INSIDE PATHOLOGY

MICHIGAN MEDICINE
UNIVERSITY OF MICHIGAN

2023

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INSIDE PATHOLOGY

ON THE COVER

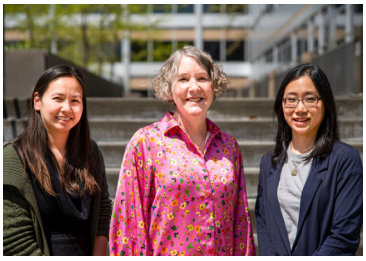

Photo: Anastazia Hartman
Left to Right — Angela Wu, Laura Lamps, and Maria Westerhoff.

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The pandemic has been challenging for everyone yet our department has remained strong, and our staff, trainees, and faculty rose to the occasion and continued providing outstanding service. I am grateful for the incredible team we have in the Department of Pathology that deserves accolades for our successes.

In this edition of *Inside Pathology* magazine, you will have the opportunity to read about some of our faculty, trainees, and staff, and get a glimpse of the Michigan difference. We appointed three new Assistant Chairs, Drs. Laura Lamps, Maria Westerhoff, and Angela Wu, whom you will meet as you learn about the work they are doing that makes us a unique Department. You will also be introduced to Dr. May Chan, our interim Director of Dermatopathology. Mrs. Cheryl Wonch, a patient whose story was made possible by the efforts of our Pathology team, shares her story and on the research front, you will read how Dr. Andrew Lieberman's research into neurological diseases have made significant strides toward finding possible new treatments for patients suffering from Kennedy's disease and other related conditions. Research from other key members of our department is also highlighted in this year's issue.

As you read, remember that this work was made possible in part through the generous donations made by friends and alumni of the Department of Pathology. Through your gift, our story can continue onward and thrive into the future. We hope you enjoy this issue of *Inside Pathology* magazine.

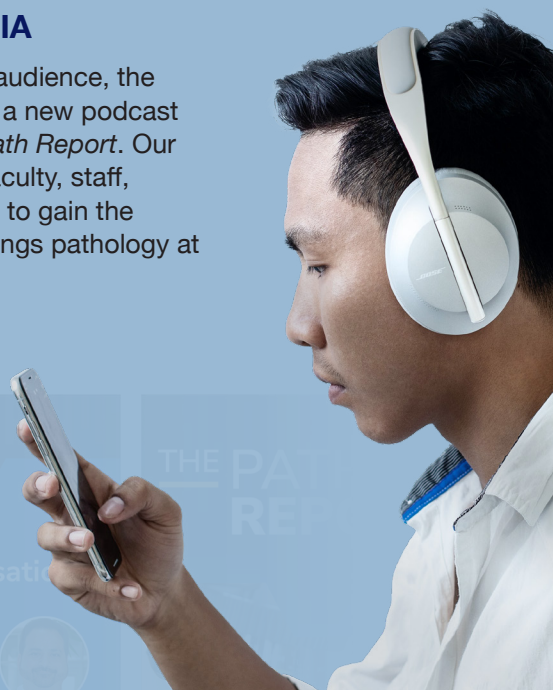
Charles A. Parkos, MD, PhD
Carl V. Weller Professor and Chair
Department of Pathology
Michigan Medicine

ON SOCIAL MEDIA

To engage a broader audience, the department launched a new podcast through Acast: *The Path Report*. Our host sits down with faculty, staff, residents, and fellows to gain the inside scoop on all things pathology at Michigan Medicine.

Acast

@umichpath



OUR WEBSITE

A Passion for Helping Others Leads to a Career in Pathology
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A Year of Transition
February 7, 2023

Peek Inside a Bank Full of Priceless Gifts
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Building a Culture of Development, Inclusion and Wellness

by Anastazia Hartman

Laura Lamps, MD

Angela Wu, MD

Maria Westerhoff, MD

The Department of Pathology is dedicated to fostering faculty and staff development, promoting diversity, equity, and inclusion in the workplace, and prioritizing employee wellness. The Department has a renewed focus on these initiatives, which stems from the recognition by Dr. Charles Parkos, Chair of Pathology, of the need for attention in three key areas aligned with important societal topics. Faculty within the department had already begun initiating positive changes when Parkos instituted a formal leadership team to increase the pace of progress. Leading these initiatives are assistant chairs Drs. Laura Lamps, Angela Wu, and Maria Westerhoff.

Faculty and Staff Development: Dr. Kathleen Cho, Vice Chair for Academic Affairs, has played a critical role in addressing faculty-based issues for many years. A major identified gap affecting faculty relates to challenges in finding qualified staff to fill vacancies within the department's clinical laboratories. To help fill this gap, Parkos and Cho reached out to Lamps. "She stepped up and was instrumental in identifying and developing leadership within Allied Health programs in collaboration with Karen Barron, Allied Health Program Manager. Through their efforts, our department is making significant progress in fixing this gap," said Parkos.

DEI: To be more intentional in our commitment to Diversity, Equity, and Inclusion (DEI), Parkos created a leadership structure to embrace ongoing departmental efforts that align with both Michigan Medicine and the University of Michigan's missions. "The vice chairs felt that this new structure provided the right person an opportunity to play a significant role in the department," said Parkos. "Before Dr. Angela Wu was appointed, she was already working closely with committed faculty and staff to elevate these efforts within the department." Alongside Wu, the Pathology Anti-Racism Taskforce is made up of Eileen McMyler, Keisha Beck, Marie Brady, and Chris Rigney, all of whom provide assistance and insight to the Taskforce.

Wellness and Culture: The importance of wellness and culture has become increasingly evident in a post-COVID world, with heightened awareness of work-life balance. Dr. Maria Westerhoff, an established wellness leader, was quickly identified as the ideal candidate for this role. Parkos mentioned, "Maria Westerhoff was an immediate leader within this space. She is an excellent fit for this role due to her consistent effort to put 150% into everything she does, and the continuous joy she expresses in her work and life." With the support of her colleagues, Regina Ferguson, Facilities Manager, and Yvonne Beadle, Administrative Specialist, Dr. Westerhoff strives to create an environment where employees can thrive and grow, both individually and as a group. The department is finding new ways to provide resources and rewrite the script for wellness in faculty, staff, residents, and fellows.

Where are we now?

For Lamps and Barron, facilitation of faculty and staff development is key to helping them reach their career goals. Lamps stated that focusing on development is helping staff and faculty alike to become the best versions of themselves, both professionally and personally. "On the faculty side," Lamps said, "development efforts tend to focus more on promotions and tenure, assessing whether faculty want to train for leadership positions, and

helping them gain access to those resources." This will lead to more faculty truly becoming the leaders and the best.

Barron focuses her efforts on providing resources for staff education and professional development. "I'm using education programs and concepts to improve employee engagement, retention, and recruitment specifically through continuing education and resources for career advancement."

The Pathology Anti-Racism Task Force (PART) is actively engaging staff, faculty, and trainees in diversity, equity, and inclusion initiatives to keep abreast of the accelerating pace of change in our world. "This year's focus has been on engagement. We're giving opportunities for staff and faculty to become actively involved with diversity, equity, and inclusion efforts," explained Wu. This has included participation in lunch and learns, an Underground Railroad bus tour, and an annual Juneteenth equality walk, among other activities. Trainees have initiated their own DEI Committee with a broad spectrum of related activities. Their aim is to further include DEI in recruitment and education programs for medical students and residents.

The Wellness Committee, led by Westerhoff with the help of Ferguson and Beadle, is working towards building an attractive environment to work, learn, and grow as a group and as individuals. Westerhoff described her role's impact, "What we bring to our work with patient care is our strong connection to how we can be the best, not only for patients, but for ourselves and our colleagues. That is why wellness and culture is important to me and the department." Their three-phase plan includes raising awareness that wellness is something they can engage with at work and at home, engaging faculty and staff to participate in wellness efforts, and allowing different areas within the department to undertake their own wellness and culture projects.

Where are we going?

Looking ahead, Lamps and Barron are committed to enhancing staff and faculty education, retention, and interest in the department. Their primary goal is to bridge the gap between faculty and staff to foster a more cohesive and welcoming work environment. The highest-achieving workplaces are those in which employees are friendly, open, and respectful to each other. "We're trying to increase the interaction between our staff and our faculty while also helping the staff understand what a critical role they play in direct patient care," said Lamps.

Wu envisions ongoing improvements in DEI that are visible and lead to better practices, with a continued focus on engagement. "I think one of the challenges with DEI engaging with faculty and staff is time and commitment, but I do think that everyone has been really positive about a lot of our engagement opportunities," she said. "I want everyone on the staff and faculty to feel they're valued, important, and belong here. The goal is to make pathology a leader among Michigan Medicine and DE&I," said Wu. Parkos knows that change will not happen overnight, but hopes that through Wu and PART's work, more communities can be reached who might not know about pathology career paths or that pathology is for them.

To fully achieve the potential and goals that leadership has for wellness and culture within the department, it is crucial to foster collaboration and increase awareness among members. Westerhoff had identified three primary areas on which to focus this coming year: (1) Ensure each member of the department knows of the wellness activities available, (2) Communicate support for mental well-being, and (3) Recognize the success of each person. Westerhoff has continued to support Friday Leadership Walks, which were launched by the Chair's Suite, as an opportunity to informally interact with departmental leadership. She revived a system to recognize staff members or groups through a grant funded by the university and began conducting prize drawings. The Trainee Wellness Committee, which works alongside Westerhoff, enables residents and fellows to work together on important wellness topics. "They care about each other and their work. They're wonderful human beings and appreciate the opportunity to influence and hopefully make their workplace a better space. The trainees are extremely inspirational."

From left to right — Regina Ferguson, Maria Westerhoff, and Yvonne Beadle.

Looking to the future, Parkos and the Assistant Chairs look to be more intentional as they recruit, identify, and retain individuals within our department, with the aim of creating a diverse group of individuals who share the same goals. Lamps agrees, "When you say Michigan, we're the leaders and the best, we need to have the best people. We really need to think ahead. How do we recruit and retain? I think that's a big thing to emphasize for the future."

