

PHARMAPRENEURSHIP™

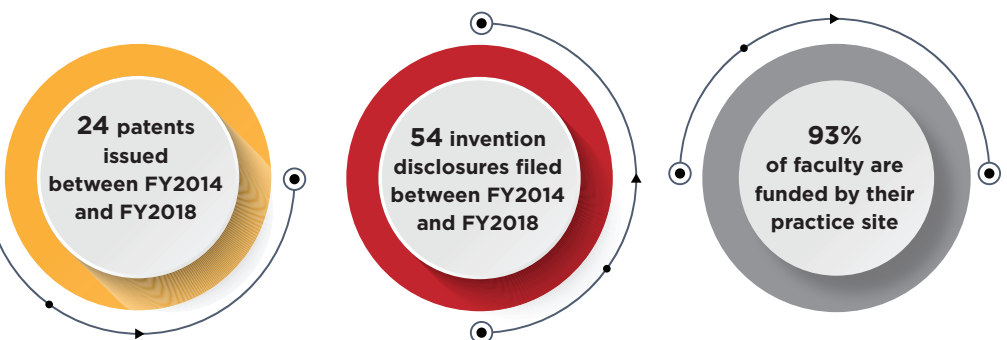
“When we use the term *pharmapreneurship*, we're talking about innovation and how innovative activities within the School can address some of the big issues impacting public health, research, and education.”

- DEAN NATALIE D. EDDINGTON,
PHD, FAAPS, FCP



PHARMAPRENEURSHIP™ PATHWAY

Designed for a select group of qualified and motivated PharmD students, the School's new Pharmapreneurship Pathway offers students the opportunity to pursue special interests in innovation, entrepreneurship, and creativity with a high degree of individual attention and coaching by faculty and external advisors. A priority of the pathway is to develop new research study designs, drug discovery, modern analytic methods, and business and innovative methods in the broad areas of basic pharmaceutical sciences, clinical/translational research, pharmaceutical health services research, and outcomes research, as well as to create innovative clinical patient care programs and business solutions in health care. Students in the Pharmapreneurship Pathway will conduct original projects with faculty or advisors/mentors and receive individualized counseling about courses, internships, and potential career options.



MILLION-DOLLAR INVESTMENTS IN PHARMAPRENEURSHIP:

\$1 MILLION
Felix A. Khin-Maung-Gyi, PharmD '83, MBA Memorial Scholarship Endowment in Pharmapreneurship

\$1 MILLION
Fully endowed Professorship in Pharmapreneurship

\$1 MILLION
Establishment of the endowed Center for Women in Pharmapreneurism

ENTERING THE RACE TO BRING BIOPHARMACEUTICALS TO MARKET

In 2016, the School of Pharmacy joined the National Institute for Innovation in Manufacturing Biopharmaceuticals (NIIMBL) in its mission to bring safe drugs to market faster and develop workforce training. As demand for medications using living cells increases, the School is able to help the pharmaceutical industry address current biopharmaceutical manufacturing challenges, propose its own innovative ideas, and develop new methodologies.

In 2018, a School faculty member was among the first to receive a NIIMBL grant of \$600,000.

ENCOURAGING PHARMAPRENEURSHIP, SHARK TANK-STYLE

To celebrate its commitment to pharmapreneurship, the School hosted a *Shark Tank*-style competition in the summer of 2017. Faculty teams from the School's three departments proposed innovative ways to address the nation's health care, research, policy, and societal needs. Each of the three winning teams received a \$50,000 investment to propel its idea from concept to reality:

- Pharmaceutical Health Services Research's proposal would link the Medicare and Medicaid databases and use data related to people with disabilities to ultimately establish a multidisciplinary, patient-centered research collaborative that identifies and overcomes disparities in their care.
- Pharmacy Practice and Science proposed an app — Microbe Master — for students to study antimicrobial activity and antimicrobial stewardship.
- Pharmaceutical Sciences proposed the creation of a Metallotherapeutics Research Center to advance therapeutics in that field.



