP with clinical and biomedical expertise*

at UMB to tackle grand challenges in genomic research, medical information management, and precision medicine, and their translation to human health.

COLLABORATIVE RESEARCH PROPOSALS

The University of Maryland Strategic Partnership: *MPowering the State* is a collaborative resource for joint research and the generation of new ideas. Since fiscal year 2012, UMB and UMCP have built an effective joint research proposal infrastructure that has streamlined shared proposal development and research administration. Before the alliance, joint research proposals were rare, but now submitted proposals total more than 375, with resulting awards of nearly \$100 million in new, joint research funding to UMB and UMCP.

IMPACT: *This collaborative, joint proposal infrastructure has resulted in nearly \$100 million in awards since FY12.*

JOINT RESEARCH AND INNOVATION SEED GRANTS

The program promotes structured, cross-disciplinary, and cross-university research that impacts human lives. Seed funds are given to creative teams of investigators working across disciplinary boundaries and universities with the understanding that these will lead to joint research proposals to external agencies. To date, 150 students and researchers have engaged in 60 projects.

IMPACT: *Providing seed funds to interdisciplinary research teams stimulates the submission of proposals to federal, public, and private funding agencies.*

Two provisions of the Strategic Partnership Act of 2016 are meant to capitalize on the research and development success of *MPowering the State*, fortify its innovation infrastructure, and create the next generation of Maryland entrepreneurs.

CENTER FOR MARYLAND ADVANCED VENTURES (CMAV)

To be located at UMB, CMAV will promote the commercialization of university discoveries, providing grants to university entrepreneurs whose research has high commercialization potential and supporting startups with staff, facilities, and equipment needed to develop companies. The center will assist university-affiliated startups from across the state to locate in Baltimore City.

PLANNED IMPACT: *Will increase economic development and job creation in Baltimore City through the commercialization of university discoveries.*

UNIVERSITY OF MARYLAND CENTER FOR ECONOMIC AND ENTREPRENEURSHIP DEVELOPMENT (UMCEED)

To be located at UMCP, this joint center will advance education and research in neuroscience, virtual and augmented reality, biomedical devices, data analytics, and cybersecurity.

PLANNED IMPACT: *Will advance education and research in fields where job growth and entrepreneurial potential are high.*

NEW COLE TO FOCUS ON TRAUMATIC BRAIN INJURY PREVENTION AND RECOVERY

From the playing fields of the Big Ten to the battlefields of Iraq and Afghanistan, **traumatic brain injury (TBI) has become a pressing medical issue.** Yet those at risk aren't just athletes strapping on football helmets or soldiers climbing into Humvees — they are drivers navigating highways, children turning cartwheels in the yard, and the elderly navigating tricky stairs.

IN 2010 ALONE, more than 2.5 million emergency room visits, hospitalizations, and deaths were associated with TBI, according to the Centers for Disease Control and Prevention. And as awareness and reporting of these injuries rise, so do questions for researchers.

“What factors control the different recovery rates for TBI?” asks University of Maryland, College Park (UMCP) biology professor Elizabeth Quinlan, PhD. “What can be done to promote recovery and response?”

The Center for Sports Medicine, Health and Human Performance in the new Cole Field House at UMCP will be at the forefront of tackling this public health problem and advancing the science of sport in a partnership with the University of Maryland, Baltimore (UMB).

Research at the center, co-directed by Quinlan and Alan Faden, MD, the David S. Brown Professor in Trauma at the University of Maryland School of Medicine (SOM), will bring together the scientific expertise of UMCP with the clinical faculties of UMB's professional schools. It is the latest collaboration between UMCP and UMB through the University of Maryland Strategic Partnership: *MPowering the State* initiative.

“The breadth and scope of this center is well beyond what currently exists in other sports performance centers,” Faden says. “It is intended to harness unique and complementary capabilities across the two campuses.”

The new Cole, expected to be completed in 2019, is bringing academics and entrepreneurship, football operations and

athletic training together under one roof. It will have more than 40,000 square feet of research and clinical space for experts in neuroimaging, genomics, and biomechanics, and an orthopaedics clinic will take advances from the lab to the broader community.

Kevin Plank '96, founder and CEO of Under Armour, pledged \$25 million to launch the project and has called Cole an opportunity to “define a new era for Maryland.”

