



**THE OHIO STATE
UNIVERSITY**

WEXNER MEDICAL CENTER

Medical Scientist Training Program

November 2019

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Welcome to
Another Year!

Dr. Tamar Gur

It is my complete pleasure to welcome our newest students: Aliyah Bennett, Karthik Chakravarthy, Jack Hedberg, Erin Jeremy, Sabrina Mackey-Alfonso, Arden Piepho, Charles Rabolli, Michael Ruesch, Shane Scott, and Felix Yang! It simply amazes me to think how much can happen in a year; at this time last year, they were applicants going through our rigorous (but fun!) application process, and now they are seasoned MS1s, with Foundations 1 and 2 under their belt. This also leads me to reflect on just how much has happened this past year. We've had students win prestigious awards from the American Heart Association and National Institute of Health; organize 5Ks to benefit the free clinic; perform with the medical student orchestra; run Marathons; publish their works in reputable journals. Watching our students thrive is easily the best part of my job.

We've also accomplished much to be proud of as a program. Our Medical Scientist Student Organization (MSSO) seminar has been revitalized under the leadership of MSSO president Kylene Daily. Twice a month our students gather for vertical mentorship, scientific and clinical case presentations. Our winter retreat was a resounding success—Dr. Peter Lee MD, PhD gave a fantastic talk about his interest in aerospace research. Our summer retreat featured a keynote address by Dr. Kafui Dzirasa, MD, PhD from Duke University, who gave an inspirational talk about his path to becoming a physician scientist. As we all know, the path to becoming a physician-scientist is not an easy one, and hearing from others who have chosen this challenging but rewarding career can be uplifting.

What are we going to accomplish next? Time will tell, but as we prepare the MSTP T32 for submission, we are brainstorming many new ways to impart the skills and knowledge necessary for a career as a physician scientist. We look forward to working with our current students and alumni, as well as recruiting another stellar class. The future is bright here at OSU MSTP, and I look forward to the ride.

--Tamar Gur, MD, PhD, Associate Director OSU COM MSTP



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2019-2020 Medical Scientist Student Organization Officers Statement

The MSSO Officers this year are excited about making changes to existing MSTP programming, along with introducing some brand-new ideas. During this summer, we worked on encouraging variety in student presentations as part of our MSSO Seminar Series for the upcoming year. Additionally, we participated in the programmatic review at the Summer Retreat so that feedback could be compiled and reviewed by both MSTP leadership and student leadership. That program-comprehensive student feedback is helping us prioritize our goals for the rest of the year. We are planning on updating the student handbook, making it easier to find opportunities for clinical preceptorships during graduate school and providing more information on student experiences to recruits at interviews and during second-look. We also have a few fun ideas of our own: creating a peer-to-peer grant review workshop for students submitting fellowships, having Indian food at MSSO, helping our incredible Social Committee fund an amazing and well-deserved holiday party and M4-send off, setting up MSSO Officer Hours, and creating more opportunities for MSTP students to work with our APSA chapter.

If all of this isn't exciting enough, just check out our new MSSO Officer Mission Statement:

“MSSO Officers are student leaders of the MSTP who will serve the program as both advocates, for the needs and effective training of students, and ambassadors, between students, leadership and other groups at OSUCOM, to ultimately influence the direction and continued success of our program.”



Kylene Daily, G2
President



Tiffany King, G4
Vice President



Akila Venkataramany, M2
Secretary



Zheng Hong Tan, G1
Treasurer



Experiences at the 2019 APSA Conference

The 15th annual meeting of the American Physician Scientist Association was held this April in Chicago. Several OSU students attended, across multiple years and programs. Attended by MD/PhD trainees from across the country, the APSA national meeting represents a unique opportunity to meet other trainees and future colleagues, interact with MSTP and residency directors, and hear about research from trainees and established physician scientists. From our program the following students attended APSA this year: Kyleigh De Petro, Olga Golubeva, Ilse Hernandez Aguirre, Dmitry Malyshka, Lauren Otto, Akila Venkataramany, Wesley Wang (all pictured on the right), Tiffany King, Kevin Blum, Eileen Hu, Alex Hartlage and Seemaab Ali.



Presentations by world-renowned researchers highlighted the meeting, including keynote speakers Steven Rowe, Dorry Segev, Carl June, Douglas Lowy, Arturo Casadevall, Aimee Payne, and Donna Martin.

A mentoring breakfast with residency directors offered a more intimate opportunity to interact with directors in specific specialties, as well as other trainees interested in the same career path.

This annual meeting also marked the first research-residency panel, including research residency and PSTP directors from around the country. The panel was of very high interest to trainees and other program directors alike, resulting in an overflowed room of full seats and full standing-only wings.

Those interested in presenting at or attending the National Meeting in 2020, becoming a member of APSA, or getting more involved with APSA leadership can contact the OSU APSA Institutional Representative Kevin Blum, at kevin.blum@osumc.edu.