The Department of Pathology is on a continuous improvement pathway and Wu is encouraged that improvements in diversity, equity, and inclusion will significantly enhance the welcoming nature of the department. Combined with the wellness initiatives led by Westerhoff, as well as those available throughout the university and externally, the department anticipates increased workplace satisfaction and highly successful recruitment and retention efforts.

Westerhoff shared some thoughts on where to begin one's wellness journey. First and foremost, one needs to be grateful. A grateful attitude goes a long way toward wellness. Next, is to know yourself and the type of boundaries that you need, which are likely different from those of family and friends. Finally, respect your and others' wellness journeys. No two journeys are the same.

While our leadership is charting the course, each member of the department is taking this journey together. "We have so much talent within our department," said Parkos. "We must find ways that we can all work together alongside Drs. Wu, Westerhoff, and Lamps to continue finding opportunities to ensure DEI and wellness are at the top of mind when thinking of the Department of Pathology, and we must also work together to identify opportunities for career advancement not only with faculty, but staff as well."

Below — Assistant Chairs and committee members.

Only Steps Away From the Finish!

by Christine Baker

Another year towards the completion of this multi-phase, multi-year effort is complete! And not only that—the finish line is finally within site! By this time next year, the Pathology Relocation and Renovation (PRR) project will be in the rear-view mirror after more than 9 years of design, construction, and activation effort.

A year ago, we were in the weeds of activating the new Blood Bank laboratory at University Hospital (UH), with the construction of PRR Phases 2.4 and 2.5 still in our future. Over the past year, we have not only seen the rearrangement of Specimen Processing and arrival of two pre-analytic automation lines, but the completion and activation of the new Phlebotomy team room and cart room, the new employee break room and other support spaces, as well as the completion of the brand-new, state-of-the-art Cellular Therapy Laboratory. In recent weeks we completed an open house for the new Cell Therapy lab and are in the process of moving towards activating this wonderful new space.

Many years ago—during the design activities for the Pathology spaces in UH—the design team worked with a cross section of the Pathology department to find the optimal location for all the required spaces within the footprint of available space at UH. These design sessions ultimately led to the entire Core Lab being one large expansive space, and the Blood Bank, Apheresis and Cell Therapy units sharing one "neighborhood" as well as their office spaces. As part of this effort, the Pathology team together chose to put the employee break room and the Phlebotomy team room along a beautiful wall of windows, to allow for a striking view and natural light to be accessible to all employees. It was a highlight of the year to see these spaces come to fruition, and faculty and staff to move in and use these new spaces.

New break room for phlebotomy.

Members of faculty and staff touring the new Celluar Therapy Laboratory.

Mentorship by Managers – Empowering the Next Generation of Scientists

by Anne Van Veen

The University of Michigan Department of Pathology research laboratories hum with the activity of scientific discovery. Within these walls, talented minds collaborate to unravel the mysteries of disease and pave the way for medical advancements. But amidst the cutting-edge research, there is another vital aspect of the department's mission: nurturing the next generation of scientists. In research laboratories across the Department, laboratory managers help mentor undergraduate students and shape their scientific journeys. Michele Cusato from the Dr. Analisa DiFeo Laboratory and Lisa McMurry, from the Michigan Center for Translational Pathology, are two of these managers. The DiFeo lab is a small-to-mid-sized research laboratory while the MCTP is a very large, complex laboratory.

Cusato and McMurry are passionate about mentoring and guiding young minds as they explore career options in the sciences. They believe in the power of mentorship to inspire, challenge, and empower students. At the MCTP, as new students arrive in the laboratory, McMurry welcomes them and orients them to the University and to the MCTP in particular. "I make sure our students are set up to succeed in the laboratory with all their mandatory training and HR-related onboarding completed. I also introduce them to their research supervisor and make sure everything goes smoothly." Cusato, due to working in a smaller lab, has additional responsibilities beyond onboarding the students. "I train them in some of the more common laboratory procedures and encourage them to not just learn techniques and perform experiments, but to explore with curiosity, to ask questions, and to understand that they will make mistakes and that is ok. Part of my role as the lab manager is to guide and support our undergraduate students on their scientific journey and to help them nurture a passion for discovery," she stated.

As students are oriented to their laboratory, each is assigned to a research project where they work with graduate students, postdoctoral fellows, and research faculty. They learn specific techniques to complete their tasks, proper research record-keeping processes, how to ask the right kinds of scientific questions, and how to develop a research plan. Their lab manager is present to answer questions, ensure the students have access to the resources they need, and in some labs, to demonstrate how to perform specific experimental tasks in the laboratory. "Laboratory managers are typically not doctors. However, those of us working in the smaller labs often have years of technical experience in the laboratory and are familiar with many aspects of the research being conducted in the lab. We ensure the equipment is well maintained and functioning properly, supplies are in stock, and the laboratory is managed to run smoothly," explained Cusato.

True growth in the students comes not just from imparting knowledge, but also from fostering personal development. "I encourage the students to face their insecurities and to step outside their comfort zones," shared McMurry. For many of the students, this includes presenting newly published articles in laboratory meetings called Journal Club. The students explore published scientific literature in their field and present a selected article to the lab. In addition, students prepare year-end presentations on their research, where they provide a broad overview of the project and the specific

Michele Cusato

Lisa McMurry

findings of their research. Lab managers often serve as sounding boards as the students prepare these presentations.

Scientific discoveries are made regularly in the laboratory and the students are often involved in the research when these pivotal moments occur. "When experiments yield unexpected results, it can often leave students wondering if they made a mistake. In reality, it may be that they actually discovered something new. When that happens, the excitement in the laboratory is palpable," exclaimed Cusato. McMurry echoes that sentiment and shared a recent example, "Sarah Kang, who works on our bioinformatics team, is mentored by Drs. Yi Bao and Yuping Zhang, who are working on identifying a treatment for immunologically "cold" prostate cancers. So far, immunotherapy has a limited role in the treatment of prostate cancer. To understand the molecular biology of cancer immune escape, our lab has pinpointed a gene named UBA1, which exhibited negative association with T cell signature in tumor. Through analysis of RNA-seq data from UBA1 perturbation experiments (knockout and over-expression) with xenograft models, Sarah's work has helped to identify the key genes and pathways affected by UBA1 in tumor, confirm its role in immune-related signaling and CD8 T cell infiltration, suggesting that a Uba1 inhibitor could be used to enhance patient responsiveness to immunotherapy."

McMurry and Cusato are two of several research laboratory managers in the Department of Pathology and their experiences are echoed across the other laboratories. Each year, dozens of undergraduate students begin their research journeys under the watchful eyes of these managers. These students learn, grow, and discover the joys of research and in being part of the process of improving patient care for patients of the future.

Individualized Opportunity: Physician Scientist Training Pathway

by Anastazia Hartman

Gain perspectives from both the mentor and the trainee on the department's Physician Scientist Training Pathway (PSTP) program.

New career advancement opportunities for residents in clinical and anatomical pathology are now available to our next generation of leaders in pathology. At the University of Michigan Department of Pathology, residents have the choice to follow the Physician Scientist Training Pathway (PSTP). Co-led by Dr. Aaron Udager, Associate Director of the PSTP, this pathway helps prepare these eager leaders for careers in academic pathology, combining both clinical and research training throughout their time at Michigan.

Originally started by the Department of Pathology's Chair, Dr. Charles Parkos, and Dr. Asma Nusrat, Director of Experimental Pathology, the PSTP grew out of a need to encourage more residents to become interested in becoming physician scientists, and our longstanding track record of excellence in Anatomic and Clinical Pathology residency training. This dual program allows pathology residents to simultaneously receive clinical and postdoctoral research training to prepare for careers in academic lab-based research. At the start of a resident's journey, a mentorship committee helps create tailored plans for each trainee and identifies the corresponding lab in which training can be completed. Upon completion of the program, trainees complete all requirements for American Board of Pathology certification in Anatomic Pathology or Clinical Pathology as members of the University of Michigan Pathology Residency Program.

