



# UNIVERSITY *of* MARYLAND, BALTIMORE



## TESTIMONY TO THE MARYLAND GENERAL ASSEMBLY

Presented by Jay A. Perman, MD  
President, University of Maryland, Baltimore

*February 2016*

## LETTER TO THE COMMITTEE



The University of Maryland, Baltimore (UMB) is committed to improving the human condition through leadership in education, research, clinical care, and public service.

We train the professionals who work to secure the health, well-being, and just treatment of Maryland's citizens. We create the knowledge that cures disease and strengthens communities, locally and globally. We develop the practitioners and innovators who drive discovery and fuel economic growth.

I am deeply grateful to Gov. Hogan and the Maryland General Assembly for their continued support of UMB as we strive to keep Maryland strong. In the pages that follow, you'll see some of the ways in which UMB is expanding efforts to train Maryland's workforce, invigorate its economy, and engage with underserved communities in Baltimore and across the state.

We are, as always, eager to work with you in building Maryland's future.

Sincerely,

A handwritten signature in black ink that reads "Jay A. Perman". The signature is written in a cursive, flowing style.

Jay A. Perman, MD  
President

## WE ARE UMB

The University of Maryland, Baltimore (UMB) is Maryland's public health, law, and human services university. We are a leading U.S. institution for graduate and professional education and a thriving academic health center combining cutting-edge biomedical research and exceptional clinical care.

UMB enrolls 6,329 students in six nationally ranked professional schools and an interdisciplinary graduate school. We offer 40 doctoral, master's, and bachelor's degree programs and 12 certificate programs.



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UMB prepares Maryland's professional workforce, every year conferring the majority of the state's professional practice doctoral degrees in health, law, and human services.

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UMB is among the country's preeminent public research universities, competitively capturing \$500 million in grant and contract awards each year. We are aggressive in moving our science out of the lab and into the marketplace, where it can have a consequential impact on human health and well-being. In FY 2015, 39 UMB inventions were licensed to private companies, and new startups raised private capital to accelerate the transition from idea to innovation to impact.

The University of Maryland BioPark is Baltimore's biggest biotechnology cluster, with three dozen biotech companies and research institutes employing 750 people and actively building the city's science community. Our BioPark fuels the commercialization of new drugs, diagnostics, and devices and catalyzes economic and community development in one of Baltimore's poorest neighborhoods.

UMB occupies 68 buildings over 71 acres of land in downtown Baltimore, but our academic and clinical footprint extends well beyond the city. More than 400 students are pursuing degrees in nursing, pharmacy, and social work through UMB programs offered entirely at the Universities at Shady Grove in Montgomery County. Our School of Nursing now offers courses at Laurel College Center. Our School of Dentistry operates clinics for underserved patients in Frederick and Carroll counties. We're expanding physician assistant training to the Eastern Shore. We care for hundreds of thousands of Marylanders through health care and human services delivery sites across the state.

Through *MPowering the State*, UMB and the University of Maryland, College Park join their expert people and abundant resources to stimulate collaborative research, develop academic programs that prepare the nation's best workforce, accelerate technology commercialization, and fuel economic growth.

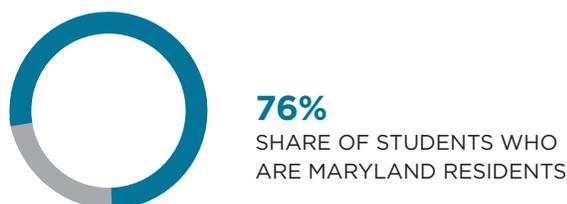
As one of Baltimore's most powerful anchor institutions, UMB is deeply committed to using its influence and assets to bring greater equity and opportunity to residents deprived of both—to improve community health, strengthen schools, train the local workforce, and drive neighborhood development.

UMB attracts outstanding faculty and students dedicated to leadership in professional and graduate education, research, patient care, and public service. **Together, our mission is to improve the human condition and serve the public good—of Maryland and society at large.**

## UMB: BY THE NUMBERS

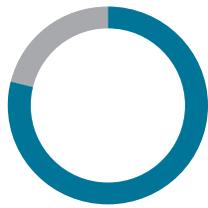
**7** SCHOOLS

MEDICINE | LAW | DENTISTRY | PHARMACY | NURSING | GRADUATE | SOCIAL WORK

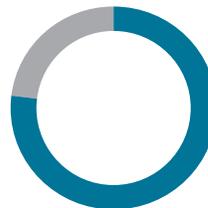


*Professional practice doctoral degree data: FY 2014  
Service data: FY 2012  
All other data: Fall 2015*

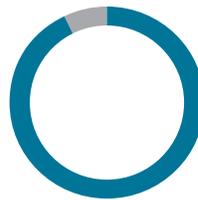
# UMB EDUCATES MARYLAND'S PROFESSIONAL WORKFORCE



**PROFESSIONAL PRACTICE  
DOCTORAL DEGREE:**  
78.7% IN-STATE  
21.3% OUT-OF-STATE  
TOTAL ENROLLMENT: 2,909



**MASTER'S DEGREE:**  
77.2% IN-STATE  
22.8% OUT-OF-STATE  
TOTAL ENROLLMENT: 1,967



**BACHELOR'S DEGREE:**  
93.3% IN-STATE  
6.7% OUT-OF-STATE  
TOTAL ENROLLMENT: 866

In-state students comprise 76 percent of UMB's overall enrollment. Many of our graduates are the state's front-line practitioners, tackling Maryland's greatest challenges in health, law, and human services.

DEGREE PROGRAM	IN-STATE STUDENTS	TOTAL ENROLLMENT
Dentistry—DDS	77.6%	523
Law—JD	71.1%	651
Medicine—MD	84.8%	651
Nursing Practice—DNP	85.0%	280
Pharmacy—PharmD	75.8%	629
Physical Therapy—DPT	87.4%	175
Social Work—MSW	83.3%	958
Nursing—BSN	93.7%	777

Most UMB students earning professional practice degrees are Maryland residents.

The last decade has seen growth in most professional programs.

SCHOOL	2005	2010	2015
Dentistry	608	695	638
Law	815	974	706
Medicine	1,256	1,282	1,307
Nursing	1,367	1,734	1,728
Pharmacy	627	705	842
Social Work	837	959	1,000
Graduate-Unaffiliated	--	--	108
	5,510	6,349	6,329

DEGREE	2005	2010	2015
<b>Bachelor's</b>	858	772	866
<b>Master's</b>	1,492	2,059	1,967
<b>Research &amp; Scholarship</b>			
<b>Doctorate (PhD)</b>	497	448	472
<b>Professional Practice</b>			
<b>Doctorate</b>	2,598	2,994	2,909
Dentistry—DDS	440	519	523
Law—JD	815	969	651
Medicine—MD	604	642	651
Nursing Practice—DNP	--	67	280
Pharmacy—PharmD	528	634	629
Physical Therapy—DScPT/DPT	211	163	175
<b>Certificate</b>	65	76	115
	5,510	6,349	6,329

UMB is expanding programs and enrollments to fill anticipated workforce shortages in Maryland and designing programs that meet emerging student needs. We're thinking broadly about how and where our programs are delivered, and leveraging partners and technology to meet students where they are, so that they're more likely to serve patients and clients in their own communities.