-- Kevin Blum, G4

I attended APSA this year as a 4th year in the program this past April, and it was one of the best conferences I have attended so far as a trainee. I gained something from speakers, panels, and networking opportunities. I was very impressed by every talk that I attended. The speakers were all leaders in their fields and shared their extraordinary accomplishments and contributions to science. Many had found important therapy for diseases and was able to navigate through policy changes exhibiting their influence outside of science.

Another great opportunity was to hear from residency directors about PSTPs and research in residency and fellowships during a panel Q&A session. Although this seems a while away, I learned a lot about what the next step of our training looks like. I plan to attend the conference again as a M3 to use it as a way to continue networking with program directors prior to my residency application cycle.

I was also able to participate in the poster session, which allowed opportunities to meet other MD/PhD students at other institutions and discuss similar challenges and interests. As a MD/PhD student, it is easy to feel lost between the two worlds of science and medicine, and I enjoyed bonding through our unique experience as a dual-doctorate student and came away with a few new friends during my time at APSA.

I found this conference incredibly refreshing and rejuvenating, especially as I am working through the middle years of our long training. It was a great way to get a glimpse of what our futures may hold. I highly encourage all of our MSTP students to take advantage to attend APSA, no matter what stage in training. It is also a great opportunity to visit one of our nation's best cities.

-- Tiffany King, G4



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The Transition from Graduate School Back to Medical School

Towards the end of graduate school, I was often asked, “Are you worried how much you forgot about medicine in four years at the bench?” For better or worse, the scramble to finish my thesis left me with little time to worry. The pressure, focus, and stress of those final months were strikingly similar to the final push studying for the USMLE Step 1 exam. To escape the bustle of lab while writing, I even returned to my Step 1 study haunts to write my dissertation—Mission Coffee was my second home for both boards and thesis-writing. While my soon-to-be classmates were studying human anatomy, physiology, and pathophysiology for their board exam, I was writing hundreds of pages about a single cell-type’s involvement in a singular disease. Those final few months were a blur, culminating with graduation in Ohio Stadium. That Sunday I was posing for photos in my PhD regalia, and the following morning was the first day of third year.



Early in my rotations, an attending surgeon with both MD and PhD degrees described his return to medical school from the lab as “humbling.” At the time, I thought he meant how behind I was in terms of medical knowledge. In four years, I managed to forget everything from the difference between indirect and direct bilirubin to the musculature of the forearm. Thankfully, there are enough study guides that I got my knowledge-base mostly up to speed with my peers in the first few weeks. While there were still embarrassing lapses from time to time—like when I failed to recall the mechanism by which heparin prevents coagulation—they were not what was humbling. What is humbling is that finishing a PhD and starting M3 year felt most like being an adult trapped in a kindergartener’s body: you feel like an intelligent and capable life-form, but for some reason everyone is either upset at you, expressing pity for your life choices, or simply talking down to you. As a graduate student, I collaborated closely with not only fellow graduate students, but also other faculty in our department. While I respected the doctorate that faculty and post-docs held, I also saw them as colleagues. I was surprised to find that on the wards, no one saw me as a colleague and navigating the vast hierarchy of sub-interns, interns, junior residents, and chief residents was lonely. Getting to know more of my M3 classmates on rotations helped, but the shift in mindset has certainly been humbling.

Despite the internal challenges I encountered whilst navigating the Oslerian hierarchy, my first rotations reminded me why I entered MD/PhD training in the first place: service and patient care. After years spent working with small-animal models, I was reassured to find that I enjoy working with patients, their families, and with other providers as much as I hoped I would in 2012 when I applied to Ohio State’s MSTP. I look forward to advancing my clinical training, but also hope that my experiences in science continue to help me think critically and disruptively about medicine.

-- Kristina Witcher, M3



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Pelotonia 2019

This past August, I rode the less hilly (what a misleading description; it was still so much hillier than I expected) 55 miles to raise funds for life saving cancer research! I first heard about Pelotonia and its mission to support cancer researchers when I participated in SUCCESS program five years ago. Even though I chose OSU MSTP for the wide breadth of research options, other aspects of OSU such as Pelotonia also played a role in my consideration. It spoke of the OSU's commitment to research, especially cancer researchers ranging from undergrads to young principal investigator, and these were all appealing prospects to me.

So the first summer after I moved to Columbus, I volunteered for Pelotonia. I helped out with the final day activities around the Columbus Commons. This year, I had the chance to participate in the ride. Despite my excitement, I was also a bit nervous about the fundraising goal I had to hit. But that's when the awesome communities of MSTP and COM stepped in. Ken, who is a part of the leadership of Spin Doctors (COM Peloton) and a fellow MSTPer, walked me through the process of signing up and how to maximize variety of options to reach my fundraising goal. I also loved the attitude of the whole Columbus community when it comes to Pelotonia. Around this time of the year, there are so many green arrows on cars and business windows. It was encouraging to see how the whole city comes together in this fight against cancer.

This was especially evident in numbers. Funds raised to date are almost \$200 million and still counting. \$102,265,000 was pledged to help launch the Pelotonia Institute for Immuno-Oncology at OSUCCC-James. All of these are impressive achievements for the Pelotonia and OSU communities.

