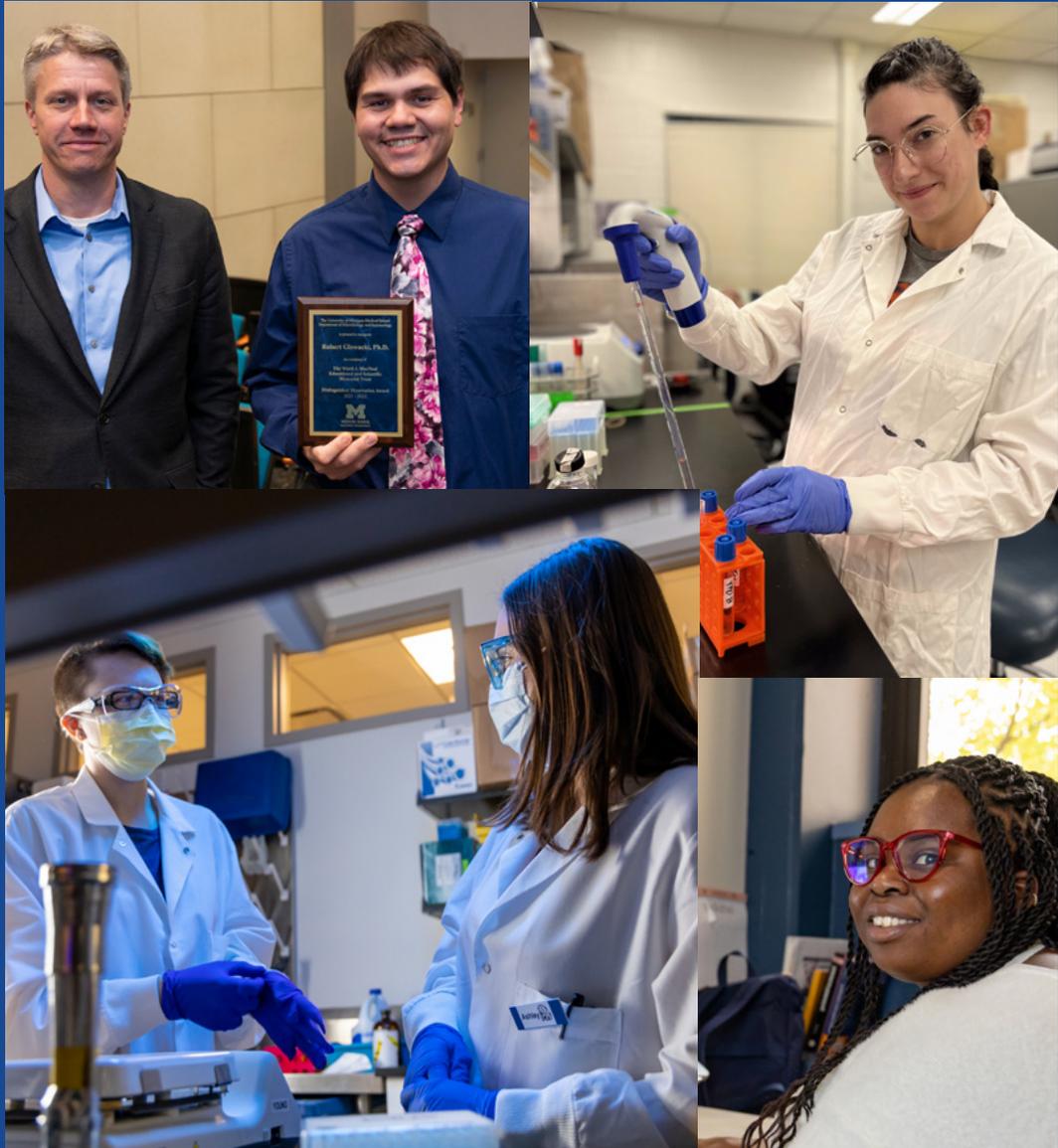




UNIVERSITY OF MICHIGAN
MEDICAL SCHOOL
MICHIGAN MEDICINE

DEPARTMENT OF MICROBIOLOGY & IMMUNOLOGY



2020-2022 REPORT

“The Joy of Discovery”

2021 & 2022 IN NUMBERS

over **243**
PEOPLE

Primary faculty: 32
Joint faculty: 18
Research track faculty: 11
Undergraduate students: over 30
Graduate students: 59
Postdoctoral scholars: 41
Research staff: 41
Administrative staff: 10
Facility manager: 1

7 PI faculty in the top 200 out
of 1100 entries for NIH funding.

Vern Carruthers, Phil King,
Eric Martens, Harry Mobley,
Beth Moore, David Sherman,
and Alice Telesnitsky

462
PUBLICATIONS

#10 RANKING

Blue Ridge NIH rankings:
We moved from #12 to #10.

51 COURSES
over two years

\$37.8
million
in NIH Grants

2021: \$19.1 million
2022: \$18.7 million



The world needs M&I
science and scientists
now more than ever!

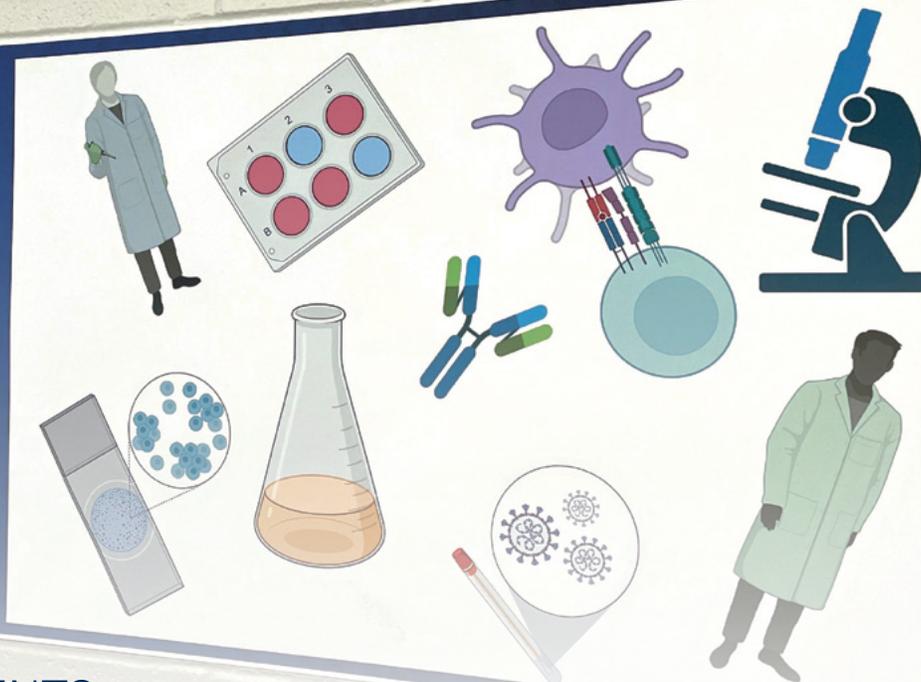


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Adam Luring	Nicole Schloss
Beth Moore	Alice Telenitsky
Harry Mobley	Heidi Thompson

Photos: Thank you for the photos many of you sent!

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Photos: Cover top row: Eric Martens and Robert Glowacki who received the 2021 MacNeal Award for his Ph.D. dissertation; Faith Anderson, O'Meara lab; bottom row: Snitkin lab (photo: C. Clouthier). Page 1: M&I retreat, October 2022. Above: Mural in the department

MESSAGE FROM THE CHAIR



Dear Friends,

I am so pleased to write to you as we look back on the 2020–21 school year and are nearing the end of 2021–22. A lot has happened in the department over this two-year span and I am eager to share the news! That is why our report is longer this year!

First off, I write to you this year as the permanent chair of the Microbiology and Immunology (M&I) department. Following a national search, the Regents approved my appointment in April 2021. It is such an honor and a privilege to lead this storied department. I take pride in being the first immunologist and the first woman to lead our department which was founded in 1902, but actually began in 1887 when Victor Vaughn established the “Hygiene Laboratory” to analyze food and water for contamination for the state. See below the picture of where we started!

Currently, M&I has 32 primary faculty members, 18 joint faculty members, 11 research-track faculty members and over 50 staff members. We are the largest basic science department in the medical school and are actively engaged in training over 100 graduate students and postdoctoral scholars.

There is no question that the COVID pandemic has touched every part of our operation and impacted everything from funding, supply chain, staffing, our methods of teaching, the research we are doing and, importantly, our sense of wellness. Despite all those challenges, I am incredibly proud of the resilience and dedication of our M&I family. In this report, I’ll hope you take notice of the faculty promotions, new hires and will note the talent we are sending out into the world. I wish you could experience the excitement of our new trainees as they embark on their studies of microbiology and immunology. We have a sign on the walls of our department that says “The world needs M&I science and scientists now more than ever!” I truly believe that! While I will admit to being biased about our great team, I am so proud of the enormous dedication they have shown in applying for and obtaining funding for our work and in disseminating that knowledge through publications and presentations. Our teaching mission is strong and we are educating students at all levels here at U-M. Finally, we have an extraordinary ethos for service in M&I and I hope you will note the many ways our department members contribute and volunteer their professional service.

As always, be sure to follow us at: <https://twitter.com/UMMicroImmuno> to get tweets about all the latest department news and publications. You can access the latest tweets and other news by visiting the departmental website at: <https://medicine.umich.edu/dept/microbiology-immunology> as well. We love hearing from our friends and alumni, so please feel free to drop me a note anytime at bmoore@umich.edu. Stay well, stay in touch and Go Blue!

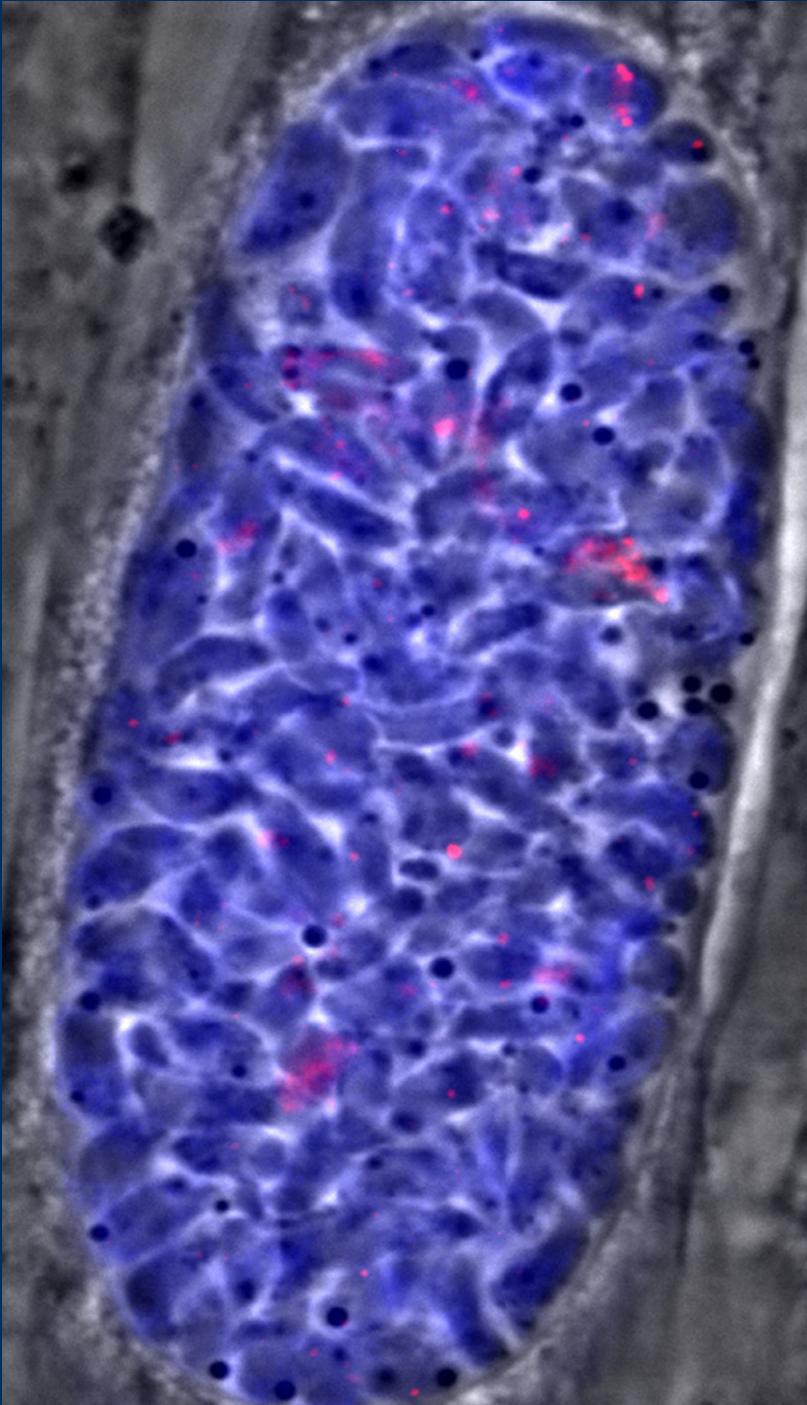
Bethany B. Moore, Ph.D., ATSF
Nancy Williams Walls Ph.D. Endowed Professor and Chair, Department of Microbiology and Immunology
Professor of Internal Medicine, Division of Pulmonary and Critical Care Medicine



Left: Hygiene Laboratory, in 1887

Below: Balunas lab after renovations, in 2022





*A Toxo cyst
containing ~100
chronic stage
parasites
(Carruthers lab)*

RESEARCH LAB HIGHLIGHTS

Carruthers lab

The Carruthers lab is exposing aspects of how the single celled intracellular parasite *Toxoplasma gondii* (Toxo) establishes infection and causes disease. In the past year, we have learned more about how this cousin of the malaria parasite exits from infected cells by activating glycolysis, a metabolic pathway that converts glucose into energy. Glycolysis not only revs the parasite's engine for a quick escape, but **Mae Huynh, Ph.D.**, Associate Research Scientist, recently discovered that Toxo excretes the products of glycolysis to acidify its surroundings moments before departure. This acidification stimulates parasite motility and boosts a parasite-secreted pore forming protein to help Toxo burst out of infected cells.