MAJOR FACULTY AND STAFF APPOINTMENTS AND AWARDS

- AcademyHealth**
Board of Directors

American Academy of Clinical Toxicology
Fellows

American Academy of Hospice and Palliative Medicine
Visionary in Hospice and Palliative Medicine

American Association of Colleges of Pharmacy
Academic Leadership Fellow
Administration and Finance Special Interest Group - Chair
Administrative Services Section - Chair and Secretary
Chemistry Section - Chair
Council of Faculties - Chair
Global Pharmacy Education Special Interest Group - Chair
Laboratory Special Interest Group - Secretary
Master Preceptor Award
New Investigator Awards
Public Health Section - Chair
Walmart Scholars Mentor/Mentee Award

American Association of Pharmaceutical Scientists
Fellow

American Association of Poison Control Centers
Board of Directors

American College of Clinical Pharmacy
Cardiology Practice and Research Network's Junior Investigator Award
Critical Care Practice and Research Network's Clinical Practice Awards
HIV Practice and Research Network - Secretary/Treasurer
Infectious Diseases Practice and Research Network's Clinical Practice Award
New Educator Award
Pain and Palliative Care Practice and Research Network - Chair

American Foundation for Pharmaceutical Education
Board of Grants - Vice Chair

American Geriatrics Society
Dennis W. Jahnigen Memorial Award

American Pharmacists Association
Board of Trustees
Political Action Committee Board of Governors
House of Delegates - Speaker and Member
Immunization Champions Awards - Honorable Mention

American Pharmacists Association-Academy of Student Pharmacists
Advisor of the Year

American Pharmacists Association Foundation
Jacob W. Miller Award
Pinnacle Award for Career Achievement
Ton Hoek Scholarship

American Society for Clinical Pharmacology and Therapeutics
Sheiner-Beal Pharmacometrics Award

American Society for Pharmacy Law
Larry M. Simonsmeier Writing Award

American Society of Consultant Pharmacists
Archambault Award
Armon Neel Senior Care Pharmacist of the Year
Fellow
President's Award

Association of Asthma Educators
Board of Directors
President-elect

Association of Graduate Regulatory Educators
Board of Directors

Biophysical Society
Junior Faculty Award

Board of Pharmacy Specialties' Council on Psychiatric Pharmacy
Member

Clarivate Analytics
World Class Researcher Award

College of Psychiatric and Neurologic Pharmacists
President

Drug Development Research
Associate Editor

Environmental Protection Agency
National Toxicity Challenge Finalist

Ethnicity & Disease
Associate Editor
- Food and Drug Administration**
Advisory Committee Member
Anesthetic and Analgesic Drug Products Advisory Committee
Big Data for Patients Steering Committee Member
Office of Clinical Pharmacology Distinguished Alumnus Award

Food and Drug Law Institute
Board of Directors

Health & Place
Outstanding Reviewer

Health Resources and Services Administration
Advisory Committee on Interdisciplinary, Community-Based Linkages

International Journal of Multiple Research Approaches
Editor

International Society for Pharmacoeconomics and Outcomes Research
Distinguished Service Award
Marilyn Dix Smith Leadership Award

International Society for Pharmacoepidemiology
Fellow

International Society of Pharmacometrics
Fellow

Johns Hopkins University
Distinguished Alumna Award

Journal of the American Pharmacists Association
Outstanding Reviewer
Editor

Maryland Board of Pharmacy
Governor's Citation
Maryland Reserve Corps Best Practice Award

Maryland Higher Education Commission
Member

Maryland Pharmacists Association
Board of Trustees
Bowl of Hygieia
Cardinal Health Generation Rx Champions Award
Excellence in Innovation Award
Mentor Award
President

Maryland Society of Health-Systems Pharmacy
Board of Directors
Excellence Award
Jeffrey Ensor Leadership Awards
Medication Safety Award
Preceptor of the Year
W. Arthur Purdum Award

MD Anderson Cancer Center
Debra Sivesind Career Award for Outstanding Contributions to Palliative Care

National Academies of Practice
Creativity in Practice and Education Award
Distinguished Practitioner
Fellow

Pharmacy Academy - Chair

National Institute for Minority Health and Disparities
Scholar

North American Congress of Clinical Toxicology
Service Award

Oklahoma University College of Pharmacy
Distinguished Alumni Award

Pharmacoeconomics - Open
Editor

Pharmacotherapy
Editor
Outstanding Reviewer Recognition

Pharmacy Leadership and Education Institute and Phi Lambda Sigma Pharmacy Leadership Society
Albert B. Prescott Pharmacy Leadership Award