The driving focus of that new era will be to address one of the most important medical issues of modern life.

“A significant percentage of the population will suffer a head injury,” Faden says. “The number of individuals affected is considerably larger than previously recognized.”



ELIZABETH QUINLAN



ALAN FADEN



COLE FIELD HOUSE

These injuries can cause depression, sleep disorders, and cognitive decline and adversely impact a victim's ability to function. Already, \$3 million of *MPower* funds have been invested to fund cross-university, multidisciplinary studies in brain and behavior, and injury, recovery, and enhancement.

Even though adult brains are much less “plastic” than those of children, research shows how to reactivate some flexibility. For example, exercise, intermittent fasting, and cognitive training have the capability to limit the consequences of brain injury and to facilitate recovery.

“Each of these potential therapies may tap into the same mechanisms to promote plasticity,” Quinlan says. “When is the most important time to learn? When you are stressed, when you are challenged, when you are in ‘fight or flight’ mode.”

Researchers at Cole, with its community of coaches, athletes, scientists, and clinicians, will explore the details of these processes by creating enhanced diagnostic tools and using “big data” computing capabilities to map the brain's litany of metabolic pathways and neuronal connections.

“We are going to utilize a wide array of advanced research tools to study the mechanisms that lead to cell death or cell dysfunction after brain injury, with the goal of improving recovery and limiting disability,” Faden says.

That is Cole's starting point. But the true benefit, Quinlan says, is opening a door into a fuller understanding of the human brain.

“The collection of experts from diverse fields will allow us to approach problems in an exciting and highly interdisciplinary way,” she says.



ACADEMIC PROGRAMS AND STUDENT EXPERIENCES

Enhancing academic programs and student experiences is an important part of the University of Maryland Strategic Partnership: MPowering the State. Through MPower, UMB and UMCP developed joint, cross-university academic programs, service learning, and enrichment opportunities that attract the best and the brightest students to Maryland, prepare them to lead, and to excel in the region's workforce.

MLAW: UNDERGRADUATE PROGRAMS IN LAW

MLAW provides comprehensive programming in undergraduate legal studies with a curriculum designed to be interdisciplinary, experiential, and applicable to a variety of educational and career opportunities. Taught by UMCP faculty in behavioral and social sciences and arts and humanities, and law faculty from the Francis King Carey School of

Law at UMB, the program integrates a social sciences approach to law designed to develop legal and law-related skills.

IMPACT: *MLAW provides creative, interdisciplinary learning opportunities in undergraduate legal studies.*

MASTER OF SCIENCE IN LAW (MSL)

Launched in 2015, the program targets working professionals in highly regulated fields as seen in state and federal agencies, corporations, and not-for-profit organizations. The program offers five specialties: health care law, environmental law, patent law, cybersecurity law, and homeland security & crisis management law. Taught in College Park (health, environmental, and patent) and online (cybersecurity and homeland security & crisis management) by faculty from the Carey School of Law at UMB, the MSL curriculum allows students to earn their master's degree in four semesters and on a part-time basis.

IMPACT: *The MSL offers an education in law for non-lawyers, designed to provide specialized legal knowledge for professionals to succeed in an increasingly complex legal workplace.*

BIOENGINEERING CAPSTONE PROGRAM

Highlighting the link between bioengineering and human health, this program connects undergraduates in bioengineering at UMCP with the clinical ecosystem at the University of Maryland School of Medicine at UMB.

IMPACT: *Working with faculty mentors, students practice entrepreneurialism and innovation by creating their own engineering designs from concept to product.*

UM SCHOLARS PROGRAM

UM Scholars is a mentored educational program that connects students from UMB and UMCP to faculty mentors at the opposite campus to work on research projects designed to expand students' knowledge and enlighten students about career choices. Conducted in 10-week terms, the structured projects tap into the complementary strengths of UMB and UMCP.

IMPACT: *Research projects aid in expanding students' knowledge and enlightening students about career choices.*

UM VENTURES: SHEPHERDING THE NEXT BIG IDEA

From innovative heart surgery devices to revolutionary computer science theory, **UM Ventures is an entrepreneurial powerhouse** dedicated to turning the big ideas of faculty and researchers at the University of Maryland, College Park (UMCP) and the University of Maryland, Baltimore (UMB) into reality.