In another vein, **Yolanda Rivera-Cuevas, Ph.D.**, has shown for the first time that a eukaryotic pathogen exploits the ESCRT vesicle generating system while replicating inside host cells. Toxo hijacks this system to capture tiny packets of host material that it internalizes and degrades to supplement its diet according to recent work by Ph.D. candidate **Patrick Rimple**.

The Carruthers lab has also gained new insight into how Toxo switches from an actively replicating acute stage to a slow growing chronic stage by changing the types of proteins it expresses. In this work, Research Investigator **Fengrong Wang** discovered a component of the parasite's protein making machinery (ribosomes) that is

crucial for translating key chronic stage proteins. Wang and M.D./ Ph.D. student **Pha Thaprawat** are also revealing how Toxo lingers indefinitely in muscle and brain by turning on a recycling system called autophagy. Autophagy might serve to keep the hibernating chronic stage fresh while awaiting the big day when its host gets eaten by a predator that becomes the parasite's next host. This happens all the time in the wild among the many types of animals infected with Toxo. But when the parasite infects a human, it is unfortunate for both parties. The infected person is at risk of disease (toxoplasmosis) in the heart, brain, or eyes. And the parasite is doomed, unless the person it infects is eaten by a carnivore!



Carruthers lab, 2021

Koropatkin lab

Filipe Cerqueira and the DEI Taskforce tackled the important topic of Mental Health in STEM in a virtual workshop in May 2021. Speakers included Kate Hagadone and LaNeisha Murphy, the OGPS counselors and M&I faculty Nicole Koropatkin who spoke about her experience with staying healthy in a STEM career. Cerqueira also successfully defended his thesis entitled “Biochemical Features of Resistant Starch Degradation by *Ruminococcus bromii*” in June 2022. He is now a Clinical Microbiology Postdoctoral Fellow in the Department of Pathology at the University of Texas Medical Branch.

Postdoctoral fellow **Krista Armbruster** mentored undergraduate Yixel Soto (University of Puerto Rico) as part of the 2021 in-person immersive lab experience for Developing Future Biologists (see page 39). Armbruster was selected for oral presentations at the Gordon Research Seminar and Conference on Bacterial Cell Surfaces in Mount Snow, VT, in June 2022! She also presented her work at the Michigan Postdoctoral Pioneer Program Symposium and won a poster award!

Postdoctoral fellow **Haley Brown** was selected for an oral presen-

tation at 41st Midwest Enzyme Chemistry Conference held online in October 2021, and the Beneficial Microbes Conference in Madison, WI, in June 2022.

Former Koropatkin lab postdoctoral fellow **Rebecca Pollet** joined Vassar College as an Assistant Professor of Chemistry.

The Koropatkin lab welcomes Ph.D. student **Michael Cadigan** (CMB Program). Cadigan was chosen as CMB’s Rackham Regents’ Fellow for 2022–2023.



Amanda Photenhauer and Filipe Cerqueira

Mobley lab

Despite the trials and tribulations of 2021 and 2022, the Mobley Lab saw our trainees soar over the past year and a half. First, five of our scientists moved on to bigger and better things. **Sebastien Crepin, Ph.D.**, was appointed as a Research Officer at National Research Council Canada in Ottawa where he has opened his laboratory. **Laura Mike, Ph.D.**, accepted a position as Assistant Professor in the Department of Medical Microbiology and Immunology at the University of Toledo and has opened her own lab. We also congratulate Post-doctoral Fellow **Sapna Pahil, Ph.D.**, on accepting a position as a tenure-track Assistant Professor in the Department of Medical Microbiology at the Postgraduate Institute of Medical Education and Research in Chandigarh, India. As well, congratulations to Postdoctoral Fellow **Amanda Starr, Ph.D.**, on accepting a position as an Instructor at Bryant & Stratton College in Richmond, Virginia. Finally, congratulations to Postdoctoral Fellow **Allyson Shea, Ph.D.**, for earning a tenure track Assistant Professor position at the University of South Alabama Medical School.

We were also busy presenting our work at scientific meetings. The lab virtually attended the World Microbe Forum 2021 and presented eight projects at ASM Microbe 2022 in Washington, D.C. **Melanie Pearson, Ph.D.**, **Geoffrey Severin, Ph.D.**, and **Arwen Frick-Cheng, Ph.D.**, attended the 2021 Midwest Microbial Pathogenesis Conference at Michigan State University to present their research. Arwen Frick-Cheng, Ph.D., and Allyson Shea,



Mobley lab attending the ASM Microbe meeting in Washington, D.C., June 11, 2022

Ph.D., virtually attended and presented posters at the 13th Cold Spring Harbor meeting on Microbial Pathogenesis and Host Response in September 2021 with Allyson Shea, Ph.D. giving a lecture on her work. Arwen Frick-Cheng, Ph.D. then presented her work “Ferric Citrate Uptake is a Virulence Factor in Uropathogenic *Escherichia coli*” as a part of UTI Hour seminar series with the UTI Global Alliance in October 2021. At the Microbial Glycobiology Conference in Lisbon in June 2022, **Mark Anderson, Ph.D.**, gave a presentation titled “Clinical-associated capsule types provide a fitness advantage to *Serratia marcescens* strains.” **Harry Mobley, Ph.D.**, had the opportunity to share the lab’s work through an invited seminar at the University of Buffalo in April 2022, and during an FDA public workshop on uncomplicated UTI and antibiotic resistance in

June 2022 and at the UTI Global Alliance meeting in July, 2022. Melanie Pearson, Ph.D., Geoffrey Severin, Ph.D., and Arwen Frick-Cheng, Ph.D., attended the 2021 Midwest Microbial Pathogenesis Conference at Michigan State University to present their research and Allyson Shea, Ph.D., Melanie Pearson, Ph.D., and Geoffrey Severin, Ph.D. attended the 2022 Midwest Microbial Pathogenesis Conference at the University of Wisconsin to present their research

Members of the lab have received many accolades for their work and maintain a strong publication record. We were delighted that Ph.D. student **Aric Brown** was awarded a two-year American Heart Association Predoctoral Fellowship for his proposal, “The two-component system ArcAB contributes to bacterial fitness during Gram-negative

bacteremia.” We are also very proud of Ph.D. student **Madison Fitzgerald** for being awarded a Ruth L. Kirschstein Predoctoral Individual National Research Service Award (F31) for her proposal, “Systematic analysis of *Proteus mirabilis* transcriptional regulators that drive uropathogenesis.” Fitzgerald also earned the departmental AdMiration Award, recognizing her major contribution to our PIBS graduate student recruitment efforts. As well, Lab Manager **Stephanie Himpsl** received a subsequent AdMiration Award for her outstanding service to the department (see page 26). Geoffrey Severin, Ph.D., was selected as one of the 2021 postdoctoral recipients of the departmental T32 grant program Molecular Mechanisms of Microbial Pathogenesis and has recently been named the Collett Endowed Postdoctoral Fellow (see page 44). Our lab along with collaborator labs published ten primary research articles and review articles in 2021 and 2022. Many of these studies include the outstanding work of **Stephanie Himpsl**, **Valerie Forsyth, M.S.**, and **Sara Smith** who are recognized for their superior contributions. The Mobley lab looks forward to another productive year and will soon welcome new trainees and scholars.

Sandkvist lab

Kris Blair, Ph.D. (postdoc) and **Austin Shannon** (Ph.D. student) finished a successful year on the MMMP training grant in 2021. Kris completed his postdoctoral studies at the end of 2021 and left for a position as a Research Development Specialist at Fred Hutch/University of Washington Cancer Consortium in Seattle. **Jiaxin Chen** (Master’s student) completed her research and graduated in April 2021. Her departing gifts to the lab were crocheted bacteria. Those working with *Acinetobacter baumannii* received a round, aflagellate bacterium, while those studying *Vibrio cholerae* received a curved rod with a polar flagellum. Maria was fortunate in receiving both!!! Jiaxin will start in Veterinary School in fall of 2022. Another Master’s student, **Melissa Bush**, graduated in the spring of 2022. **Laura Hutchins**, an undergraduate researcher, graduated and



Acinetobacter baumannii and *Vibrio cholerae* cozied up to one another in Sandkvist lab.

began her postbac studies at NIH in July 2022. We wish them best of luck!

A new postdoctoral fellow, **Dr. Cameron Roberts**, joined the lab in January of 2022. He is a biochemist who earned his Ph.D. from Wayne State University.



Sandkvist lab, April 2021

PUBLICATION HIGHLIGHTS



Dr. Alice
Telesnitsky

Brown JD, Kharytonchyk S, Chaudry I, Iyer AS, Carter H, Becker G, Desai Y, Glang L, Choi SH, Singh K, Lopresti MW, Orellana M, Rodriguez T, Oboh U, Hijji J, Ghinger FG, Stewart K, Francis D, Edwards B, Chen P, Case DA, Telesnitsky A, Summers MF. (2020) Structural basis for transcriptional start site control of HIV-1 RNA fate. *Science*. 368(6489):413-417. doi: 10.1126/science.aaz7959

One guanosine determines transcript fate

Transcripts of the HIV-1 RNA genome can be either spliced and translated into viral proteins or packaged into new virions as a progeny genome. The path taken depends on whether the transcript contains one guanosine at the 5' terminus (1G) rather than two or three (2G or 3G). Brown *et al.* used nuclear magnetic resonance spectroscopy to show that 1G transcripts adopt a dimeric structure that sequesters a terminal cap required for translation and splicing but exposes sites that bind to the HIV-1 Gag protein, which recruits the genome during viral assembly. Conversely, 2G or 3G transcripts have the cap accessible, but Gag-binding sites are sequestered. Therefore, a single guanosine acts as a conformational switch to determine the fate of HIV-1 transcripts.



Dr. Denise
Kirschner

Louis R. Joslyn, Jennifer J. Linderman, Denise E. Kirschner, **A virtual host model of *Mycobacterium tuberculosis* infection identifies early immune events as predictive of infection outcomes**, *Journal of Theoretical Biology* (2022), DOI: 10.1016/j.jtbi.2022.111042, PMID: 35114195

This new work is the first whole-host immune computational model of any infection. It captures pulmonary tuberculosis dynamics within lungs, lymph nodes and blood and can now be used to study treatment, vaccines and perform pre-clinical trials narrowing the design spaces of drugs regimens and vaccine candidates.