Race day was a unique experience on its own. I loved the energy at the start line, but even more so at the rest stops and the finish line. I saw many signs of encouraging words and grateful messages. People were posted up by their houses with cold water, signs, bells, and their young ones. I felt the goodness of the goal I was biking for. I saw many riders with their loved ones' names on their jerseys or the word "Survivor" written across their backs. I am glad I took part in Pelotonia 2019. I realized that I was part of something bigger—the hopeful nature of humans and our community's drive to overcome cancer.

-- Ariunaa Bayanjargal, G1



OSUCOM 2019 Spin Doctors



OSUCOM MSTP Pelotonia Riders

Front Row: Matthew Lordo, Dr. Kirschner, Eileen Hu, Lisa Heisterberg, Ansel Nalin

Back Row: Max Yano, Kylene Daily, Ariunaa Bayanjargal



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THE INTERVIEW



Marilisa G. Elrod, MD PhD, FAAP
CDR MC (UMO) USN
Developmental-Behavioral
Pediatrician
Associate Professor of Pediatrics
Naval Medical Center Portsmouth
Graduate of OSU MSTP Class of
2005

Akila Venkataramany: Could you tell me about your background (i.e. where you grew up, education, etc.) and your time in the US Naval Academy?

Dr. Elrod, MD, PhD, FAAP: I grew up in Sylvania, OH, a suburb of Toledo. My mother was an elementary art teacher and my father was an insurance agent. My father is from Vicenza, Italy, having been imported by my mother while she was an Ohio Wesleyan art student on a semester abroad. I entered the US Naval Academy as a track and field recruit following a strong push to apply by my maternal grandfather who had served as a Navy pilot in World War 2. I was a math major at the academy and also a varsity athlete in soccer, gymnastics, and track. I was and still am a sports fanatic. So, when I was awarded the Marshall Scholarship to study in the UK at Cambridge University, I joined the University athletics and football teams as well as studied Natural Sciences, focusing on microbial and parasitic diseases. I still play soccer, compete in triathlons and also have picked up ice hockey recently.

AV: Why did you choose OSU for your MD/PhD?

Dr. E: I had several options for medical school, and it was a hard decision. However, OSU had a consolidated campus with the medical school and graduate schools collocated geographically and also had the option of earning a PhD in biostatistics through a statistics department. My younger sister was also at Ohio Wesleyan at the time. She eventually joined me at OSU when she entered dental school.

AV: Are there any memorable or pivotal moments you recall from your training at OSU?

Dr. E: The pivotal moment in my training was when I passed the dreaded second qualifier in the statistics department which

meant I could officially be a PhD candidate. I also remember the first day of my OB-GYN rotation after being away from medical school for 3 years in the statistics department. I was so scared I would mispronounce something or reveal how much I had forgotten! But as others will tell you, the transition was hard but ultimately went really well.

AV: How did your PhD shape your view of research and your goals for incorporating it into your career?

Dr. E: My PhD is in a field very different from medicine, so it was challenging while I was studying the more technical aspects of statistics to see how I could use the skills I had attained during my PhD in my medical career. However, as time went on, it became very clear that the large gap between the fields of medicine and statistics was precisely why having trained in both was so valuable. I am adept at helping others design and analyze their research and also in incorporating the use of statistics into my areas of interest. I became the Director of Research for the Department of Pediatrics at the teaching hospital where I work and acted as consultant and mentor to many members of the department including staff and residents.

AV: What factors helped you choose your medical and research specialties?

Dr. E: The reason I chose my specialties had to do with finding my tribe and then copying what they did! I had planned to complete a PhD in virology, and so studied pathology at Cambridge prior to coming to OSU. However, while I was in Cambridge, one of my best friends from my athletics team was studying statistics. I was missing the study of mathematics and we had talked about biostatistics, so I started attending her lectures. I was hooked. For my medical specialty and later research interest, my

my choice was again driven by meeting people that I could see myself working with. My mentor during residency was a Developmental-Behavioral Pediatrician and one of the kindest people I had ever met. He was also a very intelligent individual with some eccentric tendencies. So were his colleagues... I figured they may accept a quirky statistician as one of their own. I also am fascinated by normal behavior and development, and by association all the disorders of behavior and development. This includes autism, which is my main research focus.

AV: What additional training did you complete after graduating from the MD/PhD program?

Dr. E: Pediatric internship- National Capital Consortium 2005-06 (Bethesda, MD), Undersea Medical Officer School 2007 (Naval Undersea Medical Institute- Groton, CT), Diving Medical Officer School 2007 (Naval Diving and Salvage Training Center- Panama City, FL), pediatric residency 2010-2012 (Naval Medical Center San Diego), fellowship in Developmental-Behavioral Pediatrics 2012-2015 (Madigan Army Medical Center, Tacoma, WA and University of Washington).



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AV: What is your career now, and can you describe your typical workday/week?

Dr. E: I am the Associate Director for Professional Education at one of the two large Navy teaching hospitals. We have seven departments in our directorate that the Director and I are responsible for running: Clinical Investigations (research), Graduate Medical Education, Library Services, Simulation and Bioskills, Staff Education and Training, Nursing Research, and Visual Informatics. We also serve on the Command Executive Board and report directly to the Commanding Officer of the hospital.