*Dr. Eleanor Perfetto in the School of Pharmacy has joined a national project focused on improving patient value in the delivery of health care. By combining large amounts of genomic data with data on the environments in which patients live and receive their care, Dr. Perfetto and her colleagues can begin to understand how the interplay of a patient's genetics and behaviors can inform interventions that support precision medicine—getting the right treatment to the right patient at the right time.*

## EDUCATING MARYLAND'S NURSING WORKFORCE

The University of Maryland School of Nursing—Maryland's largest public nursing program—is a leader in educating nurses for entry-level and advanced practice. This leadership is especially critical now, as nurses assume a central role within the health care team.

Half of all U.S. nurses currently hold a bachelor's degree. The Institute of Medicine recommends this share grow to 80 percent by 2020. The School of Nursing has therefore increased enrollment in its Bachelor of Science in Nursing program (BSN) and its RN-to-BSN pathway. Since fall 2013, these programs have grown 21 percent—641 students to 777—without additional state allocation. The school has also signed dual admission agreements with two associate degree-granting nursing programs—at the College of Southern Maryland and Montgomery College—and has four additional agreements underway with community colleges in Anne Arundel, Cecil, Howard, and Prince George's counties.

Meanwhile, the American Association of Colleges of Nursing recommends that all advanced practice nursing programs move to the Doctor of Nursing Practice (DNP) degree. In response, the School of Nursing has begun converting its advanced practice programs from master's degrees to DNPs, offering programs for nurse practitioners, clinical nurse specialists, and nurse anesthetists. Enrollment in the DNP programs has grown from 89 in fall 2013 to 280 in fall 2015. Additionally, the school reopened its Neonatal Nurse Practitioner program in fall 2015, recognizing a need to better serve Maryland newborns and their families.

As chronic disease afflicts an aging population and the country faces a shortage of primary care physicians, advanced practice nurses are taking on a leadership role in primary care. Focusing on health promotion, disease prevention, and health education and counseling, their service is critical for our most vulnerable patient populations and for rural communities, such as those on the Eastern Shore, where health care access is limited.

## EXPANDING PHYSICIAN ASSISTANT TRAINING TO THE EASTERN SHORE

Through the AACC/UMB Physician Assistant Program, Anne Arundel County Community College (AACC) and UMB collaborate to train Maryland's primary care physician assistant workforce. Students completing the 25-month, post-baccalaureate program receive a Certificate of Physician Assistant Studies from AACC and a Master of Health Science from UMB. Graduates are eligible to sit for the national physician assistant certification exam.

On average, 80 percent of the program's enrollees are Marylanders, and they remain in Maryland to practice. Consistently greater than 30 percent of program graduates choose to practice in primary care, improving health care access statewide.

UMB and AACC are now working with the University of Maryland Shore Regional Health Center and with Peninsula Regional Medical Center partners to create longitudinal training opportunities for physician assistant students on the Eastern Shore.

This proposed class expansion would accommodate those students on track to complete the University of Maryland Eastern Shore's (UMES) physician assistant program in 2016 or 2017. Since the UMES program lost its accreditation in fall 2015, UMB and AACC have leveraged institutional and system resources to assure adequacy of resources and clinical training sites for this class expansion.

To date we have secured affiliation agreements and a commitment to accommodate 24 students per year for all mandatory rotations. We're now engaged in operationalizing the process. A dedicated Eastern Shore clinical coordinator will work with our hospital partners to onboard students, perform site visits, and coordinate all student credentialing.

We recognize the urgent need for competent primary care providers in Maryland, and consistent with the mission of the AACC/UMB Physician Assistant Program, we feel it's in our communities where we need to create opportunities for future providers to learn.



*The new UMB Center to Advance Chronic Pain Research is directed by Dr. Susan Dorsey in the School of Nursing and Dr. Joel Greenspan in the School of Dentistry. The center brings together pain experts and research from different disciplines so that we might fulfill the most basic promise of clinical care—to relieve patients' pain and unburden them of suffering.*

# DEVELOPING AN INTERPROFESSIONAL WORKFORCE TO IMPROVE COMMUNITY HEALTH

UMB has built a strong foundation for interprofessional education, training students to work in teams to improve the care and services that Marylanders receive.

## Serving Prince George's County and Southern Maryland

This interprofessional model is especially important in Prince George's County and Southern Maryland, where there's a deficit of primary care providers and a surfeit of chronic diseases that degrade population health—asthma, cancer, diabetes, heart disease, hypertension.

UMB has therefore developed a pilot project for providing transition-of-care services to Medicare and Medicaid patients in the region who are high users of health care. The University will work with a coalition of eight hospitals and medical centers in Prince George's County and Southern Maryland, which together serve a considerable majority of the region's population.

UMB will assemble interprofessional clinical teams to provide comprehensive, integrated services to high-need patients transitioning out of hospital care. These teams will consist of faculty, residents, and students from our schools of pharmacy, nursing, social work, and law, so that all resources are brought to bear on improving patient health—medical care, comprehensive medication management, behavioral and mental health care, and legal and social services. Telehealth tools will augment the work of these clinics.

Close collaboration with local and state agencies and organizations, community clinics, Federally Qualified Health Centers, and others will ensure that all resources and services are well coordinated within the coalition and the region.

There is a tremendous and urgent need in Prince George's County and Southern Maryland for this model of interprofessional care. However, another critical purpose of the project is to expand opportunities for our health, law, and social work students and residents to serve underserved populations—and to do so as part of an interprofessional team, the desired care model for chronic disease management. It's not only good professional training for Maryland's future front-line practitioners; it should also increase the number of providers serving the underserved, as students are more likely to practice in diverse and rural communities when they've been educated there.

## Serving Frederick and Carroll Counties

Serving this same dual purpose of high-quality, experiential learning for students and high-quality health care for Maryland's people is our School of Dentistry's work in Carroll and Frederick counties.

In Carroll County, the School of Dentistry has partnered with Access Carroll Integrated Health Care, which provides multidisciplinary health services to low-income county residents. The facility is staffed with volunteer physicians, nurses, and other health providers. A private gift enabled Access Carroll to build and equip dental operatories at the facility, where our dental and dental hygiene students are now providing oral health care. The School of Dentistry's faculty, meanwhile, volunteer their time to provide direct supervision to the students.

In Frederick County, the School of Dentistry is partnering with Frederick Memorial Hospital to provide oral health services to low-income residents. The Hospital will provide the dental facility and staffing, including a dental director, to support the clinic's administrative operations, and our dentistry students will begin rotating through the clinic this spring. The hospital plans to move the clinic into a new, multidisciplinary health facility in 1-2 years.

Both of these community-based models offer an invaluable opportunity for interprofessional education and multidisciplinary care. In addition to addressing a significant oral health need in the community, these clinical experiences expand students' work with diverse and underserved populations, who will need their competent—and compassionate—care the most.

