



Navigating the Time of COVID-19



Fall 2020 Newsletter

| | |
|---------------------|-------|
| News from the Chair | 2-3 |
| COVID-19 Features | 3-11 |
| Department News | 12-19 |
| Faculty News | 19-20 |
| Postdoctoral News | 20-21 |
| Graduate News | 22-23 |
| Undergraduate News | 23 |
| Donations and Gifts | 24 |

We pay special tribute to the lives lost in 2020 during the COVID-19 pandemic. At the mid-November 2020 press date, there are at least 1.4 million deaths worldwide and over 250,000 in the USA from infections with SARS-Coronavirus-2. We also honor the lives lost during this time from other causes when isolation and restrictions on visits to hospitals and delay of routine and non-emergency medical care were necessary.

Cover image illustrates how laboratory work has been affected by the pandemic, from the early shut down of all research with no one allowed in research buildings to reopening with required use of restrictive preventions and routine monitoring. *Photograph by Bethany Moore*

A Message from the Interim Chair

Dear Friends,

It is hard to believe it has been nearly 18 months since I took over as interim chair, and the 2019-2020 school year has hardly been normal. The COVID-19 pandemic caused by the SARS-CoV-2 virus has upended all of our lives and our work. Some of those stories can be found throughout this newsletter. In addition, the financial implications of the pandemic on the university as a whole, and in particular on the hospital and medical school, have brought substantial challenges. I will briefly detail some of the issues and consequences here, but more importantly, I want to celebrate the incredible resiliency and dedication of our faculty, trainees and staff.

Starting in March, 2020 the University of Michigan closed all research labs on campus except for those who were conducting essential research related to COVID-19. We had fewer than 10 days of notice to wrap up ongoing experiments, make arrangements for our animal colonies, freeze down essential reagents and safely close down our research laboratories. In that same time frame, every undergraduate and graduate class we teach had to move from in-person to a virtual format. Needless to say, this was no small disruption. I commend the entire department on how quickly they became experts at virtual conferencing and online teaching and learning. Our trainees used the time during the shutdown to dig into the literature, analyze data and write up their results for publication. Many of the trainees took the time to learn new skills in computational biology and statistics. That focused training paid off in exciting new directions for many projects once wet labs were reopened in June. Even now in early November, we are not yet operating at full capacity, necessitating shift work to reduce lab personnel density, and our computational labs are still working remotely. Those working on campus have had to learn how to wear a mask and safety goggles all day without fogging and how to modify our laboratory routines to maintain physical distancing. It is still not business as usual, but we are happy to be back in any capacity.

A special shout-out goes to our clinical faculty within the department including **Adam Lauring**, M.D. Ph.D., **Vince Young**, M.D. Ph.D., **Suzu Dawid**, M.D. Ph.D., **Jason Weinberg**, M.D., **Kathy Collins**, M.D. Ph.D., **Bob Dickson**, M.D., **Kathy Gallagher**, M.D., **Daniel Goldstein**, M.D., **Michael Bachman**, M.D. Ph.D. and **Andrew Tai**, M.D. Ph.D. Many of these have been working on the front lines with SARS-CoV-2-infected patients or dealing with the enormous need to ramp up viral testing or addressing other urgent clinical issues complicated by COVID-19. We are proud of them and grateful for their selfless service. Our department also took the lead in creating a curated webpage of COVID-19 information that can be found here: <https://medicine.umich.edu/dept/ebs/curated-information-covid-19>. **Oveta Fuller**, Ph.D. served in advisor capacities to community organizations and engaged routinely in multiple platforms to communicate science insights for navigating the COVID-19 pandemic.

We were gratified that we could use the deep expertise available in our department to rapidly open a biosafety level 3 laboratory (BSL3) to support the COVID-19 related research efforts that were deemed essential. Special thanks to **Phil Hanna**, Ph.D. and **Brenda Franklin** for managing the BSL3! **Christiane Wobus**, Ph.D., **Carmen**





Vitrual meeting of the M&I staff and chair person.
 Top row, left to right, Cindy Shaw, Bethany Moore, Susan Agnew
 Bottom row, left to right, Sheryl Smith, Carol Solomon, Heidi Thompson
 Missing, Bonnie Krey and Kathy Olbrich

Mirabelli, Ph.D., and **Teresa O'Meara**, Ph.D., along with **Carla Pretto-Kernahan**, partnered with Jonny Sexton, M.D., (Internal Medicine and Medicinal Chemistry) to carry out an impressive and rapid screen of FDA-approved drugs to identify 16 that could limit SARS-CoV-2 infectivity or replication. We are especially excited about their identification of lactoferrin as a potential drug candidate. You can see their early results here: <https://pubmed.ncbi.nlm.nih.gov/32577649/>. **Phil King**, Ph.D., **Akira Ono**, Ph.D., **Malini Raghavan**, Ph.D., **Marilia Cascalho**, M.D., Ph.D., Dr. Gallagher, Dr. Goldstein and myself all also started coronavirus-related projects. Be sure to follow us at: <https://twitter.com/UMMicroImmuno> to get tweets about all the latest department news and publications from the department. You can access the latest tweets and other news by visiting the departmental website at: <https://medicine.umich.edu/dept/microbiology-immunology>.

Speaking of our terrific faculty, I am pleased to announce that **Maria Sandkvist**, Ph.D. was promoted to full Professor and **Nicole Koropatkin**, Ph.D. and Dr. Dickson were promoted to Associate Professor. **Jie Geng**, Ph.D. and **Basel Abuaita**, Ph.D. were promoted to Assistant Research Scientist. We also welcomed **Joyce Wang**, Ph.D., **Alfredo Guerra**, Ph.D., and **Andrea Hodgins-Davis**, Ph.D., to the research track faculty ranks. Sadly, we did have to say goodbye to a few members of our research-track faculty who began excellent new positions: **Kalyani Payaram**, Ph.D. accepted a faculty position at Kansas State, **Ambiola Kolawole**, Ph.D. accepted a faculty position at Wright State, and **Karla Passalacqua**, Ph.D. took a position at Henry Ford Health System. **Ann Smith**, our departmental administrator for the past seven years, also accepted a promotion in Biomedical Engineering here at the University of Michigan. **Brenda Byrne** retired after 25 years of dedicated management of the M. Swanson laboratory.

As you might realize from the news media, universities have faced budget constraints during the pandemic due to lost revenue in the clinical operations, reduced student enrollment, reductions in density in student housing, halted athletic seasons, frozen endowments and increased costs for masks, testing, sanitation and information technology. These challenges have led to significant cost-cutting measures. Michigan Medicine (including M&I) has contributed to these measures through temporary salary reductions at the executive level, suspension of university matching to retirement accounts, suspension of merit raises and freezes on travel, non-essential faculty hiring and discretionary spending. For that reason, this newsletter will look a little different to you this year as we are saving costs by not printing or mailing it. The good news is that our grant portfolio remains strong (#9 nationally among all Microbiology and Immunology departments, with nearly \$18 million dollars in funding from the National Institutes of Health).

I hope that by the time you hear from us next year, we will have finalized the search for a new department chair and a new departmental administrator. In the meantime, we always love hearing from you, so please feel free to reach out to bmoore@umich.edu anytime!

Stay well, stay in touch and Go Blue!

Bethany Moore

Navigating the Time of COVID-19

In November 2019, no one had a clue that 2020 would bring a global pandemic that would change almost every facet of research and education in schools, colleges and universities and daily life around the world.

Before 2020 began, events that would resound across the continents already were underway. Somewhere the RNA genome of an animal virus (maybe of a bat) was changing to make the virus more capable of avoiding host defenses during encounter with humans, reproducing in human cells to high progeny numbers and moving deftly from one human respiratory tract into another.

At this writing, over 56 million cases of Coronavirus infectious disease-2019 (COVID-19) have been reported in 217 countries. Outcomes of infection by Severe Acute Respiratory Syndrome-Coronavirus-2 (SARS-CoV-2), the official name of what was initially labeled the 2019 novel Coronavirus, have resulted in a reported 1.3 million deaths and at least 40 million survivors. Some survivors have continuing long-term effects on organ system function. As we enter what has been deemed “a dark phase of winter”, we are seeing a surge of new infections worldwide. An upward infection trajectory for the USA shows over 140,000 reported new cases of SARS-CoV-2 (CoV-2) infections each day. Almost one American dies per minute from COVID-19 even as new data from Phase III clinical trials report evidence for safety and efficacy of several types of vaccines to protect against CoV-2 infection.

Some courses taught by M&I departmental faculty include insights on human viruses and the 1918 influenza pandemic. We teach that pandemics of viruses or bacteria likely will occur more frequently due to increases in factors that contribute to emergence of new pathogens or movement of others into new locations. Exam questions designed for synthesis of concepts ask about the molecular events that would bring about emergence of a pathogen with pandemic potential similar to the 1918 influenza virus. Students are challenged to consider what would be needed to be ready for such an emergence.

We are not in a pandemic caused by a new influenza virus, but by a new human virus in the Coronavirus family added to six other known human Coronaviruses. As not much was known about this emerged virus, researchers around the world have stepped up to make new inquiries and to communicating what we learned about this highly contagious viral pathogen and its disease COVID-19.

SARS-CoV-2 is easily transmitted by respiratory droplets or aerosols. It can reproduce in cells of many body organs. A respiratory virus by mode of entry into the host, it can affect function of many organs after it enters into the circulatory system through the membranous air sacs in lung tissues. A wide range of mild to severe COVID-19 effects can appear in the lungs, kidneys, heart, brain, liver and skin—every site it seems. Or, there may be no symptoms at all for asymptomatic infections. Almost a year after the initial recognition of SARS-CoV-2 infection, we know that at least 40% of infections are from exposure to virus produced by someone who is asymptomatic or pre-symptomatic. Thus, this emerged virus has spread rapidly throughout the world in part because people who do not know they are infected shed virus.

A perfect storm to escalate SARS-CoV-2 infections brews this November from a convergence of factors. Winter season in the northern hemisphere with cooler temperatures drives people to gather inside. Typically, family and friends come together from near and far to celebrate a string of holidays that occur over the next several months. Unmanaged high levels of community circulating virus may increase even more from exposures from the end-of-semester travels of students headed home from colleges. By this time in 2021, we will know what happens with convergence of these factors when there is widespread *COVID-19 fatigue* almost ten months since the World Health Organization declared the Coronavirus pandemic on March 11, 2020.