I see patients one day per week. The rest of the time, I am engaged in an array of administrative tasks as well as managing the departmental leadership, personnel issues, and the budget, engaging with other leaders to support command initiatives, answering to higher echelons of command regarding Graduate Medical Education matters, and attending official command functions. I also have several research projects that are ongoing that I mostly mentor others in. I think my position is most like an associate dean, but it has many aspects that are military specific as well.

“It is the relationships you build that will guide you along and keep you afloat.”

AV: In 2008, you were awarded your “dolphins” and became the 12th woman in the history of the US Navy to be qualified in submarines. What was that experience like?

Dr. E: I spent 3 years as the Medical Department Head at Naval Submarine Support Command Pearl Harbor in Hawaii, and it was expected that anyone in this position should go through the qualification and earn submarine “dolphins”. The fact that I was female did make things more challenging, as there were rules at the time that prevented women from being stationed or deployed on submarines. My job and the requirements for submarine qualification included riding the submarines to audit

records and support and train the Independent Duty Corpsmen who served as the submariners’ onboard medical providers. We had 18 submarines in Pearl Harbor at the time, so it was a busy job. Every time I went underway on a submarine, I had to get special permission from the admiral. Luckily, I had a very supportive commanding officer who had two daughters, one of which is now a 3rd year medical student at the John A. Burns School of Medicine at the University of Hawaii! So, he helped route the requests and would vouch for my professionalism and competency.

I would describe a submarine ride like a really long train ride with no windows and the chemical smell of amine. The submarine community was extremely accepting and filled with very smart and dedicated people. I feel extremely fortunate to have been able to serve with them.

AV: What do you feel is the most rewarding aspect of being a physician-scientist?

Dr. E: I am able to translate between the scientific and medical fields and support others to improve the quality of their research. I also love using journal club to teach medical students and residents how to critically assess a paper.

AV: How have your physician-scientist education and Navy background complemented each other?

Dr. E: To be honest, it has been a struggle to find my niche in the Navy as a physician-scientist. The Navy does not have the flexibility for medical personnel to engage in research as a primary duty unless they are stationed at a non-clinical duty station. However, as Graduate Medical Education is a primary mission at the large Military Treatment Facilities, such as Naval Medical Center Portsmouth where I am currently stationed, research and teaching are encouraged and supported in addition to clinical duties. It has been my mission here to support researchers to increase their productivity and improve the quality of their scholarly products.

AV: What are some of the biggest challenges you have faced in your journey to complete your education and to progress in your career?

Dr. E: The biggest challenge was trying to

work out how to complete a Biostatistics PhD as part of an MD-PhD program within the Navy’s set timeframe of only 3 years for the PhD! I started my statistics classes in my second year of medical school and finished by PhD three months before medical school graduation. I spent so much time in the library, that if my friends wanted to talk to me, they would not call my house, they would just show up to the library (this was before wide-spread cell phone use!).

AV: Looking back, would you have changed any aspect of your professional training?

Dr. E: No. My journey has been interesting, challenging, and rewarding.

AV: What advice would you give to current MSTP students in their medical or graduate years?

Dr. E: Remember that you should enjoy the journey, not just be focused on the end goal of graduation. Your training will continue after you graduate. If things are hard, surround yourself with supportive friends and mentors. Mentor an undergraduate or more junior MSTP student. It is the relationships you build that will guide you along and keep you afloat.

AV: What words of wisdom do you have for our M4 students who will be graduating in the upcoming year?

Dr. E: Be open to new experiences and opportunities. Don’t be afraid to reach out to staff and senior residents that you admire or have accomplished something you would like to do in your own career and ask for mentorship. Most importantly, nurture your intellectual curiosity. There will be a time when you feel busy and stressed on a chaotic shift and in the midst of the overwhelming information onslaught, some subtle lab abnormality or exam finding will make you pause. You will want to ignore it or explain it away, but it will nag at your thoughts. This is the moment when attention to your instincts and your analytical abilities that have been honed through your PhD training may change the course of treatment, lead to a paradigm shift in diagnosis, or frankly save a patient’s life. So, take a moment, go to the bedside, or find some references, and have a good think about it before you let it go.



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Thank You for the M1 White Coats!

OSU has a long-standing tradition of linking incoming medical students with College of Medicine alumni, countless individuals who have traveled the arduous yet rewarding path to becoming a physician, through white coat donations. Within the MSTP program, we encourage our alumni to extend the same welcome to our new MD/PhD students. Our hope is that this gesture will forge a unique connection, which may manifest into mentoring relationships and meaningful interactions, to our physician-scientist community. After receiving their white coats, the MSTP students write a note of gratitude and thanks to the alumni who contributed to their white coat donation.

The MSTP and M1 students would like to thank OSU MSTP alumni **Dr. Chadwick Wright, MD PhD**, and **Dr. Richard Wardrop, MD PhD**, for their generous donation of funds to sponsor white coats for the entering M1 MSTP class!