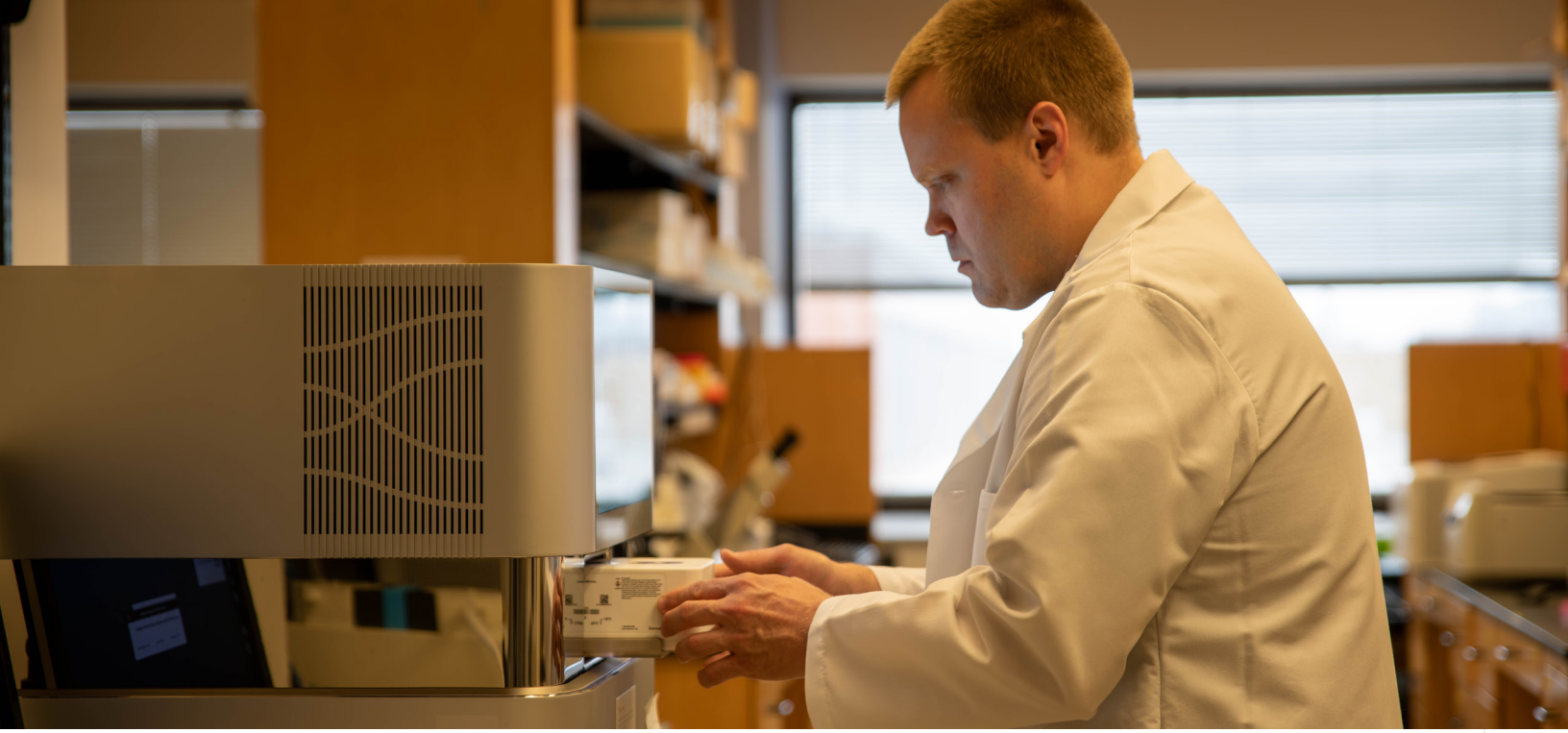
Udager is committed to keeping the same mission laid out by his predecessors, ensuring highly trained graduates. "The vision [Parkos and Nusrat] laid out and that we are continuing to promote is really to train the next generations of physician scientists, generating future leaders in the field of pathology," said Udager.

Udager himself is familiar with this concept as he received similar training prior to the program's official inauguration. It is his unique perspective that positions him to support trainees as they walk their path in academic pathology. "I started my training program right before the formalized program, however, from my experiences as both a clinical trainee and then an early career faculty launching a research program, I have an understanding of the trends, challenges, and needs of the trainees." This perspective allows him to

Aaron Udager, MD

MENTOR / PHYSICIAN SCIENTIST TRAINING PATHWAY

"The program is highly individualized to a given trainee's needs and career goals. They really are at the forefront of new fields and new types of research."



identify trainee concerns more quickly, to ensure that no time is lost in their education.

All PSTP trainees complete a three-year residency program in anatomic pathology or clinical pathology. Following completion of their residency, some chose to continue clinical training with one or more years of post-residency clinical fellowship training. Here fellows can identify their desired subspecialty area and next career steps. With the mentorship committee's help, there is plenty of room to work in highly personalized areas.

"The program is highly individualized to a given trainee's needs and career goals. They really are at the forefront of new fields and new types of research. We provide them the mentorship and opportunities to pursue passions and receive a high-quality clinical education."

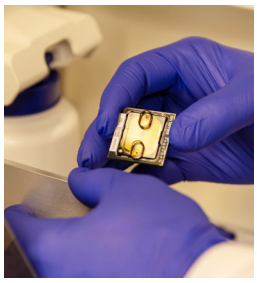
At the University of Michigan, there are many established resources and labs available to trainees. Udager feels this is a smart opportunity for trainees to embed and thrive in a breadth of different research programs across the medical school or other graduate schools or programs based on their interests. "The majority of our fellows end up in academic research positions at research institutes, where they do some clinical work, and they secure external funding to support their research."

Throughout their residency, fellowship, and postdoctoral research training, there are endless opportunities and value provided through the leadership and mentorship of long-time faculty members. In the Department of Pathology, there is a strong commitment to ensuring everyone has what they need to be the most successful in their respective area. Udager mentions that the University is a large institution and that this program is valuable both in the context of the Department of Pathology, and in general. Through the program, trainees are connected with people from other fields and disciplines who might have different perspectives and experiences. Connecting on these points can lead to trainees becoming future collaborators, friends, or support networks for each other.

Udager also has seen and sees the value of the University itself playing a role in the program. He says, "The University of Michigan, especially the Department of Pathology, really provides the best of both worlds. The clinical training that trainees receive here both in residency and fellowship is phenomenal. For the PSTP trainees, as they transition to working in different types of research laboratories and different areas of research, it's really being able to leverage the full breadth of the research enterprise and diversity of research opportunities here at the University of Michigan."

Dr. Udager's thoughts and opinions are shared by many others in the Department of Pathology. The Physician Scientist Training Pathway is a program and educational opportunity that can and will open new paths for many fellows and enhance their freedom to grow and succeed as pathologists, researchers, and people.

Above —
Aaron Udager working in his lab.



Emile Pinarbasi, MD

TRAINEE / PHYSICIAN SCIENTIST TRAINING PATHWAY

"That's the nice thing about being a physician-scientist. You get to tie in your research to something very tangible in terms of patient care."

Trainees within the Physician Scientist Training Pathway (PSTP) are given countless resources and mentors that guide and prepare them as they create their academic research career path. PSTP combines clinical training and a PhD program to prepare trainees for both anatomic or clinical pathology clinical work and laboratory-based research work. Each trainee is provided with a mentorship committee that helps establish individualized training plans and suitable labs in which research can be conducted as students pursue their PhD research.

Emile Pinarbasi, MD is one of several trainees within this training pathway offered by the Department of Pathology. She chose this unique career trajectory after working in a female-led research lab during a gap year after medical school. During this time Pinarbasi chose an MD/PhD program which allows for the opportunity to complete a body of research work. "I almost stumbled into it!" said Pinarbasi, "I decided to take a gap year after medical school, wanted to work in a research lab, and was working for a woman who was a physician-scientist. I got to witness firsthand what her career was and saw how much I really loved being in a lab."

Pinarbasi loves the opportunity to work in a lab setting, specifically noting the excitement of waiting for experiment results, wondering what they will be, and what new things will be discovered; that is why she feels that the PSTP program is a fantastic opportunity for her career. "That's the nice thing about being a physician-scientist. You get to tie in your research to something very tangible in terms of patient care, which I think is cool and fulfilling."

With a focus on neuropathology, Pinarbasi's long-term career goal is to be a neuropathologist physician-scientist, with her own lab focusing on neurodegenerative diseases and their underlying causes. She feels that being at the University of Michigan sets her and other trainees up for success. "They set you up with mentorship very early," she said. "Within the first couple months, I had a committee of people that I was meeting with, basically helping to guide me."

Another avenue for success comes from faculty helping identify new scholarship programs and opportunities for trainees. Pinarbasi mentioned Dr. Andrew Lieberman, Director of Neuropathology, who helped identify the Neurodegenerative Scholars program, which sets up a group of people who would like to pursue careers as neurodegenerative physician-scientists. This group works to break ground on networking opportunities, future collaboration, how to apply for grants, and how to get more involved with clinical research.

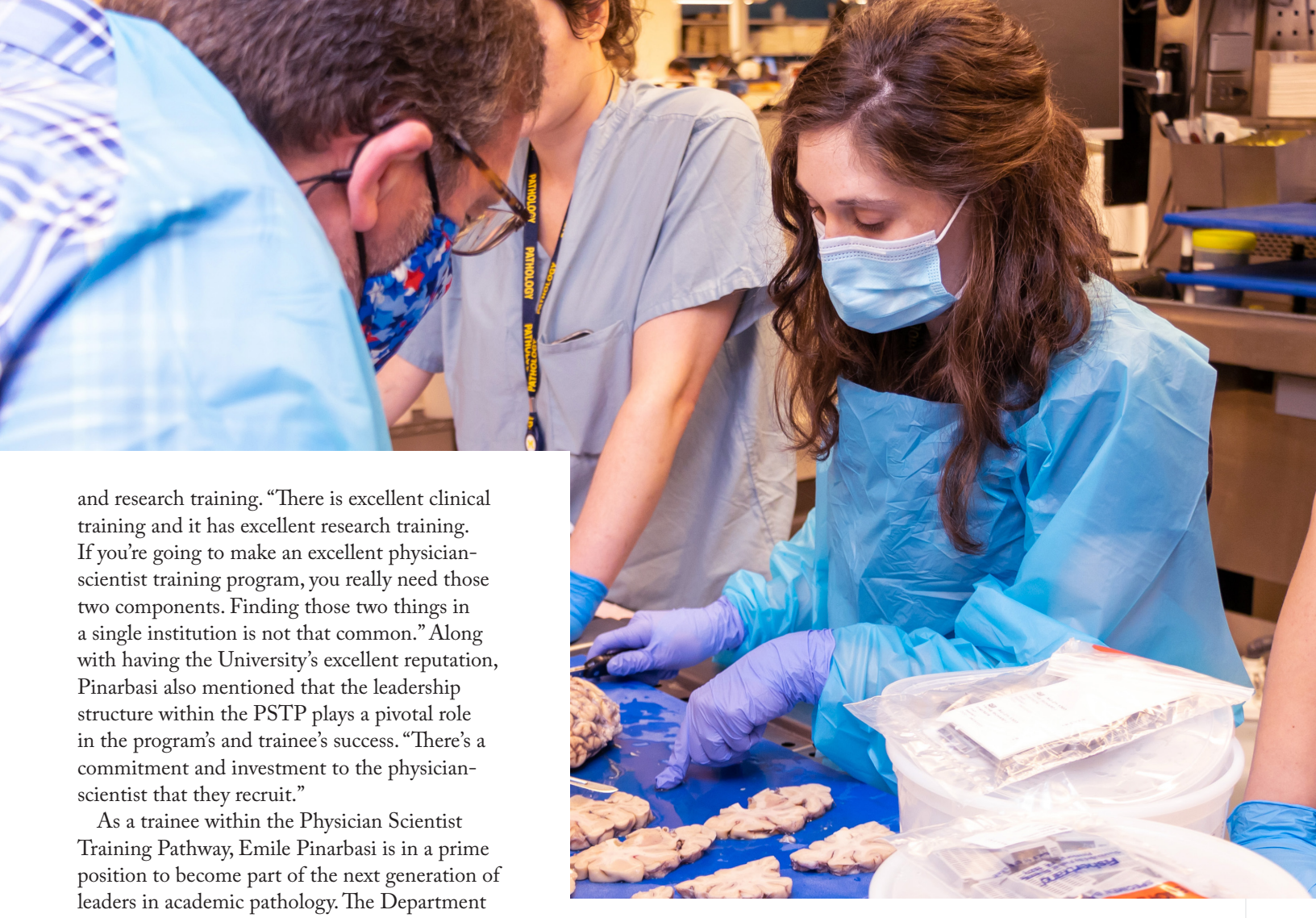
There is a lot of value and benefit from trainees and leadership. Due to her mentorship and available opportunities, Pinarbasi has already served on committees for the American Association of Neuropathology and written for *Pathology Outlines* (an online pathology resource). "It really has a lot of tangible benefits just to have mentorships set up so early." As well as mentors helping guide trainees on organizations or research areas, these mentors also help trainees to understand when they should be reaching out to research collaborators or when they should be applying for grants.