Phi Lambda Sigma
Proctor and Gamble National Leadership Award

Preventing Chronic Disease: Public Health Research, Practice, and Policy
Editor

Professional Fraternity Association
Volunteer of the Year



- Public Relations Society of America-Maryland Chapter**
Award of Excellence
Best in Maryland Award

Purdue University College of Pharmacy
Distinguished Alumnus Award

Society of Critical Care Medicine
Presidential Citations

Society of Infectious Diseases Pharmacists
Board Member

Society of Palliative Care Pharmacists
Board of Trustees

St. Agnes Healthcare
Board of Directors

United States Pharmacopeia
Expert Committee on Health Care Quality - Member
Expert Panel on Allergies and Intolerances - Chair

University System of Maryland
Board of Regents Award for Excellence in Teaching

Zeta Phi Beta
Woman of the Year in Health Services

STUDENT HONORS AND ACHIEVEMENTS

- Academy of Managed Care Pharmacy Chapter of the Year Award
- American Association of Colleges of Pharmacy Walmart Scholars
- American Association of Pharmaceutical Scientists Student Chapter of the Year - Honorable Mention
- American Chemical Society Chemical Computing Group's Excellence Award for Graduate Students
- American College of Clinical Pharmacy Clinical Research Challenge - Finalist
- American Foundation for Pharmaceutical Education Gateway Research Scholarship and Fellowships
- American Pharmacists Association-Academy of Student Pharmacists (APHA-ASP) Student Leadership Award
- APHA-ASP Region 2 Operation Diabetes and Operation Immunization Awards
- APHA Mary Louise Andersen Scholarship and Juan Esperanza Luna Scholarship
- American Society of Clinical Psychopharmacology New Investigator Awards
- American Society of Consultant Pharmacists Student Pharmacist of the Year Award
- EPIC Pharmacies Student Grant
- Express Scripts Scholarship
- Food and Drug Administration ORISE Fellowship
- International Society for Pharmacoeconomics and Outcomes Research Chapter of the Year Award
- JAMA Pediatrics Trainee Paper of the Year
- Kappa Psi Top-Performing Chapter
- Maryland Pharmacists Association Foundation Student Scholarship
- Maryland Public Health Association's Board of Directors
- National Academy of Medicine's D.C. Public Health Case Challenge Winner
- National Community Pharmacists Association Good Neighbor Pharmacy Puritt-Schutte Student Business Plan Competition - Finalist
- National Institutes of Health Predoctoral Fellowship
- National Institutes of Health National Research Service Award
- Pharmaceutical Research and Manufacturers of America Fellowships
- Pharmacy Quality Alliance-CVS Health Foundation Scholarships
- Phi Lambda Sigma Charles Thomas Leadership Challenge Award
- Society for Medical Decision Making Lee B. Lusted Student Prize
- Student Society of Health-System Pharmacists Outstanding Professional Development Project Award
- United States Pharmacopeia Greg Amidon Fellowship
- University of Maryland, Baltimore County Meyerhoff Fellowship



MARYLAND EXCELLING

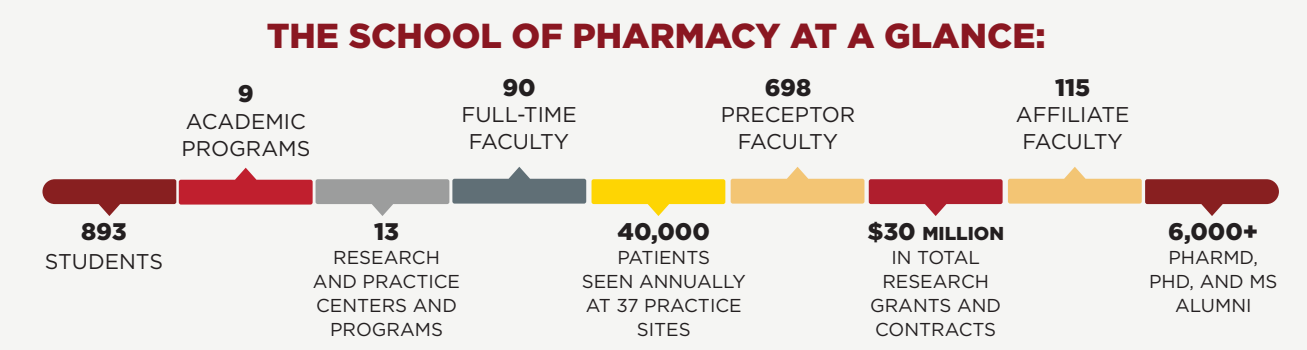
The University of Maryland School of Pharmacy's Continued Expertise, Influence, and Impact