## MPOWERING EDUCATION

*MPowering the State* leverages the sizable strengths of two leading universities—UMB and the University of Maryland, College Park (UMCP)—to develop cross-university academic programs, service-learning opportunities, and enrichment activities that draw the best and the brightest students to Maryland and prepare them to excel in the region's workforce.

MPower is expanding UMB's participation on UMCP's campus. Through the Master of Science in Law Program, launched in fall 2015, faculty from the Carey School of Law at UMB train working professionals in highly regulated fields like health care, the environment, crisis management, and cybersecurity. The part-time program, delivered at UMCP, helps professionals succeed in an increasingly complex legal workplace. A patent law specialty will be added in fall 2016.

Meanwhile, MPower's MLAW program is providing law training to UMCP undergraduates through courses and experiential opportunities taught by faculty from both UMB and UMCP. The curriculum examines topics such as Supreme Court decisions and top-of-mind legal issues like big data and cybersecurity.

*In fall 2015, our Carey School of Law offered an eight-week course, "Freddie Gray's Baltimore," examining the issues of equity that sparked Baltimore's spring 2015 unrest—policing and criminal justice, housing segregation, education, employment, and public health. In spring 2016, UMCP is offering this same course to students, taught by faculty from both MPower universities.*



MPower's UM Scholars Program creates unique enrichment experiences for students through mentored research projects. Conducted in 10-week terms, the projects allow students to explore career choices or round out professional goals by tapping into the complementary curriculum strengths of the two MPower universities.

Over the past three years, 30 UMCP undergraduates majoring in STEM subjects have engaged in mentored research projects at our medical school. This year, UMB students will, in turn, engage in multiprofessional studies at UMCP. For instance, our social work students might explore journalism to learn how to communicate social, legal, and health issues in a way that effects change, and UMB students interested in a teaching career might take advantage of UMCP's education, curriculum, and training programs.

## ENSURING AFFORDABILITY FOR MARYLAND STUDENTS

Graduate and professional education is a financial challenge for many UMB students, and a number of them graduate with heavy debt loads. This burden can, in turn, affect their choice of practice. Although a number of students aspire to primary care practice and to working in rural and underserved communities, they seek more lucrative positions when they realize the significant debt burden they'll carry when they graduate.

Tuition affordability is very much a concern at the University. UMB doesn't benefit from the enrollment initiative that provides state support in lieu of tuition increases for undergraduate in-state students. Graduate and professional students comprise a considerable majority of our enrollment, so we see negligible tuition replacement funds.

Meeting our FY 2017 mandatory expense increases, with a small student body, would require an across-the-board tuition increase of 7.6 percent. We are sensitive that substantial tuition hikes could be a barrier to entry into our educational programs, particularly those that address workforce shortage areas. Therefore, our budget proposal was based on a 3.9 percent tuition increase and included an increase in financial aid to help offset the tuition growth.

SCHOOL/DEGREE PROGRAM	TOTAL COST OF ATTENDANCE* In-State Students 2014-15 Academic Year
Medicine—MD	\$64,892
Dentistry—DDS	\$71,938
Law—JD	\$58,904
Social Work—MSW	\$41,336
Pharmacy—PharmD	\$53,560
Nursing—MS	\$42,655
Nursing—CNL	\$52,702
Physical Therapy—DPT	\$58,881

\* Total cost of attendance includes tuition and fees, living expenses, student loan fees, University health insurance, transportation, board exam fees, computer fees, malpractice insurance fees, instruments, books, and supplies.

SCHOOL/DEGREE PROGRAM	AVERAGE STUDENT LOAN DEBT* All Graduating Students: May 2015
Medicine—MD	\$158,374
Dentistry—DDS	\$203,267
Law—JD	\$114,493
Social Work—MSW	\$56,871
Pharmacy—PharmD	\$143,039
Nursing—MS	\$44,344
Nursing—CNL	\$74,912
Physical Therapy—DPT	\$100,314

\* Federal and private loan debt acquired while attending UMB; figures do not include any debt carried over from students' undergraduate education

GRADUATE AND PROFESSIONAL PROGRAMS	MONTHLY REPAYMENT*
Nursing & Social Work	\$660-\$670
Physical Therapy & Law	\$1,180-\$1,350
Pharmacy, Medicine & Dentistry	\$1,690-\$2,400

\* Monthly debt calculated at 7.35% interest, with debt to be repaid over 10 years

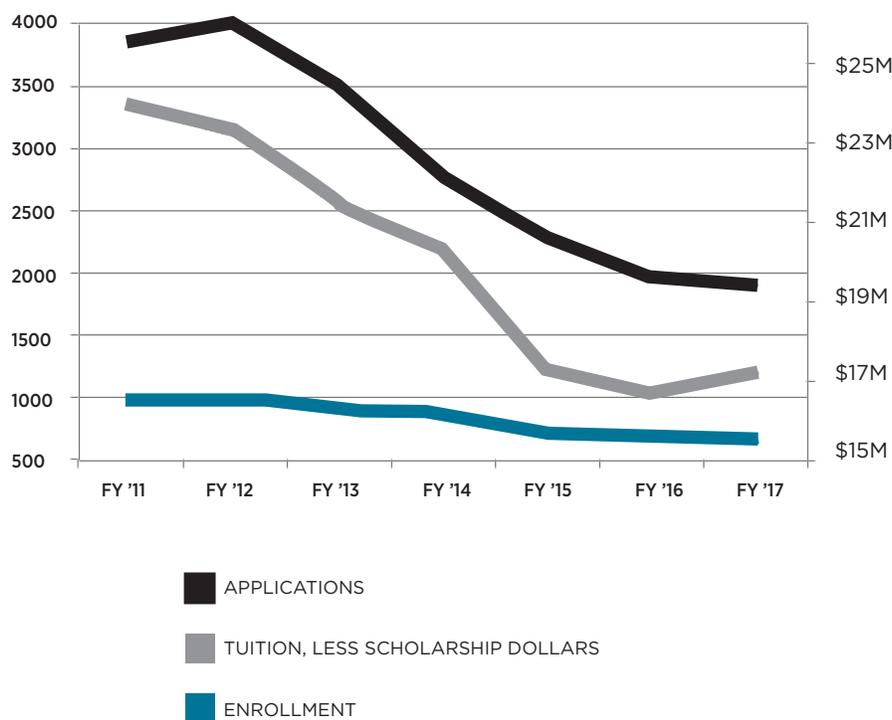
## Revitalizing the Carey School of Law

The challenging situation facing law schools, including ours at UMB, illustrates the urgency of tuition affordability and the need for scholarship assistance. The significant decline in the job market for law school graduates has led potential students to evaluate the cost of their education against what they can reasonably expect to earn following graduation. That analysis has, in turn, persuaded many not to apply.

UMB has felt these sharp declines in applications to the law school, as have universities across the country. To maintain the high academic quality of its student body, the Carey School of Law has decreased enrollment and increased scholarship assistance—the same actions taken by its peers nationwide.

UMB is several years into a plan to rebalance and revitalize this important school, and we're funding this transformation with existing resources. Additionally, through our innovative MPower programs (page 8), we're expanding undergraduates' exposure to legal education and meeting marketplace demand for specialized legal training.