On top of mentorship, Pinarbasi mentioned that programs of this caliber allow for more protected research time for scientific development. This devoted time stems from faculty and leaders wanting trainees to have the time they need to complete their necessary research. "You're not going to have to fight to get the resources you need or the time you need to do your research."

While there are other programs of the same nature across the country, at the University of Michigan we are known for our excellent clinical

and research training. "There is excellent clinical training and it has excellent research training. If you're going to make an excellent physician-scientist training program, you really need those two components. Finding those two things in a single institution is not that common." Along with having the University's excellent reputation, Pinarbasi also mentioned that the leadership structure within the PSTP plays a pivotal role in the program's and trainee's success. "There's a commitment and investment to the physician-scientist that they recruit."

As a trainee within the Physician Scientist Training Pathway, Emile Pinarbasi is in a prime position to become part of the next generation of leaders in academic pathology. The Department of Pathology is committed to providing rigorous training and mentorship to help best position trainees for success in their present and upcoming careers.



Above —
Emile Pinarbasi during a brain conference held at the University Hospital.

Apply to PSTP

Qualified applicants will be sought among the applications to the residency program through the Electronic Residency Application System (ERAS). Candidates may also inquire directly by contacting the program at the same time they submit the ERAS application. A committee of physician-scientists including the Director of Experimental Pathology will review application materials to identify those individuals who will be invited to interview for the PSTP. To best plan the interview experience, those invited to interview will be asked to provide a brief statement describing their potential research interests. Candidates will be ranked through the National Resident Matching Program.

www.pathology.med.umich.edu/physician-scientist-training-program

Our Mission

The Department of Pathology is advancing the future of health care through education, patient care, and research missions. We are committed to achieving the highest standard of service excellence to ensure an ideal experience for our patients and their families.

Support Leaders & Best

In the pursuit of continued excellence in our educational training, clinical care, and scientific discovery, the Department of Pathology has always been grateful for private support. Gifts from individuals, foundations, corporations, and associations play a key role in medicine at Michigan.

Available Funds

Clinical Pathology Staff Enhancement Fund - 372290
victors.us/clinicalpathologystaff

Pathology Faculty Research Fund - 324557
victors.us/pathologyfaculty

Pathology Resident Research Fund - 324555
victors.us/pathologyresident

Pathology Fellowship Fund - 324556
victors.us/pathologyfellowship

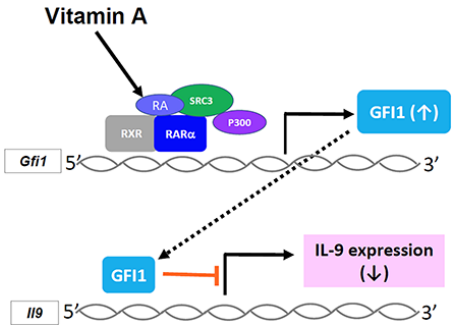
Research Highlights

www.pathology.med.umich.edu

Our faculty were very productive this year, publishing over 393 manuscripts in peer-reviewed journals! These publications represent successful research efforts undertaken. Some of the key highlights of particularly impactful research of late have included the following studies:

Novel negative regulator of immune response il9 gene expression discovered.

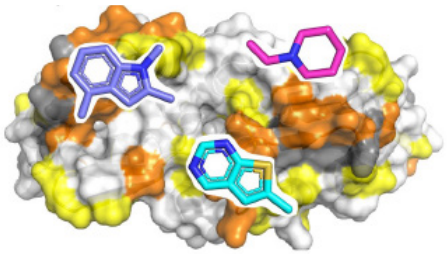
IL-9, produced mainly by specialized T cells, mast cells, and group 2 innate lymphoid cells, regulates immune responses, including anti-helminth and allergic responses. Polarization of naive CD4 T cells into IL-9-producing T cells (Th9s) is induced by IL-4 and TGF-β1 or IL-1β. In this article, we report that the transcription factor growth factor-independent 1 transcriptional repressor (GFI1) plays a negative role in mouse Th9 polarization. Moreover, the expression of GFI1 is controlled by liganded RARα, allowing GFI1 to mediate the negative effect of retinoic acid on IL-9 expression. The G*fi1* gene has multiple RARα binding sites in the promoter region for recruiting nuclear coactivator steroid receptor coactivator-3 and p300 for histone epigenetic modifications in a retinoic acid-dependent manner. Retinoic acid-induced GFI1 binds the Il9 gene and suppresses its expression. Thus, GFI1 is a novel negative regulator of Il9 gene expression. The negative GFI1 pathway for IL-9 regulation provides a potential control point for Th9 activity.



J Immunol. 2022 Oct 1;209(7)

Increased slow dynamics defines ligandability of BTB domains

The ability to predict whether protein can bind small molecules, or is 'druggable', would have a tremendous impact on the discovery of new medicines. In this study, we assessed the 'druggability' of a new class of cancer-related proteins containing the BTB domain. We showed that the combination of a technique called fragment screening with detailed analysis of protein dynamics allows us to accurately predict which protein binds small molecule compounds.



Interestingly, we found that of the three related BTB proteins (MIZ1, LRF, KAISO), only MIZ1 features unique motions and can bind small molecule compounds. In addition, we also revealed that MIZ1 features the presence of cryptic binding sites suitable for small molecule binding. Overall, we concluded that MIZ1 is a tractable target for drug discovery. Our method may have more general use for predicting 'druggability' for novel and challenging proteins with biomedical relevance.

Nature Communications, volume 13, 6989 (2022)

Cap-independent translation of GPLD1 enhances markers of brain health in long-lived mutant and drug-treated mice

There are many ways to increase lifespan in mice: genetic mutations, diets, and drugs. Xinna Li asked herself if these different ways to slow aging had common, shared mechanisms. Her recent paper proposes one such shared trait: an increase in a liver enzyme,

called GPLD1, that goes up after exercise in mice and people, and improves brain function in mice. She found that GPLD1 was indeed higher in seven kinds of slow aging mice, including mice treated with each of four anti-aging drugs developed at Michigan. All of these slow-aging mice also had improved brain cell turnover and stress resistance. She also found that GPLD1 was a member of a rare group of proteins whose levels are controlled by changes in RNA translation. Her current work is looking for other drugs that affect GPLD1, and in learning how higher GPLD1 lowers cancer risk and other late-life diseases in mice.

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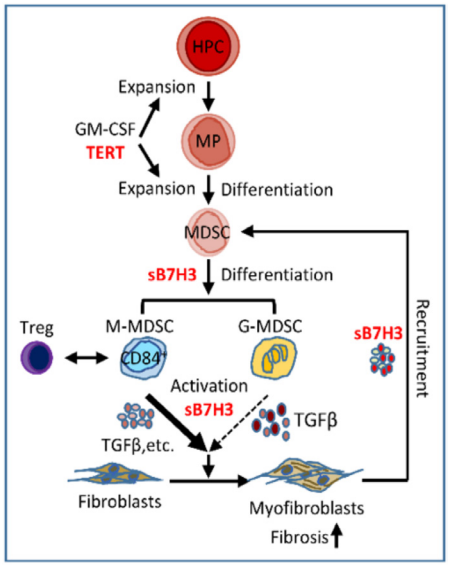
Aging Cell. 2022 Aug 5

B7H3-dependent myeloid-derived suppressor cell recruitment and activation in pulmonary fibrosis

Myeloid-derived suppressor cells (MDSCs) are recently discovered and one of the most discussed immunosuppresive cells of the tumor microenvironment. MDSCs generated during cancer progression enable the cancer cells to evade immune-surveillance, thus limiting the efficacy of cancer immunotherapies. Our findings of MDSC emergence/expansion in chronic fibrotic disease, such as idiopathic pulmonary fibrosis (IPF), suggest their importance might extend beyond cancer. MDSCs are significantly expanded in the blood of human IPF and animal model of lung fibrosis. The MDSC expansion is strongly correlated with disease severity, as well as plasma soluble B7H3, an immune checkpoint marker and inflammation inducer. Eliminating MDSCs should improve response rates to therapy and patient survival. However, direct targeting of MDSCs is difficult due to their complex phenotypic signature, which includes multiple surface markers that also identify mature myeloid cells. Our further studies suggest that the MDSC recruitment from bone marrow and/or activation are dependent on soluble



B7H3, potentially through suppression of myeloid cell differentiation. Notably bone marrow MDSC genesis is dependent on telomerase reverse transcriptase (TERT). Injection of B7H3 blocking antibody or TERT deficiency eliminates MDSCs, along with reduced fibrosis. These new mechanistic findings suggest B7H3 and TERT as novel therapeutic targets for prevention of MDSC genesis and/or recruitment.