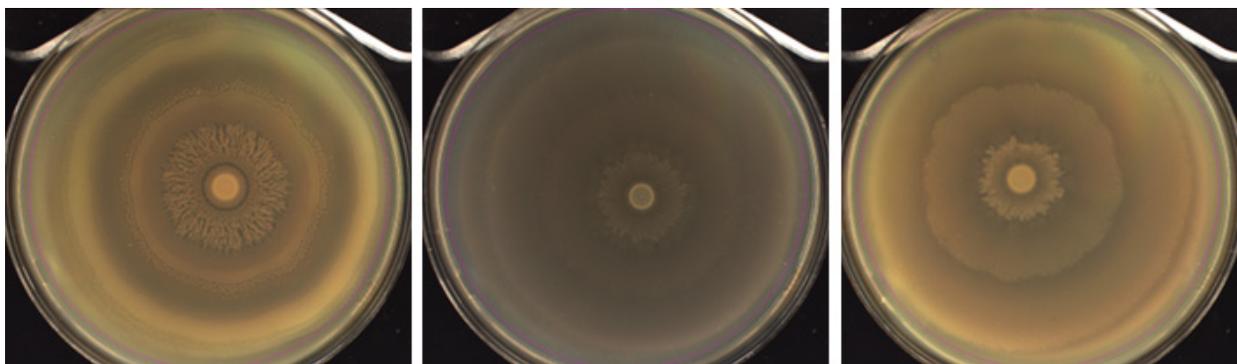


Dr. Melanie
Pearson

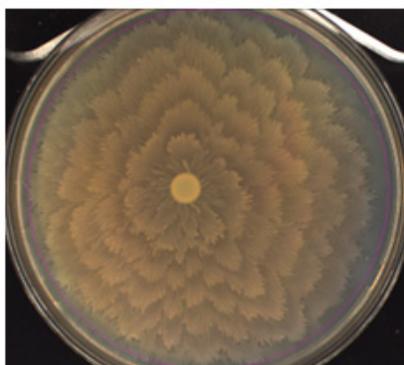
Jiang W, Ubhayasekera W, Breed MC, Norsworthy AN, Serr N, Mobley HLT, Pearson MM, Knight SD. **MrpH, a new class of metal-binding adhesin, requires zinc to mediate biofilm formation**. *PLoS Pathog*. 2020 Aug 11;16(8):e1008707. doi: 10.1371/journal.ppat.1008707. PMID: 32780778; PMCID: PMC7444556.

Many bacteria use fimbriae to adhere to surfaces, and this function is often essential for pathogens to gain a foothold in the host. In this study, we examine the major virulence-associated fimbrial protein, MrpH, of the bacterial urinary tract pathogen *Proteus mirabilis*. This species is particularly known for causing catheter-associated urinary tract infections, in which it forms damaging urinary stones and crystalline biofilms that can block the flow of urine through indwelling catheters. MrpH resides at the tip of mannose-resistant *Proteus*-like (MR/P) fimbriae and is required for MR/P-dependent adherence to surfaces. Although MR/P belongs to a well-known class of adhesive fimbriae encoded by the chaperone-usher pathway, we found that MrpH has a dramatically different structure compared with other tip-located adhesins in this family. Unexpectedly, MrpH was found to bind a zinc cation, which we show is essential for MR/P-mediated biofilm formation and adherence

to red blood cells. Furthermore, MR/P-mediated adherence can be modified by controlling zinc levels. These findings have the potential to aid development of better anti-biofilm urinary catheters or other methods to prevent *P. mirabilis* infection of the urinary tract.



Proteus mirabilis bacteria are a major contributor to catheter-associated urinary tract infections (UTIs). These bacteria are also known for their ability to swarm over surfaces, producing a characteristic bullseye pattern. Differences in swarming behavior are often connected to decreased bacterial fitness in a mouse model of UTI. Here is a wild-type strain of *P. mirabilis* (top left) and a panel of three mutants that have both severe fitness defects in mice and strikingly altered swarming motility.



Mirabelli C, Jones MK, Young VL, Kolawole AO, Owusu I, Shan M, Abuaita B, Turula H, Trevino JG, Grigorova I, Lundy SK, Lyssiotis CA, Ward VK, Karst SM, Wobus CE. **Human Norovirus Triggers Primary B Cell Immune Activation *In Vitro***. *mBio*. 2022 Apr 26;13(2):e0017522. doi: 10.1128/mbio.00175-22. Epub 2022 Apr 11. PMID: 35404121



Dr. Christiane Wobus

Human norovirus (HNoV) is the most prevalent causative agent of diarrhea worldwide, but there are currently no approved therapeutic and preventative strategies to limit the health and socioeconomic burdens associated with HNoV infections. Moreover, HNoV does not elicit lifelong immunity as repeat infections are common (one estimate put this at 5 infections in every person's lifetime), presenting a challenge for vaccine development. Given the importance of B cells in long-term immunity, we investigated the susceptibility and impact of HNoV infection on human B cells. We found that HNoV replicates in human primary B cells derived from blood, spleen, and lymph node specimens, while the nonstructural protein NS1 can activate B cells. Because of the secreted nature of NS1, we put forward the hypothesis that HNoV infection can modulate bystander B cell function with potential impacts on systemic immune responses.



Faith Anderson in the O'Meara lab



M&I research staff, M&I picnic, September 2022

GRANTS

**NIH Grants:
19.1 million in
2021, \$18.7
million in 2022**

Timi Adediran (Snitkin lab) was selected for a position on the NIH T32 Physician Scientists in Aging Training Grant and earned a F32 award.

Jenn Baker (mentors **Drs. Dickson** and **Huffnagle**) was awarded an NIH F31 for her proposal “Determining the injury-associated microbial nutrients that facilitate secondary bacterial infection in acutely injured lungs.”

Haley Brown (Koropatkin lab) received an F32 award.

Vern Carruthers was awarded an R21 by the NIH/NIAID, “Identifying novel players in toxoplasma autophagy during chronic infection.”

Kaushik Choudhuri was awarded an R21 for his project: “Biophysical tuning of chimeric antigen receptor (CAR) signaling for safe and effective T cell immunotherapy.”

Madison Fitzgerald earned an NIH F31 grant.

Jie Geng was awarded an R21, funded by the NIH/NIAID: “Modulation of CD8+ T cell responses by HLA-F.”

Kyle Gontjes (Snitkin lab) was selected for a position on the Genome Sciences Training Program T32.

Adam Hafner, Katie Winner, Zach Powers and **Lavinia Unverdorben** have all received support from the NIH Molecular Mechanisms of Microbial Pathogenesis Training Grant.

Gabby Huizinga, Amanda Photenhauer, Judy Chen, Filipe Cerqueira, Maria Virgilio and **Elissa Hult** each had NIH F31 funding.

Denise Kirschner (PI), in collaboration with investigators **Linderman** (UM), **Flynn** (Pitt), **Matilla** (Pitt) and **Angelo** (Stanford), was awarded a \$5,734,723 award lasting 3 years (with the possibility of a fourth year) by the Wellcome Leap Solicitation for Delta Tissue, for their project: “Tissue time machine for TB.”

Adam Lauring’s lab has received several grants and contracts – directly from the CDC, as subcontracts on other CDC projects, and as subawards. In total, these amount to \$2.6 million in total costs over the next several years for work on SARS-CoV-2.

Adam Lauring and **Evan Snitkin** were awarded a \$4.375 million contract from MDHHS to increase pathogen genomic surveillance in Michigan. (See article page 14)

Harry Mobley, Arwen Frick-Cheng, Evan Snitkin and the **Mobley Lab** for their R01 clinical UTI award.

Teresa O’Meara got her first R35 MIRA award and her team received her first R21 entitled “Genetic characterization of *C. auris* adhesion.”

Amanda Photenhauer (Koropatkin lab) received an F31 award.

Yolanda Rivera-Cuevas (Carruthers lab) received an F31 award.

Ally Shea (Mobley lab) received an F32 award.

Chelsey Spriggs, former MMMP T32 trainee in Billy Tsai’s lab received a K99/R00.

Dan Tyrrell (Goldstein lab) was awarded a K99/R00 on aging, the cerebral vasculature and stroke.

Helen Warheit-Niemi holds an NIH F31 grant.

Christiana Wobus was awarded an R21, funded by the NIH/NIAID: “The role of norovirus capsid flexibility in infection and pathogenesis.”

Xiaofeng Zhou received an R01 focused on microbiota influences on lung pathology post-stem cell transplant and herpes virus infection.

M&I received \$4.375 million in federal funding to strengthen genomic surveillance for infectious diseases



Adam Lauring and Evan Snitkin

At the end of 2021, the laboratories of Emily Martin, Adam Lauring, Evan Snitkin, and Betsy Foxman at the University of Michigan Medical School and School of Public Health received a \$4.375 million contract to integrate and synergize their research for more comprehensive genomic surveillance of emerging infectious diseases.

This grant is a part of the collaborative Michigan Sequencing Academic Partnership for Public Health Innovation and Response (MI-SAPPHIRE) program, led by the Michigan Department of Health and Human Services (MDHHS).

The overall goal of the MI-SAPPHIRE program is for MDHHS to work with partner universities to expand genomic surveillance across the state of Michigan. Partner universities will use the funding to expand sequencing and analysis capacity, and to improve understanding of bacterial and viral spread across the most populous regions of the state.

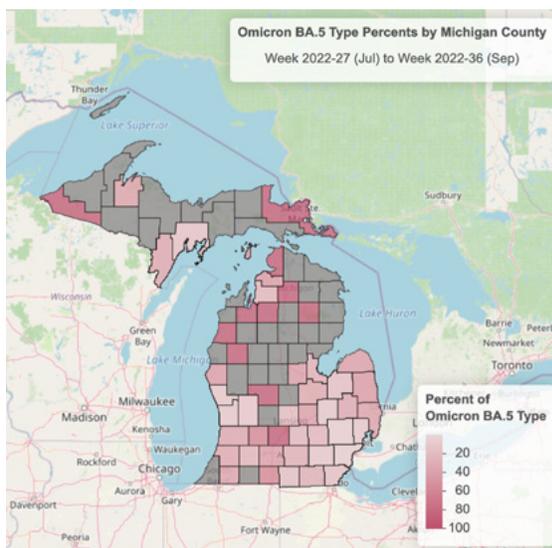
The University of Michigan component of the MI-SAPPHIRE program contains two projects. One project, led by Emily Martin

and Adam Lauring, will focus on gathering and sequencing clinical samples in the Michigan Medicine health system and other health systems across south-eastern Michigan. This project includes collaboration with partners at Trinity Health, Ascension Health, Beaumont Health, and Henry Ford Health Systems to capture viral samples for sequencing. The second project is led by Evan Snitkin and Betsy Foxman. They will use genomic sequencing and wastewater surveillance to define the spread of healthcare-associated pathogens, including multi-resistant gram-negative rods and *Candida auris*.

“The University of Michigan has significant strengths in pathogen genomics and epidemiology. This is a great opportunity to collaborate with scientists at MDHHS to expand genomic surveillance and improve the public health of Michiganders,” explained Adam Lauring, one of the recipients of the genomic surveillance fund.

Since the emergence of SARS-CoV-2, the Lauring lab has been receiving patient samples collected from University Health Service, U-M Mott Emergency Department, the CDC-sponsored IVY Network of Hospitals, UM COVID-19 Community Sampling and Tracking Program, Michigan Medicine, and the School of Public Health. Samples from these locations are used to sequence SARS-CoV-2 genomes. These genomic data can be used to answer critical questions in control and surveillance, such as which viral lineages appear in certain communities and what strains have been increasing or decreasing in the patient community.

When added to data generated at laboratory sites worldwide, molecular analysis of clinical samples here at UM helps to identify and follow viral variants, contributing to our understanding of viral evolution at a global scale.



Map showing county level distribution of the BA.5 variant of SARS-CoV-2. The map is from the dashboard developed as part of the MI-SAPPHIRE project and is updated weekly. This map is shared with local and state public health officials as well as with the CDC.

PEOPLE



Photos, top to bottom: Chang lab, M&I visits the peony garden, and lunch on the lawn.

WELCOME TO OUR NEW M&I TEAM MEMBERS!

Faculty

Marcy J. Balunas, Associate Professor
Chelsey Spriggs, Assistant Professor

Administration

Ekaterina Bethke, Research Administration
Krista Hopson, Research Administration
Silas Johnson, Program Manager
Jona Kalaj, Research Administrator
Angela Kelly, Administration Specialist
Melissa K. McGeorge, Purchasing Clerk
Elisabeth Paymal, Communications Specialist
Alan Phlipot, Financial Specialist
Kim Rize, Chief Department Administrator

Research Fellows

Kojo Sekyi Acquah
Timileyin Yetunde Adediran
Celeste Alexander
Sarah Elizabeth Arcos
Courtney Armour
Ricardo de Souza Cardoso
Luiza Castro Jorge
Keshav G C
John Kaletka
Hargobinder Kaur
Nathaniel Lartey
Nicholas Lesniak
Sarah Lucas
Emily Clare Maggioncalda
Praveen Manivannan

Allison Mason
Michael James McFadden
Christian Michael
Rajat Mudgal
Pariksheet Nanda
Nhu Nguyen
Einar Birnir Olafsson
Estela Aparecida Pereira
Cameron Sevon Roberts
Geoff Severin

Research Lab Staff

Roxann Alonzo, Research Lab Specialist
Theadora Ceccarelli, Research Lab Technician
Ya-Ting Chang, Research Lab Technician
Thomas Decoville, Research Lab Technician
Harini Desikan, Research Lab Technician
Daniel Edwards III, Research Lab Specialist
Amanda Flora, Research Lab Specialist
Chunfang Guo, Research Lab Technician
Zijun He, Research Lab Technician
Christina Kiser, Research Lab Specialist
Shiuhyang Kuo, Research Lab Specialist
Daniel Macedo de Melo Jorge, Research
Lab Specialist
Britton Michmerhuizen, Research
Lab Technician
Ashley Miihlbach, Research Lab Technician
Carson Nickel, Research Lab Technician
Lauren Suttentberg, Research Lab Technician
Martijn Van der Ent, Research Lab Specialist
Tiffany Wan, Research Lab Specialist



M&I departmental picnic, September 2022

WELCOME FACULTY

Marcy Balunas, Ph.D.