The University of Maryland School of Pharmacy is the fourth-oldest school of pharmacy in the country. Since its founding in 1841, the School has been recognized as a place of innovation. The School has a highly progressive history, from graduating its first female pharmacist in 1898 to supporting the entrepreneurial efforts of its graduates, including the founders of **Noxzema** and **Sharp & Dohme (now Merck)** and a **MacArthur Foundation Genius Award winner**. Today, the School is building on its past and proactively looking for opportunities to transform pharmacy education, research, and practice in order to best prepare current and future pharmacy professionals to meet the needs of our ever-changing health care environment.

Moving forward, the School is emphasizing the concept of **Pharmapreneurship™**, which the School believes in so strongly that we trademarked the term in 2018. The idea that education, practice, research, and community service can and must intersect with innovation informs all the activities at the School. This can be seen in the many new developments underway, including the design and upcoming construction of the “Pharmapreneurs’ Farm”—a hub for brainstorming, idea fermentation, and exploration — in the Ellen H. Yankellow Grand Atrium of Pharmacy Hall, and the expanding number of pharmapreneurial master’s degrees.

We invite you to see how
MARYLAND IS EXCELLING



EDUCATION

The School is expanding its master's degree offerings, with a particular emphasis on pharmapreneurial programs to meet workforce needs for innovative education and skills training. Many of the programs are offered online as a means of meeting the "anytime, anywhere" learning needs and lifestyles of busy professional students:



- ▶ MS in Medical Affairs*
- ▶ MS and Graduate Certificates in Palliative Care
- ▶ MS in Pharmaceutical Health Services Research
- ▶ MS in Pharmacometrics
- ▶ MS in Pharmaceutical Sciences
- ▶ MS and Graduate Certificate in Regulatory Science

*Proposed for fall 2020

- ▶ MS in Medical Cannabis Science and Therapeutics

MS in Medical Cannabis Science and Therapeutics is launching in fall 2019. The two-year program is the first of its kind in the U.S. to provide students with the knowledge needed to support patients and the medical cannabis industry, add to existing research, and develop well-informed medical cannabis policy.



DUAL-DEGREE OFFERINGS:

- ▶ PharmD/MBA with University of Maryland, College Park
- ▶ PharmD/MBA with University of Baltimore
- ▶ PharmD/JD with UMB Carey School of Law
- ▶ PharmD/MPH with UMB School of Medicine
- ▶ PharmD/MS (Palliative Care, Pharmacometrics, Regulatory Science)
- ▶ PharmD/PhD (PHSR, PSC)
- ▶ PhD/MS (PHSR)

- ▶ Doctor of Pharmacy
- ▶ PhD in Pharmaceutical Health Services Research
- ▶ PhD in Pharmaceutical Sciences

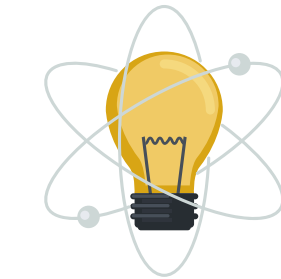


INTERPROFESSIONAL EDUCATION & PRACTICE

As part of the University of Maryland, Baltimore (UMB), the School of Pharmacy has unique opportunities to train students in interprofessional practice, working with our partners at the schools of dentistry, law, medicine, nursing, and social work. UMB established a Center for Interprofessional Education (IPE), co-directed by a School faculty member, that offers seed grants to interprofessional faculty teams working on projects to enhance interprofessional education initiatives on campus and at the individual schools.

