Training the MD Scientist

A new initiative to support physician-scientists is advancing Ohio State's success in training the biomedical researchers of tomorrow.

By Kelli Trinoskey

Strong mentorship and leading-edge research.

That's what drew **Aliyah Bennett MD/PhD candidate 2027** to The Ohio State University College of Medicine's Medical Scientist in Training Program (MSTP). Bennett's research aims to fight chronic infections by addressing bacterial biofilms, barriers that prevent the immune system and antibiotics from ridding the body of the biofilms' infectious spread.

"I get a lot of one-on-one time with faculty, and they follow me over time," she says. "My principal investigator, Dr. John Gunn, is my most involved mentor."

Bennett and her MSTP peers also credit the program's resources such as counseling, academic support and participation in student groups for contributing to their success.

The program's culture is intimate, yet connected within the larger academic community, Bennett says, making it easy for her to interact with a wide variety of learners and researchers from a variety of disciplines.

It's that focus — early and more holistic support for trainees throughout the multi-year program — plus the increased need for physician-scientists, that led the Ohio State College of Medicine to launch the Physician-Scientist Initiative in 2021.

The initiative's goal: to make certain that more trainees like Bennett can enter the physician-scientist career path sooner — including as early as the undergraduate year and into medical school, residency and fellowship — and receive ongoing support and mentorship. The initiative also aims to ensure that trainees acquire the skillsets necessary to pursue independent research funding and transition into an independent physician-scientist faculty position.

Strengthening a legacy

The Physician-Scientist Initiative builds on the Ohio State College of Medicine's existing and longstanding structured physician-scientists training programs in its medical school, residencies and fellowships, all of which support trainees' dual pursuits of excellence in patient care while also developing disease prevention and novel treatment strategies, says Ginny Bumgardner, MD, PhD, co-director of the Medical Scientist Training Program and director of the Department of Surgery's Research Training Program. Bumgardner was appointed in 2021 by Ohio State College of Medicine Dean Carol R. Bradford, MD, MS, FACS, to serve as the inaugural associate dean for Physician-Scientist Education and Training.

A surgeon-scientist and professor of Surgery at the Ohio State College of Medicine, Bumgardner previously served as director of the Medical Student Research Program (MSRP) and Master of Medical Science Program for 15 years.

"The initiative's framework will also leverage the experience and success of existing highly structured programs to create a multidisciplinary community of physician and surgeon scientist trainees," she says.

One of these programs, the Physician-Scientist Training Program (PSTP), within the Department of Internal Medicine, was established in 2013 as a combined internal medicine residency and fellowship program, so that residents could be mentored and trained by a team of experienced physicians/physician-scientists. This unique program provides opportunities to work collaboratively with clinicians

*Personalized support is what drew **Aliyah Bennett, MD/PhD candidate 2027**, to Ohio State College of Medicine's Medical Scientist in Training Program.*

and basic scientists as well as on breakthrough discoveries using leading-edge technologies such as next-generation gene sequencing, precision medicine and the use of analytic tools to manage big data.

In the Department of Surgery, the Professional Development and Research Training Program provides the infrastructure for a Surgeon Scientist Training Program and has, since 2002, provided general surgery residents with administrative and financial support, protected research time and advanced degree opportunities as a way to enrich their professional development and facilitate productive surgeon-scientist careers.

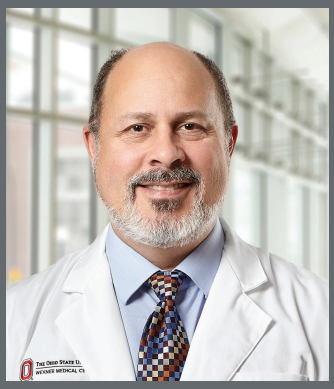
Leadership support, early training

While the need for novel treatments has grown, the number of physician-scientists and surgeon-scientists in the United States has declined, Bumgardner says.

"The career path has less visibility, fewer role models and mentors and significant challenges, such as academic and financial disincentives, that can thwart success," she says. Often, physician-scientists are lured away by private institutions or drop out due to work-life balance challenges, she adds.

The new initiative aims to change that, says **Robert Baiocchi '99 MD, '05 PhD**, professor of Internal Medicine and associate program director for Research in the Department of Internal Medicine's residency program.

"Our recent efforts to broaden the number of 'on ramps' for physicians who are interested in integrating research into their clinical training is novel," he says. "This college-wide initiative unites efforts under one umbrella and promotes a strong physician-scientist culture, while addressing the important need to bolster the physician-scientist workforce.



"This college-wide initiative unites efforts under one umbrella and promotes a strong physician-scientist culture, while addressing the important need to bolster the physician-scientist workforce."