This 2020 issue of the M&I Newsletter seeks to document how we navigated the 2020 time of COVID-19—how we coped, found joy, started new ventures, grew closer to family and made major research, teaching, clinical, community engagement and service advances. As necessity is said to be the mother of invention, by necessity we learned new ways of teaching, of planning, scheduling and implementing experiments, of communicating for lab meetings, science conferences, seminars and dissertation defenses. Importantly, we recognized, valued and addressed the very real human need for social contact.

During the 2020 emergence of COVID-19 when state-issued guidelines and university-wide restrictions moved people out of the routine, M&I witnessed and is responding to an unveiled existing pandemic - that of longstanding institutionalized anti-blackness played out in highly visible events and more nuanced ways. The time of COVID-19 amplified health and economic disparities such as the disproportionately high level of severe illness and deaths among African Americans in the USA from Coronavirus infection. With workshops, retreats, climate surveys, book read groups, discussions and personal reflections, along with the continuing university-wide efforts, our actions avow that Black Lives Matter and that M&I can be a better place.

Collective efforts are required to address ongoing issues of our time such as emergence of new microbes,

effects of climate changes and growing distance between income levels in the USA. With capable interim department leadership, M&I students, staff, postdocs and faculty engaged in affirmations, sought new insights and even undertook difficult conversations to begin the changes needed to remove anti-blackness and institutionalized racism.

2020 has been a year like none other in the history of this department that was officially begun in 1902, from the idea of ferments and germs from a “Sanitary Science” course taught in 1881. In this issue, we explore how we coped. We highlight interactions and progress in research, teaching, communications and service. When this unique year is recorded in history, the pages of our 2020 M&I newsletter will document that we navigated the emergence of COVID-19 with integrity, creativity, grit, compassion and resilience.

- Oveta Fuller, Ph.D.

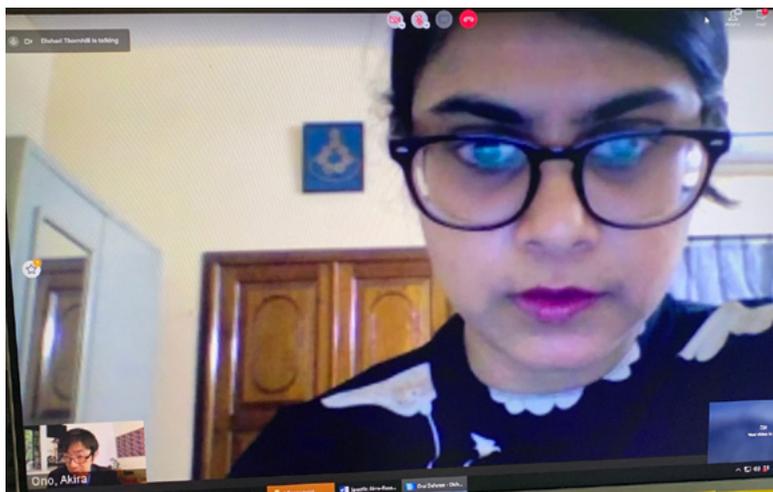
“Pande-fense”: Scientific Milestones in the midst of a Global Pandemic

As **Dishari Thornhill** (Ono lab) was preparing for her final dissertation committee meeting in February 2020, she received an unexpected phone call. It was her sister, calling from Kolkata, India, to tell Dishari that their mother was in the hospital. Immediately, Dishari booked the next available flight back to India.

“I knew I was needed and just went,” she says of her decision to travel back to India on February 21, about two months after the first cases of a new viral infection, now known as COVID-19, were identified in Wuhan, China. *“I emailed Akira and told him that I needed to go home, and he was extremely supportive. He told me to take my time and do whatever I needed to do to help my parents out.”* And with that, Dishari flew home to be with her family, putting the final preparations for her dissertation defense on hold until returning to Michigan. *“Perhaps one month,”* surmised Dishari’s dissertation advisor, **Akira Ono**, Ph.D., about her emergency leave. And in any other year, Akira may have been right. However, the news of her mother’s hospitalization was only the first of many consecutive events that would shape Dishari’s final months of graduate school in a most unusual year.

Back in India, Dishari spent time at her parents’ home in the outskirts of Kolkata, visiting her family and helping out as needed. Following surgery and in-patient hospital care, her mother returned home in early March to recover. As Dishari started looking for return flights to the United States (U.S.), the World Health Organization declared the SARS-CoV-2 outbreak a global pandemic. International travel quickly became impossible with flights around the world grounded due to emergency declarations and travel bans. In Michigan, the Ann Arbor campus sent students home and closed down all but essential research labs. Although returning flights to the U.S. were available in some locations for green card holders such as Dishari, no flights out of Kolkata were available due to travel restrictions imposed by the local West Bengal government. These restrictions prevented travel out of the state to Delhi or Bombay for subsequent transfer to a U.S. service destination. Getting accurate information about travel restrictions was also difficult. *“I even followed Hardeep Singh Puri, India’s Minister of Civil Aviation, on Twitter to get updates as soon as they came out because the guidelines were changing so quickly,”* recalls Dishari. Despite her continued efforts to find travel accommodations, Dishari quickly realized that her stay in India would last indefinitely, not for a month as originally planned.

From March until July, Dishari worked from her childhood home caring for her family and finishing up her graduate studies. At one point, with her mother still recovering, her father and her sister sick, Dishari found herself in charge of the household upkeep, including cooking. She relied on Amazon and locals who sold fresh produce on traveling carts for groceries in the midst of lockdown.



Dishari Thornhill in Kolkata (left) connected virtually during her dissertation defense seminar that was hosted in real-time by Dr. Akira Ono in Ann Arbor (right).

After months of visiting with family, helping at home, attempting to find flights, and working hard to finish her analyses and writing, Dishari successfully defended her dissertation virtually on July 30 at 10:30 pm IST (1:00 pm EDT) from her parents' home in Kolkata. The defense occurred five months after traveling to India for a family emergency. Though in-person festivities were impossible, Dishari was able to virtually celebrate her successful defense during a pandemic, a “pande-fense,” as she calls it, with friends and colleagues in the U.S. and in-person with family in India. A lift in travel restrictions in mid-September allowed Dishari to return to Michigan, where she continues her research on HIV virion assembly as a postdoctoral researcher in the Ono lab.

Preparing for and defending her dissertation from her childhood home half a world away in the midst of global pandemic had its challenges. Even so, Dishari is thankful for her experience and for the support received from family and colleagues.

“My mother has always said that my studies come first, and when crunch time came, everyone in my family was able to help out,” she says of the long days of preparation leading up to the virtual defense. “I was able to work for long hours, come downstairs for family meals, and then return to work after.” Her husband Kyle supported her from afar, as he took care of their home in Michigan and sent care packages with candies and cookies to enjoy as she studied. Even their cat Tofu pitched in, serving as her husband’s official “mental health cat” during Michigan’s mandated Stay-at-Home order.

Dishari expressed the importance of her colleagues in M&I and her gratitude for their efforts over her last tumultuous months of graduate school, *“Everyone else also had to adjust to the time difference and the many interrupted virtual meetings. Akira, especially, is an excellent mentor and he went above and beyond. Akira, the rest of my committee members (Alice Telesnitsky, Ph.D., Billy Tsai, Ph.D., and Robert Fuller, Ph.D.) and Heidi Thompson (M&I’s student services coordinator) played such an integral part in this difficult process and were very flexible and supportive...I couldn’t have done this defense without their help.”*

- Jennifer Baker

SARS-Coronavirus-2: Research We Started from within M&I

Realizing the fast spread of SARS-Coronavirus-2 (CoV-2), to help combat the pandemic, many of the M&I faculty pivoted to research exploring the novel coronavirus and the immune response to infection. Cross-disciplinary collaborative efforts have increased for CoV-2-related projects (e.g. better understanding of virus biology, development of detection devices, and identification of antivirals including broadly neutralizing antibodies).



Dylan Bartikofsky wearing appropriate PPE to work with CoV-2

The collaboration of **Christiane Wobus**, Ph.D., **Carmen Mirabelli**, Ph.D., and Jonny Sexton, M.D. (Internal Medicine and Medicinal Chemistry) and the Michigan Drug Repurposing Center seeks to develop drug candidates with anti-viral activity against the virus that causes COVID-19. The Wobus laboratory collaborates with at least 13 UM laboratories across multiple units and with the National Institutes of Health.

A BSL2 laboratory level collaboration involves members of several departments (**Marilia Cascalho**, M.D. Ph.D., **Jeffrey Platt**, M.D., **Andrew Tai**, M.D. Ph.D., Dr. Wobus, David Ginsburg, M.D., [Human Genetics], Evan Keller, D.V.M. Ph.D., [Urology, Pathology, and Comparative Pathology] and Thomas Lanigan, Ph.D. [UM Research Core]). They are designing a spike pseudotyped virus (a non-pathogenic virus engineered to express the CoV-2 spike protein that is responsible for virus binding to cells for infection) for evaluating serum and antibody neutralization properties. Drs. Cascalho and Platt work with four other institutions nationally and internationally in efforts to procure anti-CoV-2 therapeutics. Graduate student **Dylan Bartikofsky** (pictured) recently received BSL3 training for conducting research with CoV-2 as a respiratory transmitted virus.

Using the spike pseudotyped virus, Dr. Cascalho and colleagues have isolated and cloned human monoclonal antibodies from CoV-2 spike-specific memory B cells. They produced 40 human anti-CoV-2 broadly neutralizing antibodies that are among the most powerful antibodies described ($IC_{50} < 10^{-12} M$, 3 with $IC_{50} = 10^{-15} M$). Drs. Cascalho and Platt are pursuing strategies to prevent and treat infection from SARS-CoV-2. In one approach, a modified antibody that inhibits degradation of heparan sulfate, seems to prevent the cytokine storm that contributes to morbidity in COVID-19 patients. In another, the researchers

seek to adapt a novel type of vaccine, they call a “mutable vaccine,” to anticipate and immunize against CoV-2 viral variants that may arise. In collaboration with scientists at Harvard University and the University of Pennsylvania, Drs. Cascalho and Platt also are studying genetic polymorphisms that may contribute to differences in human susceptibility to serious disease upon CoV-2 infection.

The laboratory of **Malini Raghavan**, Ph.D. is seeking to understand which CoV-2 epitopes might best stimulate CD8⁺ T cell immunity. CD8⁺ T cells, which are important for immune protection against viral infections, recognize short peptide antigens bound to cell-surface major histocompatibility complex class I (MHC-I) proteins. There are over 15,000 known variants in the population of human MHC-I genes. However, little knowledge is available about specific MHC-I genes in strong or poor protection against CoV-2. For testing as potential vaccine candidates, the Raghavan lab seeks to define CoV-2 peptides that induce CD8⁺ T cell responses in the context of multiple MHC-I allotypes.