M&I welcomes Dr. Marcy Balunas as Associate Professor, Microbiology & Immunology. She holds a joint appointment as Associate Professor in the Department of Medicinal Chemistry of the College of Pharmacy.

Dr. Balunas's research program focuses on interaction-driven molecule discovery from host-microbe symbioses. We seek a fundamental understanding of how the metabolome mediates host-microbiota interactions, aiming to discover novel bioactive metabolites involved in chemical communication between eukaryotic hosts, their bacterial associates, and pathogenic organisms.

Dr. Balunas received a dual B.A./B.A. degree in Chemistry and Biology from the University of Rochester, a M.S. degree in Plant Ecology from the State University of New York College of Environmental Science and Forestry, and a Ph.D. degree in Pharmacognosy from the University of Illinois at Chicago. She conducted her postdoctoral research on marine natural products drug discovery at the Scripps Institution of Oceanography at the University of California San Diego in conjunction with the Smithsonian Tropical Research Institute in Panama City, Panama. Dr. Balunas began her independent career at the University of Connecticut Department of Pharmaceutical Sciences. See featured story on page 22.

Yvonne Huang, M.D.



M&I is pleased to announce that Dr. Yvonne Huang, M.D., Associate Professor of Internal Medicine, Division of Pulmonary & Critical Care Medicine, is now also Associate Professor of Microbiology & Immunology.

Dr. Huang received her M.D. from the University of Alabama at Birmingham and did her Internship/Residency in Internal Medicine at Yale/New-Haven Hospital. She did a fellowship in Pulmonary & Critical Care Medicine at UCSF where she became an Adjunct Assistant Professor prior to joining U-M Department of Medicine in 2014.

Dr. Huang's areas of interest include:

1. Microbiome-host interactions in asthma pathogenesis and asthma phenotypes
2. Microbiome-host interactions in COPD pathogenesis and phenotypes
3. Effects of treatments (xenobiotics) on airway disease-associated microbiota
4. Multi-'omics, computational modeling of microbiome interactions in asthma and COPD.

Michal Olszewski, D.V.M, Ph.D.



M&I is pleased to announce that Michal Olszewski, D.V.M, Ph.D., a Professor in Internal Medicine, Pulmonary & Critical Care now also holds an appointment in M&I as Professor of Microbiology & Immunology.

Dr. Olszewski received his Ph.D. and postdoctoral training in pulmonary and host-defenses research. He is directing a fungal immunology research lab at the VA Ann Arbor Hospital and has been funded by the VA since 2002.

The major focus of Dr. Olszewski's research is on cryptococcosis, a leading invasive fungal infection. Cryptococcal infections continue to have an unacceptably high mortality rate due to the limited effectiveness and toxicity of antifungal drugs, rapidly increasing drug resistance, and the ever-increasing number of susceptible hosts.

Dr. Olszewski studies the immunomodulation mechanisms during infection with *Cryptococcus* sp, targeting and dissecting both "poles" of immunomodulation:

- a) Host's factors, including their alterations induced by immunotherapeutic interventions; and
- b) Immunomodulatory microbial factors that impact anti-cryptococcal host defenses. His recent studies fill the critical gaps in understanding cryptococcal host-pathogen interactions in the lungs, CNS and other organs affected during disseminated disease.

Dr. Olszewski teaches/directs a Ph.D. level class Experimental Immunology (IMM 850), which prepares Ph.D. students for qualifying exams in our T32-funded graduate program. He has successfully trained multiple post doctoral trainees, graduate and undergraduate students and post-baccalaureates towards medical/graduate schools with the ultimate goal of training medical scientists (M.D./Ph.Ds) with over 95% placement rate at the desired next-step for their careers.

Mark Schlissel, M.D., Ph.D.



M&I is pleased to welcome back Dr. Mark Schlissel, former President of the University. Dr. Schlissel trained as a physician and molecular immunologist holding his A.B. degree from Princeton and his M.D. and Ph.D. degrees from Johns Hopkins. His research has focused on the developmental biology of B lymphocytes which are important for antibody secretion. His work has contributed to a detailed understanding of genetic factors involved in the production of antibodies and how mistakes in that process can lead to leukemia and lymphoma.

Chelsey Spriggs, Ph.D.



We are delighted to announce the addition of Dr. Chelsey Spriggs to our faculty. Dr. Spriggs is an Assistant Professor at the University of Michigan in the Department of Cell and Developmental Biology (CDB) and a Research Assistant Professor at the University of Michigan's Life Sciences Institute (LSI) with a joint appointment in the Department of Microbiology & Immunology. Her work focuses on host-pathogen interactions and, more specifically, how viruses utilize host cellular machinery for the completion of their life cycles. Her lab studies the virus-host interactions mediating DNA virus entry and is funded through MOSAIC K99/R00 and Burroughs Wellcome Fund Postdoctoral Enrichment Program (PDEP) fellowships.

Dr. Spriggs earned her B.S. in Microbiology from Michigan State University and her Ph.D. in Microbiology and Immunology from Northwestern University.

Vincent Young, M.D., Ph.D.



M&I is pleased to announce that Vincent Young, M.D., Ph.D., now holds a partial primary appointment in the Department of Microbiology & Immunology. Dr. Young is the William Henry Fitzbutler Collegiate Professor of Internal Medicine, where he has been a member of the faculty since 2007. Dr. Young joined the Department of Microbiology & Immunology in 2008, and has been one of our most active joint appointees.

Dr. Young was born in Buffalo, New York. He received his undergraduate degree from the Massachusetts Institute of Technology in 1985 and received his M.D. and his Ph.D. in Microbiology & Immunology from Stanford University in 1992. Dr. Young completed his clinical training in Internal Medicine and Infectious Diseases at the Massachusetts General Hospital. He was previously on the faculty at Michigan State University prior to joining the University of Michigan in 2007.

Research in the Young lab is directed at understanding the role of indigenous microbiota in influencing the health status of their host. One research focus is to examine how the population structure and thus function of the gastrointestinal microbiota can influence host-pathogen interactions and how changes in the community structure of the indigenous microbiota itself can lead to pathogenic states. This research is being conducted both with material from human subjects as well as animal models of disease.

FACULTY ACCOLADES

PROMOTIONS

Marilia Cascalho was promoted to Professor.

Kathy Gallagher was promoted to Professor.

Stephen Gurczynski was promoted to Research Assistant Professor.

Kate Eaton was promoted to Active *Emeritus* Professor

Adam Lauring was Promoted to Professor.

Eric Martens was promoted to Professor.

Evan Snitkin was promoted to Associate Professor.



Stephen Gurczynski, Kate Eaton and Adam Lauring

Kate Eaton, D.V.M., Ph.D., joined U-M in 2003 and held a faculty position as Professor in both M&I and the Unit for Lab Animal Medicine. Her lab studied gnotobiology and enterohemorrhagic E. coli. As a veterinary pathologist she contributed to numerous collaborations studying inflammatory bowel disease, urinary tract infections, gastric cancer and fibrosis among other areas. Dr. Eaton is a treasured mentor in the department and we are fortunate she will stay with us as active emeritus. Here, she is enjoying her well-deserved retirement cake and eating it too!



Marilia Cascalho



Kathy Gallagher, Evan Snitkin and Eric Martens

FACULTY ACCOLADES (continued)

AWARDS

Oveta Fuller won the Sara Goddard Power Award, was named to the FDA Vaccine Advisory Panel, and received the SACUA U-M Regent's award for public service.

Eric Martens received the Endowment for the Basic Sciences Teaching Award.

Beth Moore was named chair of LCMI study section and received an award for service from Internal Medicine.

Mary O'Riordan was elected into the American Academy of Microbiology.

Pat Schloss earned the 2022 American Society for Microbiology Microbiome Data Prize and was elected an American Association for the Advancement of Science (AAAS) Fellow.

Kathy Spindler was elected an American Association for the Advancement of Science (AAAS) Fellow.

Michele Swanson was named a 2021 Rackham Distinguished Graduate Mentor, was named to UMMS Executive Committee and served as the Interim Associate Dean of Graduate & Postdoctoral Studies at Michigan Medicine.

FELLOWSHIPS

Cheong-Hee Chang was named Distinguished Fellow of the American Association of Immunologists.

Denise Kirschner was selected as a 2021 Fellow of the Society for Industrial and Applied Mathematics (SIAM).

Pat Schloss and **Kathy Spindler** were elected as AAAS Fellows.

KEYNOTES and CONFERENCES

Marcy Balunas was elected as vice chair and chair of a Gordon Research Conference.

Michael Imperiale was the keynote speaker at the DNA Tumour Virus Meeting in Cambridge, UK.

Nicole Koropatkin chaired a Gordon Research Conference.

Beth Moore was named vice-chair of a Gordon Research Conference and presented at the NIAID T32 directors meeting as an exemplar program. She was also the keynote speaker for the Louisiana Lung Conference in 2021 and the RESPImmun retreat for the University of Austria in 2022.

Chelsey Spriggs was elected Councilor for Virology Trainees in ASV and gave the State-of-the-Art Talk at the American Society for Virology Meeting.

Alice Telesnitsky was the keynote speaker at Cold Spring Harbor Retrovirus Meeting.

IN THE MEDIA

Adam Lauring: "What the future may hold for the coronavirus and us," *The New York Times*, November 3, 2021

Adam Lauring: "Michigan accounts for one in 10 new Covid cases in US amid surge," *The Guardian*, November 26, 2021

STAFF ACCOLADES

Susan Agnew, Will Fitzsimmons, Stephanie Himpfl, Cindy Shaw, and Joe Waliga received the AdMIration Awards (see page 26).

Nick Pudlo received the Endowment for the Basic Sciences Research Staff Award.

Kim Rize is the new Microbiology & Immunology Wellness Champion.

Retirement



Susan Agnew started at U-M in 2002 in the department of AEC (Architecture, Engineering and Construction). She worked on

the financials for several infrastructure projects throughout the university. “Thinking back on the some of the archaic software and systems we used, I wonder how we did it,” she said.

In 2004, she transferred over to the finance team within M-Care which was the University managed health-care program established in response to high healthcare costs (Michigan was only the second University in the U.S. to create its own managed

care program). “The most fun committees were planning a day trip to a Tigers game and a competition between departments where we created a black and white film noir (we won!).”

At the end of 2006—beginning of 2007, M-Care was purchased by Blue Cross, and Agnew was offered a position with her supervisor with Internal Medicine, Molecular Medicine and Genetics team and started learning about research administration. “I hadn’t realized that all of my prior experience led me into a career path I never heard of, or knew about,” she said.

In 2009, Agnew transferred to the Cancer Center and learned all about P30 grants and the finances of the CC. The P30

was one of the largest grants at the University and crossed over numerous departments within and out of the health system. The grant had many components and it took a lot of teamwork to keep it organized. It was also still submitted via paper as it was one of the last to switch over to ASSIST. “When we submitted the P30 in 2017 the stack of paper was almost 14 inches high!” she said.

In July 2018, she joined M&I. “I was lucky enough to get a position in M&I with one of the greatest groups of people of my career. I have not laughed as hard and as frequently as I have while working in M&I. I will miss all of you. Thanks for the memories.”



M&I staff at September 2022 picnic

MEET MARCY BALUNAS



Left to right: Kojo Acquah, postdoctoral scholar, Katie McBride, research specialist, Marcy Balunas, and Dulce Guillén Matus, postdoctoral scholar

Dr. Marcy Balunas's interest in science stems from her intense observation of nature interactions combined with curiosity, caring for others, and persistence. To this day, most of her work has revolved around one goal: to understand the chemistry behind the interactions between bacteria and other organisms, to eventually harness these mechanisms to cure diseases. And this quest has taken her to the tropics, the underwater world, and eventually to Michigan.

Balunas was a child when her grandmother was told that there was no more treatment, no more drugs to fight her lethal breast cancer. This dramatic scenario repeated itself when she was caring for her mother who also had terminal breast cancer. Confronted with these devastating medical limitations, Balunas launched herself in a relentless search for cancer cures. It was also her childhood experiences with outdoors and nature observation that led her to first be interested in plants and traditional medicine. One of her most



Dr. Balunas carries the Olympic Torch, December 30, 2001, after being nominated for her dedication to the search for new medicines for breast cancer.

intense moments of this journey included when she went deep into the Brazilian Amazonian rainforest to learn about indigenous plant knowledge.