ROBERT BAIOCCHI '99 MD, '05 PHD

Having served as the PSTP director since the program's inception in 2013, Baiocchi was recruited by Bumgardner to a faculty director position in the new Office of Physician-Scientist Education and Training, which she leads. He will create a new postdoctoral Physician-Scientist Development Program to support research training for residents and fellows across multiple disciplines and specialties.

The Physician-Scientist Initiative includes other leadership support, Bumgardner notes. Benjamin Kaffenberger, MD, MS, associate professor in the Division of Dermatology, will lead the Medical Student Research Program, and Michael Root, PhD, clinical professor in the Department of Microbial Infection and Immunity, will lead the Master of Medical Science Program.

The initiative also includes the creation of a new Dean's Physician Scientist Scholars Program housed within the Office of Physician-Scientist Education and Training. This program will support early career faculty transition to research independence. The office promotes collaboration and builds supportive environments within the scientific community.

The office reflects the Ohio State College of Medicine's continued commitment to early research training through two key programs: its Biomedical Science undergraduate major and the ASPIRE Medical Research Program.

The college is one of only a handful of medical schools nationwide to offer an undergraduate major in Biomedical Science, a program that includes access to intense faculty-mentored medical research.

"Students receive mentored research training in world-class laboratories, and personal and academic support," Bumgardner says. "Most importantly, such programs also introduce a group of highly talented and diverse students to the beginning of the physician-scientist training pipeline."

Doris Duke grant helps early-career MD scientists

The Ohio State University College of Medicine recently received $500,000 in grant funding from the Doris Duke Charitable Foundation — in concert with the American Heart Association, the Burroughs Wellcome Fund, the John Templeton Foundation, the Rita Allen Foundation and the Walder Foundation — to specifically support physician-scientists whose research and careers have been impacted by the COVID-19 pandemic.

Ginny Bumgardner, MD, PhD, professor of Surgery and associate dean for Physician-Scientist Education and Training at the Ohio State College of Medicine, and **Rebecca Jackson '78 MD**, professor of Internal Medicine, director of the Ohio State Center for Clinical and Translational Sciences and Max Morehouse Chair in Cancer Research, are the principal investigators of the grant.

Here's what the grant means to the four early-career faculty members who received this funding support. Read more at **medicine.osu.edu/education/dual-degree/mstp**.

Four awardees, four transformative areas of research

Beatriz Hanaoka, MD, *assistant professor in the Division of Rheumatology in the Department of Internal Medicine*

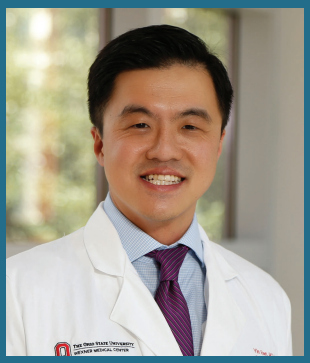
Research: Impact of diet, insulin resistance and obesity on physical function and disease activity in patients with rheumatoid arthritis.

"This grant will allow me to obtain additional biostatistics, science writing and editing support that will help accelerate my progress and to compete for extramural funding support."

Kerry-Ann Mitchell, MD, PhD, *assistant professor in the Department of Plastic and Reconstructive Surgery, surgeon-scientist*

Research: Evaluating methods to improve outcomes in neurosurgery patients undergoing cranial procedure.

"This grant demonstrates my ability to compete for research funding and it shows institutional commitment to protecting my time for research and advancing discovery."



Yin Ren, MD, PhD, *assistant professor in the Department of Otolaryngology Head and Neck Surgery, surgeon-scientist*

Research: New biomarkers and therapies for skull base tumors; gene therapy approaches for treating sensorineural hearing loss.

"This grant will provide much-needed resources to help my research and achieve my professional and research goals as a surgeon-scientist."

MuChun (Joanna) Tsai '12 MD, '15 Res, '19 Fellow, *assistant professor in the Division of Pulmonary, Critical Care and Sleep Medicine in the Department of Internal Medicine*

Research: Role of enzymes in influenza infection and the impact on host innate immune responses.

"Having more flexibility in my academic schedule in general will greatly help my research productivity and overall career progression as a female physician-scientist."

The ASPIRE Medical Research Program supports undergraduate students who have been historically underrepresented and historically excluded from the health sciences. The program aligns with the National Institutes of Health's (NIH) priority to diversify the scientific workforce.

The majority of the college's medical students pursue research at some point during their medical school career and many continue their research over multiple years, Bumgardner says. Some take a year off to pursue full-time research and those in the MSTP pursue in-depth research training that culminates in dual MD and PhD degrees. Residents and fellows have the opportunity to earn advanced degrees, such as the MS in Medical Science or even a PhD in Biomedical Sciences during their research training.

Tracking student success, progression

The initiative's new framework also includes detailed tracking of student progression through the use of an Individual Development Plan (IDP).