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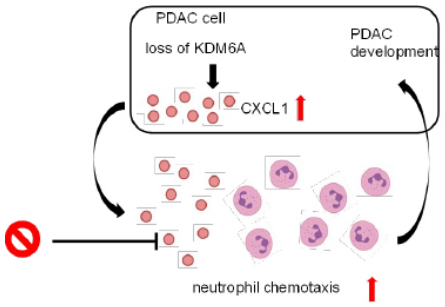
Front. Immunol. 2022; 13: 901349

Epigenetic alterations in pancreatic cancer cells reshape tumor immunity

Pancreatic ductal adenocarcinoma (PDA) has a highly immunosuppressive tumor microenvironment which contributes to treatment resistance and poor survival. How PDA cells influence the immune environment remains elusive. Epigenetics has been extensively studied in tumor cells. However, how epigenetic alterations in tumor cells affect immune environment is not clear. KDM6A is a frequently mutated histone modification and tumor suppressor gene in human cancers. In this study, using a genetically engineered, pancreas-specific *Kdm6a*-knockout PDA mouse model and human PDA tissue samples, we discovered that tumor cell-intrinsic KDM6A loss correlates with increased tumor-associated neutrophils and neutrophil extracellular traps (NET) formation, which are known to contribute to PDA progression. Genome-wide Bru-seq analysis to evaluate nascent RNA synthesis showed that the expression of many chemotactic cytokines, especially CXCL1, were upregulated in *KDM6A*-knockout PDA cells. *KDM6A*-deficient PDA cells secreted higher levels of CXCL1 protein, which in turn recruited neutrophils *(figure)*.



Furthermore, in a syngeneic orthotopic mouse model, treatment with a CXCL1 neutralizing antibody blocked the chemotactic and NET-promoting properties of KDM6A-deficient PDA cells and suppressed tumor growth, confirming CXCL1 as a key mediator of chemotaxis and PDA growth driven by KDM6A loss. These findings shed light on how KDM6A regulates the tumor immune microenvironment and PDA progression and suggests that the CXCL1-CXCR2 axis may be a candidate target in PDA with KDM6A loss.

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Cancer Research 82(22):4247–4260

Cheryl's Journey

by Lynn A. McCain, MHSA

Did you know that you don't have to die first to become an organ donor? Each year, approximately 6,500 Americans become living donors, donating kidneys, bone marrow, and other essential organs that give life to the dying. In each of these donations, pathology plays a pivotal role.

Cheryl Wonch is one of the 6,500. She received a letter from her local church asking members to consider donating a kidney to a fellow parishioner. When she agreed to be tested to see if she may be a match, Pathology walked alongside her in the process. Phlebotomists drew her blood and sent it to the HLA testing laboratory. There, laboratory professionals tested her blood to determine her blood type, such as A, B, O, or AB, and conducted tests to evaluate her compatibility with the prospective recipient. While people use the word "match" when talking about organ donations, exact matches are extremely rare, so the goal is compatibility. "We are testing to see if there is any reactivity between the donor and the recipient's blood serum," explained Dr. Matthew Cusick, Director of the HLA Laboratory in the Department of Pathology at Michigan Medicine. Cusick's team is interested in the genes that are related to the immune system and conduct tests called "tissue typing" as well as molecular tests. "We determine which genes the donor and the recipient have related to the immune system, which happens to be the most polymorphic region of the human genome, so there is a lot of variability. Basically, we want to see if the recipient has been "vaccinated" against the donor's antigens. Does their immune system react to the donor like it does to viruses and other foreign bodies, or does it accept the donor's antigens as self?" When these tests were completed, results were sent to the transplant center, where computer algorithms analyzed her information against everyone in the database in need of a kidney.

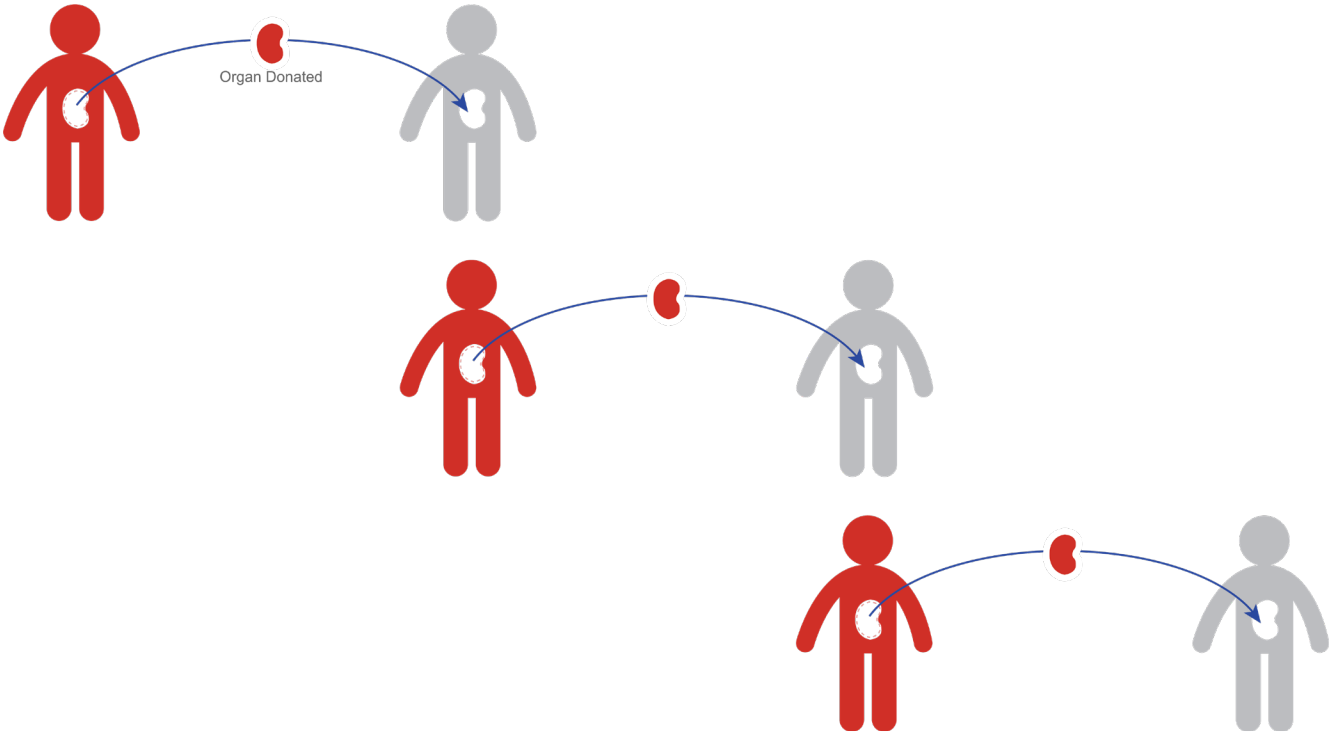
Cheryl Wonch

Meanwhile, Cheryl was awaiting the results. Weeks later, she received a call from the transplant center. "You are not a match," began the transplant coordinator. Disappointing news! "But you are a match for someone. Would you consider donating a kidney to them instead?" After consulting with her family, Cheryl agreed.

According to Cusick, this type of selfless donation often is the catalyst that starts a chain of organ donations. Cheryl's kidney may go to a waiting recipient, let's call them Recipient A, who has someone willing to donate as well (Donor B), but is not compatible. So Donor B then donates to another unknown recipient, Recipient B, who receives that kidney and who may also have someone incompatible but willing to donate (Donor C), whose kidney then goes to Recipient C, leading to a chain of organ donations. "This is always so exciting to see happen!" exclaimed Cusick.

Pathology rejoined Cheryl's journey as additional tests were run. This meant another visit to phlebotomy for a blood draw to complete the final cross-match testing. Urinalysis and a 24-hour urine test were also conducted to ensure Cheryl's kidneys were healthy. Cheryl's kidneys were functioning well. No signs of infection or disease were present. The cross-match results came back favorable. Cheryl's doctors determined she was healthy enough to proceed and to live unencumbered with one kidney.

Then came the CT scan. Cheryl met with the transplant surgeon to discuss the results and to make plans for the donation. "Your CT scan showed a tumor on the kidney," he began. Cheryl's heart dropped as she took in the news. She was no longer a candidate for donation. She needed major surgery with a lengthy recovery to remove