- ▶ Campuswide IPE activities incorporated into the PharmD program's required Abilities Labs and IPPEs
- ▶ SOP faculty received a total of 10 IPE seed grants and 13 IPE faculty development grants
- ▶ Ten inter-professional faculty clinics addressing population health were developed
- ▶ Received more than \$2 million in contracts for IPE services

RESEARCH



"As we promote research activities within the School, across campus, and with other institutions, the goal is to focus on alternative methods to expand our research enterprise by promoting pharmapreneurship, forming consortiums with academia, industry, and government agencies, and by establishing global educational cooperative centers such that we can enrich the School's research programs."

- PETER SWAAN, PHD
Associate dean for research and graduate education

FUNDED FACULTY

2012 21*	2015 24*	2017 39*
\$5,525,143	\$8,593,514	\$10,971,105
<small>in total funding</small>	<small>in total funding</small>	<small>in total funding</small>

*Includes principal investigators (PIs) and co-investigators/co-PIs receiving subcontracts

GRANTS AND CONTRACTS FUNDING

Department	2012-13	2017-18
Pharmaceutical Health Services Research	\$3,008,527	\$6,399,536
Pharmacy Practice and Science	\$11,594,141	\$15,059,210
Pharmaceutical Sciences	\$5,695,979	\$6,424,271
School total	\$20,298,647	\$27,883,017

TOTAL GRANTS & CONTRACTS FUNDING FOR FISCAL YEAR 2019 IS ANTICIPATED TO SURPASS \$30 MILLION.



M-CERSI

In 2018, the University of Maryland Center for Excellence in Regulatory Science and Innovation (M-CERSI) renewed its funding under its cooperative agreement with the Food and Drug Administration (FDA). The \$5 million per year over five years allows M-CERSI to advance its mission to promote the development of new tools, standards, and approaches to assess the safety, efficacy, quality, and performance of FDA-regulated products.

Fast Facts about M-CERSI, a School of Pharmacy partnership with the University of Maryland, College Park:

- ▶ One of only four FDA-funded CERSIs in the U.S.
- ▶ The only CERSI to receive continuous funding from the FDA since it launched in 2011
- ▶ Sponsor of more than 40 conferences and workshops
- ▶ In 2018, obtained a three-year, \$2.2 million grant from the FDA to investigate bulk drug substances for compounding
- ▶ Launchpad for the sought-after MS in Regulatory Science degree



PENICILLIN STUDY

The percentage of patients who believed they were allergic to penicillin who were not according to a study led by researchers in the Department of Pharmacy Practice and Science.

The results of this study were achieved using a straightforward skin test. The outcome is that those who previously thought they were allergic can now receive more optimal antibiotic care and without the need to visit an allergist.

LINKING ANTIDEPRESSANT USE WITH TYPE II DIABETES



A joint study between the School's Department of Pharmaceutical Health Services Research and the University of Maryland Medical System found that prolonged use of serotonin reuptake inhibitors in young people made them TWO-THIRDS MORE LIKELY to develop Type II diabetes. The study can help inform decisions of favorable risk-balance for patients.

PRACTICE



The e-Health Center, as part of an interdisciplinary transitions of care team, has seen a 66% decrease in visits within 30 days post-hospital discharge, leading to \$530,882 in savings.

A cohort of diabetic patients managed by the e-Health Center's pharmacists showed an average 1-point reduction in A1c with the percentage of patients at goal of <7 increasing from 46% to 69%.

THE PETER LAMY CENTER ON DRUG THERAPY AND AGING

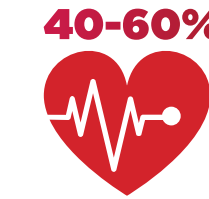
The Lamy Center is a first-of-its-kind center dedicated to improving drug therapy for older adults, producing new scientific knowledge with practical applications for improving the outcomes of pharmaceutical care for older adults, and providing information on best practices in geriatric pharmacotherapy. It is also the School's first cross-departmental center, with leadership from both Pharmaceutical Health Services Research and Pharmacy Practice and Science.

