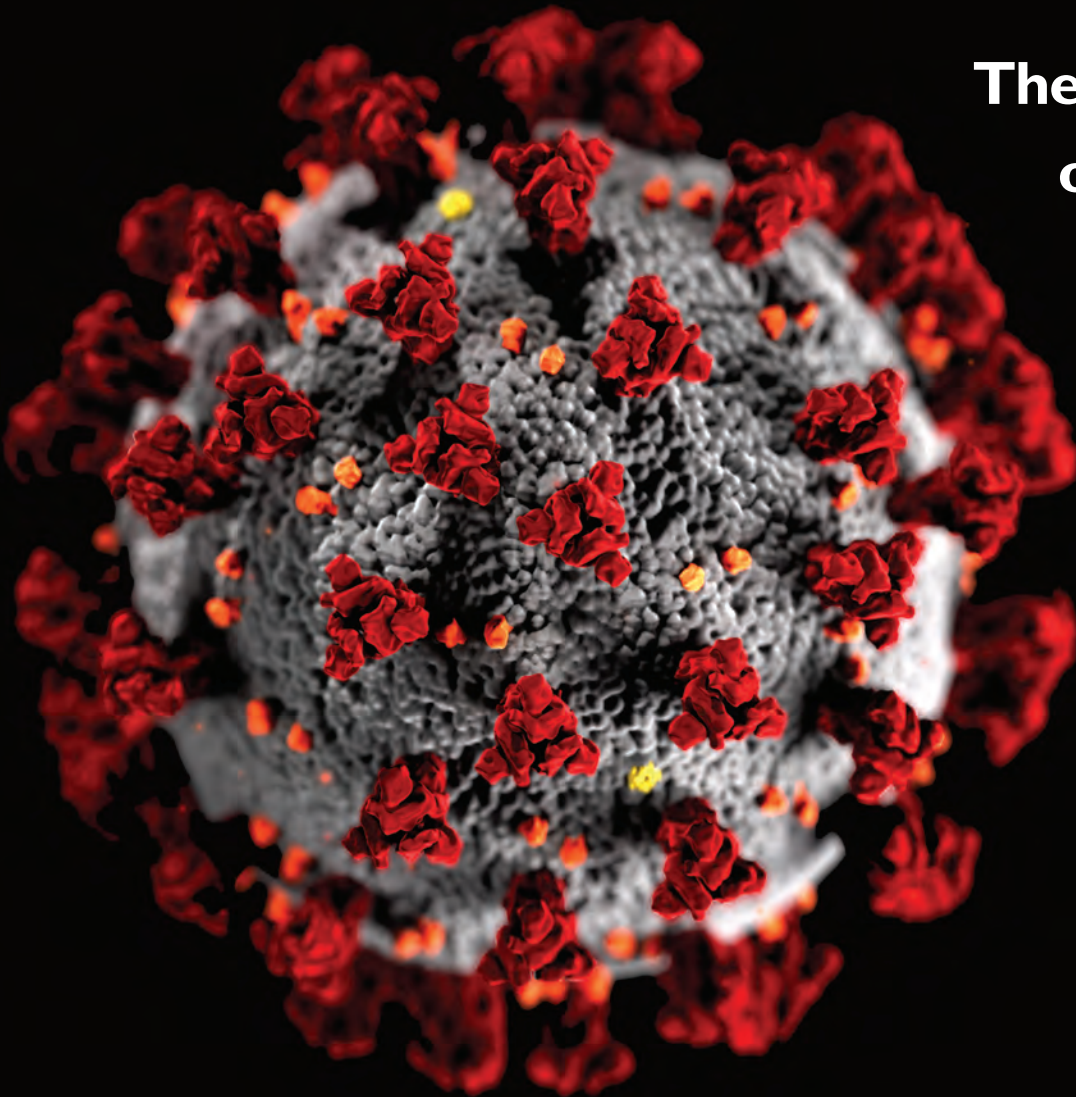


PATHWAYS

JOHNS HOPKINS PATHOLOGY

AN INCREDIBLE JOURNEY:



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Ralph H. Hruban, M.D.

This year, more than any year I have witnessed, the Department is truly living the mission of *Serve Humanity, Create Hope and Push Boundaries*, and I couldn't be prouder.