If you are an alumnus/alumna who would like to ensure that your donation matches a coat to a MSTP student, please contact mdphd@osumc.edu. Opportunities to support the MSTP's other student programs and initiatives are also available, and you are welcome to participate in those as well!

-- Akila Venkataramany, M2



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WELCOME TO OUR M1 CLASS!



Aliyah Bennett

I grew up in New York City in a neighborhood in Queens, the best of the five boroughs. I first became interested in research while I was taking in microbiology course at the University of Buffalo. It was part of one of those pesky prerequisite requirements for my major, but after a few weeks, I found that I was really interested in it and the research questions often presented in the lectures and decided to try research for the first time. I applied for and was accepted to the Environmental Health Research program at the University of Washington and flew all the way from New York to Seattle to do research for the first time under the guidance of Dr. Marilyn Roberts, where I studied antibiotic resistance in *E. coli* found in orcas, wolves, and coyotes in Washington state. I discovered two things that summer: I love the adventure of moving to a new city, and I love research even more. I decided that I wanted to continue pursuing research when I went back to the University at Buffalo, and so I started a research project under the guidance of Dr. Terry Connell, where I studied the attachment and invasion mechanisms of a strain of adherent-invasive *E. coli* often found in patients with inflammatory bowel disease and Crohn's disease. It was over this year and a half in his lab that I really developed my passion for biomedical research. I decided to revisit my love of jumping into new cities and research by attending the SUCCESS program at the Ohio State University, which was my first introduction to the Ohio State Medical Scientist Training Program. I worked on a project under the guidance of Dr. John Gunn that aimed to determine if certain large proteins produced by Salmonella Typhi, the causative agent of typhoid fever in humans, are necessary for the bacteria to produce biofilms.

In May 2018 I earned my Bachelor of Science degree in Medical Technology from the University at Buffalo. After graduating from SUNY at Buffalo, I worked for a year as a Clinical Laboratory Scientist in the clinical microbiology lab at the Roswell Park Comprehensive Cancer Center. My research experiences in infectious disease and my clinical work in laboratory medicine have influenced my research interests and desire to have a career in medical research. I am interested in research on infectious disease and antimicrobial resistance. Looking to the future, I am excited to take this next step in my career and train under the guidance of the faculty and mentors of the Medical Scientist Training Program. Outside of science and medicine, my hobbies include cooking, streaming my favorite shows, and walking my dogs Pepper and Mimi.

Fun Fact: I do not like chocolate or coffee. No, I'm not allergic to either; I just don't like the taste.



Karthik Chakravarthy

I was born and raised in Dayton, Ohio. I grew up in the suburb of Beavercreek and attended The Ohio State University for my undergraduate education. I majored in Biomedical Science at OSU and graduated in May of 2019 with a Bachelor of Science degree. While I was an undergraduate, I joined a cancer research lab within OSU's Comprehensive Cancer Center, and my involvement in that scientific environment promoted my interest in medical research. I also observed physician-scientists at the James Cancer Hospital pioneering breakthroughs in medicine and improving their patients' health outcomes through advanced medical intervention. This event inspired my passion and desire to become involved in medical innovation and translation, eventually prompting me to pursue an MD/PhD degree. Given my past experiences, my current research interests involve investigating cancer, particularly focused on studying and developing potential therapeutic options based on immunological methods.

Fun Fact: I enjoy hiking through national parks and have climbed down and back up the Grand Canyon trail in a single day of trekking.



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Jack Hedberg

I grew up in Minneapolis, Minnesota, and at my elementary and high schools - Seward Montessori and South High - I was part of communities that celebrated people's unique identities, experiences, and lives; this is where my calling into medicine emerged. During my senior year of high school, I spent several weeks observing in the molecular virology lab of Dr. Shelley Grimes at the University of Minnesota, whose extraordinary compassion and curiosity ignited my inspiration with the connection between medicine and research. This convinced me to matriculate to the University of Minnesota College of Biological Sciences, where I double majored in biochemistry and physiology. As a college freshman, I became intrigued by DNA replication/repair and joined Dr. Anja Bielinsky's lab investigating these processes. Throughout my 4.5 years in this lab, I learned basic molecular biology laboratory methods, gained experience with mass spectrometry and proteomics, and eventually developed independence, creating a knockout cancer cell line using CRISPR/Cas9 to investigate the cellular requirement for the eukaryotic replicative helicase subunit Mcm4 as my honors thesis project. Anja became an invaluable role model and mentor to me, helping me better understand what it means to pursue science with integrity.

The lessons in humanism and compassion from communities in my earlier years also drew me to patient care settings throughout college, and simultaneous clinical and basic science experiences helped me recognize that the molecular symphonies we seek to understand in the lab synchronize and converge on astounding scales to create living human beings and patients whose emotions, experiences, and stories are an immense privilege to be a part of in medicine. As a first year MD/PhD student, I have many research interests and am both fascinated and slightly terrified by settings where new bench procedures and computer power can be combined and leveraged to probe the molecular dynamics of cells with high resolution (such as single cell RNA-seq and CRISPR screens), which for me seem to lately fall within cancer immunology and/or neuroimmunology. I also enjoy distance running, backpacking, photography, scuba diving, stargazing, and listening to Odesza!