### TRENDS IN APPLICATIONS, ENROLLMENT, AND TUITION: CAREY SCHOOL OF LAW



*The scholarship and activism of Danielle Citron in Maryland Carey Law is poised to change the way we look at cyber harassment and abuse. She's working with national leaders to strengthen legislation and law enforcement around aggressive cyber behavior and to promote greater privacy protections online. Ms. Citron visits the country's biggest technology companies—Google, Facebook, Microsoft—and talks about the challenges of harnessing media that hold so much promise and yet often cause so much pain.*

## UMB FUELS MARYLAND'S ECONOMY

### TRAINING A WORKFORCE THAT GIVES BACK

UMB's graduates constitute our single biggest contribution to Maryland's economy. And the impact is considerable in more ways than one might think.

A healthier population is a more productive population. The Institute of Medicine puts the indirect costs associated with preventable chronic disease—in terms of depressed worker productivity and a lower U.S. economic output—at about \$1 trillion a year. So the graduates we put into our communities do more than cut the crippling costs associated with preventable disease or untreated conditions that exacerbate without care. Our graduates actually promote workforce productivity and fiscal strength.

More than that, our graduates, themselves, stimulate significant economic development in the communities they call home. For example, the American Medical Association estimates that, on average, every physician working in Maryland today supports more than 10 additional jobs and generates \$1.6 million a year in sales revenue, nearly \$1 million a year in wages and benefits, and about \$80,000 in state and local taxes.

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On average, every physician working in Maryland supports 10 additional jobs, generates \$1 million a year in wages and benefits, and contributes \$80,000 in state and local taxes.

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### DRIVING ECONOMIC DEVELOPMENT

UMB is a vital economic engine for Maryland, training a professional workforce and delivering care and services that spur growth. The University's annual impact on Maryland's economy is \$2.8 billion, and with the University of Maryland Medical Center and affiliated physician practices, UMB stimulates nearly \$6 billion in economic activity each year. The University alone generates 20,844 jobs and returns \$14.14 to Maryland for every dollar of the state's general fund support.



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For every state dollar invested in UMB, the University returns \$14 to Maryland.

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## UMB: BY THE DOLLARS

- **20,844** JOBS CREATED
- **\$2.8 BILLION** TOTAL IMPACT ON MARYLAND'S ECONOMY
- **\$156.3 MILLION** STATE AND LOCAL FISCAL IMPACT
- **\$14.14** UMB'S RETURN ON INVESTMENT FOR EVERY \$1 OF STATE SUPPORT

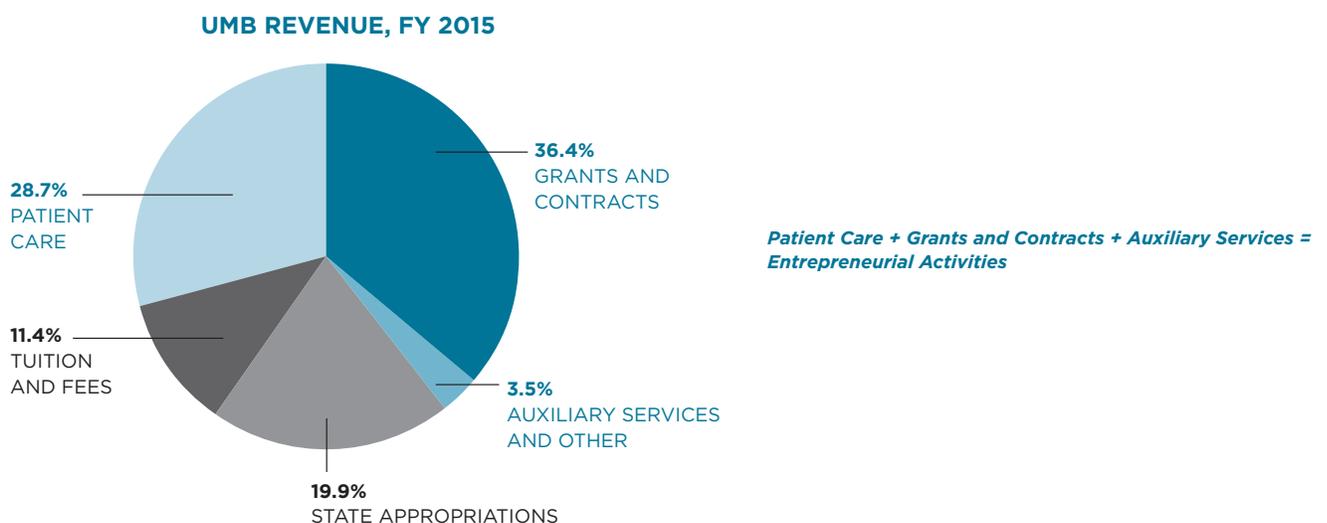
All data: FY 2014

- **\$1.1 BILLION** TOTAL UMB SPENDING
- **\$500 MILLION** GRANT AND CONTRACT AWARDS
- **\$926,973** GRANT AND CONTRACT DOLLARS PER CORE FACULTY MEMBER
- **68.6%** SHARE OF REVENUE GENERATED BY ENTREPRENEURIAL ACTIVITIES

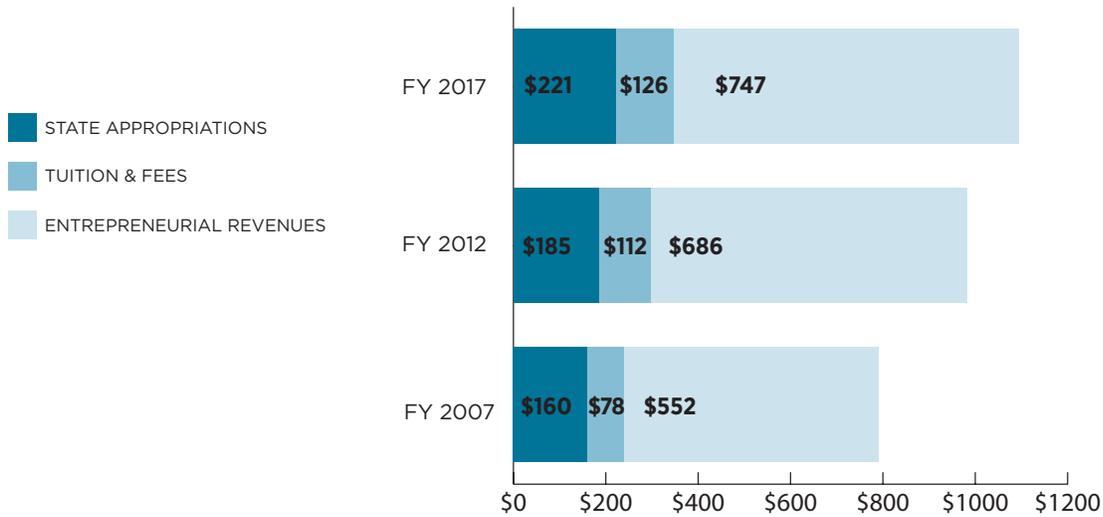
All data: FY 2015

UMB attracts \$500 million in grant and contract awards each year, and we expect to grow this total with aggressive proposal activity and with expanded research space provided by Health Sciences Facility III (HSFIII), opening in FY 2018.