I am deeply proud of the way our Department has responded to the COVID-19 pandemic. From quickly developing a diagnostic test for Sars-CoV-2 in the midst of unimaginable supply shortages, to going out onto the wards to draw blood from our patients in the midst of great uncertainty, our staff and faculty have stepped up and have made a difference.

On the clinical side, not only did **Dr. Heba Mostafa** and the Microbiology staff quickly develop a highly specific PCR test for Sars-CoV-2, but our teams also rapidly brought on a test for IL-6 levels and for antibodies to the virus, as well as point of care testing that has proven invaluable to our colleagues in Labor and Delivery. Our clinical teams have also played a critical role in evaluating the safety and efficacy of convalescent plasma in the treatment of patients with COVID-19.

Things also changed rapidly on the education front, and again our faculty adapted and created new teaching tools with amazing speed. To give just one example, **Dr. Marissa White** quickly developed an online surgical pathology course for medical students that proved extremely popular and effective. Our Grand Rounds has switched to Zoom and are now available in real time to our alumni. Please contact Ellen Winslow at ewinslo1@jhmi.edu if you have an interest in joining us.

I even taught my first all virtual pathology small group session that included break out rooms so that the students could look at the slides in small groups.



Gathering next to the Outpatient Center to remember George Floyd

Our research enterprise was hit hard as most labs were required to close temporarily for safety reasons. A number of our researchers pivoted and are helping fight the pandemic with their science. From developing new approaches to testing, to new vaccines, the science is absolutely incredible. In the meanwhile, we have been able to reopen the labs doing non-COVID-19 research, and we have done so maintaining safe social distancing.

All of the stress at work and at home has taken its toll on our staff and on our faculty. I am grateful to **Dr. Mike Borowitz**, who stepped up and initiated a series of weekly faculty meetings. These kept us all up to date and created opportunities to share concerns and best practices during the rapidly changing landscape.

Each person still struggles in their own ways. In an eye-opening article in the October 6th New York Times, **Jillian Kramer** described how the pandemic has added to the imbalances women in academia face. As she wrote, "the outbreak has laid bare gender inequalities across the country, and women in academia have not been spared." The University has stepped up with a program to support childcare, but the burdens on many are still great. At the same time, our country has been hit with public acts of racial injustice; these have placed an added burden on women of color. We cherish diversity, and the Black Lives Matter movement has inspired us to do a better job expressing our values and listening.

This year, more than any year I have witnessed, the Department is truly living the mission of *Serve Humanity, Create Hope and Push Boundaries*, and I couldn't be prouder. ■



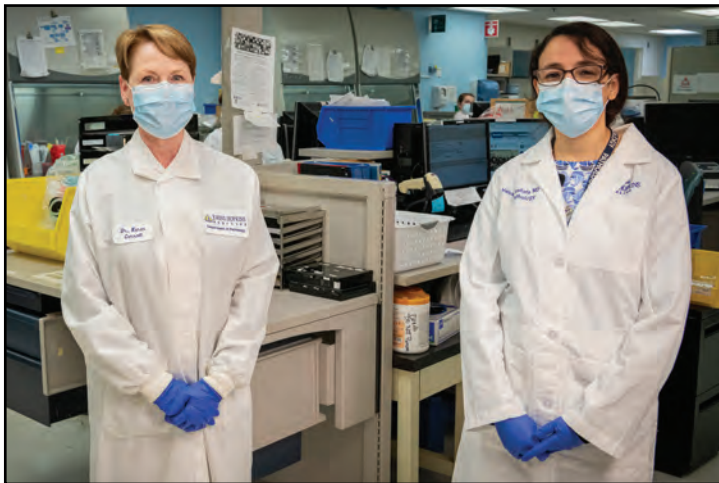
Pathology 7

AN INCREDIBLE JOURNEY: THE DEPARTMENT OF PATHOLOGY'S RESPONSE TO THE COVID-19 PANDEMIC

Our faculty rose to the enormous challenges posed by the COVID-19 pandemic. We thought that we would share with you how some of our faculty and staff responded. Although many have contributed, the goal of this article is simply to give the reader a sense of the breadth and depth of the activities.