THIS UNIVERSITY OF MARYLAND STRATEGIC PARTNERSHIP: MPOWERING THE STATE INITIATIVE focuses in part on commercializing university discoveries through partnerships with the private sector and helping them grow the state's economy.

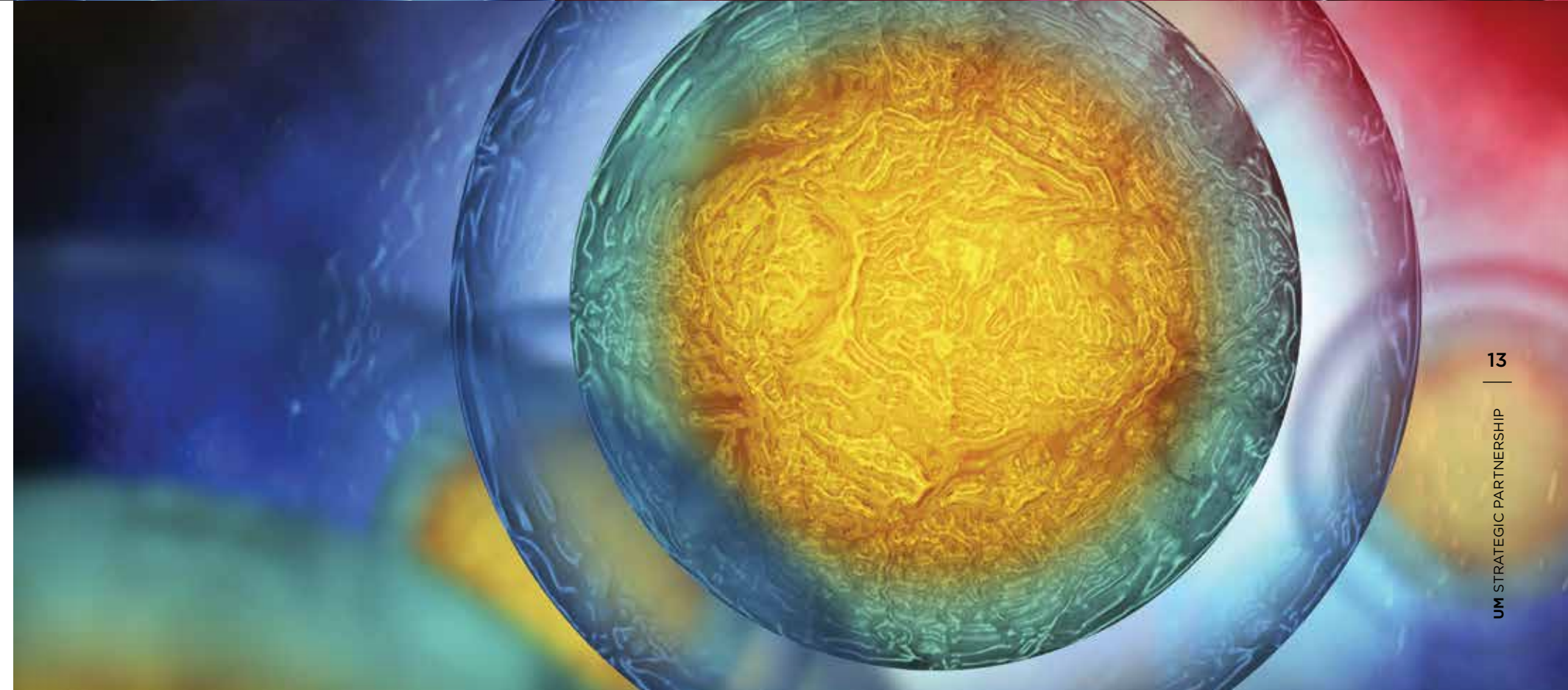
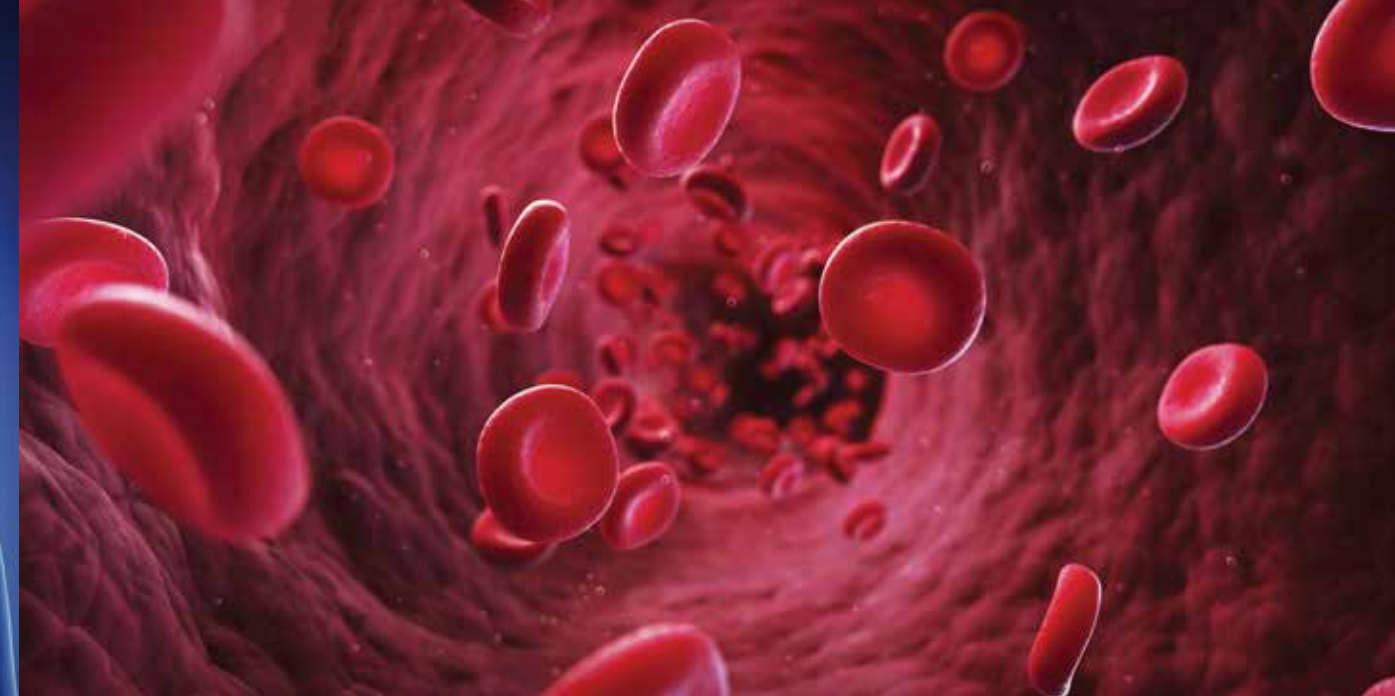
"Our researchers make discoveries every day," says James Hughes, MBA, director of UM Ventures. "We're bringing these inventions out of the lab into the market, where they can have a local and a global impact."