The laboratory of **Adam Lauring**, M.D. Ph.D. is engaged in multiple projects to sequence viral isolates from patient cohorts. They seek to better understand how this new Coronavirus is changing and how such changes may impact therapeutic strategies. Their study in *J. Infect. Dis.* documents a prolonged CoV-2 replication in an immunocompromised patient.

Work from the laboratories of **Phil King**, Ph.D. and **Akira Ono**, Ph.D. is exploring mechanisms for how CoV-2 may enter T cells differently from other cell types. Dr. King's group generated a genetically modified mouse that will express in the appropriate tissue locations the human ACE-2 protein (a cellular receptor that is necessary for viral binding and entry into cells). This development that was featured in the *Medicine at Michigan* magazine accessed at: <http://medicineatmichigan.org/newsletter/2020/09/index.html> allows animal model studies of how CoV-2 infection might result in coagulopathies and other pathologies.

Beth Moore, Ph.D. and **Kathy Gallagher**, M.D. have partnered on a project to understand why diabetic individuals are more susceptible to severe disease with CoV-2 infection. Their approach uses murine hepatitis virus that is similar to human CoV-2, to test how lean vs. diabetic mice respond when the virus is instilled in the lung. They find that diabetic mice release higher levels of pro-inflammatory cytokines than lean mice to lead to worse lung tissue damage. They also are exploring a new finding of loss of an epigenetic enzyme, which correlates with the over-active immune response in mice and humans. The laboratory of **Daniel Goldstein**, M.D. is exploring similar questions related to why aged mice or aged individuals are more susceptible CoV-2.

The laboratory of **Denise Kirschner**, Ph.D. collaborated with colleagues in the UM School of Public Health to model CoV-2 spread in Michigan. They sought to better understand how various measures such as mask wearing, partial shutdowns and physical distancing impact the disease spread and what the second COVID-19 wave might entail. Their results published in *J. Theor. Biol* can be accessed at: <https://www.sciencedirect.com/science/article/pii/S0022519320303167>.

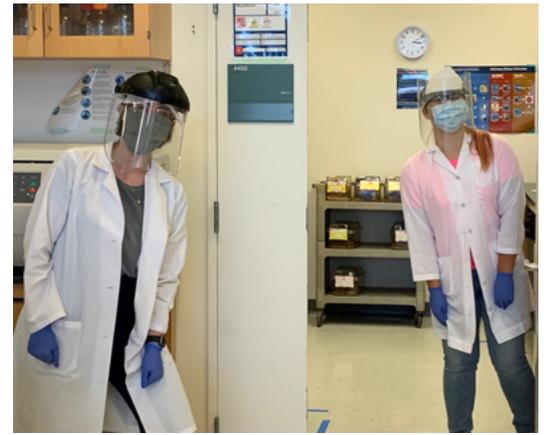
These efforts are among hundreds occurring in laboratories at UM and around the world to address challenges to understand the new virus and how to prevent or combat effects of COVID-19. The scientific community, including M&I researchers, has stepped up to address some of the many challenges of this 2020 virus pandemic.

A Tale of Resilience and Research: Perspectives through COVID-19

On March 6, 2020, **Adam Lauring**, M.D., Ph.D. forwarded this warning to the department: “*It is entirely possible that SE Michigan could eventually see an outbreak of this size [as in Seattle]. I hope that won't happen, but we need to plan as if it could. I have told my lab to think of things that they can work on from home and to not plan any long term or complicated experiments without stopping points. I cannot stress how important it is to follow the guidelines that we receive from leadership. This is not the time to be a ‘lab hero.’*”

As we all know, “it” did happen as the university and laboratories shut down two weeks later.

With that, we were forced onto either BlueJeans or Zoom virtual meeting platforms, whichever one didn't crash. Zoom eventually won out for most groups. **Joel Swanson**, Ph.D. summarized the experience nicely, “*We quickly adapted to our new virtual venue for weekly meetings; speaking to each other from inside little rectangular boxes on our screens, often with the low slurred voices of lousy connections.*” He also highlighted the Zoom skills of Emeritus Professor **David Friedman**, M.D., “*The lighting in his Zoom panel is perfect.*”



Helen Warheit-Niemi and Gabby Huizinga using PPE and physical distancing to prevent spreading of SARS-CoV-2

Many groups took the time during remote work to rethink priorities and more critically interpret data. Some considered the increased time in planning a silver lining. Indeed, due to increased focus on planning and expectations of experiments, **Eric Martens**, Ph.D. noted that *“going forward, I think this will ultimately make us more efficient.”*

For **Oveta Fuller**, Ph.D., emergence of SARS-CoV-2 turbocharged requests for science insights on coping with a new pandemic respiratory virus. She states, *“network approaches used with HIV/AIDS and Ebola, mostly at distant sites, were needed right here in our home and workspaces.”* Lack of understanding of the newly emerged Coronavirus heightened the importance—life and death for many—of reliable communications about the virus, its disease and why adherence to prevention guidance was essential.

The shutdown for COVID-19 forced us into skills-development mode, particularly those pesky reading and writing skills. The lab of **Denise Kirschner**, Ph.D. has published or submitted 10 manuscripts, with more in the pipeline. **Bob Dickson**, M.D. and his group have published 15 papers in the past year. These projects represent *“a tremendous amount of inspired work by trainees, and a true team effort across clinical and biological disciplines.”* Along with publishing 9 manuscripts, including one in *mBio* on a vaccine for *Esherichia coli* urinary tract infection, the lab of **Harry Mobley**, Ph.D. learned new programs in graphics and bioinformatics and had a bird spotting contest. **Amanda Starr**, Ph.D. and her husband spotted 34 species to win!

The Kirschner laboratory was in a unique situation as the department’s only pre-existing fully virtual lab. Their research continued, almost uninterrupted. The “almost” is important: *“the strain of isolation has impacted each of us at various times and for varying lengths over the past 6 months.”* Laboratory members were quick to recognize the effects on both physical and mental health. Thus, meetings were suddenly not just about data, but about making sure colleagues were doing okay. Even fully remote laboratories require upkeep and special recognition goes to **Joe Waliga**, lab manager, and **Paul Wolberg**, lab computer engineer, for keeping equipment and programs running smoothly for lab personnel access from remote locations.

The stress from changes due to the pandemic extends to the entire department. One staff member noted, *“COVID-19 has taken a toll on many people’s emotional health, creating more anxiety, grief, worry and being overwhelmed.”*

The lab of **Kathy Spindler**, Ph.D. coped, in part, by increasing lab meeting frequency to twice per week. This provided a chance to socialize and check on how everyone was managing pandemic isolation. After running out of new data to discuss, they began lab journal clubs. When the J. Swanson group ran out of data-related items to discuss, they moved onto COVID-19, books, TV shows, and weird dreams, notably a manuscript submission to *The Journal of Cow Research*. The Kirschner lab stayed connected both one-on-one and as a group by holding weekly, virtual meetings and, since March, a late afternoon bi-weekly happy hour. The Koropatkin lab started a book club to learn about and address the anti-Black racism pandemic. They started by discussing “White Fragility” by Robin D’Angelo and then “How to Be an Anti-Racist” by Ibram X. Kendi.

With schools shutting down in March and almost fully remote learning happening now in the fall, trainees and faculty with children have had to get creative. **Suzanne Dawid**, M.D. Ph.D. noted that *“navigating the changes in our daily patterns with patients and my own children has meant a crazy combination of worry, creative thinking and re-focus.”* Some in the department have even welcomed children, including the graduate student of **Teresa O’Meara**, Ph.D., **Darian Santana**, who became dad to Edison!

Laboratory transitions are already difficult enough, but in the middle of a pandemic, these are more complicated. Dr. Dawid faced the simultaneous relocation of her technician **Jennifer Medlin**, the loss of undergraduates, and the return of MSTP student **Charles Wang** to medical school. Dr. Dawid started from scratch in July with onboarding of new technician **JD Richardson** who is training remotely. With lab capacity restrictions, addition of new research tech **Dan Edwards** in August forced Dr. Spindler to mostly do her own experiments *“in the odd hours or when someone is out for the day.”*

Dr. J. Swanson’s lab also faced a number of pandemic transitions. Recent M.D. Ph.D. graduate **Amanda Wong** finished a manuscript from her thesis work and moved to Washington University in St. Louis to begin her residency. Research Associate **Matangi Marthi** had previous plans to move to Seattle, Washington, but also had projects she wanted to finish. She was collecting data in the lab again as soon as labs reopened. From Seattle, she continues to process data remotely and to guide Dr. J. Swanson and the new technician **Amanda Haag** in the fine points of lab operations.

The Kirschner lab hired two new postdoctoral fellows **Maral Budak**, Ph.D. and **Aadrita Nandi**, Ph.D. who have already gotten up to speed to work on grants the lab received in 2019. **Beth Moore**, Ph.D. summed up many lab experiences in describing how people have coped. She states, *“While working from home, each of the lab members took online courses to improve their knowledge of immunology or computational techniques,*

analyzed data in new ways, wrote major sections of manuscripts and dissertations and read extensively to improve their background knowledge."

Most researchers were very eager to get back to the lab, perhaps none were more eager than graduate student **Zack Mendel** who had experienced a personal lockdown last year due to a broken leg. Excited to get back to his thesis research, he *"covered the lab in tape arrows and six-foot distance markers and settled back into his place at the tissue culture hood."* The initial 30% capacity, which has since increased and in October 2020 stands at 60%, was frustrating for all laboratories. Lab members communicated frequently and had one another's backs to ensure that each person's work could still move forward.

Besides the added reach from the switch to virtual conferences and meetings, one downside of COVID-19 is that such virtual events are not conducive to networking or connecting with current or future collaborators. Job plans for postdocs or senior students have been put on hold for some. The pandemic sets up a paradox since working remotely is such an intimate process. Joel Swanson expresses it well, *"From children, cats, and dogs running around in the background to a look at everyone's dining room wall, we have gotten to know one another in new ways."*

The M&I department has taken its role seriously as scientists who contribute to the greater good in the time of COVID-19, while simultaneously not trivializing the efforts in the search for silver linings. *"Like everything else, biomedical research lab experience will be different from here on. It's nice to see that there is already a lot to like about the 'new normal' taking shape."*

- Haley Brown, Ph.D.