Clinical Testing

When the first U.S. patient was diagnosed with COVID-19 in January 2020, and the WHO declared the virus a global public health emergency on January 30, **Drs. Karen Carroll and Heba Mostafa** knew that it would just be a matter of time before the numbers of cases in the U.S. increased. At the time, we had absolutely no idea how rapidly the pandemic would spread. On February 4, the CDC announced that it had developed and received FDA-Emergency Use Authorization (EUA) for an assay that targeted three regions of the SARS-CoV-2 nucleoprotein (N) gene and that it would make testing kits available to requesting laboratories. In mid-February, our application to the CDC for access to the CDC COVID-19 kits was denied, as the CDC indicated that only public health laboratories were eligible to receive and perform testing. On top of this, laboratories were required to obtain FDA-EUA before they could utilize their own in-house tests. We were stuck! After an outcry from academic medical centers and professional societies, the FDA liberalized the policy to register laboratory-developed tests on February 29. This allowed us to develop our own lab-developed assay, while we awaited more formal FDA-EUA approval.



Drs. Karen Carroll and Heba Mostafa

We reached out to company partners, and began to prepare our own test, but we faced many hurdles, including the lack of available positive controls for analytical testing, and companies that were dramatically increasing the price of probes and primers. In the March 2nd LAC minutes, Dr. Carroll is quoted as saying “*The microbiology laboratory is anticipating a high volume of testing.*” These prescient words turned out to be an understatement!



Microbiology Laboratory

The first week in March was a blur for our Division of Medical Microbiology. The team quickly had to develop expanded safety precautions for our staff, ensuring supply chain for enhanced personal protective equipment (PPE) and other safety items. They worked closely with the Maryland State Health Laboratory facilitating testing of the sickest patients. Given the State lab's limited testing capacity, it became clear their testing was inadequate to meet our needs. Simultaneously, we reached out to all of the vendors whose instruments were already in place in our laboratory to get The Johns Hopkins Hospital on the top of a long list for test allocation and in some cases assisting them with their FDA-EUA. However, we knew there would be significant delays from industry partners as they ramped up manufacturing. There were endless meetings, calls, and high anxiety! However, as it did for Influenza A H1N1, the molecular virology laboratory, rose to the occasion and developed a highly sensitive and specific real-time PCR assay for



Testing samples in the Molecular Microbiology Laboratory

SAR CoV-2 that was applicable to nasopharyngeal swabs, throat swabs, bronchoalveolar lavage, and sputum samples.

Colleagues at the University of Texas Medical Branch were able to provide control genetic material to facilitate analytical validation. This arrived on March 3rd. Altona Diagnostics, Inc. (Plain City, OH), our primary vendor for molecular reagents, came to our rescue with primers, probes and buffers, offering at

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one point to hire a helicopter to deliver the reagents if necessary! Working day and night over one week, Dr. Mostafa and the molecular virology laboratory, successfully validated the The Johns Hopkins Hospital SARS CoV-2 assay, using the Altona RealStar SARS-CoV-2 kit. The test is designed to detect a region of the envelope small membrane protein (E) gene and the spike glycoprotein trimer (S) gene of SARS-CoV-2 using nucleic acid amplification. Initially, our daily capacity was 50 samples per day. By Monday, March 16, we were testing 180 samples per day, and with the help of **Dr. Chris Gocke's** molecular genetics laboratory, soon our testing volume increased to 500 samples per day. As fast as we ramped up, it quickly became clear that we were going to need more rapid results and automated solutions. Our major high throughput molecular vendor, Roche Molecular (Indianapolis, IN), was unable to provide reagents. Hence, we reached out to NeuMoDx (Ann Arbor, MI), a small company whose robotic platform seemed like a wonderful alternative solution. NeuMoDx had reagents available and worked with us to get an instrument in place on the Hopkins campus within two weeks, followed by a second instrument soon after to scale up to the goal of 1,000 samples per day.