Fun Fact: I absolutely love learning about space exploration and am interested in finding ways to connect the role of a physician investigator with putting humans into the final frontier!



Erin Jeremy

I was born in Royal Oaks, Michigan, but grew up in Mansfield, Ohio. I attended The Ohio State University for undergrad and received a Bachelor of Arts in Chemistry. I went on to further my education at Georgetown University in Washington, DC, where I receive a MS in Physiology and Biophysics. After graduation, I came back to OSU to work in Dr. John Byrd's Experimental Hematology Laboratory with Dr. Karilyn Larkin. During my two years in the laboratory, I studied the tetraspanin CD37 in Acute Myeloid Leukemia and evaluated its potential as a new target for direct therapy. My experiences inspired me to pursue a combined MD/PhD degree, and to use my education to conduct meaningful research that will change the lives of patients.

Fun Fact: I made a killer music video with my MD/PhD cohort, where everyone learned how much I love coffee, nature, and my family. Shout out to Felix for giving me sweet dance moves in the video! I also love to travel, run, cook, and play Yahtzee on the porch with my husband.



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Sabrina Mackey-Alfonso

I grew up in central Florida on the Space Coast (named because of the NASA Kennedy Space Center). Specifically, I went to Cocoa Beach High School. After graduating high school, I went to Johns Hopkins University where I earned a Bachelors of Science in Neuroscience with a minor in Visual Arts. Already knowing I had an interest in neurodegeneration, I chose an ALS lab with a focus in molecular and cellular biology to do research in during undergrad and did a summer at a collaborator's ALS lab through HHMI's EXROP program. After graduating in three years, I participated in the NIH Summer Internship Program and worked in an Age Associated Memory Impairment (AAMI) lab. I studied this because I was curious as to why the progression of neurodegenerative diseases were so varied. Hence, I wanted to learn more about the underlying non-pathological aging phenotype and what causes that to vary. AAMI many times precedes Alzheimer's Disease. Then, I went back to Hopkins and did a post-bac in a genetics Parkinson's lab. I am still interested in neurodegenerative diseases, and plan to study this for my PhD. As for hobbies, I love to sing, draw/paint, read, hang out with friends, and explore the city.

Fun Fact: When I was 14, I went bungee jumping off the highest cliff jump in the world in New Zealand.



Arden Piepho

I was born in Denver, CO but later moved to Fort Wayne, IN, where I spent most of my childhood alongside my twin brother Skylar. I attended Indiana University in Bloomington, IN, where I earned a Bachelor of Science in Neuroscience and a Bachelor of Arts in Chemistry with an interest in studying neurological disorders. I was an active member in the IU Run Club and IU Democrats while also working as a Medical Scribe in the Emergency Department at the IU Health Bloomington Hospital. My experiences would lead me to pursue a career in neuroscience research by joining a biotechnology startup in San Francisco shortly after graduation. As a Research Associate at System1 Biosciences, I helped drive the company's mission of better modeling neurodevelopmental diseases and neurological disorders through the production of patient-derived cerebral organoids as a platform for therapeutic development. Through my work, I became interested in exploring the genetic factors contributing to disease and experimental therapeutics. Outside of work and school, I enjoy playing various sports and videogames, as well as spending time with my senior cat Simon and hitting local bars and restaurants with friends. I also really enjoy music, although I don't play any instruments, and love going to concerts and music festivals.

Fun Fact: I really enjoy being outdoors and playing sports, especially rock climbing and ultimate frisbee!



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Charles Rabolli

I grew up in Mahwah, New Jersey and attended Rutgers University, graduating in 2018 with my BS in biomedical engineering. I started conducting research during my freshman year, where I worked on a project to help wounds heal faster in diabetic patients by creating a fusion protein. During the summer after my freshman year, I received an award at Rutgers to study and to characterize a particular type of gold nanoparticles. These first research experiences and a budding cardiovascular interest led me to apply for an American Heart Association fellowship, which brought me to Massachusetts General Hospital for the summer after my sophomore year. There, I gained invaluable experience in cardiovascular research, but more importantly I built connections that would allow me to spend the following summer in Heidelberg, Germany, continuing the same cardiovascular research that I began in Boston. After graduating from Rutgers in 2018, I received a Fulbright Fellowship which brought me to Trieste, Italy, where I was able to explore high-throughput screening and cardiovascular regeneration. Each of these experiences, from engineering to molecular biology, have shaped my research interests, and going forward I hope to be able to use my engineering background to further the field of cardiovascular regeneration. Outside of lab, I enjoy being active—playing pretty much any sport—or hanging out with friends, at the movies, at someone's house, or wherever. I really love traveling and exploring new cultures and cuisines, so I am excited to see and taste everything that Columbus has to offer!

Fun Fact: I am a certified scuba diver and really enjoy going diving whenever possible.