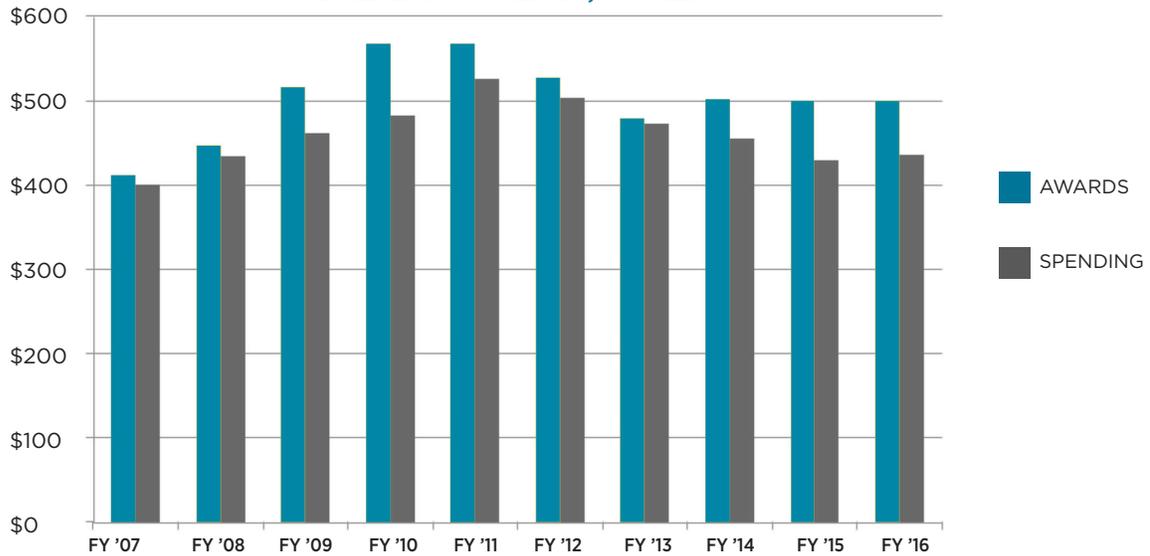
Our faculty are among the nation's most productive researchers, with each core faculty member annually bringing nearly \$1 million in grants, on average, into UMB—and into Maryland. More than two-thirds of the University's total operating budget is revenue generated from entrepreneurial activity.



### UMB FUNDING TRENDS, IN MILLIONS



### UMB RESEARCH TRENDS, IN MILLIONS



While UMB awards derived from research and patient care have shown growth over the last decade, we did see a decline in awards from FY 2011 to FY 2013. These awards have since stabilized. This fluctuation in awards has, over time, yielded a decrease in direct spending/revenue on grants and contracts, and a decrease in recovery of indirect costs—putting pressure on the University’s budget to fund the largely fixed expenses related to research facilities and infrastructure.

Since 2011, UMB has implemented efficiency measures and reallocated internal resources to absorb these decreases. While awards and revenues are expected to remain flat in FY 2016, we are confident that—with a substantial increase in our proposal activity and with HSFIII coming online in FY 2018—we will resume growth in sponsored programs.

## IDEA TO IMPACT

Academia and industry intersect at UMB. In FY 2015, UMB conducted 434 translational research projects and clinical trials on behalf of 234 corporate sponsors. Since FY 2011, corporate-sponsored research at UMB has grown 35 percent to \$38.9 million.

We are aggressive in moving our science out of the lab and into the marketplace, where it can have a meaningful impact on human health and well-being. In FY 2015, 39 UMB inventions were licensed to private companies—our highest ever one-year total. Additionally, new startup companies—launched with UMB’s intellectual property—are raising private capital to accelerate the transition from idea to innovation to impact.

### Inventing Tomorrow

**Harpoon Medical** is commercializing a device for minimally invasive heart surgery. The image-guided surgical tool allows repair of the heart’s mitral valve without opening the patient’s chest or stopping the heart. The technology was invented in the Division of Cardiac Surgery in the School of Medicine. Founded just three years ago, Harpoon has already raised \$15 million and created 15 jobs in Baltimore.

**Analytical Informatics** is a startup whose software improves health care quality and operational efficiency by aggregating huge quantities of health care data and giving providers real-time access to it. The software was developed—and the company founded—by faculty researchers in the School of Medicine.

**Breethe, Inc.** is developing the world’s first portable artificial lung. It’s a wearable device for patients suffering respiratory failure and cardiopulmonary collapse, the first such out-of-hospital device in the commercialization pipeline. The technology was invented in the School of Medicine’s Program in Lung Healing.

**Tokai Pharmaceuticals** raised \$97 million in a fall 2014 initial public offering, and began Phase III clinical trials on a drug to treat prostate cancer in summer 2015. The drug candidate was developed by faculty in the School of Medicine.

**Profectus BioSciences** raised \$50 million in 2014 to develop its Ebola vaccine candidate. In spring 2015, the vaccine was shown to be effective and safe in non-human primates. Profectus is now producing the vaccine material for an HIV/AIDS vaccine that began Phase I clinical trials at UMB in fall 2015. Profectus was co-founded by the director of the School of Medicine’s Institute of Human Virology.

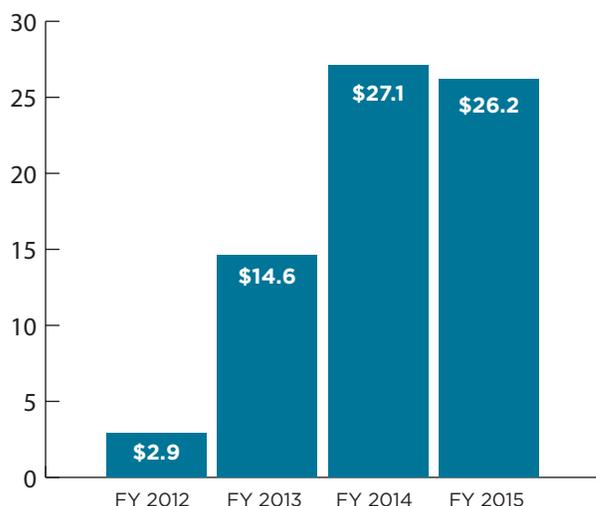
*Dr. Robert Ernst in the School of Dentistry and Dr. David Goodlett in the School of Pharmacy are using mass spectrometry to create a bacterial library so that physicians can more quickly and accurately diagnose a patient’s infection. Fast and accurate pathogen identification is sorely needed in hospitals and clinics with patients who have potentially deadly infections. A library of chemically bar-coded bacteria will make diagnosis quicker, cheaper, and better.*

## MPOWERING INNOVATION

MPower funding is building new infrastructures for joint research between UMB and UMCP, creating more and better opportunities for cross-university research and innovation, and, in turn, attracting millions of dollars in new grants. Over four years, UMB and UMCP have submitted 298 joint research proposals, and 81 have won funding—for a total of nearly \$71 million in awards.