But this was not enough for Balunas who decided to expand her initial interest in natural products chemistry by studying microbiology and the chemical ecology of host-microbe symbioses. A three-year postdoc position in

Panama offered by the Scripps Institute of Oceanography and the Smithsonian Tropical Research Institute, was perfect for her exploration of bacterial defense mechanisms in cyanobacteria. Along the way, she became interested in how an antibody could carry the extremely toxic molecules from cyanobacteria to destroy cancer cells. There, Balunas also collaborated with Panamanian scientists at INDI-CASAT, the Panamanian research institute, and encouraged American students to interact with Panamanian students as they all learned from each other. "Watching U.S. and Panamanian students exchange scientific and cultural knowledge was one of the highlights of my postdoctoral experience," she said.

While at the University of Connecticut, Balunas began studying the Hawaiian bobtail squid (*Euprymna scolopes*) that has developed two specific organs to hold bacteria. One of them combines many strains of bacteria to protect the squid eggs. The other organ is filled with bacteria that make the squid bioluminesce

at night. This protects the squid from predators who are tricked to take the glowing squid for a reflection of the moon. “How have such organs developed and what is the chemistry behind this phenomenon? This is still a mystery,” said Balunas. From the squid, she branched out to study other host-microbe associations including fungus-gardening ants, honeybees, and marine tunicates.

At Michigan, she finds again the collaborative spirit that stimulates her curiosity and research.

She is already collaborating with Patrick Schloss on bioinformatics of multi-omic data for colorectal cancer, and looking forward to potential collaborations with David Sherman, Vern Carruthers, Vince Young, Mary O’Riordan, Tom Schmidt, and many others.

Balunas welcomes applications from students and postdoctoral fellows. Her goal is to train scientists to straddle the fields of microbiology, chemistry, ecology, and drug discovery.



One of the most compelling hosts the Balunas Lab studies is the Hawaiian bobtail squid, Euprymna scolopes. It contains two organs dedicated to housing beneficial microbes for defense against predators and infection.

“Studying host-microbiome interactions with this multi-disciplinary approach will prepare people for the next generation of science.”



Dr. Balunas looking forward to exciting metabolomics results from her newly installed Bruker timsTOF mass spectrometer.

MEET TERESA RODGERS O'MEARA

Dr. Teresa Rodgers O'Meara was more interested in literature and reading novels than in science, until an 11th grade teacher introduced her to the biology framework that made sense to her. After that insightful year, biology was how she wanted to think about the world.

“Biology is what I want to do and how I want to think about the world.”

She currently studies cellular responses to stressors and in particular to fungal invasion. She is also interested in understanding the mechanisms that allow a cell to differentiate between a fungal pathogen versus a fungus that does not harm a cell (as found in food yeast—beer, bread, etc.). A fungus' ability to damage a cell by proliferating inside it or producing toxins might trigger different cellular reactions. To advance this research, the O'Meara lab engineered a new gene editing tool using CRISPR technology to study the role of individual genes in *Candida auris*. “This new gene editing tool is opening the field and we hope for a wide uptake of this new technology,” she said. This technique has been published in *Nature Communications* (2021).

O'Meara clearly distinguishes between two goals in her career. As a postdoc, her goal was to do as much research as possible, “getting in the zone,” being excited about discovering something for the first time. As an assistant professor, she wants her trainees to experience the same joy of discovery. She sees her role as supporting them and facilitating

their success. “This is how I was trained by my principal investigators, and I want to bring this type of support to my students and colleagues,” she said. “I want my students to think of their data first while I can bring a broader knowledge and context to help them keep pushing.”

O'Meara is very intentional about her mentorship and thoughtfully adapts her mentoring to what her trainees need at a particular time. She is also well-aware that academia is not the only choice and she wants her mentees to find their own professional call and be successful. In addition to reading about mentorship, O'Meara found the U-M Rackham Mentoring Others Results in Excellence (MORE) program very helpful to develop her own mentoring skills and style.

As a woman in science, O'Meara still notices a lot of bias, although she feels lucky to have had great mentors and to be in a department where these are well addressed. Becoming a mother while in graduate school, she and her husband, also a junior faculty at U-M, have to navigate work-life balance, and childcare issues (for example, during her postdoc to be able to attend departmental seminars that are usually scheduled later in the afternoon). “It was especially hard during the pandemic when there was no childcare at all. If you don't have an equal partner, it's impossible to do,” she said.

According to O'Meara, the Department of Microbiology and Immunology (M&I) at U-M is the only place she interviewed that had more than 30% faculty



women—while women have been the majority of Ph.D. graduates in biology for a while. For O'Meara, this shows an obvious systematic bias against women that has been deliberately and effectively addressed at M&I with a different hiring strategy. She feels well-supported by the department chair, Beth Moore, and her colleagues, and is very grateful to be part of this community. “The freedom and support I have received at M&I is close to unimaginable,” she said. “There is still a lot of work to be done to change systemic bias in academia as gender and racial diversity at the faculty level remains an issue.” One of her goals is to not let the society default culture push over into the lab's culture.

Scientific journey

O'Meara was born in South Korea and raised in Wisconsin and Singapore until she went to undergraduate school at the Uni-

versity of Chicago. There she took a physiology class with professor Martin Feder who encouraged students to try research before going down the medicine path. Following this recommendation, she worked in his lab on *Drosophila*, studying the role of transposable elements in the transcriptional regulation of small heat shock proteins, which impacts the physiology of the fly. O'Meara loved doing the research, asking questions, and being around scientists. She had found her path into biology research.

She went on to graduate school at Duke University, joining a genetics program and studying the genetics of fungal pathogens with Andrew Alspaugh. "This was the right mentor and the right project for me," she said, "because we applied genetics approaches and thinking to pathogen interactions, and the outcome might be clinically relevant to curing diseases and helping people."

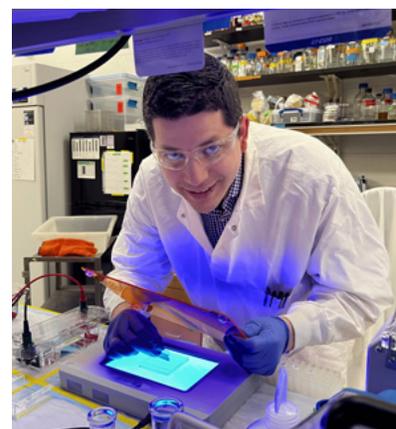
During her postdoctoral tenure with Leah Cowen at the University of Toronto, she focused on pathogen interactions with their environment, asking large questions such as how the fungus controls its shape, how it responds to environmental stressors, and how the host cell responds to infection. They used large scale screening and global genetic and proteomic analyses of fungal pathways to answer these questions. Later, at the University of California, San Francisco, she further applied her understanding of the use of large-scale screening to ask questions about the genetic underpinnings of virulence in animals.

At the University of Michigan since 2019, O'Meara has found scientists who not only study fungal pathogens but also bacterial infections, and with Mary O'Riordan, she is collaborating on several projects that compare processes and reac-

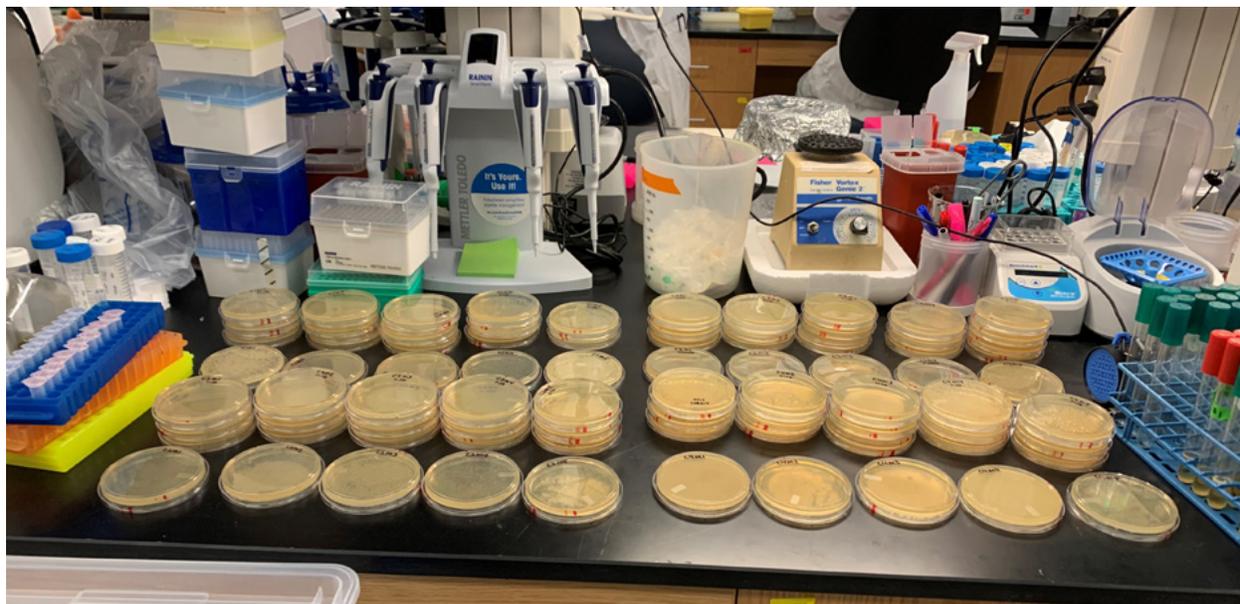
tions to different pathogens. She is also working with others at U-M on projects spanning from drug discovery to natural strain variation in human isolates of *Candida albicans*.

Cited article

Santana, D.J., O'Meara, T.R. Forward and reverse genetic dissection of morphogenesis identifies filament-competent *Candida auris* strains. *Nat Commun* 12, 7197 (2021). <https://doi.org/10.1038/s41467-021-27545-5>



Darian Santana



Plates of *Candida albicans* serial dilutions, O'Meara lab

M&I ESTABLISHES ADMIRATION AWARDS

We are pleased to announce the inaugural recipients of the Department of Microbiology and Immunology AdMIration awards. These awards honor two non-faculty individuals twice a year (June and December) who have contributed to our departmental community and made it a better place to study science together. At least one of the year's four AdMIration awards will recognize individuals who have made significant contributions to departmental DEI efforts.

Happily, we received many nominations for the first three award cycles. Nominations may be submitted by anyone in the department. The inaugural AdMIration award recipients from December 2020 were Filipe Cerqueira and Carmen Mirabelli.

Filipe Cerqueira is recognized for his work to establish the DEI Taskforce via OGPS and his involvement in the Facilitator Engagement Program at



UM. He has also been facilitating a DEI-related book club within his own laboratory that has been highly impactful.

In his nomination letter, Dr. Koropatkin commented, "I appreciate his reminders that it's okay if we 'say the wrong thing'! I know that might sound silly, but we can't have open discourse on difficult topics without the ability to make a mistake. I feel that

Filipe helped us create a safe and forgiving environment for these discussions! Filipe has definitely helped me mature as a mentor and think more deeply about issues of inclusion and equity."

Importantly, Filipe accomplished all this service while also excelling in the laboratory, solving four unique crystal structures, publishing a review article and *JBC* article and earning an F31.

"... we can't have open discourse on difficult topics without the ability to make a mistake."

Carmen Mirabelli was recognized for her efforts to rise to the challenge of the COVID-19 pandemic. Carmen was the first person in 2020 to work in the newly reopened BSL3 space with SARS-CoV-2, including many collaborative projects. Few people have the appropriate training to work in the BSL3 even still. She put enormous time and effort into training and performing experiments for many other investigators.

In her nomination letter, Dr. Wobus commented, "She has been working extremely hard (more long days and weekends as before) since March on numerous SARS-CoV-2 projects, while at the same time also trying to move some of her regular work forward. In addition to working on many projects, she is always open to help others and is effectively communicating with

everyone to keep them apprised of progress. She really has gone far, far above and beyond what anyone can ask. What a super Superpostdoc!!!"

In addition to the inaugural recipients, **Susan Agnew, Joe Waliga, Cindy Shaw, and Madison Fitzgerald** received the 2021 AdMIration Awards, and **Stephanie Himpfl** and **Will Fitzsimmons** received the first of the 2022 awards. Susan was nominated by multiple people for her patience and willingness to take on the additional workload of managing the finances while Kathy Olbrich was out. Quite literally, Susan did the work of two people on her own, keeping up with faculty accounts and departmental finances, to hold down the fort while we searched for Kathy's replacement. Joe, the other June 2021 recipient, was nominated for being the Kirschner lab's boots on the ground and for helping with several departmental needs. Most notably these were website updates, sorting mail during the pandemic, Dropbox migration, and managing the servers during fluctuating power situations! Cindy was nominated for her outstanding efforts to support our pre-award grants process - many folks noted that she hasn't lost a beat working from home. The second December 2021 recipient, Madison, was nominated for her organization of virtual recruiting for PIBS in 2021, her work on the inclusive admissions committee for PIBS to develop an applicant FAQ, and her extra effort as a Teaching Assistant for Micro 640 this year.