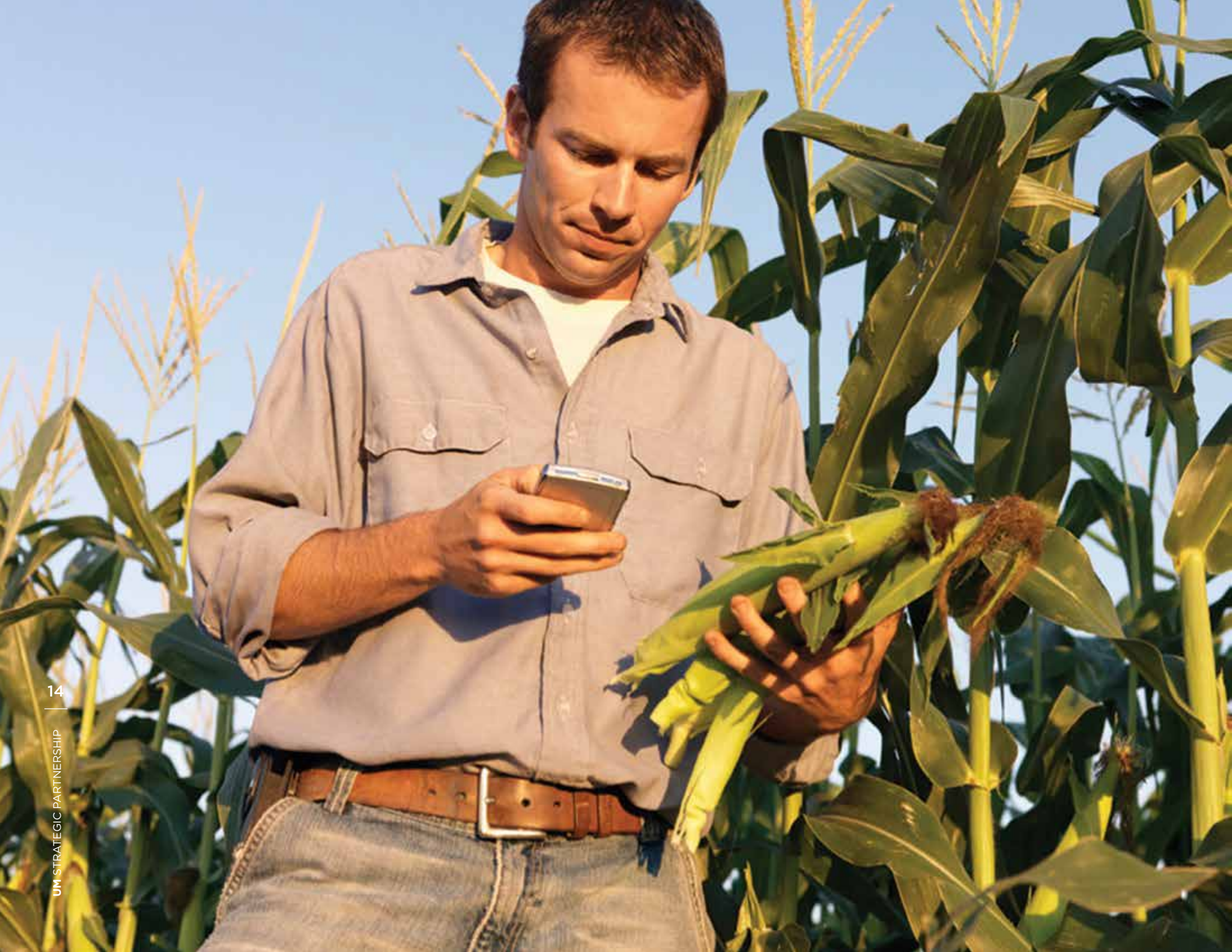
In fiscal year 2016, UM Ventures tallied more than 300 potential inventions from faculty, with more than 50 inventions licensed to companies, including 20 new startup companies. Recent success stories include gel-e Life Sciences, whose chemical products are used in dressings and gels to quickly stop bleeding; IonQ, which