"The IDP is refined as the trainee progresses in the program and defines, aligns and celebrates learners' academic, research and professional competencies and key milestones," Bumgardner says. "In this way, we can track individual and cohort training outcomes for purposes of program evaluation and continuous improvement."

New initiatives under development include a Research in Residency program, where categorical residents in medical and surgical residency training programs can engage in concentrated years of research, with the intent to transition to a path of a medical physician-scientist or surgeon-scientist. In addition, there are multiple advanced degree programs available to residents in medical and surgical disciplines, including the Master of Medical Science and the Master of Public Health.

Residents and fellows also can receive specialized training and funding support through competitive application to the NIH T32 Advanced Research Training in Immunology for Surgical Trainees program or Ohio State's Center for Clinical and Translational Science NIH TL1 training program, both directed by Bumgardner. She and Baiocchi will lead efforts to apply this model across the many diverse departments.

Next-level mentorship and support

All these efforts are paying off for the next generation of top biomedical researchers, Bumgardner says.

Lapo Alinari, MD, '13 Res, '16 Fellow, PhD, for one, realizes the opportunities at Ohio State.

An assistant professor of Internal Medicine in the Division of Hematology at the Ohio State College of Medicine, Alinari is a member of the Leukemia Research Program at the Ohio State Wexner Medical Center, where his lab focuses primarily on understanding new treatments for aggressive lymphomas.

Alinari first came to Columbus from Italy in 2006 as a visiting scholar for a laboratory-based project that focused on discovering novel therapeutic targets in lymphoma. He says he fell in love with the people and the projects.

Alinari soon realized that the ability to translate his preclinical research into novel therapies had the potential to offer patients superior care over standard treatments, so he applied to Ohio State and was accepted as the first trainee in the Department of Internal Medicine's PSTP in 2013. He completed two years of internal medicine and four years of training as a hematology clinical and research fellow before transitioning to an independent, fully-funded, laboratory-based, faculty position with clinical responsibilities.

"Ultimately, I chose Ohio State over other top PSTP programs across the country because of the superb mentorship, excellent clinical training, flexibility of the program and highly collaborative scientific atmosphere," Alinari says. "Everyone did an amazing job supporting me during the delicate transition from fellowship to a faculty position."

Alinari's experience is just one example of the trainee journey at Ohio State, Bumgardner says.

"We're really proud of the work we're doing to ensure we remain a world leader in biomedical research," she says. "We're committed to addressing and developing solutions to ensure a diverse field of trainees have the funding and support at all stages of their physician-scientist careers."

Kelli Trinoskey is senior content specialist in Marketing and Communications at The Ohio State University College of Medicine.

Emily Geyer receives prestigious national emergency medicine award

Emily Geyer, a fourth-year medical student in The Ohio State University College of Medicine, received the National Outstanding Medical Student Award from the American College of Emergency Physicians and the Emergency Medicine Residents' Association. This highly competitive and prestigious award is awarded to up to 10 fourth-year medical students in the nation to recognize their dedication to patient care and advancement of emergency medicine.

MD/PhD candidates receive national awards

Haley Klimaszewski, MD/PhD candidate 2024, was awarded American Society of Hematology's Medical Student Physician Scientist Award. From 2019-2020, Klimaszewski was a National Cancer Institute Fellow at the National Institutes of Health. **Ashley Gray, MD/PhD candidate 2024**, received a $50,000 fellowship award from the National Psoriasis Foundation.

New Neuroplastic Surgery Program to address health inequities

Kerry-Ann Mitchell, MD, PhD, assistant professor of Plastic and Reconstructive Surgery at The Ohio State University College of Medicine, received a Patient Care Innovation Award for $335,000 from OSU Physicians, Inc., toward establishment of a Neuroplastic Surgery Program at the Ohio State Wexner Medical Center with colleague Andrew Grossbach, MD, assistant professor of Neurological Surgery. The program goal: to make holistic neuroplastic surgery and care accessible to low-income populations and underserved communities. This is the first program in the Midwest to centralize neurosurgical patient care to one location. Mitchell is also developing a treatment strategy that optimizes patient-directed goals.

'Resetting' injured brain offers clues for concussion and TBI treatment

A new study, led by Jonathan Godbout, PhD, professor of Neuroscience at The Ohio State University College of Medicine, raises the prospects for developing post-concussion therapies that could ward off cognitive decline and depression, two common conditions among people who have experienced a moderate traumatic brain injury. The research, conducted with mice, showed that using a technique called forced cell turnover, eliminated immune cells that contribute to chronic inflammation. "It's almost like hitting the reset button," Godbout says. "Compared to brain-injured mice recovering naturally, mice that were given the intervention showed less inflammation in the brain and fewer signs of thinking problems 30 days after the injury."