“it is truly wonderful to work in a department where so many people are so deserving of our adMIration!”

As for the 2022 awardees, Stephanie was nominated for her multiple roles in the Mobley lab, department facilities, and DEI committee service. Will was nominated for leading the massive SARS-CoV-2 sequencing efforts in the Lauring lab, which benefits us all.

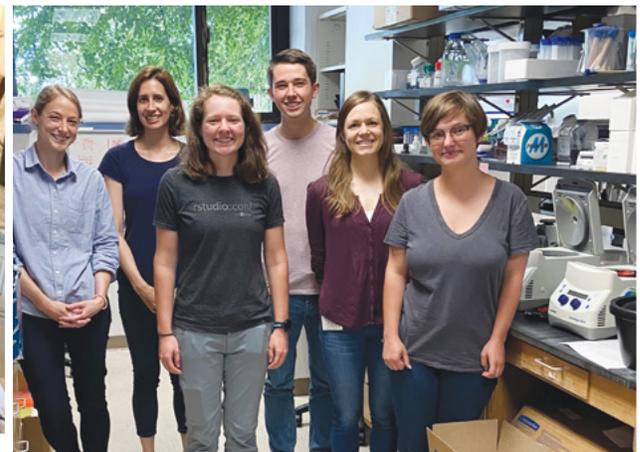
We congratulate each of the award recipients thus far—it is truly wonderful to work in a department where so many people are so deserving of our adMIration!



Madison Fitzgerald received one of the 2021 AdMIration Awards.



Tracey Schultz (left) and Amanda Flora (right), Carruthers lab



M&I faculty at M&I picnic, September 2022; Chelsey Spriggs and Adrienne Eady; Madison Fitzgerald, Karen Zeise and Helen Warheit-Niemi; Edmond Atindaana and Alice Telesnitsky; Teresa Rodgers O'Meara; Stephanie Thiede; Helen Warheit-Niemi and Beth Moore; Schloss lab (left to right: Sarah Lucas, Jay Moltzau, Kelly Sovacool, Andrew Beaudoin, Courtney Armour, and Katie McBride)

TRAINEES



From top to bottom: Chang lab, postdoctoral scholars, all students at the September 2022 M&I picnic, and student table at the departmental retreat in October 2022

WELCOME NEW STUDENTS!

Class of 2021 (Ph.D.) joined the following labs

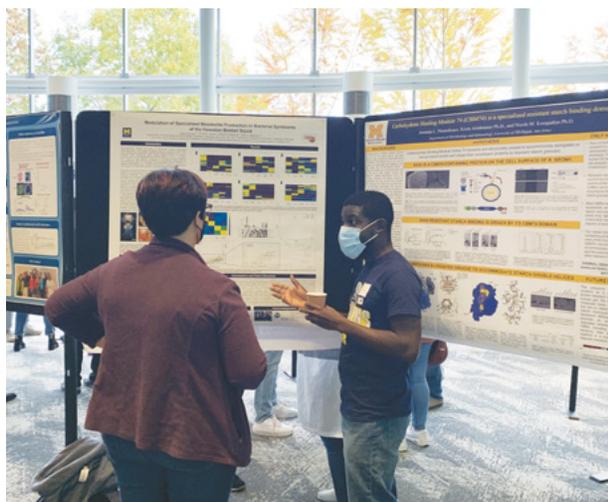
Adam Hafner - Wobus lab
 Jessica Li - Nina Lin lab
 Andres Rivera Ruiz - Wobus lab
 Xin Sun - Laouar lab

Ph.D. class of 2022

Isabel Amaya
 Olivia Harlow
 Katy Krupinsky
 Jackson Rapala
 Kelyah Spurgeon

Masters' Class 2022

Christopher Blair
 Trevor Davis
 Sara Masoud Abdellatif Mahmoud Elnztawy
 Supriya Gummalam
 Kwame Kannatey-Asibu
 Joan Price
 Yipei Tang
 Hongshan Zhang
 Deferred: Julia Elmers and Deepanshi Karwall



Poster presentation at departmental retreat,
 October 2022

OMIS Leadership 2021–2022

President: Faith Anderson
 Vice President: Patrick Rimple
 Social Chairs: Nicole Cady and
 Madison Fitzgerald
 PIBS Recruiting: Lavinia
 Unverdorben and Karen Zeise
 Student Invited Speaker
 Coordinator: Darian Santana
 BGSB Student Reps: Sadie Gugel
 and Amanda Photenhauer
 Master's Student Representative:
 Melissa Bush
 Press Coordinator: Yuan Li
 DEI Liaison: Jaime Fuentes

2022–2023

President: Zach Powers
 Vice President: Nicole Cady
 PIBS Recruiting Chairs: Andrés
 Rivera Ruiz, Jess Li
 Social Chairs: Faith Anderson
 and Karen Zeise
 Student-Invited Speaker Coordinator:
 Adam Hafner
 BGSB Student Representative:
 Darian Santana
 Master's Student Representative:
 Junha Lee
 Press Coordinator: Katie Winner
 DEI Liaison: Joey Krampen

TRAINEE ACCOLADES

POSTDOCTORAL SCHOLARS

Celeste Alexander was named a Postdoctoral Translational Scholars Program scholar.

Celeste Alexander and **Ethan Hillman** each won an abstract award from the Beneficial Microbes Conference.

Haley Brown was awarded an NIH F32 award.

Alana Condren and **Einar Olafsson** were supported on the Immunology T32 training grant.

Caity Holmes was elected University of Michigan Postdoc Association president.

Ari Kozik earned the 2021 Claudia Joan Alexander Trailblazer Award which recognizes groundbreaking accomplishments and contributions to equality in STEM.

Michael McFadden was named an MP3 fellow.

Matt Ostrowski published a paper in *Nature Microbiology*.

Sapna Pahil earned a tenure track Assistant Professor position in the Department of Medical Microbiology at the Postgraduate Institute of Medical Education and Research in Chandigarh, India.

Rebecca Pollet is now Assistant Professor at Vassar College.

Sam Porter received support from the NIH funded Molecular Mechanisms of Microbial Pathogenesis Training Grant.

Helen Rich earned a 2021 American Association of Immunologists (AAI) Trainee Abstract Award, gave a talk and was named a MP3 Fellow.

Geoffrey Severin was selected as the inaugural winner of the Dr. Marc Collett High Risk High Reward Discovery Award.

Geoff Severin and **Sarah Arcos** were supported on the Molecular Mechanisms in Microbial Pathogenesis T32 training grant.

Allyson Shea was accepted into American Urological Association's Urology Scientific Mentoring and Research Training (USMART) Academy, had a talk at ASM Microbe and holds a F32. She has also accepted a position as tenure track Assistant Professor at the University of South Alabama.

Amanda Starr, Ph.D., is an Instructor at Bryant & Stratton College in Richmond, Virginia

Dan Tyrell, Chelsey Spriggs and **Jay Vornhagen** were awarded NIH K99/R00 Pathway to Independence Awards.

Jay Vornhagen was hired as Assistant Professor at Indiana University, starting January 2023.

Fengrong Wang was promoted to Research Investigator.



Postdoctoral scholars appreciation breakfast, September 2021

STUDENT AWARDS

Jenn Baker was named Director for MiSci Writers. She was also the inaugural recipient of the Novy Scholarship to honor an outstanding student in bacteriology.

Aric Brown earned an American Heart Association Fellowship.

Judy Chen won the Monte V. Hobbs Award in 2022.

Madison Fitzgerald won the AdMIration Award (see page 26)

Jaime Fuentes was awarded a Howard Hughes Medical Institute Gilliam Graduate Fellowship.

Eli Olson won the Monte V. Hobbs Award in Immunology 2021.

Eli Olson, Emily Yarosz and Gabby Huizinga (teaching) and **Francisco Gomez-Rivera and Alex Ethridge** (DEI) won the 2021 Immunology Awards.

Megan Procaro received Pandemic Research Recovery funding from the University of Michigan.

Mack Reynolds earned the Miller Award 2021.

Austin Shannon and Patrick Rimple won the Excellence in Teaching Assistance Award from M&I.

Pha Thaprawat earned an NIH F30 award.

Stephanie Thiede was awarded a Rackham Predoctoral Fellowship.

Helen Warheit-Niemi won an Immunology Program Retreat Poster award.



Helen Warheit-Niemi in Moore lab



*Emily Yarosz (left)
and Yolanda Rivera-
Cuevas (right)*

DEFENSES 2021–2022

Stephanie Thiede (Evan Snitkin lab)



July 2, 2021
 “Genomic epidemiological insights into MRSA transmission and adaptation in an urban jail and the surrounding community”

Anna Lisa Lawrence (Mary O’Riordan lab)



December 7, 2021
 “Human intestinal organoids as a model to study intestinal infection by the foodborne pathogen *Salmonella enterica*”

Chris Sumner (Akira Ono lab)



January 21, 2022
 “tRNA binding and displacement: implications of specific membrane binding of HIV-1 gag”

Yolanda Rivera-Cuevas (Vernon Carruthers lab)



March 10, 2022
 “*Toxoplasma gondii* exploits the host ESCRT machinery for parasite uptake of host cytosolic proteins”

Elissa Hult (Bethany Moore lab)



March 14, 2022
 “The role of M2 macrophages and their product, HB-EGF, as regulators of lung fibrosis”

Nick Lesniak (Pat Schloss lab)



March 15, 2022
 “The effect of gut microbiota variation on *Clostridioides difficile* infection”

Emily Yarosz (Cheong-Hee Chang lab)



March 18, 2022
 “Novel roles for cullin 3 in T cell-mediated immunity”

Zachary Mendel (Joel Swanson lab)



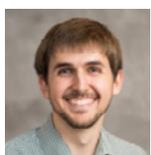
April 21, 2022
 “The role of extracellular amino acids in the regulation of macropinocytosis”

Edmond Atindaana (Alice Telesnitsky lab)



April 25, 2022
 “High throughput analysis of integrant-specific HIB-1 expression patterns, persistence and latency reactivation”

Matt Schnizlein (Vincent Young lab)



April 27, 2022
 “Examining regional differences in the gut microbiota and their effects on *Clostridioides difficile* colonization resistance”

Eli Olson (Malini Raghavan lab)



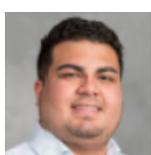
April 28, 2022
 “Endo-lysosomal assembly variations among human leukocyte antigen B allotypes in monocytes and moDCs”

Madeline Barron (Vincent Young lab)



April 29, 2022
 “Investigating bacterial intestinal colonization through the lens of systems biology”

Filipe Cerqueira (Nicole Koropatkin lab)



June 6, 2022
 “Uncovering biochemical features of resistant starch degradation by *Ruminococcus bromli*”

Helen Warheit-Niemi (Bethany Moore lab)



August 11, 2022
 “The regulation of neutrophil function and trafficking in pulmonary fibrosis”

Lisa Tran Pulianmackal (Anthony Vecchiarelli lab)



October 21, 2022.
 “Role of ParA/MinD ATPases in the spatial regulation of bacterial cargos”

MACNEAL DISSERTATION AWARD

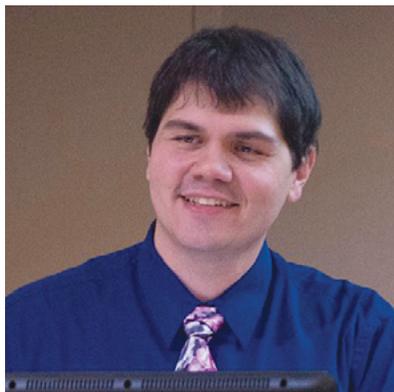
The Ward J. MacNeal Educational and Scientific Memorial Trust Distinguished Dissertation Award for University of Michigan Microbiology and Immunology Graduates

Recipients of the MacNeal Award are nominated and selected from a pool of graduates that have demonstrated innovation, creativity, and insight. Nominees are reviewed for:

- Overall scholarly credentials
- Degree of innovation, creativity, and insight
- Scope and importance of the work
- Effectiveness of the writing, including whether it is written in language that is reasonably understandable to readers in a variety of disciplines

This award honors Ward J. MacNeal (A.B. 1901, Ph.D. 1904, M.D. 1905, Honorary Sc.D. 1939). Dr. MacNeal was a pathologist who specialized in cancer research and was a noted authority on bacteria and phage. From 1912 until his death in 1946, Dr. MacNeal served as professor of bacteriology and director of the Bacteriology Service at New York Post-Graduate Medical School and Hospital. This award has been made possible by a gift from the estate of Charlotte Etzold MacNeal (A.B. 1932), the wife of Ward MacNeal's son, Perry S. MacNeal (A.B. 1933, M.D. 1936, Residency 1940).