is exploring how to build computers using quantum physics; and Harpoon Medical, which created a minimally invasive device for heart valve surgery.

Beyond fostering discoveries in industry and social ventures and making connections between faculty and industry, UM Ventures also works to bring together the expertise of both campuses to help companies operate day-to-day, including legal assistance at the Francis King Carey School of Law, business acumen found at the Robert H. Smith School of Business, and technical know-how at the A. James Clark School of Engineering.

"Our work just begins when we start a company," Hughes says. "We stick with them, helping them to thrive and to stay connected to the universities."





SERVICE

The University of Maryland Strategic Partnership: *M*Powering the State is advancing public service to the state by focusing and collaborating on critical statewide issues. By looking at issues from multiple angles, challenges are redefined and solutions are advanced in health, science, law, and social science.

AGRICULTURE LAW EDUCATION INITIATIVE (ALEI)

The ALEI partnership works to untangle and explain the network of environmental laws and their effect on Maryland's family farms and agricultural, natural resource, and environmental communities. A critical component of ALEI's mission is to educate and advance the understanding of laws and policies that apply to and affect the food system.

IMPACT: *ALEI strives to preserve Maryland's family farms by helping owners address the complicated legal issues associated with agricultural estates and trusts, regulatory compliance, and other public policies comprising what is known as agriculture law.*

SUPPORT, ADVOCACY, FREEDOM AND EMPOWERMENT (SAFE) CENTER FOR HUMAN TRAFFICKING SURVIVORS

The SAFE Center is an interdisciplinary service, research, and advocacy program that combines comprehensive services for victims to prevent this violation of basic human rights and to promote justice. To address human trafficking, it draws on the combined resources and wide range of disciplines at UMB and UMCP including the schools of Social Work, Nursing, and Law at UMB, and the School of Public Policy, the Colleges of Arts and Humanities and Behavioral and Social Sciences, and the Robert H. Smith School of Business at UMCP.