Maintaining Community in Grad School During COVID-19

A favorite part of dissertation defenses is the picture-filled slides at the end of the presentation when the almost-minted Ph.D.s. reflect on their time during graduate school and thank their family, friends, and colleagues for their support. **Danelle Weakland's** closing slides at her October 2020 defense were no exception. I listened with enjoyment on the other end of the Zoom call as she detailed the many amazing people that helped her make it through this uniquely challenging part of a scientist's career. Many of the people she thanked were present in the room with her, a fact that, under normal circumstances, would not be worth mentioning. However, since the SARS-CoV-2 pandemic shut down most of campus in March and gatherings are still at limited capacity, the significance of thanking her friends in person for their support did not escape members of the defense audience.

As the culmination of a graduate school's collaborative effort for everyone involved, a dissertation defense highlights the importance of having a personal and professional support system while navigating graduate school. However, with social interaction among graduate students during the COVID-19 pandemic relegated to virtual happy hours and physically distanced, reduced capacity lab work, social interactions and in-person connection that typically define and bolster a graduate student's experience are conspicuously absent.

Like microbial colonizers on a sterile surface, many relationships crucial to a graduate student's support system begin during the first year of graduate school. This changes, but is not entirely hampered by virtual rotations, seminars, and classes. **Lavinia Unverdorben**, a first year Ph.D. student rotating in M&I labs, writes:

"When I first learned about biofilms, I thought they were fascinating in their complexity and function. A collection of microbes that, when growing together, are stronger than when alone and better able to resist stress and harmful events. Like a biofilm, families, friends, colleagues, and other social networks exist because they give us strength and provide support when we face challenges. Like the diversity of microbes that make up biofilms, our communities are comprised of people from many walks of life, with whom we connect and learn from during our interactions, like microbes exchanging information via horizontal gene transfer or quorum sensing."

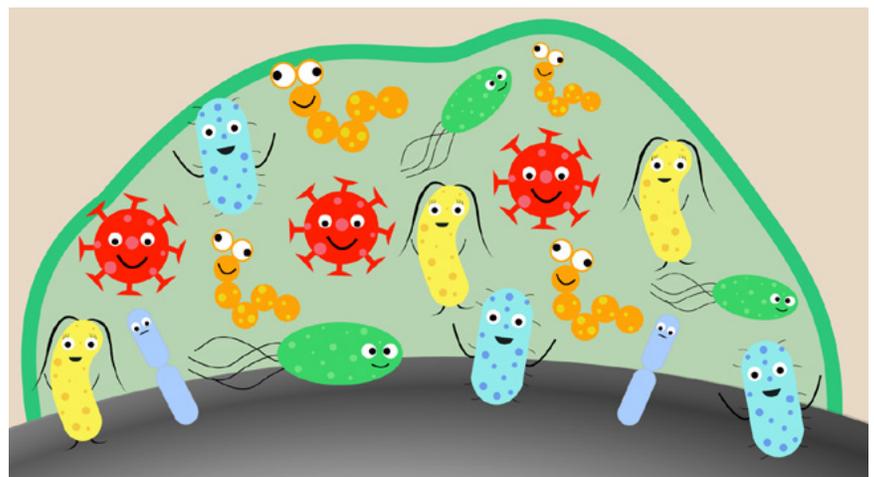


Illustration of biofilm by Lavinia Unverdorben

While some of us are more “metabolically active” and others are more reserved or “dormant” within our own communities, we all benefit from being a part of these biofilms.

This pandemic has felt like a potent new antibiotic trying to disrupt or destroy my biofilms. At the beginning of 2020, I was excited to join the UM, Ann Arbor, and M&I communities, but as the months passed, I started wondering how I would be able to connect in my new home. The pandemic has made it more challenging to form connections and communicate with others, especially for someone more introverted like me. But it also has provided an opportunity for me to become a more “metabolically active” microbe within my biofilm communities. Rather than waiting for other people to reach out first, I have set up study groups, physically-distanced gatherings, and Zoom happy hours. Even when I felt anxious or thought they might take away from my classwork, I attended departmental events like afternoon tea, and become involved in campus groups such as OMIS. Ultimately, I have decided not to let the pandemic destroy my biofilms, and instead, I have become more active, more open, and more engaged with the diverse and amazing people that comprise the UM community.”

Other more senior grad students, who have spent a longer time within the M&I community, say that they miss the opportunity to foster these connections in-person with colleagues. **Maddie Barron** (Young lab), writes:

“One thing I do miss are the spontaneous conversations with my labmates about my work or cool science in general. We would often have impromptu meetings to discuss questions I was mulling over, their opinions on an experiment I was planning, or the trajectory of my project. I would come away from these conversations with answers to my questions, a better planned experiment, and ideas for new directions to explore in my work. I relied on these moments of unplanned connection to fuel my creativity and ability to problem solve. I think this is one of the best parts of science and being in a lab and something I miss most.”

Despite missing in-person connections, this time has been a productive time for many graduate student researchers. Like other students who work primarily on computational projects, **Stephanie Thiede** (Snitkin lab) hasn't seen much of a change in her normal research routines, except if you count her “*journey from an actual desk to the kitchen table,*” as she puts it. “*I’ve been able to plug away at home doing computational stuff...my life has been mostly being at home 24/7,*” she says. But for students who spend much of their time in graduate school at the bench, missing lab time has been an adjustment, though not always detrimental. Barron continues:

“As crazy as it may seem, I think COVID-19 has been a net positive for me in terms of my research. I’ve found that self-isolation due to the pandemic has given me time to reflect on my science and be more deliberate in my planning. What is my focus and how do my current projects fit together? How will this experiment move my project forward? Before COVID-19, I was stuck with this “go go go” mentality in lab, which made the cohesiveness and quality of my work suffer. I have now drafted a really solid plan for the next stages of my research, the experiments required to get there, what my hypotheses are, what I will need to do these experiments, etc. Self-isolation has forced me to slow down and separate from the unspoken expectation in academia that if I’m not in lab doing something at all times, I’m somehow making less progress. I would say I am now positioned to make even more progress, which is something I am grateful and excited for.”

In addition to balancing between research efforts from home and effectively using precious lab time, other M&I students found ways to extend their reach beyond our home department to help surrounding communities. **Zach Mendel** (J. Swanson lab) saw the need of frontline healthcare workers' for assistance with basics such as childcare, grocery or pharmacy runs, and pet sitting, and initiated a way to help. Rallied by email blasts to departments across the UM campus, Mendel and his team of volunteers were able to assist healthcare workers and their families by responding to requests submitted through the *Michigan Helps COVID-19* email address. Mendel writes:

“At the onset of the pandemic, students within M&I created a volunteer group to assist health care providers as they worked to keep our community healthy. We recruited volunteers from all over the Michigan campus, including the Law School, Materials Science and Engineering, as well as other departments within the biological sciences. After creating online forms where healthcare providers could request specific services, we distributed (with significant help from M&I faculty members!) our forms throughout the hospital. In total, we were able to assist 14 health care providers! Primarily we provided childcare, but we also helped with pet care and a few grocery runs. Our volunteer group provided services from the onset of the pandemic in the middle of March, until the end of April, as we stopped receiving requests for assistance. We thank all those who volunteered with our group, and most importantly, we thank our health care providers for keeping us safe during these difficult times.”

COVID-19 has had an impact on all of us. We are thankful for the patience, hard work and appreciation the pandemic has fostered as it dramatically reshapes daily expectations during our graduate school experience. We are more aware than ever of the importance and impact of the M&I community and look forward to being together again.

- Jennifer Baker

Making the Most of the Michigan Experience during a Virus Pandemic

I remember sitting through the “Virology in the News” segment of Microbiol 415 (Virology) near the beginning of the 2020 winter semester, when **Kathy Spindler**, Ph.D. first mentioned a new coronavirus strain in China that had a potential to cause an epidemic. I did not think too much about the huge impacts the new virus could have on China, let alone on the world. Who knew that two months later, this will be the last in-person class I would attend during my junior year. The University of Michigan, along with many other colleges across the country, would announce the move to online classes and halting of many operations—all due to the spread of SARS-Coronavirus-2 (CoV-2).

Students’ lives quickly turned upside down. We were further informed that labs were shutting down and summer abroad programs had been cancelled, all while scrambling to pack up everything and head home. Along with three other students—Microbiology majors **Abigail Hutton** and **Sarah Socha** and a master’s graduate student **Taylor Davis**—I was anticipating time in the sub-Saharan African country of Zambia with our professor **Oveta Fuller**, Ph.D., to assist in *Trusted Messenger* implementation research for HIV/AIDS. We had bonded through biweekly team building sessions attended since January to prepare for the research immersion. However, to our deep regret, plans were cancelled due to COVID travel restrictions implemented. My anticipated 2020 summer that was supposed to be filled with new experiences and insights as I embarked on living and working four weeks in Zambia turned into a summer spent taking an online class and a remote internship.



In person classes Fall 2020. Image credit: Joseph Xu

Some undergraduate students continued their research despite changes caused by the COVID-19 pandemic. Although **Peggy Randon** (B.S. Microbiology 2021) continued to work on her thesis in the Fox Lab, she adjusted work hours and experiments. After the initial lab shutdown of the Schloss lab, **Ana Taylor** (B.S. Microbiology 2021) was fortunate to conduct gut microbiome research as they had just wrapped up mouse experiments and mainly were focusing on data analysis, she could still continue remotely. She acknowledges that their lab was not greatly affected by the shutdown. “*If we had still been in the middle of mouse experiments, it would have been a very different story,*” she says.

The hybrid fall semester brought about huge changes to the Michigan undergraduate experience. While typically many students would bustle around campus on their way to classes or sit in the library to study by 10am, during Fall 2020 the campus was silent—students took their classes on Zoom in the comfort of their rooms. A few masked stragglers could be seen headed to their only in-person class of the day. Campus buildings took on an eerie quietness, instead of their usual noisiness from large groups. This environment was exacerbated by a three-week stay-at-home order issued for undergraduate students in October by the Washtenaw County Health Department to halt rising reported COVID-19 cases for 18-26 year olds. Several outbreaks in residential halls sent students to quarantine in designated buildings.

As Microbiology majors, lab courses make up an essential part of the undergraduate education. Due to CoV-2, many lab courses were cancelled. Randon, like many other seniors, had to adjust her schedule to compensate a cancelled lab class to ensure that she still had the necessary requirements to graduate. For the lab courses that remain in-person, the curriculum was adjusted to accommodate the time after Thanksgiving break when all classes will be fully remote. Taylor’s genetics lab could not cover some lab topics or techniques, such as PCR, to ensure students could complete in-class experiments. In-person lab class environments also changed. The usual bustling around the room to carry out tasks differed in the less densely occupied rooms where students had to remain mindful to maintain at least a six-feet of physical distance.