2021 Awardee



Robert Glowacki, Ph.D., Cleveland Clinic, Cleveland, OH. Mentor: Eric Martens

Glowacki defended his dissertation, titled “Characterization of a Ribose Metabolism Pathway in *Bacteroides thetaiotaomicron*,” on December 6, 2019.

Research presentation: “Identifying *Bacteroides Thetaiotaomicron* Strain-level Determinants of Resistance to Inflammation *in Vivo*”.

2020 Awardee



Sukhmani Bedi, Ph.D., Seqirus, Cambridge, MA. Mentor, Akira Ono

Sukhmani Bedi defended her dissertation, titled “The Roles of Viral and Host Proteins in Influenza A Virus Assembly and Budding in Infected Cells,” on March 7, 2019.

Research presentation: “mRNA: Ushering in the New Age of Vaccines,” just a few months before the mRNA COVID-19 vaccines received FDA approval. This attests to Bedi’s excellent preparation in M&I to conduct cutting-edge research.

Bedi pursues her passion for infectious diseases research at Seqirus, a biomedical company that specializes in influenza vaccine development.

5 QUESTIONS TO 5 UNDERGRADUATES

How does it feel to be an undergrad in M&I?



Left to right: Sophie Engels (a visiting senior from Swarthmore College, Kirschner lab), Soorya Janakiraman (a visiting junior from Case Western Reserve University, Kirschner lab), Brody Mayoras (Dickson lab), Gina Oh (Moore lab, Xiaofeng Zhou), and Nikhil Paruchuri (Goldstein Lab, Adrian Luna)

We asked five questions to five undergraduates, and here is a brief summary of their answers:

1. What do you like best about conducting research?

- The entire discovery process from questions and hypothesis to data and findings
- The translation of the class content into concrete experiments
- Having the freedom to explore their own interests

2. What will you remember most from your time associated with M&I?

- The interactions with the mentors
- Presenting her own research to another university and bonding during the field trip there.
- The passion—and patience—from everyone in the lab!

3. What surprised you most about working in research?

- The many meticulous steps of research. It is a slow process while doing a lot
- The diversity of interests and expertise among the lab members
- The camaraderie and warm support

4. What are your next steps and how did M&I help prepare you?

- It was helpful to be exposed to the scientific research behind medical practice
- Too early to tell about next steps
- Confirmed interest in computational modeling and medicine

5. What do you like most about being a student at UM?

- The many offerings and opportunities to be involved in academic studies and socially
- There is a great number of student organizations, covering a diverse range of interests.
- Opportunities for professional and personal growth thanks to the mentors

INTERNATIONAL TRAINEES

By Alice Telesnitsky

Despite the enormous challenges presented by the current pandemic, the Michigan Infectious Diseases International Scholars (MIDIS) fund has continued to leverage the donations of its supporters to engage international scholars in research partnerships with M&I faculty. Collaborations have been particularly active with the West African Center for the Cell Biology of Infectious Pathogens (WACCBIP) in Accra, Ghana.



A WACCBIP Ph.D. student, **Irene Owusu** recently completed her Ph.D. research on noroviruses in Christiane Wobus's lab.

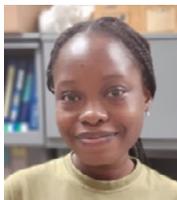
A Nigerian Ph.D. student, **Oloche Owoicho** (see photo below), has been performing MHC-related

immunology research with Malini Raghavan since he has arrived in Ann Arbor in the summer of 2021.

Juliet Anku is a visiting master's degree student from the University of Ghana. In the O'Meara lab, she is studying the emerging



pathogen *Candida auris* and the molecular mechanisms employed by pathogens in infection.



Afia Nkansah is an M.Phil. Molecular Cell Biology of Infectious Diseases student. She joined the

Cheong-Hee Chang lab as a visiting scholar from the University of Ghana and will be at U-M for two years.

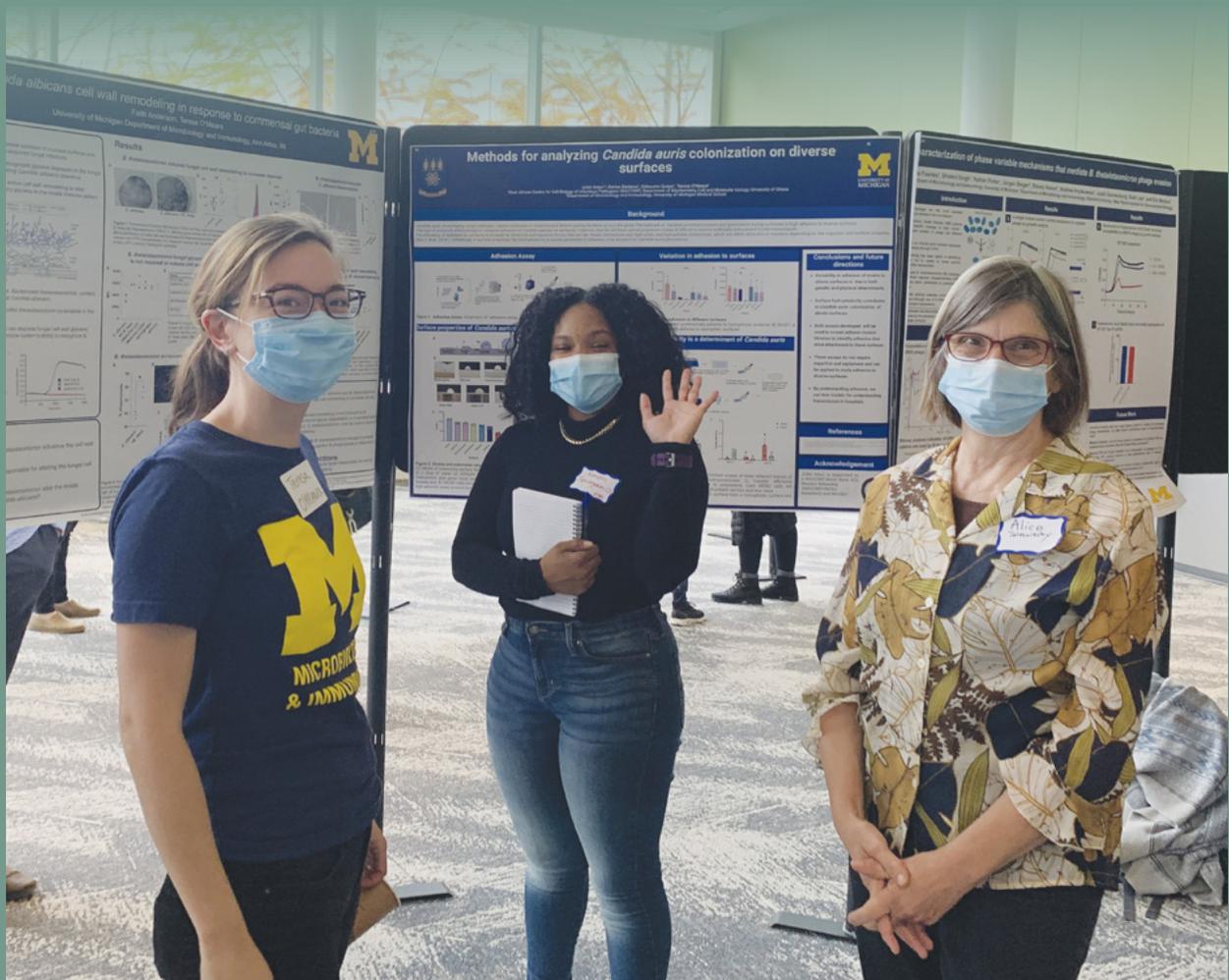


Ghana in Africa



Oloche Owoicho, Afia Nkansah, Juliet Anku, Malini Raghavan, Cheong-Hee Chang, Alice Telesnitsky, Nathaniel Lartey, Ikenna Njoku, and Phil King

DIVERSITY, EQUITY & INCLUSION, AND OUTREACH ACTIVITY



Poster presentation at departmental retreat, October 2022
Left to right: Teresa Rodgers O'Meara, Kelyah Spurgeon, and Alice Telesnitsky

DEI SEMINARS BRING DIVERSITY AND POSSIBILITY TO M&I STUDENTS

Promoting diversity, equity and inclusion (DEI) is one of M&I’s core values.

M&I offers a DEI seminar series that demonstrates the diversity of backgrounds, interests, and career paths of scientists in our field. Invited speakers are either successful academic microbiology/immunology PIs who have under-represented backgrounds, or scientists who obtained Ph.D.s in microbiology/immunology and are successful in pursuing non-academic career paths.

Since its inception in 2018, the DEI seminar series has hosted 12 speakers representing a broad array of backgrounds and careers. These include military deputy Maya Williams from U.S. Naval Research Laboratory, biotechnology entrepreneur Zachary Abbott, and Assistant Professor Rosie Alegado at University of Hawaii.



Maya Williams, Ph.D.



Zachary Abbott, Ph.D.

Initiated by Dr. Akira Ono, this speaker series is funded by a four-year Rackham Faculty Allies Diversity Grant and the department for activities aimed at promoting the inclusion of current students and enhancing their professional development. The graduate student DEI seminar

committee is in charge of selecting, inviting, and hosting the speakers. Members of the DEI seminar committee are: Madison Fitzgerald, Jaime Fuentes, Nicholas Lesniak (graduated), Amanda Photenhauer, Yuan Li, Yolanda Rivera-Cuevas (graduated), Matt Schnizlein (graduated), Pha Thaprawat (current lead), and Katherine Winner.

In the school year 2022–2023, we anticipate the DEI seminars coming back in person. We are excited to have again four extraordinary speakers lined up, including our very own M&I alum **Lt. Olivia McGovern**, who currently works at the Centers of Disease Control and Prevention as an Epidemic Intelligence Service Officer.



Lt. Olivia McGovern, Ph.D.

2020–2021 speakers

Heather Pinkett, Ph.D.,

Associate Professor, Northwestern University

Rosie Alegado, Ph.D.,

Associate Professor; University of Hawaii

Johnna Frieson, Ph.D.,

Assistant Dean in the DEI area, Duke University

Julie Wolf, Ph.D.,

formerly Science Communications Specialist for the American Society for Microbiology (ASM) and now at Indie Bio.

Michael Johnson, Ph.D.,

Associate Professor, University of Arizona, chosen as a guest speaker by department postdoctoral scholars.

2021–2022 speakers

Andres Gomez, Ph.D.,

Assistant Professor, University of Minnesota

Krystle McLaughlin, Ph.D.,

Assistant Professor, Vassar College

Karissa Culbreath, Ph.D.,

Director of clinical microbiology, University of New Mexico

Paloma Vargas, Ph.D.,

Dean, San Diego Mesa College

Robert DeSalle, Ph.D.,

Curator, American Museum of Natural History and author.



Karissa Culbreath, Ph.D.



Rosie Alegado, Ph.D.

M&I TRAINEES TEACH 7TH AND 8TH ANNUAL DEVELOPING FUTURE BIOLOGISTS (DFB) SUMMER SHORT COURSES



In June 2021, **Krista Armbruster, Ph.D.** (Koropatkin Lab), **Matt Schnizlein** (Young Lab), and **Eli Olson** (Raghavan Lab), along with seven other graduate students and postdocs across PIBS, taught the week-long Developing Future Biologists (DFB) course here at the University of Michigan. DFB seeks to introduce core biology concepts and information about careers in science to undergraduate students, particularly those from historically excluded populations. Ultimately, DFB aims to bridge the gap between under-

graduate and graduate education for students who have an interest in research, but a lack of opportunities for research experience at their home institution.

The DFB course includes interactive lessons, hands-on lab activities, career and professional development modules, and panel discussions. Participants also benefit from individual mentoring and networking opportunities. This was the seventh iteration of the DFB course and the second to be held virtually. DFB is also evolving to include more activities throughout the year to engage with students. Notably, DFB sponsored two Summer Research Fellowships in 2021, one of which was awarded to Yixel

Soto (University of Puerto Rico), who worked with Krista in the Koropatkin Lab.

Besides the current trainee involvement in DFB leadership, DFB alumni have also contributed directly to the M&I department. This past year, Nayanna Mercado-Soto (DFB '19) was a postbac in Dr. Vern Carruthers' Lab and is now in the Microbiology Doctoral Training Program at the University of Wisconsin-Madison. In addition, Francisco Gomez-Rivera (DFB '15) is a current Immunology Ph.D. candidate in Dr. Kathleen Collins's lab. Both Nayanna and Francisco participated in this year's course on our DFB Alumni Panel.



The 2022 DFB cohort (includes students, TAs, instructors, and faculty).