	FY 2012	FY 2013	FY 2014	FY 2015	TOTAL, FY12-FY15
Proposals Submitted	4	68	114	112	298
Proposals Awarded	1	18	26	36	81
Anticipated Award	\$2.9M	\$14.6M	\$27.1M	\$26.2M	\$70.8M

### JOINT UMB/UMCP RESEARCH AWARDS, IN MILLIONS



### Center for Health-Related Informatics and Bioimaging

CHIB unites researchers in computer science and engineering at UMCP with experts in genomics and clinical medicine at UMB to so that they can better understand diseases like Parkinson's, cancer, and traumatic brain injury.

CHIB's newest focus area is augmented reality. UMCP researchers, in collaboration with surgeons from the R Adams Cowley Shock Trauma Center, are working on visualization tools that could allow doctors to see critical information about a patient's biomedical status—during surgery or at the bedside—without ever taking their eyes off the person they're treating.

CHIB has contributed \$48 million of MPower's total competitive funding, and has recently been awarded another \$10 million in grants from the U.S. Department of Agriculture and the National Institutes of Health.

## Institute for Bioscience and Biotechnology Research—Montgomery County

IBBR enhances collaboration among UMCP, UMB, and the National Institute of Standards and Technology in biological and quantitative sciences, medicine, and engineering.

The institute is leading new vaccine and drug discovery programs and working with Montgomery County’s dynamic biotech community to more quickly and safely bring medical products to market. IBBR has established a center to help life sciences entrepreneurs commercialize their technologies. It’s forged a partnership with KeyGene, the leading agricultural-biotech company in Maryland. And it’s launched ProCure Life Sciences, now developing a novel protein-measurement technology based on the intellectual property of all three partners.

## Center for Sports Medicine, Health and Human Performance

This new center will advance solutions that improve human health, performance, and injury recovery while expanding Marylanders’ access to world-class sports medicine and occupational health services. The center will be a signature component of the conversion of UMCP’s Cole Field House into a national model for integrating athletics, academics, and research.

The University of Maryland School of Medicine at UMB will lead the facility’s clinical programs and will collaborate with UMCP on center research. Now under construction, the center is expected to open in 2020.

## UM Ventures

MPOWER’s joint technology transfer operation, UM Ventures, is turning university research into market-ready technologies and therapies. It’s also creating energy and opportunity, attracting talented faculty and students who want to work and learn at these two prominent universities.

### UM VENTURES: COMMERCIALIZING UNIVERSITY INVENTIONS

	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	Total, FY11-FY15
<b>Invention Disclosures</b>	<b>206</b>	<b>265</b>	<b>264</b>	<b>366</b>	<b>306</b>	<b>1,407</b>
UMB	88	131	128	170	139	656
UMCP	118	134	136	196	167	751
<b>Startups</b>	<b>5</b>	<b>7</b>	<b>11</b>	<b>8</b>	<b>10</b>	<b>41</b>
UMB	3	3	3	3	5	17
UMCP	2	4	8	5	5	24
<b>Licenses</b>	<b>28</b>	<b>34</b>	<b>41</b>	<b>51</b>	<b>55</b>	<b>209</b>
UMB	14	21	23	30	39	127
UMCP	14	13	18	21	16	82

*The School of Medicine is at work around the world to prevent, control, and eradicate diseases of global impact. Its Center for Vaccine Development carried out the very first clinical trials for an Ebola vaccine in the U.S. and co-led the first Ebola vaccine trials in West Africa. Its Institute of Human Virology has treated 1 million patients with HIV/AIDS in Africa and the Caribbean, as well as 6,000 patients back home in Baltimore.*

## STATE SUPPORT IS STIMULATING GROWTH

### Maryland Innovation Initiative

UMB has been the primary recipient of 15 MII awards in FY 2015 and the first half of FY 2016. Together, these awards total \$1.2 million.

MI provided critical early funding to two of UMB's most promising startups, Harpoon Medical and Analytical Informatics, both based in Baltimore. Upon receiving MII funding, the companies together employed four people. Today, they employ more than 20 people and will likely grow to 30 this year.

### Maryland E-Nnovation Initiative Fund

Designed to enlarge Maryland's corps of entrepreneurial faculty, MEIF offers a state match to private funds raised in support of endowed professorships or chairs. UMB has won \$2.1 million in MEIF matches for two professorships.

#### *The Robert C. Gallo Distinguished Professorship in Human Virology, School of Medicine*

The endowment will cover the base salary and research expenses of an eminent physician-scientist who will conduct basic and applied research in HIV/AIDS and other virally linked diseases, and advance vaccine development in the School of Medicine's Institute of Human Virology. Private Donor: Estate of Robert Keith Gray, \$995,000. MEIF Match: \$995,000

#### *Endowed Professorship in Entrepreneurial Surgical Science, School of Medicine*

The endowment will be used to recruit a new professor in the Department of Surgery, a senior entrepreneurial bioengineer who will lead a new program to develop and commercialize devices and techniques that help critically ill people. Private Donors: Peter Angelos Family Foundation, \$600,000; Hales Family Foundation, \$250,000; Hamish Osborne, \$250,000; Abell Foundation, \$100,000. MEIF Match: \$1,106,750

## REDEVELOPING BALTIMORE'S WESTSIDE

For years, UMB has been working with Baltimore Mayor Stephanie Rawlings-Blake on the redevelopment of the city's Westside, a once-thriving retail district. Earlier this fiscal year, UMB entered into two long-term ground leases with a development team to repurpose four contiguous University-owned properties at the northeastern edge of our campus.

With this redevelopment, nearly one full city block will be improved, the properties will return to productive use, the historic Drivers & Mechanics National Bank building will be renovated, and about 300 apartments will be added to the west side of downtown. We anticipate breaking ground on the project by the end of the calendar year.



## BUILDING BALTIMORE'S SCIENCE COMMUNITY

The University of Maryland BioPark is Baltimore's largest biotechnology hub, with 35 biotech companies and research institutes sharing the 12-acre park and actively building the city's science community. The park represents a private capital investment of \$400 million.

UMB's BioPark fuels the commercialization of new drugs, diagnostics, and devices by giving more than 700 research scientists and entrepreneurs the space to create and collaborate.

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The Maryland Proton Treatment Center opened in the BioPark in fall 2015. We expect its first patient to be treated in March 2016. The center is the only facility in the Baltimore-Washington region providing advanced radiation therapy for the treatment of cancer. The center will serve 1,900 patients a year and employ 170 doctors, technicians, and administrative staff.

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**Maryland Proton Treatment Center**

*Dr. Sunjay Kaushal in the School of Medicine discovered robust regenerative capacity in the cardiac stem cells of infants with congenital heart disease. In rodent models, the cells sped recovery and strengthened heart function. Now Dr. Kaushal's team has gotten FDA approval to transplant the cells he harvests back into the hearts of his young patients, the first clinical trial with children. Ultimately, Dr. Kaushal hopes the procedure will delay the need for more surgeries. A grant from the Maryland Stem Cell Research Fund supports Dr. Kaushal's work.*

In December 2015—following approvals by the Baltimore City Mayor and the City Council—the Maryland Department of Commerce designated the BioPark a Regional Institution Strategic Enterprise (RISE) Zone. This designation is critical to UMB's next step in growing the BioPark even further.