Even though continuing our undergraduate education during the COVID-19 pandemic comes with many challenges, we are grateful to have the support of professors and advisors every step of the way. The Coronavirus pandemic has emphatically emphasized the importance of microbiology and immunology research to protect and educate the community. These experiences will make us better lifelong scientists and more informed persons as we encounter microbes.

- Kallan Roan

Department News

MacNeal Dissertation Award - Sukhmani Bedi

The **MacNeal Dissertation Award** honors Ward J. MacNeal (A.B. 1901, Ph.D. 1904, M.D. 1905, Honorary Sc.D. 1939), a pathologist who specialized in cancer research, who also was a noted authority on bacteria and phage. This award is given each academic year to a Ph.D. graduate from a pool of nominees in recognition of their scholarly credentials, significant contribution to the field, and effective dissertation writing.

The 2020 MacNeal Scholar was **Sukhmani Bedi**, Ph.D., a graduate who defended her dissertation research in the lab of **Akira Ono**, Ph.D. on March 7, 2019. Dr. Bedi continues to pursue her passion for infectious diseases research, joining Seqirus, a company in Cambridge, MA that specializes in influenza vaccine development. Dr. Bedi presented her current work titled: **“mRNA: Ushering in the New Age of Vaccines.”** The first two COVID-19 vaccine candidates to report efficacy in the USA from Phase III clinical trials utilize mRNA. This attests to Dr. Bedi’s excellent preparation in M&I to conduct cutting edge research.



Sukhmani Bedi, Ph.D. and Akira Ono, Ph.D. at 2019 UM Spring Commencement (pre-COVID-19)

SARS-CoV-2 Research and Scholarship from M&I: In Brief

In the laboratory of **Christiane Wobus**, Ph.D., **“Carmen Mirabelli**, Ph.D. was the trailblazer” at getting the lab equipped to work on SARS-CoV-2 (CoV-2). They started by collaborating with the lab of Jonny Sexton, M.D. and the Michigan Drug Repurposing Center to find FDA-approved drugs with antiviral activity against the virus. The cross-disciplinary efforts on CoV-2 related projects have allowed fruitful collaborations. Currently, the laboratory is working with at least 13 groups at UM across multiple units and the NIH. Graduate student **Dylan Bartikofsky** received BSL3 training so that he can be part of research efforts to battle CoV-2.

In the lab of **Malini Raghavan**, Ph.D., post-doc **Anita Zaitoua**, Ph.D. is performing experiments to validate predictions that she and SROP student **Amanda Stubbs** made about CoV-2 epitopes. Undergraduate student **Avrokin Surnilla** continues to work on predictions remotely, and Dr. Raghavan has submitted an R21 application based on the predictions.

Joel Swanson, Ph.D. has submitted an R03 proposal to study macrophage cell biology in the context of SARS-CoV-2 infection. **Bethany Moore**, Ph.D. served on a UMMS grant review committee for COVID-19-specific research project proposals.

A number of M&I faculty including **Adam Lauring**, M.D. Ph.D., **Christiane Wobus**, Ph.D., **Teresa O'Meara**, Ph.D., **Daniel Goldstein**, M.D., **Michael Bachman**, M.D. Ph.D., **Michael Imperiale**, Ph.D., **Denise Kirschner**, Ph.D., and **Bob Dickson**, M.D., have published or are in the process of publishing research articles, editorials, or comments on the rapidly evolving understanding of the new Coronavirus and COVID-19. The Kirschner lab, spearheaded by post-doc **Marissa Renardy**, Ph.D. built a mathematical model to study COVID-19 dynamics within Washtenaw County, the results of which were published in *The Journal of Theoretical Biology*.

Oveta Fuller, Ph.D. and **Kathy Spindler**, Ph.D. have disseminated accurate science insights and guidelines around the pandemic to non-scientists and virologists alike.

Dr. Fuller served as an invited resource expert for CBS *Coronavirus House Calls*, the 313 Coalition aired twice weekly on Detroit Public television, the National Parent Union, Redditt, and Municipal Legislators of Michigan among other ongoing advisory roles. She piloted a continuing education short-course “What You Should Know about COVID-19” and is an invited participant in a plethora of webinars and panels on SARS-CoV-2 including during the *Black in Microbiology* week. Dr. Spindler continued her role as a co-host on, “[This Week in Virology](#)” with the frequency of podcasts increasing from one to three per week due to the volume of developing information about the newly emerged pandemic virus.

Three Spindler Lab alumni are engaging in SARS-CoV-2 research: **Marty Moore**, Ph.D. (Meissa Vaccines, Inc., CEO), **Lei Fang**, Ph.D. (Pedicine, Inc., Senior Director, Product Development and Operation), and **Lisa Gralinski**, Ph.D. (University of North Carolina, Chapel Hill, Research Asst. Professor, Epidemiology).

- Haley Brown, Ph.D.



Michigan Medicine knelt on the sidewalk surrounding the medical campus on June 19th in recognition George Floyd and support for Black Lives Matter

M&I seeks to become “A Better Place” - Diversity, Equity and Inclusion

Besides the COVID-19 pandemic, 2020 brought increased awareness of social inequities and racial disparities and of the need for M&I to actively seek to become a better place - a more inclusive and satisfying site for research, work and studies.

Many struggled, and struggle still, to comprehend the murders of Eric Garner, George Floyd, Breonna Taylor and the many others who lives are lost by police brutality or gun violence. This year, more than any, we are forced to examine issues of systemic and institutionalized racism and bias. That M&I personnel are deeply affected by this realization has prompted numerous actions aimed at education, awareness, advocacy, and action.

A few of these actions are highlighted here. 1) We engaged in our first commemoration of June 19—the day celebrated by some when enslaved African Americans in the southern states, e.g. Texas, first learned that they were free persons. Slavery in the USA had been legally abolished as of January 1865. To honor George Floyd, the department participated with others who knelt for 8 minutes and 46 seconds around the perimeter of the UM medical school in a campus-wide Black Lives Matter event. 2) A group of faculty led by **Yasmina Laouar**, Ph.D., collaborated to create a hiring manual with best practices to increase opportunities to hire more diverse faculty. 3) Some faculty members of the faculty participated in a series of book club discussions, while several laboratory groups began reading and discussing relevant resources to explore with colleagues some of the nuances of anti-black racism experienced by faculty and students of color in academia.

4) More than 50 members of the department participated in the “Anti-Racism 101” workshop facilitated by the UM Office for Health Equity and Inclusion. 5) We were one sponsor of the international **Black in Microbiology** event (see following article) that involved UMMS or M&I students, postdocs or faculty (**Ariangela Kozik**, Ph.D., **Filipe Cerqueira** and Dr. Fuller) to highlight scientists of African descent who work in the microbiology discipline. 6) An M&I student committee (**Amanda Photenhauer, Jaime Fuentes, Madison Fitzgerald, Matt Schnizlein, Nick Lesniak, Yolanda Rivera-Cuevas, and Yuan Li**) will host the third year of the Diversity, Equity, and Inclusion (DEI) speaker series supported by a Rackham Faculty Allies for Diversity grant. During the previous two years, this series each year has brought as department seminar speakers two academic microbiologists with underrepresented heritages. In 2018-19, speakers were Paul Turner, Ph.D. (Yale University) and Kat Milligan-Myhre, Ph.D. (University of Alaska). In 2019-2020, they were Alfredo Torres, Ph.D. (University of Texas Medical Branch) and Juanita Merchant, M.D. Ph.D. (University of Arizona). 7) Our weekly departmental communication email contains a DEI-related suggested read to promote self-reflection and education and progress in this area that affects everyone in some way.

The M&I DEI committee, led by **Akira Ono**, Ph.D., consists of faculty, trainees and staff members that meet regularly to discuss issues, resources and programming. The DEI Liaison of the Organization of Microbiology and Immunology Students (OMIS) serves as a point of contact. Student concerns or suggestions can be confidentially communicated to the liaison. Moreover, mandatory reporter and non-reporter faculty were identified to help to address issues or concerns from students and fellows. The new OMIS DEI Liaison for 2020-21 is **Austin Campbell**. He will continue working to implement the action plan resulting from student feedback in the department’s 2019 DEI climate survey.

Yolanda Rivera-Cuevas is recognized and appreciated for her work as OMIS DEI Liaison for 2019-20 to curate data from the DEI climate survey and provide action plan recommendations. 8) Filipe Cerqueira of the Koropatkin Lab continues to run UM’s DEI Taskforce in collaboration with fellow Ph.D. student Lindy Jensen in Molecular and Integrative Physiology. This effort is supported by the UM Medical School Office of Graduate & Postdoctoral Studies. The Taskforce recently hosted the first workshop in a virtual format to focus on strategies for effective allyship. While M&I has the best gender balance of any basic science unit on campus and a high level of ethnic diversity, we have much more to do to become a fully inclusive and racially diverse department. Actions taken in 2020 suggest that M&I is eager and willing to do the work to become a better place for all of its members!

- Jennifer Baker and Austin Campbell

M&I Spotlight: Black in Microbiology Week

On September 28 - October 4, 2020, members of the UM Microbiology and Immunology department joined microbiologists from all over the world to participate in the first ever Black in Microbiology (BIM) week. The idea for this event was conceived in the midst of two pandemics, one of COVID-19, which disproportionately affects communities of persons of color, and the second of deeply rooted racial injustice marked by increased visibility of police brutality in the United States. These have spurred supporters of the Black Lives Matter movement to renewed strength and actions that are committed to bringing about change.

In this environment, the co-founders of Black in Microbiology, **Ariangela Kozik**, Ph.D., UM postdoctoral researcher (Internal Medicine) who studies the interactions between the respiratory tract microbiome and asthma, and Kishana Taylor, M.S. Ph.D., of Carnegie Mellon University, were moved to create the fully virtual event. In an interview with [Michigan Medicine Headlines](#), Dr. Kozik explained, “*Dr. Taylor and I saw it as more important than ever to work on the representation of Black microbiologists in our field so we can help identify and overcome the structural and systemic barriers that lead to devastating impacts from things like COVID-19 in certain populations.*”

Driven by the current sociopolitical climate and a surging SARS-CoV-2 pandemic, the BIM team created and implemented a week of fully virtual programming to begin to highlight the experience of Black microbiologists. It explored how Blackness intersects with research and daily lived experiences as scientists. Each day of programming was centered around a theme that included virology, mycology, parasitology, bacteriology, and microbiome research, disparities in STEM education, and careers in microbiology. These themes guided panel discussions, keynote addresses, Q&A sessions, and community building via Twitter and other media platforms.