Michael Ruesch

I was born and raised in Alpine, Utah, a small but growing town in central Utah located right up against the Wasatch Mountains. I attended Brigham Young University, where I studied Biochemistry and earned my Bachelor of Science degree in April of 2018 while also minoring in Music. My research in Biochemistry began in June 2011 as a junior in high school where I received an internship working with Dr. Daniel Simmons of the Department of Biochemistry at Brigham Young University. His work aligned with my interest in studying pathology, pharmacology, and novel enzyme processes. I was able to continue to work with Dr. Simmons throughout my high school and college studies assisting in and leading multiple projects studying cyclooxygenase and nucleobindin. Following graduation in 2018, I was hired to work as a lab specialist with Dr. Simmons at his startup research company, Intronex. My greatest contribution at Intronex was developing a process to purify an enzyme from the cyclooxygenase family and measure its activity. I also spent a summer in 2017 with Dr. Randy Jensen at the Huntsman Cancer Institute studying hypoxia in meningiomas and gliomas and how hypoxia affects radiation treatment in these cancers. I've loved the time I've spent doing research and it has motivated me to continue to pursue a career in medical research.

Outside of science, I'm a big fan of music and enjoy improvising and composing new works on the piano. I also have a love for jazz music and started learning the alto saxophone while at BYU. I'm the youngest of 7 in my family, and I'm also an identical twin. One of my greatest joys recently (besides acceptance into the OSU MSTP) was my wife Liz and I having our first child, James, in June 2019.

Fun Fact: My high school choir was the featured choir in a concert at Carnegie Hall with several choirs from around the country.



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Shane Scott

“It is easy to blur the truth with a simple linguistic trick: start your story from ‘Secondly,’” Mourid Barghouti. Do not start my story at my birth to a fisherman and a stay-at-home mom in the parish of St. Mary, Jamaica. Do not start in 2004 when I immigrated to the United States. Do not start with my acceptance to The Ohio State University College of Medicine MD-PhD program. For none of the above truly embodies the realization of my dream to be a participant in the care of our shared earth family. But if you must start somewhere, start with my belief in the celebration of gratitude. For if it were not for them—my ancestors, family, life coaches, mentors and friends—my story would be entirely different. Thank You All!!!!

With the help of coaches, teachers and family, I decided to attend Brandeis University, where I earned Bachelor of Science degrees in Biochemistry and Chemistry. My time at Brandeis was sprinkled with opportunity and luck. I quickly deviated from the path to become a linguist and began a research project in the laboratories of Dr. Jason Pontrello and Dr. Melissa Kosinski-Collins. My project focused on the synthesis and characterization of multivalent biopolymers designed to block the association of HIV TAR-RNA to Tat, an interaction necessary for HIV replication and pathogenesis. I struck my luck when I was introduced to Dr. Eve Marder who sponsored my first trip to a scientific meeting, the 2012 Annual Biomedical Research Conference for Minority Students. This was an auspicious meeting, as I was introduced to the world of shared scientific inquiry and mentors who would later challenge me to push beyond the barriers in front of me.

As a senior, participation in a journal club focused on abnormal neurotransmission in mental health sparked my interests in Neuroscience. To explore this passion, I obtained a Postbaccalaureate Research Fellowship at the National Institutes of Health (NIH). At the NIH, I had the privilege to work in Dr. Barry Kaplan’s neurobiology laboratory where my work provided the first evidence for the existence of a cis-acting transport element in the tyrosine hydroxylase (TH) 3’ UTR responsible for directing axonal TH mRNA transport.

Being at the NIH where medicine and research is inextricably linked inspired me to pursue an MD-PhD dual degree. With the guidance of my mentors, I applied and earned a Master’s in Medical Sciences at the Boston University School of Medicine in May 2018. I completed my thesis work for this program in Dr. Susan Amara’s laboratory, where I studied how alterations in the structure and function of neurotransmitter transporters by psychostimulants contribute to the pathogenesis of psychiatric disorders. My specific work sought to demonstrate the intracellular membrane localization of the G-protein coupled receptor, trace amine associated receptor 1, TAAR1.

At OSU, I have interest in conducting research in neuroimmunology and neurocardiology with an emphasis on population medicine. As it is my desire to become a physician who is also an advocate of social justice, outside the laboratory, I look forward to participating and engaging in initiatives that address the socio-economical determinants of health globally.

Fun Fact(s): I can cook, and I can dance. I love to sing, but I can’t. I am a poet, artist and story teller.