Excitingly, DFB returned to their traditional in-person course format in 2022, with Eli Olson as a returning instructor and Jay Moltzau Anderson (postdoc, Schloss lab) and Francisco Gomez-Rivera (student, Collins lab) as a first-time instructors.

To keep up with the DFB team and support their efforts, visit their website: www.developingfuturebiologists.com.

Instructor Hannah Schrader helping students set up their microscope station.



Tasmine Clement (left) and Ashley Muehlbach, Snitkin lab (photo: C. Clouthier)

M&I GRAD STUDENTS TAKE ON LEADERSHIP ROLES FOR MICHIGAN SCIENCE WRITERS

By Jennifer Baker



Jennifer Baker and Andrés Rivera Ruiz, also a student in M&I, at the Rackham Org Fair, September 2022.

Six years after Michigan Science Writers (MiSciWriters) was co-founded by M&I alum Ada Hagan, Ph.D., M&I graduate students have returned to the helm of the campus-wide organization focused on written scientific communication. During the 2021–2022 academic year, Maddie Barron (Young lab) served as the MiSciWriters editor-in-chief, with Jenn Baker (Dickson lab) supporting as the communications director. Upon Maddie's defense in April 2022, Jenn took over as the MiSciWriters editor-in-chief, where she will serve for the 2022–2023 year.

Both Maddie and Jenn have written and edited for MiSciWriters previously and have tackled their respective roles serving the MiSciWriters community with a similar enthusiasm. Of her experience with MiSciWriters, Maddie said: "I love having the opportunity to help other students tell stories in an accessible way. Teaching and learning from other science communicators in

the MSW community has been an invaluable experience."

The recurring presence of M&I graduate students on the MiSciWriters leadership team has also contributed to increased awareness and editorial team recruitment from the M&I department. Fellow grad student Austin Shannon (Sandkvist lab) serves on the MiSciWriters senior editorial team, and Andrés Rivera Ruiz (Wobus lab) is the new Spanish Language Coordinator for the Ciencia en Español section of the MiSciWriters blog.

Despite its relatively new status as an organization, UM graduates who have held leadership positions for MiSciWriters have blossoming careers in science communication, including M&I alums Maddie Barron, who was recently recruited to the American Society of Microbiology as a Science Communications Specialist, and Ada Hagan, owner and lead consultant for Alliance SciComm & Consulting LLC.

In a "full-circle moment", M&I alum and MiSciWriters co-founder Dr. Hagan gave a virtual science writing workshop titled "How to Write a Blog (without the overwhelm!)." During this November 2021 event, sponsored by MiSciWriters, Dr. Hagan provided practical strategies for researching and drafting written pieces that communicate science in an accurate, accessible way for



audiences that have little scientific background. Of her experience coming back to give a MSW workshop, Ada commented: "It was a pleasure to be asked back to MSW. I am very proud to learn of how the group has grown and all that they have achieved over the last few years."

Founded in 2015, MiSciWriters' multi-purpose mission is: to educate the public about scientific topics, to train scientists and researchers to communicate their science better, and to encourage students interested in science writing careers. MiSciWriters has fulfilled this mission by training graduate students in scientific writing, publishing the resulting articles on their blog, co-organizing and hosting writing workshops for students on campus and for venues such as ComSciConMI, translating a growing number of their articles into Spanish, and releasing the inaugural edition of their print magazine titled *EquilbriUM*.

To get involved or read MiSciWriters' latest pieces, visit their blog or follow @MiSciWriters on Twitter.



Female faculty gather to wish Irina Grigorova good luck and good-bye before she left for Russia in December, 2021. At this impromptu brunch, from left to right: Denise Kirschner, Mary O’Riordan, Nicole Koropatkin, Christiane Wobus, Teresa O’Meara, Irina Grigorova and Beth Moore.



Tasmine Clement (front) and Tiffany Wan (photo: C. Clouthier)

PHILANTHROPY



Thank you for your support
of the joy of discovery!

PHILANTHROPY UPDATES

M&I could not support the outstanding training and research missions we undertake without support from generous donors. The world needs M&I science and scientists now more than ever! Please consider how you can help support our vital missions!

M&I is thrilled to share some exciting news regarding major gifts that have greatly impacted the department.



Dr. Marc Collett endowed the **Dr. Marc Collett Endowed Fellowship for Discovery Fund**. This generous award provides stipend and research support to one outstanding postdoctoral fellow each year who is engaged in high-risk, high-reward research. This fellowship is intended to help launch the career of the postdoctoral fellow. Dr. Collett received both his BS and PhD degrees from U-M. You can read about his amazing life here: <https://www.freep.com/obituaries/det115576>. We are pleased to announce that **Dr. Geoff Severin** is the first recipient of this award in M&I and we will be forever grateful to Dr. Collett for this endowment.



Left to right: Melissa Lynch, Tom Schmidt, Anthony Veit, Geoff Severin, Leslie Roberts, Nate Collett, Harry Mobley and Vern Carruthers with Beth Moore joining by zoom due to COVID!

Photo on previous page, left to right: Michael Imperiale, Bethany Moore, Mary Woodworth, and Michele Swanson

Lynn Kitabchi generously endowed a scholarship in memory of her grandfather, **Dr. Frederick G. Novy** who was a former chair of our department. This generous scholarship is meant to support a deserving microbiology or immunology student and we are pleased to announce that **Jenn Baker** was the inaugural recipient.



Nancy Williams Walls whose generous gift supports two professorships.

The Nancy Williams Walls Professorship which is held by Dr. Bethany Moore was able to be split into two separate fellowships. The new Research Endowed Chair will be used to recruit a fantastic new scientist who is underrepresented in the sciences.

Dr. Mary Woodworth continues to make donations towards establishing an endowed chair for M&I. Drs. Imperiale, Moore and Swanson had the joy of visiting with Dr. Woodworth in Ohio this past July. Dr. Woodworth has had an impressive career herself, working as a virologist and in the upper administration of Miami University in Ohio. We are so grateful for her gift to U-M!

We continue to raise funds to endow a lectureship in the name of **Dr. Harry Mobley**, our former chair. Should you wish to contribute to any of the funds that support M&I research, please see this link: <https://leadersandbest.umich.edu/find/#!/mimed/mimed/microbio>



Dr. Evan Snitkin with students (photo: C. Clouthier)

MICROBIOLOGY & IMMUNOLOGY GIVING OPTIONS

Scholarship and professorships are essential to the life of this department. We are very grateful for our generous donors who support our efforts to advance the biomedical knowledge that leads to cures and therapies.

- Willison Lectureship
- Neidhardt-Freter Lectureship
- MacNeal Educational & Scientific Memorial Trust
- MacNeal Endowed Student Aid Fund
- Nancy Williams Walls Professorship
- Frances Wang Chin Endowed Fellowship
- Frederick Novy Collegiate Professorship in Microbiology
- Frederick G. Novy Endowed Scholarship Fund
- Frederick G. Novy Fellowship Fund in Microbiology



GIVE

Dr. Marc Collett Endowed Fellowship for Discovery Fund - 702234

Dr. Collett (BS'73, PhD'77) established this fund to provide on-going support of postdoctoral trainees in the Department of Microbiology and Immunology. The annual recipient fellow will be conducting novel research that is deemed high-risk/high-reward.

Harry L.T. Mobley Lectureship Fund - 335804

Funds will be used to support an annual lectureship named for Dr. Mobley, which will honor his contributions to the field of bacteriology and related disciplines.

Kevin J. Thompson Memorial Fund for Sepsis Research - 336663

Gifts will fund research directed at understanding the shared features (genes) of common bacterial species that infect the bloodstream and trigger life-threatening sepsis.

Microbiology and Immunology Endowed Graduate Education - 731244

Contributions help underwrite microbiology and immunology graduate student stipends, lab fees, pilot research funding and travel to present at annual meetings.

Microbiology and Immunology Research Opportunity Fund - 323153

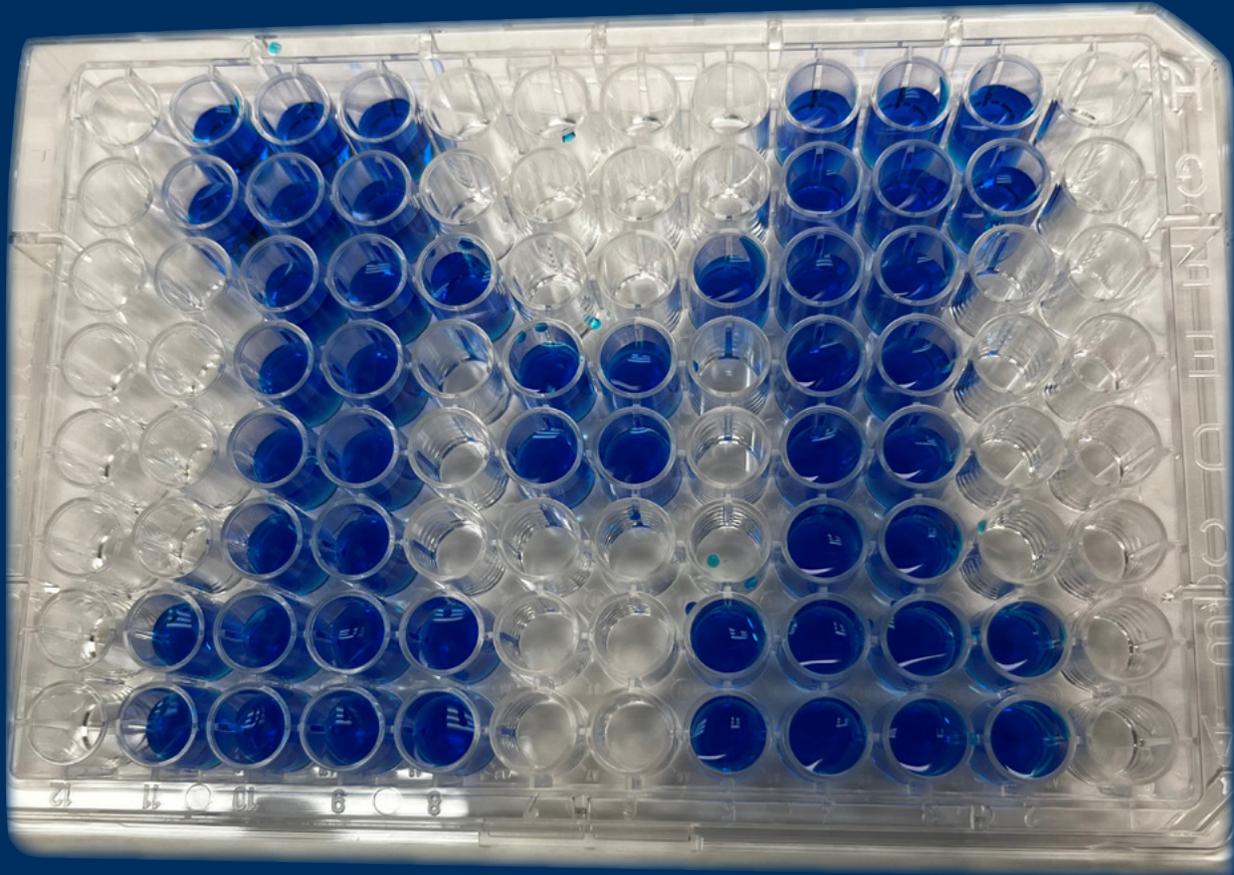
Contributions to this fund will help support faculty research projects and proposals, ranging from proof-of-concept demonstration projects to bridge funding.

Photo above: Kevin Thompson's U-M classmates who initiated the eponyme Memorial Fund for Sepsis Research. They gathered at their pre-game tailgate in October 2022, around Kevin's paver on Ann Arbor Golf & Outing's Memorial Walk. The paver reads: "Kevin Thompson, True Blue Michigan Man, Your Love and Laughter Live on in our Hearts."

Next page: After a cheerless 2020 Christmas, members of the M&I department decided to celebrate the 2021 holidays and coming new year in a more festive way with a door decoration contest. The Imperiale lab door received the "Most Impressive" nomination.



DEPARTMENT OF MICROBIOLOGY & IMMUNOLOGY
<https://medicine.umich.edu/dept/microbiology-immunology>



M&I congratulates Dr. Santa Ono on being named U-M President. As an immunologist, Dr. Ono will hold a joint appointment in M&I and we look forward to welcoming him.



*Team Toxo (Carruthers lab)
pipettes a block M.*



The Regents of the University of Michigan: Jordan B. Acker, Huntington Woods; Michael J. Behm, Grand Blanc; Mark J. Bernstein, Ann Arbor; Paul W. Brown, Ann Arbor; Sarah Hubbard, Okemos; Denise Ilitch, Bingham Farms; Ron Weiser, Ann Arbor; Katherine E. White, Ann Arbor; Santa J. Ono (*ex officio*)