The BIM team recruited a host of leaders in microbiology-related careers for events streamed live to participants via Zoom. These include Beronda Montgomery, Ph.D., the Foundation Professor in Microbiology and Molecular Genetics and an Assistant Vice President for Research and Innovation at Michigan State University,





who delivered a truth-filled keynote address on disparities in STEM education. Also featured in the *Black in Virology* evening panel were Kizzmekia Corbett, Ph.D., the 2020 Norman Salzman Memorial Award recipient and scientific lead of the NIH Coronavirus Vaccines and Immunopathogenesis team and our M&I faculty **Oveta Fuller**, Ph.D., a virologist now focused on implementation science for controlling microbial infections. Though the BIM team had only two months to assemble and plan the week-long event, it was a resounding success. Support from organizations such as the American Society for Microbiology and the American Society for Virology brought media attention that helped to garnish engagement of *The New York Times* and over 3,000 registered participants from every continent except Antarctica.

M&I Ph.D. candidate **Filipe Cerqueira** (Koropatkin lab), an organizing member of the BIM Programming Committee, was featured in two events on *Black in Virology* day. In one, he was part of a fascinating COVID-19 Q&A session with LaNell Williams, Ph.D. candidate at Harvard University, that was enhanced by Dr. Fuller's community interface-honed expertise. In an afternoon session, Filipe interviewed Leon Golson, Prevention Director of UNIFIED - HIV Health and Beyond in an insightful

discussion of how the Black queer community is impacted by the HIV global pandemic. After immigrating to Texas from Bahia, Brazil when he was young, Filipe attended the University of Texas (UT) for an undergraduate degree in Microbiology. While at UT, Filipe took courses in social justice education and practiced the art of effective facilitation to engage with STEM colleagues about diversity and inclusion. Filipe joined PIBS in 2017 and the M&I department in 2018. He continued advocacy by co-founding the Diversity, Equity, and Inclusion (DEI) Taskforce at the University of Michigan, which is supported by the UM Biomedical Research Office of Graduate and Postdoctoral Studies.

Although his doctoral research involves starch-active proteins from human gut bacteria, Filipe's involvement in *Black in Virology* highlighted his background in cytomegalovirus biology, HIV/AIDS advocacy, and social justice education. Of his involvement with BIM week, Filipe says, "*We planned this worldwide event in only two months! I am very proud to be a member of M&I at the University of Michigan that is one of the Silver Level Sponsors of BIM. This was a unique opportunity to connect Black microbiologists from around the globe. Concentrating Black scholars into one space led to an exceptional transaction of science and mentorship. The event emphasized the great loss due to an on-going exclusion of Black people from science. BIM is a small glimpse of what can be accomplished when Black people are not only included, but celebrated for their intellect, expertise, and talent.*"

Dr. Fuller was featured in the COVID-19 Q&A session and the *Black in Virology* panel. Dr. Fuller's interdisciplinary research engages community leader networks, international and domestic, as *Trusted Messengers* to embrace and distribute accurate scientific information about HIV/AIDS. This network approach has been adapted to provide essential science communication during the SARS-CoV-2 pandemic. Dr. Fuller stated, "*BIM week was a wonderfully refreshing gathering of African American scientists. It is a delight and encouraging to see the excitement, curiosity and breadth of expertise brought to a range of topics in microbial sciences. New connections were made. The founding of Black in Microbiology highlights the need for all to continually tackle anti-Black racism so those gifted for and interested in science, no matter who they are, can attain their potential and contribute to discovery.*"

Though BIM week has formally concluded, the BIM team will continually find ways to engage the community of Black microbiologists around the world while working towards fulfilling its mission. The mission is to: "showcase the presence and accomplishments of Black microbiologists...connect Black microbiologists with one another...provide a forum for the discussion of racial disparities in microbiology and its sub-disciplines, engage with the community at large to increase general microbiology knowledge, acknowledge the contributions [of Black microbiologists] to their disciplines, and...pursue equity in academe, industry, government, and beyond."

To join the Black in Microbiology team in pursuit of this mission, connect on [Twitter](#) (@BlackinMicro), watch recorded versions of the week's events on the [YouTube channel](#), listen to BIM team members discuss experiences on podcasts including [This Week in Virology](#) and [This Week in Microbiology](#), and follow updates from the BIM team on website, [blackinmicrobiology.org](#).

- Jennifer Baker

Named Lectures

Neidhardt-Freter Symposium - October 8, 2020

Neal Hammer, Michigan State University
Hosted by Laura Mike, Ph.D.

Mariana Byndloss, Vanderbilt University
Hosted by Mary O'Riordan, Ph.D.

Brockman Lecture - November 5, 2020

Denise Galloway, Fred Hutchinson Cancer Center
Hosted by Michael Imperiale, Ph.D.

Research Grants Awarded for M&I Trainees

Molecular Mechanisms of Microbial Pathogenesis T32

With renewed support from the National Institutes of Health, the Molecular Mechanisms of Microbial Pathogenesis (MMMP) training program is excited to have seven exceptionally talented young investigators join the program this year.

The Sandkvist, O'Meara, and Snitkin laboratories had a good year on this front! **Kris Blair**, Ph.D. (postdoctoral fellow) and **Austin Shannon** (graduate student) from the Sandkvist lab were awarded training support on the MMMP T32 grant. Graduate students **Faith Anderson** and **Darian Santana** from the O'Meara lab were also awarded spots. Postdoctoral fellow **Arianna Miles-Jay**, Ph.D. and graduate student **Andrea Garretto** from the Snitkin lab were funded and finally, graduate student **Gabby Huizinga** (Singer and Moore labs) rounds out this great group of seven.

Through the program, these trainees will have opportunities to enhance their knowledge of microbial pathogenesis and related themes, together with augmenting critical thinking, networking, leadership and communication skills. The MMMP leaders are looking forward to helping these rising stars boost their trajectories toward successful careers in biomedical research.

Research Training in Experimental Immunology T32

This training grant provides *"a cohesive infrastructure to bring multidisciplinary researchers from across campus together to facilitate collaborations on problems of immunologic importance, stimulating immunology-related faculty recruitment and providing outstanding research and mentoring support to meet the growing demands of students and post-doctoral fellows wanting to prepare for immunology-related careers."* At its outset, the grant helped stimulate the development of the Graduate Program in Immunology. **Alanna Condren**, Ph.D. (Sherman lab) and **Einar Olafsson**, Ph.D. (Carruthers Lab) were supported by the Immunology Training grant as postdoctoral fellows. Five graduate students in non-M&I labs were also appointed.

NIH Grants of M&I Faculty

Two research faculty in the Mobley lab, **Mark Anderson**, Ph.D. and **Sébastien Crépin**, Ph.D. were awarded R21 grants. The lab's "Uropathogenesis" R01 was refunded. The lab of **Cheong-Hee Chang**, Ph.D. received an R01 for "Regulation of metabolic pathways in NKT cells." **Nicole Koropatkin**, Ph.D. and **Eric Martens**, Ph.D. are co-PIs on a new NIH R01 to characterize enzymatic pathways that gut bacteria use to degrade mucus. This work will be conducted in collaboration with former Martens' lab postdoc Ana Luis, Ph.D. and Gunnar Hansson at the University of Gothenburg. Dr. Koropatkin is a co-investigator on a new collaborative P01 with Pavan Reddy, M.D., and M&I colleagues **Tom Schmidt**, Ph.D. and Dr. Martens. The goal is to study how resistant starch (RS) administration alters microbial and host metabolism to decrease the severity of graft versus host disease. The Koropatkin lab will contribute by exploring the molecular mechanism by which gut bacteria harness RS to produce beneficial metabolites. **Phil King**, Ph.D. was awarded a new R01 to study the molecular pathogenetic mechanisms in capillary malformation-arteriovenous malformation (CM-AVM). **Evan Snitkin**, Ph.D. was awarded a new R01 to study regional genomic epidemiology to identify drivers of resistance, transmission and infection with carbapenem-resistant *Klebsiella pneumoniae*. **Alice Telesnitsky**, Ph.D. was awarded a new R21 with UM co-investigators of Jeffrey Kidd, Ph.D. (Human Genetics and Computational Biology & Bioinformatics) and **Andrew Tai**, M.D. Ph.D. to examine HIV-1 genomic RNA integrity.

National Science Foundation Grants

Vincent Young, M.D. Ph.D. is a co-PI for a new grant through the Microbiome Theory and Mechanisms funding program. The research combines structural informatics and crosslinking mass spectrometry to predict key protein-protein interactions shaping symbiotic microbial communities.

Developing Future Biologists

In August 2020, **Krista Armbruster**, Ph.D. (Koropatkin Lab), **Matt Schnizlein** (Young Lab) and nine other graduate students and postdocs from across PIBS, engaged in 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 underrepresented backgrounds who attend non-research focused two- and four-year schools.

This mission is accomplished through two major components of the DFB annual summer course: 1) teaching students about developmental biology through interactive lessons and hands-on lab activities, and 2) providing a clear picture of what science careers look like and the tools to pursue them through professional development workshops and mentorship.

Originally designed as an on-campus course, the DFB team successfully adapted these learning goals to a virtual format due to pandemic restrictions. DFB taught 36 students across four time zones — the biggest DFB cohort of students yet!

Krista and Matt look forward to continuing their service as DFB instructors as they prepare for next year's course and developing programs to provide ongoing support for DFB alumni. Keep up with the DFB team and learn how to support their efforts by visiting their website: www.developingfuturebiologists.com.

- Jennifer Baker



Collage of the 2020 DFB student cohort's virtual introductions

New Courses in Microbiology and Immunology

Two new courses have arisen in 2019-20 partly due to effects of the COVID-19 pandemic.

MICRBIOL450: "Global Impact of Microbes"

Course Director: **Oveta Fuller**, Ph.D.

Microbes can be beneficial or pathogenic. Through online lectures, readings, discussion and projects, the course in Winter 2021 will explore impacts of pathogenic viruses, bacteria, fungi or parasites. The overall objective is that participants gain appreciation of the multiple factors that influence transmission, control and outcomes from encounters with microbes in different global sites. This is intended as an online complement to the former immersion experiential course begun in 2010 "Global Impact of Microbes: Fieldwork" that was affected in 2020 by travel restrictions of the COVID-19 pandemic.

Course participants in the online course will better understand biological mechanisms of prevalent microbial pathogens and controls or prevention and appreciate how molecular features of a given microbe intersect with cultural norms in control and prevention of disease. In the context of socioeconomic factors and the environment, we will explore how the biological features of selected microbial pathogens impact individuals, families, communities and nations. The course is ideal for those interested in infectious diseases, medicine, health, policy or related areas.