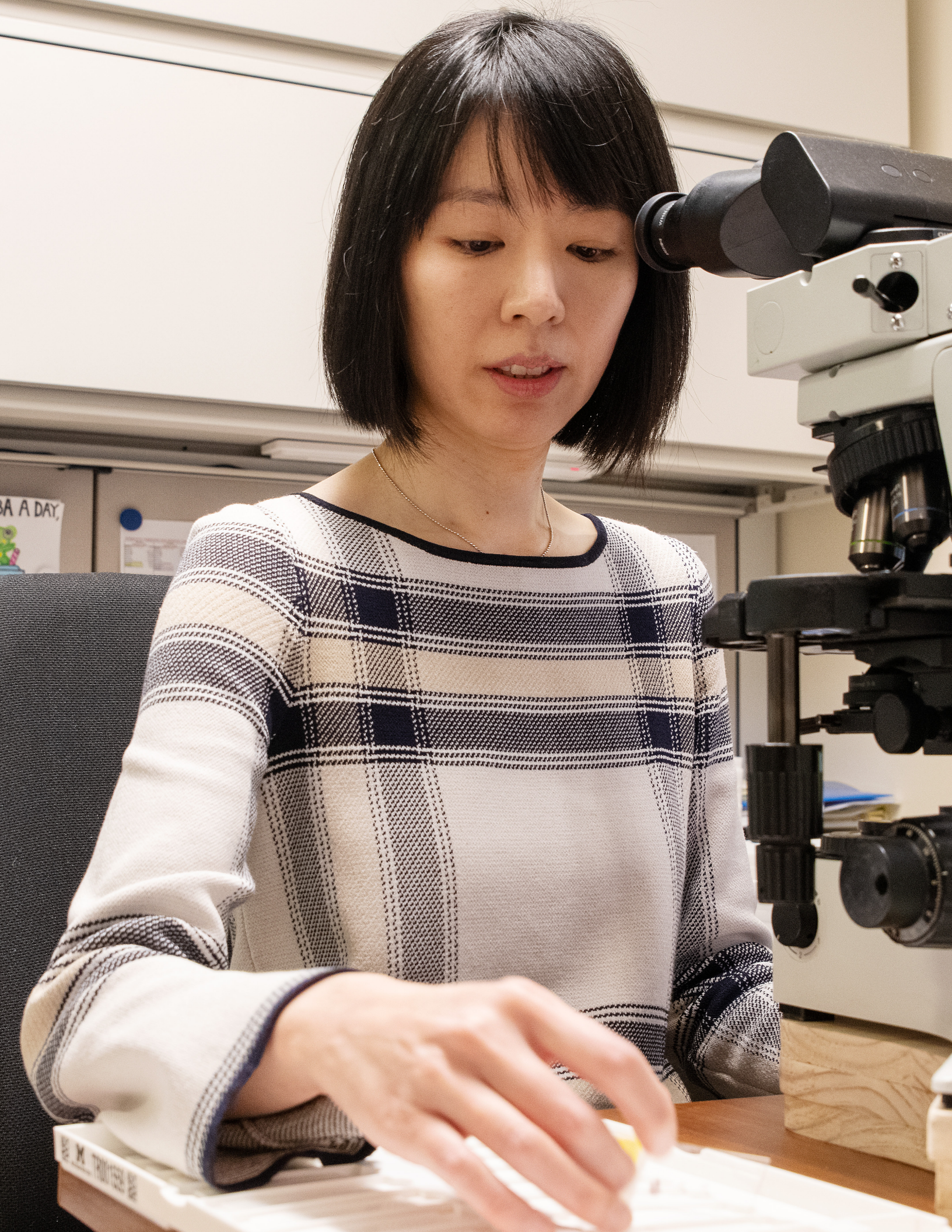
the tumor, which was about 4 cm (1.5 inches) in diameter. Her husband, a cancer survivor, was anxious that this tumor be removed from his wife as quickly as possible.

Days prior to her scheduled surgery, Cheryl decided she needed a second opinion and contacted Michigan Medicine. "I called on Monday and I had an appointment on Friday," she praised. A fine needle aspirate biopsy, which was relatively painless, was completed and Michigan Medicine's Department of Pathology joined Cheryl's journey. Dr. Aaron Udager, Associate Professor of Pathology, reviewed her case. "It was a clear cell papillary renal cell carcinoma, grade 3," reported Udager. "This was good news as this type of cancer is slow growing and tends not to spread. In fact, since this diagnosis was made, the World Health Organization reclassified it from a carcinoma to a tumor."

Based on these results, Drs. Samuel Kaffenberger and Randall Sung, her Michigan Medicine urologist and transplant surgeon, determined the kidney could be used for transplantation and the surgery could be done via laparoscopy, a much less invasive procedure than her other institution planned, with a significantly shorter recovery time. "One of the reasons I like Michigan Medicine is that they think out of the box," said Cheryl. This thinking allowed her to move forward in her organ donation…and still go on her planned Florida vacation later that fall.

On a warm August day in 2018, Cheryl underwent the surgical procedure to remove her kidney. But she wasn't alone. In addition to her stellar surgical team, Pathologists Sara Hawes and Andrew Sciallis stood by to perform the frozen section to ensure the entire tumor was excised from the kidney. While Cheryl was still in surgery, the pathologists were examining the tumor to be sure no part of it remained in the body. The report returned to the surgeons – the margins were clear – no tumor cells remained. The kidney was then donated to the recipient as Cheryl's surgeons finished up her surgery. As she was recovering in the hospital, Dr. Angela Wu, Associate Professor of Pathology, took a final look at the tumor after it had been sliced, to confirm the diagnosis and the negative margin status. She concurred with Udager's biopsy interpretation. "It was completely excised and should present no threat to the recipient," she stated.

Since recovery, Cheryl indicates that she has felt great. She has experienced no negative effects of living with just one kidney and is grateful to Michigan Medicine's transplant team, including the pathologists who guided her care along her journey. Without Pathology's support each step along the way, Cheryl would have been unable to be a living donor and someone else may not have been able to receive a life-giving kidney. "In the end, I was blessed," reflected Cheryl. "I hope that the recipient of my kidney has also been blessed."


A DAY,

Visual Recognition Talent Leads to Career in Dermatopathology

by Lynn A. McCain, MHSA

"I never imagined I would come to Michigan," began Dr. May Chan, Professor of Pathology and Dermatology at Michigan Medicine. "I really thought I would stay in Boston following my fellowship training. I interviewed at Michigan because it was one of two academic dermatopathology jobs available at the time, and a position at my home institution didn't open until after I applied elsewhere. The day I came here to interview – I just fell in love with the Department of Pathology, way beyond my imagination! I was eager to become a part of it!"

What Chan experienced during her interview is fondly called The Michigan Difference. Those who have spent their entire careers at Michigan know that there is something special about the Department of Pathology, but it is those who experience it for the first time from outside the department who can truly appreciate the difference.

Born in Hong Kong, at age 16 Chan moved to Toronto, Canada alone, where she attended a boarding high school. After completing college in Canada, she came to the United States for medical school in Buffalo, NY. As a medical student, she was introduced to pathology through an elective. Pathology was not part of the required curriculum, and she thought it may be useful to know a little about it. During this elective, she discovered her talent in visual recognition – as soon as she saw something under the microscope, she remembered it. She found rotations in other areas of medicine to be a lot of plain memorization of information. "There were a lot of buzz words, like 'non-caseating granulomas' in sarcoidosis, that I just memorized without clearly understanding what it meant. It's not until I saw one under the microscope that it finally made sense to me. Most diagnoses in pathology are indisputable—you see it, you prove it, and that's what it is." Pathology was exciting and intriguing. It appeared to be more "black and white" than other fields of medicine, although Chan now realizes there are many shades of gray in pathology, too.

Following medical school, she moved on to Boston, MA for postgraduate training. During her first year of anatomic pathology residency, she was exposed to at least five weeks of dermatopathology under the guidance of a key mentor, Dr. Steve Tahan. From that moment, she gravitated to the field and continued to pursue it throughout her residency and fellowship training.

Then in 2011, Chan came to Michigan to join the dermatopathology team at Michigan Medicine. "We have one of the largest academic dermpath sections in the nation and it is unique in many ways," Chan explained. "We have a huge case volume, primarily driven by Michigan Medicine's dermatology clinics which includes a busy melanoma clinic that sees more new patients than almost any other melanoma clinic in the United States, in addition to MLabs reference laboratory cases and consult cases." The case volume continues to grow and has fostered expertise among the department's dermatopathologists who are able to excel in niche subspecialty areas. "We have dermpath experts subspecialized in cutaneous lymphomas, cutaneous soft tissue neoplasms, molecular pathology, clinical dermatology, among other areas. I also do surgical pathology and have a special interest in melanoma, inflammatory skin diseases, and immunohistochemistry." This combination of niche subspecialties in dermatopathology and heavy case volumes allow each member of the team to continue to enhance their expertise, which is part of the Michigan

Difference that Chan observed during her interview.

The majority of dermatopathologists do not practice in other areas of pathology. When asked what motivated her to keep doing general surgical pathology, she explained, "When you have a mentor that you truly respect, you set them as your goal and want to do what they do." Her mentor, Dr. Tahan, used to sign out surgical pathology cases and cover frozen sections in addition to practicing dermatopathology, and Chan does the same. She was most impressed by the breadth of knowledge and diagnostic acumen shown by Tahan. "Seeing a great master in dermatopathology diagnose a pancreatic carcinoma on frozen section was humbling and inspiring." When she covers frozen sections, she pretty much sees everything except brains, which are reserved for the neuropathologists. At Michigan, Chan was given the freedom to expand beyond frozen sections to the "Room 1" surgical pathology service where she reads bone and soft tissue, head and neck, lung, and endocrine cases. "Even though I'm a dermatopathologist, I enjoy seeing other organs, too. The nature of the job is the same; we look at the tissues and make a diagnosis." In this day and age when pathology is increasingly subspecialized, Chan is eager to use her experience and knowledge to bridge any gaps between dermatopathology and other subspecialties.

Dr. May Chan

"One of the things that drew me to Michigan, that stands apart from other institutions, is their internal research funding mechanism. At other places, a great research idea is often followed by the question, 'Who is going to fund it?' At Michigan, the Department of Pathology has its own internal funding mechanism for clinical research," Chan explained. It was through this mechanism that Chan began to study the utility of various immunohistochemical stains in dermatopathology. One of the markers that Chan has explored using internal research funding is the PRAME antibody, which stands for PReferentially expressed Antigen in MElanoma. PRAME is very useful in differentiating benign moles from melanoma. What Chan and colleagues did was to study its expression in a number of melanoma mimickers. For example, they examined melanomas composed of tumor cells with a spindle morphology, which may at times be difficult to distinguish from other spindle cell tumors. They found that PRAME has lower sensitivity and specificity for spindle cell melanoma compared to conventional melanoma, so it cannot be relied on as a sole diagnostic marker in this context. Other markers need to be included for definitive diagnosis in these morphologically unusual cases. Chan published her research (Histopathology, 2022) to ensure other dermatopathologists would be able to learn from her findings and ensure patients receive the most accurate diagnoses.

When the former medical director of immunohistochemistry stepped down, Chan was given the opportunity to take on this leadership role. She considers this one of the best career moves she has made thus far. "This job forces me to keep up to date with what's new in pathology across different subspecialties, which is both fun and rewarding." A few years back, Drs. Charles Parkos (Chair of Pathology) and Jeffrey Myers (Vice Chair of Pathology) also recruited Steve Hrycaj, PhD, to be a technical director for the immunohistochemistry laboratory. "Steve has been able to help us optimize some really challenging antibodies. There are not many clinical immunohistochemistry labs that have a technical director like Steve. We are really blessed to have him and to have leadership that supports us in this way."