IMPACT: *The SAFE Center combines direct services, research, advocacy, and training to combat trafficking and empower survivors to heal and rebuild their lives.*

See more about the center on page 17.

FUTURE COMMUNITY DEVELOPMENT PROGRAMS

As major anchor institutions, UMB and UMCP have long worked to improve the social and economic health and development of our home communities, particularly in the areas of health care, housing and development, transportation, public education, public safety, and sustainability. A key provision of the Strategic Partnership Act of 2016 recognizes the importance of this role and calls for continued support to advance community development priorities, in particular in Baltimore, College Park, and Prince George's County.

SAFE CENTER: HELPING THE VULNERABLE

With its location along the I-95 corridor and proximity to major cities up and down the East Coast, Maryland has been described as a hub of human trafficking. The University of Maryland Strategic Partnership: *MPowering the State* initiative is taking steps to help its victims, some of the most vulnerable and invisible people in our communities.



BEN CARDIN, NANCY KOPP, SUSAN ESSERMAN, AND CHRIS VAN HOLLEN



THE UNIVERSITY OF MARYLAND SUPPORT, ADVOCACY, FREEDOM AND EMPOWERMENT (SAFE) CENTER FOR HUMAN TRAFFICKING SURVIVORS in College Park provides case management, counseling, legal, and other services for adults and children who have been victims of sex and labor trafficking. It collaborates with community organizations and task forces to enhance services for human trafficking survivors and engages in research, policy development, and advocacy in this critically important area.

Since opening in May 2016, the center, working with partners within and outside the University of Maryland, College Park (UMCP) and the

University of Maryland, Baltimore (UMB), has provided social, basic medical and mental health, and legal services to more than 20 clients, many of whom have young children.

"A holistic approach is essential for human trafficking survivors to recover from the trauma as they need more than just legal assistance," says center founder and director Susan Esserman, JD, a faculty member in the schools of Social Work and Law at UMB. Clients receive medical care through the School of Nursing at UMB and mental health treatment through UMCP psychology clinics, and economic empowerment programming is being developed. Students at both campuses are actively involved in the program and its research projects.



"This is a project where multidisciplinary coordination and integration is absolutely essential," Esserman says. "We are fortunate to draw on the many different vantage points and expertise within the universities."

In the latest example of research designed to inform service delivery and policy objectives, the School of Public Policy in College Park offered a spring 2017 course to research critical issues related to the SAFE Center and establish metrics for success.

AT A GLANCE

LEADERSHIP

Wallace D. Loh, PhD
PRESIDENT, UMCP

Jay A. Perman, MD
PRESIDENT, UMB

JOINT STEERING COUNCIL

Michele Eastman, MA, MEd
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Roger Ward, EdD, JD, MPA
CHIEF ACCOUNTABILITY OFFICER, VICE PRESIDENT,
OPERATIONS AND PLANNING, AND VICE DEAN,
GRADUATE SCHOOL, UMB

CURRENT PROGRAMS AND INITIATIVES

Agriculture Law Education Initiative (ALEI)

Bioengineering Capstone Program

Center for Health-Related Informatics
and Bioimaging (CHIB)

Center for Sports Medicine, Health and
Human Performance (CSMHHP)

Collaborative Research Proposals

Institute for Bioscience
and Biotechnology Research (IBBR)

Joint Research and Innovation Seed
Grant Program

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

Master of Science in Law Program

MLAW: Undergraduate Programs in Law

SAFE Center for Human Trafficking Survivors

School of Nursing 2+2 Program and Pathway
to Nursing

Shared Library Resources

Shared Recreation Resources

Social Work Program Expansion at Shady Grove

UM Scholars Program

UM Ventures: Commercialization of University
Inventions

FUTURE AND PROPOSED PROGRAMS AND INITIATIVES

Center for Maryland Advanced Ventures (CMAV)

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



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