Images from topics covered in MICRBIOL 450

Methods in Microbiology & Immunology

Organizer: **Nicole Koropatkin**, Ph.D.

Graduate students have shown great interest in learning from a methods course. Accordingly, a new course was piloted in Fall 2020. Each week a different technique in bacteriology, virology and immunology will be covered. The speaker provides some background on the technique, how it is used, data output, controls, considerations, pros/cons and alternatives that would make the technique most useful. The majority of the speakers are postdocs, augmented by a few faculty. All are volunteering their time for this series. Sessions of the methods course are being recorded and shared with the department.

Some of the topics covered are: flow cytometry, ELISA, how to distinguish between presence and infectivity of SARS-CoV-2, mouse models, LC-MS/MS and MALDI for small molecules and proteins, light microscopy, pathology/histology (and preparation at UM), systems biology modeling of viral and bacterial infections, culturing basics and non-mammalian infectivity models, basic cloning, making gene knock outs in bacteria, qPCR and RNAseq, TnSeq and functional screening, and whole genome sequencing.

Michigan Infectious Diseases International Scholars

The Michigan Infectious Diseases International Scholars (MIDIS) fund was created 16 years ago as the brainchild of M&I faculty **Alice Telesnitsky**, Ph.D. Its purpose is to help create research opportunities for international master's students, support short-term research experiences for trainees from preventable disease-endemic nations, and leverage the admission of international graduate students into the M&I Ph.D. program.

In recent years, MIDIS has partnered with the West African Center for the Cell Biology of Infectious Pathogens (WACCBIP) to enable three graduate students from Ghana to spend one to two years performing research at Michigan. To further our relationship with the WACCBIP, M&I faculty member **Akira Ono**, Ph.D. and departmental grad alumna **Adewunmi Nuga**, M.D. Ph.D., former doctoral student in Telesnitsky lab and former postdoc in the Collins lab, used funds awarded to them by the UM Global Reach to visit WACCBIP in Accra last December. During their visit, they met directors of institutes and presented seminars, where they were enthusiastically received by scientists and students at the University of Ghana (UG). From the trip, they hope to strengthen the relationship with WACCBIP and the university and to pursue establishing a potential exchange between UG and UM students.



International travel curtailed by the COVID-19 pandemic impacted multiple planned events. This includes the summer 2020 immersion in Zambia (south central Africa) for the M&I experiential learning course “Global Impact of Microbes: Fieldwork” led by **Oveta Fuller**, Ph.D. Additional plans in 2020 for MIDIS were to have UM faculty and graduate students make short visits to Ghana in 2020 while other WACCBIP trainees would start at UM. The pandemic has altered these M&I global engagements. Current exchange student, **Irene Owusu**, had to change her plans as the pandemic hit. As a Ph.D. candidate in Molecular Cell Biology of Infectious Diseases at UG, Irene was able to use funds provided by MIDIS to conduct research for the past two years studying noroviruses in the laboratory of **Christiane Wobus**, Ph.D. She planned to return to Ghana in October 2020, but has extended her research appointment for another year due to pandemic-related travel restrictions. Irene states that she misses her family back in Ghana, but is grateful for the research opportunity at the UM.

The pandemic has underscored the global nature of infectious diseases! Financial donations made to MIDIS (fund #308700) are greatly appreciated. They support international student training and help to leverage additional funding that make the international exchanges possible. Collaborations globally are more important now than ever as the world continues to encounter emerging pathogens and to fight against impact of infectious diseases.

- Kallan Roan

Faculty News

Nancy Williams Walls Professorship Awarded to Dr. Bethany Moore

Nancy Walls, Ph.D., was an amazing alumna of the University of Michigan. From arriving in Ann Arbor as an out-of-state student, she performed her undergraduate and master's degrees at UM and began her doctoral program here on the effects of gamma radiation on botulism before finishing her dissertation at Emory University. She spent her academic career at the Georgia Institute of Technology, where she was the first woman to head a department.

Dr. Walls' research and love of travel took her all over the world studying microorganisms from the ocean floor and the environment. She also established an environmental consulting firm. Dr. Walls was a committed advocate for supporting women in science and donated several major gifts to UM. One was a scholarship for out-of-state students. Another was sponsorship of the Early Career Scientists Symposium in the Department of Ecology and Evolutionary Biology. A third supported the UM Biological Station. Happily, for M&I, one gift was a bequest to the Department of Microbiology and Immunology to “honor the most wonderful teacher I ever had” who taught *Introduction to Microbiology* when she was a doctoral student.

A fascinating remembrance of Dr. Walls' life and legacy can be found at: <https://lsa.umich.edu/eeb/news-events/all-news/archived-news/2013/04/in-memoriam--alumna-dr--nancy-walls--a-lifetime-of-adventure-and.html>.

It is with special delight that the current M&I interim chair, **Bethany Moore**, Ph.D., has been named the first recipient of the Nancy Williams Walls Professorship, approved by the UM Regents as of November 1, 2020. Dr. Moore's highly productive immunology research and scholarship, strong mentorship record and compassionate and visionary leadership in multiple positions make her an ideal candidate to honor Dr. Walls' amazing legacy of achievement and generosity.

Pictured: Nancy Williams Walls, Ph.D. (top). Dr. Walls at the Early Career Symposia in 2009 with then-EEB chair, Deborah Goldberg, Ph.D. (bottom)



Spotlight on Faculty and M&I Laboratories

Promotions

Maria Sandkvist, Ph.D., was promoted to Full Professor with tenure.

Nicole Koropatkin, Ph.D., was promoted to Associate Professor with tenure.

Bob Dickson, M.D., was promoted to Associate Professor with tenure.

Publication Highlights

Andrea Hodgins-Davis, Ph.D. and new Assistant Professor **Teresa O'Meara**, Ph.D. wrote a review on systems biology of *Candida albicans* in *Current Opinion in Microbiology*. **Irina Grigorova**, Ph.D. guest-edited (together with Richard Kennedy, Ph.D.) a special issue of *Immunological Reviews*: "B and Th cell responses to antigen: implications for vaccine development and diseases." <https://onlinelibrary.wiley.com/doi/epdf/10.1111/imr.12782> **Michele Swanson**, Ph.D. co-authored a Consensus Report of the *National Academies of Sciences, Engineering, and Medicine* "Management of *Legionella* in water systems." **Bethany Moore**, Ph.D. published a collaborative paper with fellow M&I faculty member, **Katherine Gallagher**, Ph.D., "Epigenetic regulation of the PGE2 pathway modulates macrophage phenotype in normal and pathologic wound repair" in *JCI Insight*. **Alice Telesnitsky**, Ph.D. published "Structural basis for transcriptional start site control of HIV-1 RNA fate" in *Science*, available at: <https://pubmed.ncbi.nlm.nih.gov/32327595/>. **Phil King**, Ph.D. and **Joel Swanson**, Ph.D. published "Macropinocytosis drives T cell growth by sustaining the activation of mTORC1" in *Nature Communications*. **Vern Carruthers**, Ph.D. published "Toxoplasma Cathepsin Protease B and Aspartyl Protease 1 Are Dispensable for Endolysosomal Protein Digestion" in *Msphere*. **Cheong-Hee Chang**, Ph.D. published "Cutting Edge: Activation-Induced Iron Flux Controls CD4 T Cell Proliferation by Promoting Proper IL-2R Signaling and Mitochondrial Function" in *J. Immunol*. **Malini Raghavan**, Ph.D. published a review "Polymorphisms of HLA-B: influences on assembly and immunity" in *Current Opinions Immunology*. **Harry Mobley**, Ph.D. published "Optimization of an Experimental Vaccine to Prevent Escherichia coli Urinary Tract Infection" in *Mbio*. **Eric Martens**, Ph.D. published "Phase-variable capsular polysaccharides and lipoproteins modify bacteriophage susceptibility in *Bacteroides thetaiotaomicron*" in *Nature Microbiology*.

Tackling Anti-Black Racism in Publishing

Pat Schloss, Ph.D., **Michael Imperiale**, Ph.D. and **Oveta Fuller**, Ph.D. were among the co-authors of an editorial published in the ASM Journals entitled "The ASM Journals Committee Values the Contributions of Black Microbiologists." The editorial points out the roles that ASM journals have in ensuring black microbiologists and issues pertinent to the black community are not silenced during peer review. The authors outlined a framework to increase representation in the peer review process and in the editors-in-chief; strategies to recruit black scientists to publish in their journals; and ways to ensure that peer review is less affected by implicit or covert bias.

Awards and Honors

Michele Swanson, Ph.D. and **Vern Carruthers**, Ph.D. were elected as fellows of the American Association for the Advancement of Science. **Bob Dickson**, M.D. received the Jerome W. Conn Award for Excellence in Research by a Junior Faculty Member in Internal Medicine. **Maria Sandkvist**, Ph.D. was appointed to the Prokaryotic Cell and Molecular Biology NIH study section (2020-2024). **Oveta Fuller**, Ph.D. was appointed to a 4-year term for the Vaccine and Related Biological Products Advisory Committee of the Federal Drug Administration. **Bethany Moore**, Ph.D. was appointed to a 4-year term on the Lung Cellular and Molecular Immunology NIH study section.

Post-doctoral News

Funding and Awards

Kris Blair, Ph.D. (Sandkvist Lab) and **Arianna Miles-Jay**, Ph.D. (Snitkin Lab) were appointed to the Molecular Mechanisms in Microbial Pathogenesis T32 training grant. **Jay Vornhagen**, Ph.D. (Bachman Lab) received a perfect score on his NIH K99/R00 grant application - way to go, Jay! **Sarah Tomkovich**, Ph.D. (Schloss Lab) was accepted into the MICHR Postdoctoral Translational Scholars Program. Dr. Vornhagen and **Ariangela Kozik**, Ph.D. (Huang Lab - Internal Medicine) were both awarded the 2020 Outstanding Postdoctoral Fellow Award. Dr. Kozik is a cofounder of the **Black in Microbiology** group and served as one of the co-lead organizers for this year's **Black in Microbiology** week in October!

Postdoc Career Transitions

Telesnitsky lab postdoctoral scholar **Jackie Esquiaqui**, Ph.D. accepted a faculty position in Chemistry and Biochemistry at Palm Beach Atlantic University. **Kalyani Pyaram**, Ph.D. (Chang Lab) accepted a position at Kansas State University, where she will teach immunology and setup her lab that will focus on the role of the antioxidant system in governing the T cell-mediated inflammation and inflammatory diseases. **Rebecca Pollet**, Ph.D. (Koropatkin Lab) accepted a position as a Visiting Assistant Professor of Biology at Davidson College.