Under her leadership, the immunohistochemistry laboratory has been able to bring on a constant stream of new immunohistochemical markers that help with diagnosis and guide therapeutic decisions for patients. "If I were a patient, I would go to the University of Michigan because I know there would be tests available at Michigan that may not be available elsewhere. Other institutions send us their slides to stain because they don't have the bandwidth or resources to run those tests, some of which are used to determine what kind of therapy patients will receive based on their predicted response to specific treatment," said Chan. She emphasized that the success of the immunohistochemistry laboratory would not be possible without the excellent teamwork modeled by our skillful and dedicated histotechnologists.

In many institutions, women may find moving into leadership roles challenging. But not at Michigan Medicine's Department of Pathology. Chan serves not only as the Medical Director of the Immunohistochemistry Laboratory, she is also the Program Director of the Dermatopathology Fellowship and Interim Director for the Dermatopathology Section. Chan is also recognized outside the department for her expertise, recently being named to the Dermatopathology Test Development and Advisory Committee at the American Board of Pathology. The committee is responsible for designing the board exam that certifies

Above —
Dr. Chan (third from right) and Steve Hrycaj (first from right) with their team.

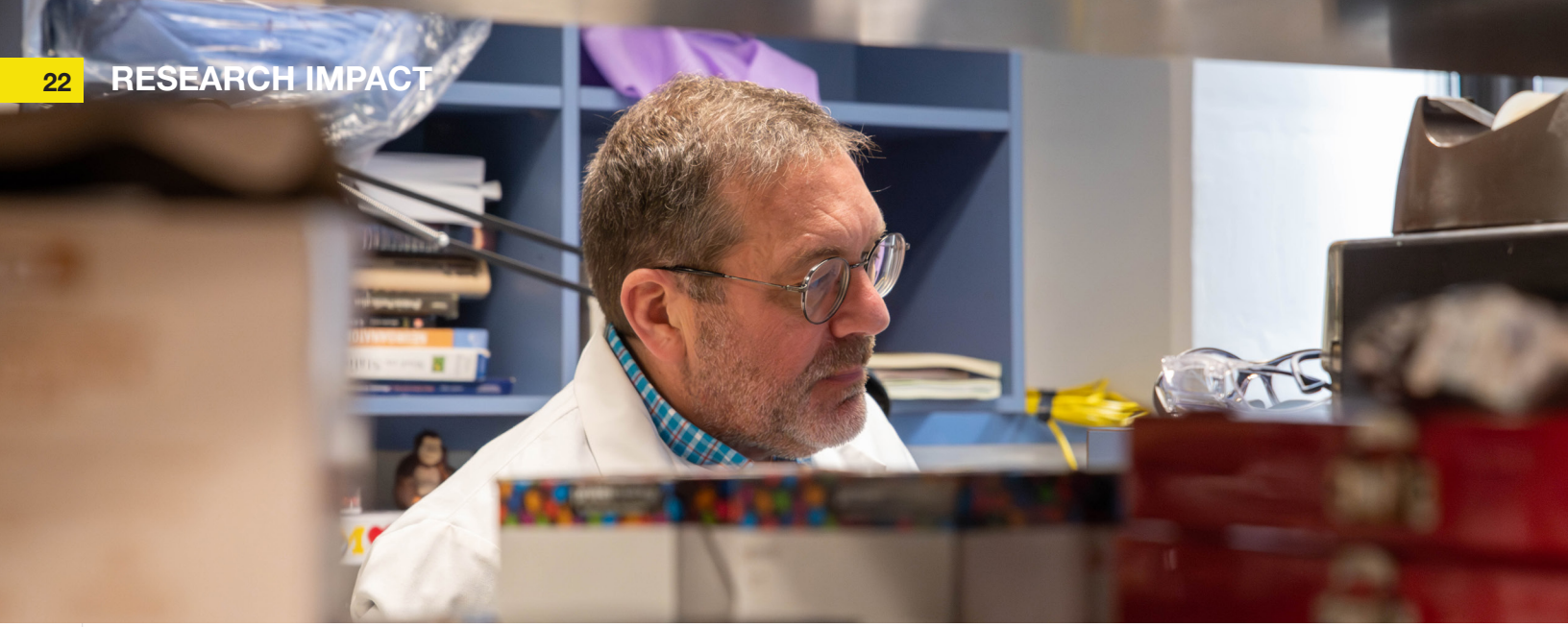
dermatopathologists. One of her goals is to focus on practical questions that adequately assess someone's ability to make accurate diagnoses, rather than trivia-type questions with which prior test takers have struggled.

Looking ahead five or ten years, Chan believes that most pathology departments will convert to full digital review of slides. At Michigan Medicine, the department is moving forward with the plan of digitizing all glass slides into whole slide images. "Transition to digital images will have a lot of advantages. If the pathologist with the necessary expertise is away at a conference, they can still pull up the digital slides on their computer and provide a diagnosis remotely." Glass slides still need to be made and stained prior to being digitized, so they will always be an available option for pathologists.

Another area of advancement that Chan sees coming is the increased use of artificial intelligence to perform image analysis on digital slides. "Initially AI may bring some anxiety among pathologists. But AI is there to assist us, not to replace us. For example, it can help us assess the proliferative activity of a tumor more quickly and accurately than manual estimation."

In immunohistochemistry, Chan sees many potential advances using new chromogens. Currently, all immunostains in our immunohistochemistry lab give either a red or brown signal. "But there are many new chromogens available now that allow us to put multiple colors on the same slide and still be able to sort out which cells express which markers." Chan recounted some beautiful test slides recently stained by Hrycaj, "When a yellow marker colocalizes with a purple marker, they give an orange color. Such evaluation for coexpression of multiple markers in the same cell compartment is not feasible with the traditional red and brown stains. With this new technology, we can use more than two colors on the same slide; but the more colors are used, the harder it is to examine with the naked eye. That's where digital image analysis may come in to help. I expect these technologies to grow in the coming years." The Michigan Difference is plain to see in this as well. Internal Pathology Informatics specialists are training AI algorithms to continue to make advances such as these possible.

Whether she considers the dermatopathology team, opportunities for professional growth and leadership, clinical research, departmental support from leadership and colleagues, or future directions for the department, Chan has found Michigan to be set apart from other institutions. The Michigan Difference is more than a catchy phrase, it is real and it is what keeps Chan enthused for each new day.



ASOs to the Rescue!

by Zander Tolyn

Imagine experiencing tremors, muscle cramps and twitches, weakness in the limbs spreading to loss of muscle control in the face, tongue, and throat. This progresses to an inability to swallow, recurrent aspiration pneumonia, and eventually death. These are symptoms patients with Kennedy's Disease experience; a disease being studied in the laboratory of Dr. Andrew Lieberman, the Gerald Abrams Collegiate Professor of Pathology and Director of Neuropathology at the University of Michigan, Department of Pathology. This disease affects only men, with a typical onset between 20-40 years of age, although men in their teens through their 70s have been diagnosed. The laboratory also studies a pediatric neurodegenerative disease, Niemann-Pick Type C Disease (NPC), which affects children as early as pre-birth through adolescence. This autosomal recessive genetic disease impacts the body's ability to properly transport cholesterol and other lipids intracellularly, resulting in excessive deposits of these fatty substances throughout the body. Children with this disease experience gradual loss of neurological function, with symptoms varying based on age of onset, and eventually death.

Lieberman has been diagnosing and studying neurological diseases at the University of Michigan for more than 20 years. When asked how he decided to go into medicine, Lieberman laughingly replied, "I have a Jewish mother!" He had strong family support for his decision to pursue a medical career, as did his brother, who is a cardiologist. Although, a career in pathology was not initially on his radar. Lieberman decided to pursue an MD/PhD degree at the University of Maryland, and it was during his predoctoral research that he first discovered his passion for pathology. "My graduate PI, Dr. Moon Shin, a renal pathologist, was interested in inflammation and was studying multiple sclerosis, which is an inflammatory demyelinating disease that affects the brain," Lieberman explained. "Through that, I became very interested in neuropathology." This interest was further nurtured when he completed his residency training at the University of Pennsylvania in Anatomic Pathology and Neuropathology.

Lieberman entered neuropathology at a time when exciting discoveries were being made. "The first neurodegenerative disease caused by a polyglutamine expansion was discovered while I was doing my training at The University of Pennsylvania in the lab where I ended up doing my postdoctoral research. Then, during my training, there were identified a number of other diseases with the same kind of genetic mutation, and that list included Huntington Disease, which is probably the best known of this group of diseases," Lieberman enthusiastically recounted. "When I started my clinical training, this group didn't even exist because none of the mutations were known, and then, as I was training, this whole new group of diseases was being discovered. It was really an exciting time!" Lieberman's postdoctoral mentor, Dr. Kenneth Fischbeck, led many of

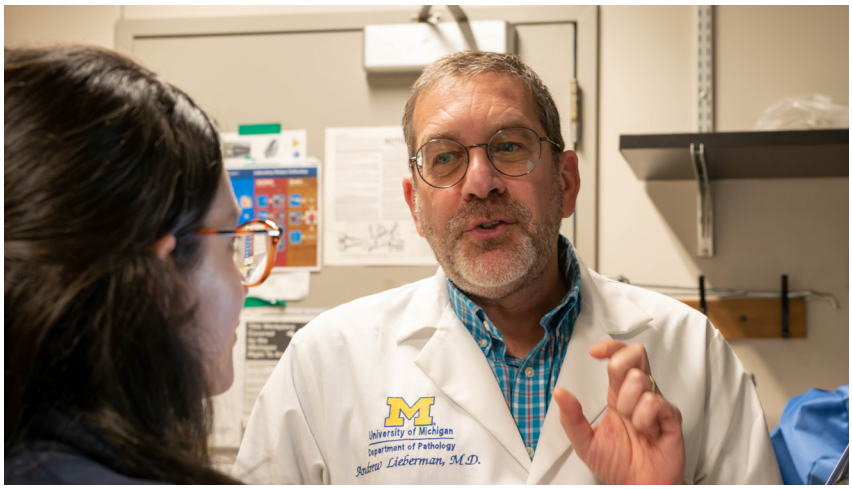
these discoveries. When he moved to the NIH, Lieberman followed him.