That next step is construction of 873 W. Baltimore Street, a 250,000-square-foot, \$110 million Innovation Center housing more than 100 companies and employing 900 people. The building's anchor tenant will be CIC, the nation's biggest business incubator and the same company largely responsible for making Boston/Cambridge into one of the most successful Innovation Districts in the world. The RISE Zone designation was instrumental in CIC's decision to expand its operations to Baltimore.

We expect that construction of 873 W. Baltimore Street will begin this year and that the building will open in 2018.



**873 W. Baltimore Street**

## UMB SERVES MARYLAND'S PEOPLE AND COMMUNITIES

The University of Maryland BioPark is not just a growing research and technology park; it's a growing park in one of Baltimore's poorest neighborhoods. In this West Baltimore neighborhood—adjacent to the UMB campus—63 percent of children live in poverty, three in 10 residents have no high school diploma, the median household income is \$19,000, and the average life expectancy is 68 years old—nearly 17 years shorter than that of the wealthiest city neighborhoods.

Successful research and technology parks are critically important in these kinds of neighborhoods because they stimulate diverse development to serve the growing population—housing, restaurants, retail, and services—and they entice entrepreneurial residents to start businesses that meet new local needs.

The BioPark's tenants have a vested interest in the health and vibrancy of the community in which they're rooted. Every tenant contributes to a community fund that has thus far spent more than \$600,000 on neighborhood improvement projects. The fund will grow considerably once the Maryland Proton Treatment Center and the multitenant lab and office building at 873 W. Baltimore Street are operational.

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In February 2016, the nonprofit corporation operating the BioPark joined with the BioPark's private developer (Wexford Science + Technology) in an agreement to contribute approximately \$4 million toward local community projects, such as redeveloping Hollins Market and providing residents workforce training.

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The BioPark houses Baltimore City Community College's Life Sciences Institute, which trains the city's future health sciences workforce. And we partner with the BioTechnical Institute of Maryland to place the nonprofit's graduates into entry-level lab tech positions in the BioPark, at the University, and in laboratories across the city.

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Our community-building work in the BioPark is part of an expansive place-based strategy to effect real and lasting change in West Baltimore—to improve health, create wealth, and advance social justice.

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## UMB Community Engagement Center

Inside this West Baltimore catchment area we established the UMB Community Engagement Center, a space where the University provides services to nearby residents and works with them to strengthen their neighborhoods. Following are just some of the activities taking place at the center, which opened in fall 2015:

- **Workforce Development:** A UMB workforce liaison holds open office hours at the center each week so that residents can talk to her about their career goals and access free job-preparation programs. Our human resources department will soon staff the center as well, to match neighbors with job opportunities at UMB.
- **Legal Advice:** The Carey School of Law uses the center to offer residents free and low-cost legal services in family law, elder law, housing, employment, expungement, criminal law, and civil law. Teams of students, faculty, and volunteer attorneys provide the consultation services.
- **Community Organizing:** The President's Student Leadership Institute prepares UMB students and residents for leadership in local advocacy issues. Neighbors who are active in community organizing help facilitate the trainings.
- **Play Time:** A weekly play group offers safe, unstructured play for infants and toddlers.
- **Nursing Practicum:** Nursing students at UMB are using the center to complete a clinical practicum for their course in Community Health Nursing. Under close faculty supervision, the students conduct a community needs assessment and use it to develop localized health interventions. By overlapping meeting times with the weekly play group, the students can interact with families and more easily identify their needs.
- **Community Lunches:** Monthly lunches give neighbors the chance to get to know UMB's people and the work we're undertaking in the community, and to share their thoughts on the kinds of programs and services the center should offer.
- **Fresh Food Market:** A weekly food market coming this spring to the center will give neighbors access to healthy produce, meats, and breads at deeply discounted prices. UMB students will staff the market as volunteers.



## Community Schools

UMB's School of Social Work is a national leader in the community schools movement, fast becoming the standard model for urban schools, which must address complex community trauma like regular exposure to violence and loss. The School of Social Work is the lead agency in 12 community schools throughout Baltimore, coordinating a network of partnerships that help stabilize and strengthen families so that children can achieve.

In Upton/Druid Heights, UMB is inside all five of the neighborhood's public schools, offering and integrating a critical mass of services—cradle to career—so that we can achieve a measurable and sustained impact on child and family outcomes.

For instance, at the Historic Samuel Coleridge-Taylor Elementary School in Upton/Druid Heights, UMB's dental students and faculty provide oral health care and instruction for preschoolers. Medical students provide one-on-one tutoring in math and science. Nursing students arrange empowering activities for the school's girls and host health learning parties, where parents and children learn healthy habits together.

A parenting class, reaching 20 families each week, teaches responsive parenting, which benefits children's emotional and cognitive development. The Breathmobile, our mobile asthma clinic, makes regular stops at the school. An on-site workforce liaison helps parents surmount their obstacles to employment so they can find and keep good jobs.

*In 2009, Upton/Druid Heights had one of the highest infant mortality rates in Baltimore—more than 18 infant deaths per 1,000 live births, most of them attributable to unsafe sleeping. After years of awareness campaigns targeting the neighborhood's pregnant women and new families—undertaken with the Baltimore City Health Department and CareFirst—Upton/Druid Heights just reached a milestone: two full years without any sleep-related deaths.*



## UMB CURE Scholars Program

The UMB CURE Scholars program was launched in fall 2014 with a grant from the National Cancer Institute. It's an intensive, long-term mentoring program for West Baltimore middle school students, designed to put them on a path to good-paying careers in the health sciences and to grow the number of underrepresented health professionals in Maryland's workforce. This is incredibly important in West Baltimore, where we see yawning gaps in health care access and equity, and where cancer and other chronic diseases devastate families and communities.

In fall 2015, UMB inducted its first class of scholars, 40 sixth-graders from three West Baltimore middle schools. After school twice a week and every other Saturday, the scholars receive tutoring on campus, they conduct science experiments in UMB labs, and they learn about careers in biomedicine.

Mentoring these scholars are 100+ UMB students, faculty, staff, alumni, and partners who are passionately dedicated to making a transformative difference in the students' lives.



## Southwest Partnership

UMB has become deeply involved in the Southwest Partnership, an association of seven neighborhoods in West Baltimore that fall within our geographic area of focus. UMB sits on the partnership's board and financially supports the nonprofit.

As part of this collaboration, UMB is developing residents' capacity to be effective leaders on behalf of their neighborhoods. We're matching neighborhood businesses to UMB's procurement needs and providing training to local companies so they can tap into our purchasing power. We're lobbying for better schools and better school models, supporting job training programs, and incentivizing local home buying.





## **MPOWERING SERVICE**

The greatest challenges we confront as a society can seldom be solved by scholars in one discipline alone. MPower is bringing together top thinkers—from health, science, law, social science, and human services—to reimagine the problems that plague us and reengineer their solutions.

### **Support, Advocacy, Freedom and Empowerment Center for Human Trafficking Survivors**

The S.A.F.E. Center is an interdisciplinary program established to end human trafficking and support its survivors. The center will provide legal, social, medical, and economic empowerment services to trafficking survivors using a platform that combines direct services with research and advocacy.