Departmental and University Postdoctoral Association Activity

The Microbiology and Immunology Postdoctoral Association (MIPDA) is co-led by **Lisa Abernathy-Close**, Ph.D. (Young Lab), **Ally Shea**, Ph.D. (Mobley Lab), and **Sarah Tomkovich**, Ph.D. (Schloss Lab).

The postdoc invited speaker in March was A. Sloan Devlin, Ph.D., who was welcomed from the department of Biological Chemistry and Molecular Pharmacology at Harvard Medical School. Her talk was entitled, "Gut Bacterial Modification of Host Metabolites Alters Host Physiology." The second postdoc invited speaker, Michael D. L. Johnson, Ph.D., from the Immunobiology department at the University of Arizona College of Medicine, could not travel as planned due to the COVID-19 outbreak. We look forward to his re-scheduled virtual talk in December 2020 entitled "Something Old, Something New, Something Borrowed, Copper II."

The postdocs in M&I are eager to use the information we gleaned from **Bethany Moore**, Ph.D. and **Michele Swanson**, Ph.D. during the departmental climate survey debrief to cultivate a more inclusive postdoc culture. For example, a number of respondents reported experiencing bias from another trainee. Addressing this is a priority. Another discussion point around inclusiveness was to "create a departmental norm to allow protected time for postdocs to participate in professional development and/or teaching activities" including outside internships. This has now been implemented.

M&I postdocs continue to serve in influential ways on behalf of post-docs of the university through the UMPDA. **Caitlyn Holmes**, Ph.D. (Bachman Lab) was elected as a co-president in June. Dr. Miles-Jay (Snitkin Lab) was elected to the UMPDA board in June to co-lead Diversity, Equity, and Inclusion efforts.

Publications

Post-docs were extremely productive this year in the form of publications. Some of these are highlighted below: Dr. Tomkovich (Schloss Lab) - *mSphere*, *mSystems*, and *PLoS Computational Biology* (with **Begum Topçuoğlu**, Ph.D. and former post-docs **Ada Hagan**, Ph.D. and **William Close**, Ph.D.); **Carmen Mirabelli**, Ph.D. (Wobus Lab) - *Journal of Medicinal Chemistry*, *Biochemistry and Cell Biology*, *Nature Communications*, *International Journal of Infectious Diseases* (COVID-19 work); **Haley Brown**, Ph.D. (Koropatkin Lab) - *Glycobiology*; **Amanpreet Kaur**, Ph.D. and **Anita Zaitouna**, Ph.D. (Raghavan lab) - *F1000Research*; Dr. Abernathy-Close (Young Lab) - *mBio* and *Infection and Immunity*; **Di Chen**, Ph.D. (King Lab) - *Nature Communications*; **Arwen Frick-Cheng**, Ph.D. (Mobley Lab) - *mBio* and *Infection and Immunology* (2); **Ajay Kumar**, Ph.D. (Chang Lab) - *Journal of Immunology*; **Gabriel Pereira**, Ph.D. (Martens Lab) - *mBio*; **Marissa Renardy**, Ph.D. (Kirschner Lab) - *Journal of Theoretical Biology* (COVID-19 work), *Bulletin of Mathematical Biology*; and Dr. Shea (Mobley Lab) - *Applied and Environmental Microbiology*, *PLoS Pathogens*. M&I postdocs published over forty papers. While some were wrapping up stories from graduate school, the majority were from studies conducted at UM.

Embracing Postdoc Life during a Pandemic

A number of post-docs served as instructors for piloting (online) the new "Methods in Microbiology and Immunology" course. Dr. Abernathy-Close, Dr. Holmes, **Helen Rich**, Ph.D., **Krista Armbruster**, Ph.D., **Matt Ostrowski**, Ph.D., **Amanda Starr**, Ph.D., Dr. Frick-Cheng, and Dr. Shea all gave seminars about their favorite frequently used technique!

A number of postdocs continued mentoring undergraduates who worked in research labs through the end of the Winter 2020 semester and into the summer. This required working diligently to transition to projects that could be completed remotely - think bioinformatics!

Planning of the next career step for postdocs, and also for M&I graduate students nearing their dissertation defense, feels a little more uncertain now than in otherwise pandemic-free years.

- *Haley Brown, Ph.D.*



Basel Abuaita, Ph.D., at a COVID-19 health screening checkpoint

Undergraduate Research 2020 Symposium

In mid-September, eight students put on a fantastic M&I Undergraduate Research Symposium to showcase their research through ten-minute talks using a Zoom platform. Although the first to be held in a virtual format, this was the 12th symposium in M&I. Hearing how each student persevered through disruptions caused by COVID-19 to continue their work was particularly inspiring!

Students received feedback on their talks from post-doc judges **Amanda Starr**, Ph.D. (Mobley Lab), **Krista Armbruster**, Ph.D. (Koropatkin Lab) and **Matt Ostrowski**, Ph.D. (Martens Lab). Participants included **Vedhika Raghunathan** (O’Riordan Lab), **Kylie Schache** (Mobley Lab), **Beverly Fu** (Cascalho Lab), **Sam Venkatesh** (Koropatkin lab), **María José Andrade** (Imperiale lab, NSURP student) and **Vanessa Stubbs** (Raghavan Lab, SROP student).

The 2020 Undergraduate Research Award was presented to **Adeline Morris** for her work on an enigmatic starch-binding protein from *Bifidobacterium adolescentis* conducted in the Koropatkin lab. A runner-up award was presented to **Sinyu Yang** for her work in the lab of Anthony Vecchiarelli, Ph.D. characterizing ParA-mediated cargo sorting mechanisms in *Halothiobacillus neopolitanus*. The symposium was organized by **Haley Brown**, Ph.D., a post-doc in the Koropatkin lab.

- Haley Brown, Ph.D.

Graduate News

Dissertations November 2019 to October 2020

Robert Glowacki, Mentor: Eric Martens, December 6, 2019

“Characterization of a ribose metabolism pathway in *Bacteroides thetaiotaomicron*”

Shawn Hawken, Mentor: Evan Snitkin, March 17, 2020

“Integration of genomic and epidemiologic data to detect hospital transmission of carbapenem-resistant *Enterobacteriaceae*”

Jay Lubow, Mentor: Kathleen Collins, March 19, 2020

“Vpr enhances expression of HIV Env and viral spread in infected macrophages by counteracting the host restriction factor mannose receptor”

Michael Dieterle, Mentor: Vince Young, April 27, 2020

“Predicting adverse outcomes in *Clostridioioides difficile* infections and identifying associated host and microbial drivers of disease severity”

Dishari Thornhill, Mentor: Akira Ono, July 30, 2020

“MA-RNA interactions in cells and their effect on HIV-1 assembly”

Danelle Weakland (pictured below), Mentor: Harry Mobley, October 16, 2020

“Investigating the contribution of iron acquisition to *Serratia marcescens* pathogenesis during bacteremia”



Danelle Weakland was the first to hold an in-person defense since the COVID-19 shut down



Microbiology and Immunology Ph.D. class 2020



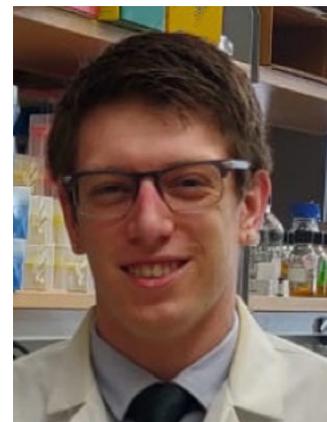
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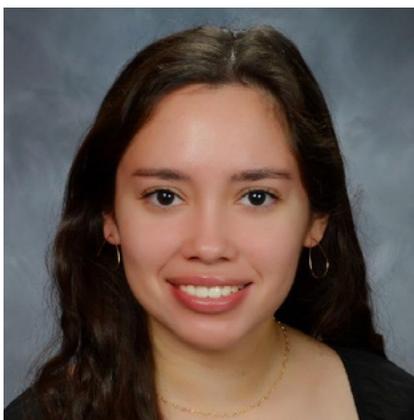


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Microbiology and Immunology Masters class 2020



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Ya-Ting Chang
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Members of the Sandkvist lab (left) or the Carruthers lab (right) connect while remaining safe.

Giving Opportunities in Microbiology and Immunology

We extend sincere thanks to the donors who have contributed to our research, education and service missions. Your support is critical, especially in difficult financial times surrounding the COVID-19 pandemic. We list opportunities to support ongoing work of the Department of Microbiology and Immunology. You can donate to any of these funds at the site indicated:

The **Harry L.T. Mobley Lectureship Fund** will endow a lectureship to honor former chairperson, Harry Mobley, Ph.D., by bringing an outstanding scientist working in an interdisciplinary way across domains of Microbiology and Immunology. Student and faculty engagements with outstanding guest scientists are an important part of the M&I training mission. A gift to this fund will help to bring exceptional scientists to campus each year. Currently 11% of the \$100,000 goal has been raised. www.giving.umich.edu/give/335804

The **Microbiology and Immunology Research Opportunity Fund** provides seed money for exciting new projects that are not yet mature enough to garner federal research support. It pays for research needs to advance pilot projects. The COVID-19 pandemic created many pilot projects that allow M&I faculty to pivot their expertise to address the 2020 pandemic. As this high impact fund likely will be depleted in 2020, your gift will support this important work. www.giving.umich.edu/give/323153

The **Michigan Infectious Diseases International Scholars (MIDIS) Fund**, founded over 16 years ago, supports international student training. It assists with leveraging additional funding to make possible mutually beneficial international exchanges of personnel between Microbiology and Immunology and partnering universities. www.giving.umich.edu/give/308700

The **Kevin J. Thompson Memorial Fund for Sepsis Research**. Kevin Thompson was the charming, outgoing, healthy, athletic, loyal Wolverine and partner of faculty member Michele Swanson, Ph.D. In March 2020, Kevin lost his life to sepsis from a Group A Streptococcus blood infection. This reminder of how devastating sepsis can be points to an urgent need to better understand this syndrome. A gift will support UM researchers in understanding the pathogenesis of sepsis. www.giving.umich.edu/give/336663

The **Microbiology and Immunology Endowed Graduate Education Fund** helps underwrite graduate student stipends, lab fees, travel for meetings and pilot projects. It supports the next generation of scientists! www.giving.umich.edu/give/731244

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