Fast Facts on the Lamy Center from 2018:

\$1,438,426 total research grant funding	34 peer-reviewed papers published	29 seminars supported	35 community events supported
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GENES AND STROKE RISK



40-60% Percentage of people who inherit the risk of a large artery stroke. Researchers from the Department of Pharmaceutical Sciences collaborated on a multinational study that found a single gene variant is linked to the risk of these deadly strokes.

"As a leader in pharmacy practice, the University of Maryland School of Pharmacy improves the health of people through innovation, collaboration, and advocacy. Innovative programs developed at the School have taken root and grown throughout the state because they work. These programs support and empower patients while improving clinical outcomes, decreasing costs, and enhancing continuity of care in the health systems in which we operate."

- MAGALY RODRIGUEZ DEBITTNER, PHARM D
Associate dean for clinical services and practice transformation

CENTER FOR INNOVATIVE PHARMACY SOLUTIONS

Through the School's new e-Health Center, our clinical pharmacists leverage technology to expand their practice to reach those in need via:

TECHNOLOGY:

Medication management services are delivered from a remote location through HIPAA-compliant video platforms.

INTERPROFESSIONAL/MULTIDISCIPLINARY CARE:

E-Health pharmacists work with other health care providers and disciplines such as physicians, nurses, paramedics, social workers, and life coaches to ensure an effective care plan and better patient outcome.

TRAINING AND EDUCATION:

Pharmacy residents, students, and fellows are trained in clinical care, administration, and use of technology to provide health care services.

RESEARCH AND INFORMATION DISSEMINATION:

The e-Health Center studies the economic and clinical impact of these innovative health care delivery models as compared to normal/standards of care or as a solution to patient populations that otherwise would not have easy access to care, with dissemination to the health care community.

\$200,000

Contract from the Maryland Department of Health to promote appropriate antimicrobial use in long-term care and nursing facilities across the state of Maryland by establishing a training program on antimicrobial stewardship and infection control



COMMUNITY



"The community pharmacist has always been one of the most accessible health care providers, and the University of Maryland School of Pharmacy excels in preparing future pharmacists for that role. We also embrace community engagement in our research and services activities. Patients' voices and concerns drive how we care for patients and improve the health of patients and communities."

- C. DANIEL MULLINS, PHD
Professor and Chair, Department of Pharmaceutical Health Services Research

STUDENTS IN THE COMMUNITY

The School's students participate in events and outreach within the School and collaboratively across campus providing:

- ▶ 1,200 hours annually of tutoring as part of the campuswide student group, A Bridge to Academic Excellence
- ▶ 150 events, 67 direct patient care interactions, and 14 immunization clinics via the American Pharmacists Association-Academy of Student Pharmacists group (APhA-ASP)

TOTAL APhA-ASP efforts from 2017 equated to:

- ▶ 6,800 patient interactions
- ▶ 645 immunizations



RECORD-BREAKING SUPPORT FOR ONLINE GIVING DAY

\$30,000: Funds raised during the School's first Online Giving Day in 2017, held on Facebook, Twitter, and Instagram

\$30,000
Funds raised on Giving Day 2018

\$70,000+
Funds raised on Giving Day 2019

CHARM OF A MILLION HEARTS

Student groups provide volunteer assistance to many community entities, including the city's Ronald McDonald House, Hope Lodge (another location for patient families), and various elementary/middle/high schools. Charm of a Million Hearts is the Student Government Association's largest event. In 2018, the event drew together 40 School and community organizations from around the Baltimore area to provide free health screenings, harm reduction with naloxone, health information, vaccinations, and public resources to more than 400 community members.



PATIENTS PROGRAM

The School's Patient-Centered Involvement in Evaluating the Effectiveness of Treatment (PATIENTS) program, initially funded by a \$5 million grant from the Agency for Healthcare Research and Quality, engages people from local communities to answer questions about the best treatment options to improve health and quality of life.

During the program's first five years, it supported approximately 116 new proposals, 40 of which were funded and generated approximately \$40 million in new grants and contracts — that's an 800 percent return on investment in just five years.

Each year the program sponsors PATIENTS Day, an interactive health fair and education day.

200: The number of community members, health care providers, and researchers who participated in the 2018 PATIENTS Day



\$250,000: Grant amount from Merck to establish a new Learning Health Care Community in Baltimore to promote collaboration between patients and their health care providers and improve health equity