Then, in 2001, Lieberman was recruited to the University of Michigan's Department of Pathology as an Assistant Professor. His area of focus was on one of the polyglutamine expansion diseases discovered during his training, Kennedy's Disease. This disease is clinically similar to Lou Gehrig's disease but progresses more slowly. Kennedy's Disease is caused by a mutation in the Androgen Receptor (AR) gene, the male hormone receptor, which is also often mutated in prostate cancer. It was once thought to be exclusively a motor neuron disease, as that's where the disease process appeared to start. However, Lieberman discovered that this disease doesn't just affect the motor neurons, but also the neuromuscular system, causing degeneration. His research using a mouse model carrying human AR genes has shown that if the muscle is treated with an antisense oligonucleotide (ASO), the mice experience a dramatic rescue of both the muscle and the motor neurons. The whole system can be restored, and the disease process reversed. "By administering the ASO peripherally, we could silence the expression of the mutant gene only in muscle, without affecting the motor neurons. We were able to get complete rescue of disease phenotypes, so that has been a very important observation for the field and has shifted the way people think about this disease," Lieberman explained.

ASOs are now being made and used in the clinic to treat other diseases to knockdown or decrease the expression of the mutant protein. While clinical trials for Kennedy's Disease using ASOs haven't happened yet, there are a number of companies that are looking to test these or similar compounds.

When Lieberman arrived at Michigan, a colleague suggested that he may also want to study a pediatric neurodegenerative disease, Niemann-Pick Type C (NPC). NPC is in a group of diseases called lysosomal storage disorders. Approximately 1 in 8000 newborns have a lysosomal disorder, making this group of diseases an important cause of illness in the pediatric population. The lysosome is an important organelle that mediates degradation and recycling in the cell to regulate metabolic function. About ten years ago, the Lieberman lab discovered that the quality control pathway of the lysosome, called autophagy, was dysfunctional in NPC. Since then, it has been determined that this autophagy pathway is dysfunctional in virtually all the lysosomal storage diseases. "This finding provides a potential therapeutic target that may enable rescue of autophagic function in these diseases. There are a lot of us trying to explore and take advantage of this possibility," stated Lieberman. Since NPC is a currently untreatable and terminal disease, finding this therapeutic target could significantly impact the lives of individuals with this disorder.

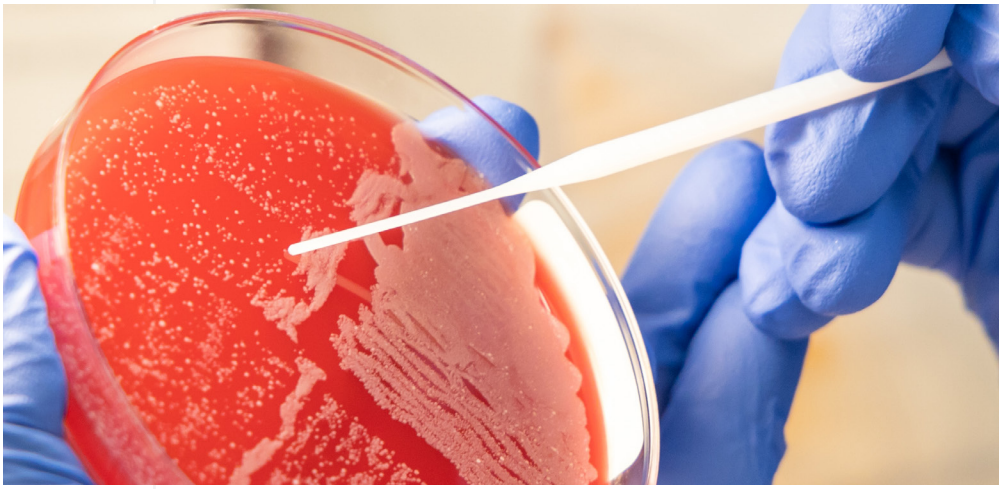
Lieberman is very involved in the rare diseases communities, especially for those associated with Niemann-Pick and Kennedy's Diseases. "As a physician-scientist, my involvement with these communities is especially meaningful as I have an opportunity to talk to patients with these diseases.



Above —
Dr. Lieberman speaking to lab member, Ruth Azaria.

This recenters and refocuses me about what is important about the disease, and patients and their family members are very appreciative of those interactions." Lieberman is hopeful that in the next five- to ten years there will be new discoveries that will advance to the clinic and help individuals suffering with these disorders. The outlook for Kennedy's disease seems particularly promising as the mutated gene is also a target for treatment in prostate cancer. "There are so many varieties and different approaches to prostate cancer research. I'm hopeful that some of these may be very applicable to Kennedy's disease."

For rare disease therapeutics to advance to the clinic, changes will need to be made in the way the FDA manages clinical trials. The processes that work for common diseases such as Alzheimer's Disease, don't work for rare diseases like NPC or Kennedy's Disease. The FDA is currently exploring alternative models that can safely advance therapeutics for rare diseases to clinical trials and get these into the clinic more quickly. "Maybe I'm overly optimistic," stated Lieberman, "but I hope that happens!"



New Staff Enhancement Fund Supports Frontline Staff

by Jason Keech

Each year, more than 7 million tests are run in the Michigan Medicine Department of Pathology and with each test, one or more laboratory professionals are responsible to ensure patient specimens are procured, distributed, processed, and run correctly so that patients receive accurate and timely results. These lab professionals are highly trained and certified, or eligible for certification, by their national associations. Annual ongoing education and recertification every three years is required to obtain or maintain certification. The recertification fees can be hundreds of dollars and have historically been paid out-of-pocket by the staff.

To honor the work of these professionals, Ms. Suzanne Butch, who is herself a laboratory professional, generously donated funds toward the establishment of a Staff Enhancement Fund to support certification fees and other professional development opportunities for laboratory professionals within the Department of Pathology.

"I owe the Blood Bank and the Department of Pathology a big thank you for providing me with many opportunities and encouragement in my career," commented Butch. "I want to provide opportunities to other medical laboratory staff members in the Department of Pathology to grow professionally. Until the fund is fully endowed, I will be making periodic donations to the Staff Enhancement Fund. These donations can be used for many purposes, as long as the beneficiaries are considered laboratory students or current staff as determined by the current needs in the support of medical laboratory staff."

If you wish to help ensure more of our frontline staff have their certification fees covered, and can obtain ongoing professional education, you can contribute to this fund. Certification fees range from $170-$240 and recertification ranges from $95-$110. Larger gifts can help multiple individuals or be used to grow the fund for future use. Even a small contribution can make a big difference to our frontline staff, and may be tax deductible, so make a gift today!

The Department of Pathology also offers opportunities to support other areas such as Resident and Fellow education, professional development for faculty, and more. For a full list of funding opportunities, visit:

https://michmed.org/47Zkz

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[1] Kristina Martin and Christine Rigney speaking on behalf of Clinical Pathology at the 2023 Clinical Pathology Symposium.

[2] Dr. Maria Westerhoff, welcoming attendees to the New Frontiers in Pathology Conference in Fall of 2022.

[3] Keynote speaker, Dr. James Olson, spoke at the 21st Annual Pathology Research Symposium in November 2022 on the subject, “Protein and peptide therapeutics based on blueprints from nature.”

[4] Juan Torres using a fake arm to explain to a young student about methods used in phlebotomy at the 2nd Annual Youth Summit held at the Big House on the campus of Ann Arbor.

[5] Drs. Allecia Wilson *(left)* and Jeffrey Jentzen hosting the 2023 Advances in Forensic Medicine and Pathology Conference in May.

[6] Dr. Renée Canady-Branch *(third from left)*, CEO of the Michigan Public Health Institute, was invited to discuss Health Equity in September of 2022.

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ACGME Fellows

Kathryn Gibbons, MD
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Alberta, Canada

Residents

Margaret Fang, MD
Gastrointestinal Fellowship
Michigan Medicine

Efrain Gutierrez-Lanz, MD
Hematopathology/Surgical Pathology Fellowships
Michigan Medicine

Justin Kelley, MD, MPH
Hematpathology Fellowship
Michigan Medicine

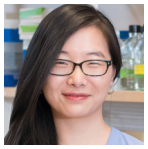
Lauren Kroll-Wheeler, MD
Pediatric Pathology Fellowship
University of Colorado
Aurora, CO

Tim Miller, MD
Hematopathology/Molecular Genetic Fellowships
Stanford University
Stanford, CA

Catherine Perez, MD
Forensic Pathology Fellowship
Michigan Medicine

William Perry, MD, MPH
Thoracic Pathology Fellowship
Michigan Medicine

Molecular & Cellular Pathology - PhD



Hanjia "Angela" Guo, PhD
Defended / August 5, 2022
Mentor / Dr. David Lombard
Position / Scientist
Cell Signaling Technology in the Epigenetics Applications Group

Hsiang-Yu "David" Hu, PhD
Defended / March 24, 2023
Mentor / Dr. Andrew Muntean
Position / Postdoctoral Fellow
AstraZeneca

Siva Kumar Natarajan, PhD
Defended / April 6, 2023
Mentor / Dr. Sriram Venneti
Position / Postdoctoral Fellow
Michigan Medicine

Rita A. Avelar, PhD
Defended / April 24, 2023
Mentor / Dr. Analisa DiFeo
Position / Postdoctoral Fellow
Michigan Medicine

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Ann Arbor, MI 48109-2800

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LABORATORIES

19 SUBSPECIALTIES

24-48 HOUR TURNAROUND*

60 EXPERT CONSULTANTS

15k REFERRALS ANNUALLY

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JULIA DAHL, M.D.
Assistant Professor, Placental, Gastrointestinal and Hepatobiliary Pathology
Medical Director, MLabs

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