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Felix Yang

I was born and raised in Ames, IA, and lived there up until the end of college. Wanting to get out of the Midwest, I headed off to Rice University in Houston, TX, where I majored in Biochemistry and Cell Biology. When I initially started college, I knew I wanted to pursue a career in medicine; however, throughout my undergraduate and post-undergraduate years, I gained valuable research experience in a variety of fields that led me to pursue a career as a physician-scientist. My formative wet-lab research experience took place after my freshman year at the U.S.D.A. National Animal Disease Center (NADC) in Ames, IA. At the NADC, I worked under the guidance of Dr. Kay Faaberg and Dr. Allyn Spear on a project to develop a novel vaccine candidate for porcine respiratory and reproductive syndrome virus. In addition to this experience, I also worked in the labs of Dr. Yizhi Tao at Rice University (studying virus capsid formation) and Dr. Eric Taylor (worked to develop a “tunable” plasmid to rescue CRISR/Cas9 knockouts of the mitochondrial pyruvate carrier). After graduating from Rice University in 2016, I moved back to Iowa; although this time, I moved to Iowa City (University of Iowa). At the University of Iowa, I worked as a research technician in the labs of Dr. Douglas Houston (where I studied early development in *Xenopus laevis*) and Dr. Songhai Chen (studying the role of GPCR signaling proteins in hepatic carbohydrate/lipid metabolism). The variety of the scope of my research experiences have led my research interests to center broadly around metabolism, systems biology, and neuro-immunology.

In my free time, I enjoy all things related to food such as cooking, eating, and grocery shopping. I also like to exercise (basketball and tennis) and spend time with my wife and family.

Fun Fact: In my summer after college, I traveled to an island off the coast of Cambodia and went swimming with bioluminescent plankton.



Recent Student Publications

Merchand-Reyes G, Robledo-Avila FH, Buteyn NJ, Gautam S, Santhanam R, **Fatehchand K**, Mo X, Partida-Sanchez S, Butchar JP, Tridandapani S. CD31 Acts as a Checkpoint Molecule and Is Modulated by FcγR-Mediated Signaling in Monocytes. *J Immunol*. 2019 Nov 15. pii: j1900059. doi: 10.4049/jimmunol.1900059. [Epub ahead of print] PubMed PMID: 31732534.

Duggan MC, **Regan-Fendt K**, Olaverria Salavaggione GN, Howard JH, **Stiff AR**, Sabella J, Latchana N, Markowitz J, Gru A, Tridandapani S, Eisfeld AK, de la Chapelle A, Carson WE. Neuroblastoma RAS viral oncogene homolog mRNA is differentially spliced to give five distinct isoforms: implications for melanoma therapy. *Melanoma Res*. 2019 Oct;29(5):491-500. doi: 10.1097/CMR.0000000000000623. PubMed PMID: 31116161.

Roberts JD, **Murphy NP**, Hamilton RM, **Lubbers ER**, James CA, Kline CF, Gollob MH, Krahn AD, Sturm AC, Musa H, El-Refaey M, Koenig S, Aneq MÅ, Hoorntje ET, Graw SL, Davies RW, Rafiq MA, Koopmann TT, Aafaqi S, Fatah M, Chiasson DA, Taylor MR, Simmons SL, Han M, van Opbergen CJ, Wold LE, Sinagra G, Mittal K, Tichnell C, Murray B, Codima A, Nazer B, Nguyen DT, Marcus FI, Sobriera N, Lodder EM, van den Berg MP, Spears DA, Robinson JF, Ursell PC, Green AK, Skanes AC, Tang AS, Gardner MJ, Hegele RA, van Veen TA, Wilde AA, Healey JS, Janssen PM, Mestroni L, van Tintelen JP, Calkins H, Judge DP, Hund TJ, Scheinman MM, Mohler PJ. Ankyrin-B dysfunction predisposes to arrhythmogenic cardiomyopathy and is amenable to therapy. *J Clin Invest*. 2019 Jul 2;129(8):3171-3184. doi: 10.1172/JCI125538. eCollection 2019 Jul 2. PubMed PMID: 31264976; PubMed Central PMCID: PMC6668697.

Malhotra S, Hayes D Jr, Wozniak DJ. Cystic Fibrosis and *Pseudomonas aeruginosa*: the Host-Microbe Interface. *Clin Microbiol Rev*. 2019 May 29;32(3). pii: e00138-18. doi: 10.1128/CMR.00138-18. Print 2019 Jun 19. Review. PubMed PMID: 31142499; PubMed Central PMCID: PMC6589863.

Czeisler CM, Silva TM, Fair SR, **Liu J**, Tupal S, Kaya B, Cowgill A, Mahajan S, Silva PE, Wang Y, Blissett AR, Göksel M, Borniger JC, Zhang N, Fernandes-Junior SA, Catacutan F, Alves MJ, Nelson RJ, Sundaresan V, Rekling J, Takakura AC, Moreira TS, Otero JJ. The role of PHOX2B-derived astrocytes in chemosensory control of breathing and sleep homeostasis. *J Physiol*. 2019 Apr;597(8):2225-2251. doi: 10.1113/JP277082. Epub 2019 Mar 19. PubMed PMID: 30707772; PubMed Central PMCID: PMC6462490.

Upcoming Events

- Final MSTP Recruitment Event of the 2019-2020 season: January 14-16, 2020
- College of Medicine Match Day: March 20, 2020
- MSTP Second Look Event: April 16-18, 2020
 - OSUWMC Trainee Research Day: April 16, 2020
 - College of Medicine Second Look: April 17-18, 2020
- College of Medicine Graduation: May 3, 2020 at the Ohio Stadium



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