Convening law enforcement, social services, health care providers, legislators, and survivors themselves, the center will work to improve prevention and survivor services, share best practices, and pursue policy solutions. It will open in spring 2016 near the UMCP campus in Prince George’s County, where human trafficking is unconscionably common.

### **Agriculture Law Education Initiative**

ALEI gives Maryland farmers better access to the expertise of UMB, UMCP, and the University of Maryland, Eastern Shore. It educates farmers on practical topics like agricultural leasing and estates and trusts, while simultaneously building capacity in the private bar around agricultural issues.

In late 2015, ALEI hosted a sold-out Agriculture and Environmental Conference for regulators, attorneys, agriculture professionals, and farmers to shine a spotlight on the complex network of environmental regulations that Maryland farmers face and to put forth policy solutions.

An Eastern Shore-based legal specialist and research associate was hired in 2014. Her substantial professional history working with the region’s farmers benefits ALEI’s outreach and advocacy efforts.

*The Carey School of Law is teaming up with the School of Social Work to tackle longstanding issues of social justice in our homes, our communities, our schools, and our prisons. By combining social work and legal expertise, the schools aim to dramatically improve the delivery of services to those suffering injustice and to effectuate groundbreaking policy reforms at the state and national levels.*

## FY 2017 GOVERNOR'S ALLOWANCE AND WHAT IT SUPPORTS

The FY 2017 governor's allowance for UMB includes \$221.1 million in general funds and higher education investment funds—an increase of \$5.7 million over our FY 2016 appropriation. The allowance also includes tuition and fee income of about \$126.4 million—an increase of \$2.4 million over last year.

This allowance will fund increases in merit pay, fringe benefits, bond debt service, some facilities renewal, University System of Maryland (USM) mandatory cost allocations, and financial aid. In order to fund all of the allowance, we will need to find efficiency and effectiveness savings or delay the investment in funding the balance of the requested facilities renewal and HSFIII equipment with a useful life of less than 15 years.

UMB confronts significant challenges in continuing to fund ongoing programs and program development with existing resources. Providing access and critical support to students, and growing our research in the face of shrinking federal funding and expanding federal regulation, will prove difficult. The University remains committed to efficiency and cost-savings efforts, but these opportunities are increasingly rare.

We look forward to working with Gov. Hogan and the General Assembly to ensure that we can continue to produce a talented workforce, win new research funding, translate our discoveries into innovations that cure disease and strengthen communities, and provide the momentum to sustain a robust economic recovery.

## LEGISLATIVE AUDITS AND INTERNAL CONTROLS

UMB is, as always, committed to ensuring that the state dollars we're appropriated are adequately controlled. The report from our last legislative audit was issued in April 2013, and the legislative auditors recently completed their fieldwork for the most recent audit.

We appreciate the input of the auditors on areas where we can continue to improve, and we have made the suggested changes. We continue to monitor our internal control environment and areas of significant external risk, most notably IT system security. To our knowledge, UMB does not have any repeat findings.

## SUMMARY AND CONCLUSION

We at UMB appreciate the very difficult balancing act this subcommittee must perform in funding health care, public safety, juvenile justice, elementary and secondary education, and higher education—all of which, of course, are critically important.

We understand that state funding is essential to UMB's success, and we're grateful for your continued support. On behalf of UMB, I respectfully ask the subcommittee to approve USM's allowance as proposed by Gov. Hogan.

At a time when our state and our nation grow ever more dependent on the health, law, and human services workforce we educate; on the innovation economy we nurture; and on the research, care, and service we provide, we, in turn, rely on your support of our budget.

## UMB RESPONSE TO DLS QUESTIONS AND COMMENTS

### ***The President should comment on factors that may have led to the decline in doctorates awarded in health.***

Exhibit 3 on page 9 of the DLS analysis indicates that, in 2013, UMB awarded 29 research doctoral degrees in Health, but only 14 in 2014. This data is from the Survey of Earned Doctorates (SED), administered by the National Science Foundation. The PhD programs primarily considered “Health” programs are Nursing, Pharmaceutical Health Services Research, and Pharmaceutical Sciences.

The decrease in Health graduates is largely attributable to our Nursing PhD program, where there were 14 graduates in 2013 but only five in 2014. (Not yet reflected in the SED data is the fact that UMB had 10 students graduate from the Nursing PhD program in 2015.)

The high number of Nursing PhDs conferred in 2013 was attributable to our success in graduating “lingering” students taking less-than-full course loads due to insufficient financial resources. UMB provided additional institutional support to allow these students to finish the program in 2013.

It is reasonable to expect annual variation in the number of graduates in highly specialized advanced degree programs that enroll a small number of students. UMB experienced a similar decline in Health graduates in 2010. That year, a 13-degree deficit in Health was offset by a 13-degree increase in the SED category “Biological and Sciences.”

### ***The President should comment on the decline in enrollment, especially in the Law School, and what efforts are being taken to stabilize and improve enrollment.***

UMB’s actual full-time equivalent student (FTES) enrollment in 2016 is 6,419, compared to a working budget of 6,300. This represents a decrease of 89 FTES since 2012. The School of Law experienced a loss of 310 FTES during this timeframe, while the net growth in UMB’s other schools was 221.

The challenging situation facing law schools, including ours at UMB, illustrates the urgency of tuition affordability and the need for scholarship assistance. The significant decline in the job market for law school graduates has led potential students to evaluate the cost of their education against what they can reasonably expect to earn following graduation. That analysis has, in turn, persuaded many not to apply.

UMB has felt these sharp declines in applications to the law school, as have universities across the country. To maintain the high academic quality of its student body, the Carey School of Law has decreased enrollment and increased scholarship assistance—the same actions taken by its peers nationwide.

UMB is several years into a plan to rebalance and revitalize this important school, and we’re funding this transformation with existing resources. Additionally, through our innovative MPower programs, we’re expanding undergraduates’ exposure to legal education and meeting marketplace demand for specialized legal training.

### ***The President should comment on what can be done to bring down the debt for graduate and professional students and on whether other states are attracting students because of their loan forgiveness programs.***

Western and Midwestern states do commit state dollars to loan repayment programs, thus allowing graduates to pursue primary care fields, remain in the state in which they’re trained, and contribute to the state’s economy. UMB’s students certainly become aware of these incentives during their residency interviews.

UMB students have generally not applied for the Janet L. Hoffman Loan Assistance Repayment program because the award is considered taxable income. In its budget, the state of Maryland should commit loan assistance repayment funds that are not taxable income.

In terms of the Maryland Loan Assistance Repayment Program (MLARP), we believe priority in awards should be given to graduates of UMB's professional programs to encourage the practitioners we educate to remain in the state.

Through the program, graduates may apply for and receive up to \$50,000 in loan repayment. A medical school graduate, with a debt burden of \$158,374, would be able to complete a primary care residency in three years and receive a license to practice. At that time, the physician would apply to the MLARP and receive \$50,000 in loan repayment funds. The remaining loan debt of \$108,374 would allow the practitioner to remain in primary care medicine and afford the monthly loan payments.