Simultaneously, other vendors whose instruments we had in place began to have tests available. On March 31, we were able to go live with the GeneXpert assay (Cepheid, Sunnyvale CA) for stat testing which really assisted the emergency departments throughout the healthcare system with bed management. A point of care testing platform, the Accula (Mesa Biotech) SARS CoV-2 test (see point of care testing below) supplemented stat testing for labor and delivery. In total, the laboratory validated assays on nine different platforms, which, due to significant supply chain issues were needed to keep testing seamless and consistent. COVID-19 testing, test management and reporting has thus become the major focus of the entire laboratory. Two more high throughput platforms are on the way to reach the goal of 2,500 tests per day and to provide redundancy for influenza A, B, RSV and SARS- CoV-2 during the upcoming respiratory season.

“What an amazing effort and incredible teamwork from Clinical Microbiology!”

Point of Care Testing



Mickayla Karikari, Dr. William Clarke, Jennifer Stauffer

Point of care testing (POCT) has the ability to impact patient care for COVID-19 in a number of ways. It facilitates screening in asymptomatic patients, allows for quicker diagnosis and triage in symptomatic patients, and it can help determine past exposure and seroprevalence. For screening and diagnosis, **Dr. William Clarke's** point of care testing laboratory evaluated two POCT platforms for PCR testing and three POC antigen tests. The challenge for implementation of PCR testing outside of the main clinical lab is high cost and maintaining good quality practices for nonlab staff. For POC antigen testing, the challenge is in determining the appropriate comparator for performance assessment. An open question is whether PCR is too sensitive as the gold standard, and whether clinical progression or viral culture are better for assessment of test utility. Last, the challenges for POC antibody testing are interpretation, not all antibody positive tests are predictive of protective immunity, and highly variable performance. At present, our POCT team is offering POC PCR testing in Labor and Delivery at The Johns Hopkins Hospital and are planning an additional roll-out in the emergency department. Dr. Clarke's team is evaluating the best options including antigen testing for our ambulatory care and community physician sites. There are no plans to implement POC antibody testing at present.

Convalescent Plasma Treatment

There are limited treatment options for COVID-19. Passive antibody administration through transfusion of convalescent plasma offers a short-term strategy to confer immediate immunity to susceptible individuals for COVID-19. Convalescent plasma may be one of the best treatment options currently available, so it is critically important to assess efficacy, safety and the sub-populations of patients who will benefit most. This underscores the need for well-designed randomized controlled trials. Towards this goal, our Transfusion Medicine Division is supporting clinical trials of convalescent plasma as 1) post-exposure prophylaxis to prevent infection, 2) early treatment to prevent hospitalization, 3) multi-dose treatment of severely ill patients who are mechanically ventilated for COVID-19 to assess safety and viability of use, and 4) prophylaxis or early treatment of high-risk pediatric patients. Further, the division has been supporting compassionate use treatment of hospitalized patients with COVID-19 using convalescent plasma both under the former expanded access program as well as emergency use authorization.

The Transfusion Medicine Division has shown that while two-thirds of donors have high neutralizing titers, there is significant heterogeneity in antibody response among individuals who have recently recovered from SARS-CoV-2. Interestingly, eligible convalescent plasma donors with blood group B have higher neutralizing antibody titers. The team also found that SARS-CoV-2 antibody avidity correlates with duration of infection and higher neutralizing titers. In

addition to viral neutralization, convalescent plasma contains antibodies capable of mediating such Fc-dependent functions as complement activation, phagocytosis and antibody-dependent cellular cytotoxicity.

Autopsy

While workload increased, the pandemic also presented the Autopsy Division and its staff with the challenge of safely



Dr. Jody Hooper

completing postmortem examinations on patients who died of and with COVID-19 infection. Many autopsy services around the country were shut down entirely or did not perform these cases and guidelines shifted as more was learned about the disease. At Hopkins, testing protocols were put in place with the assistance of Microbiology. New dissection procedures were developed to complete autopsies safely while maximizing diagnostic yield.

The Autopsy Division also received approval for and collected invaluable research specimens including blood, fluids, frozen, and fixed tissues, and **Drs. Jody Hooper and David Nauen** are currently collaborating with more than ten research groups. There is one accepted paper and multiple already submitted, including the largest international autopsy study of COVID-19 to date. Dr. Hooper has presented at an NIH webinar on autopsy safety and is scheduled to speak at USCAP and ASIP meetings and seminars next year on the Johns Hopkins COVID-19 experience. Autopsy studies will be invaluable in characterizing the disease and the effects of treatment.

Education

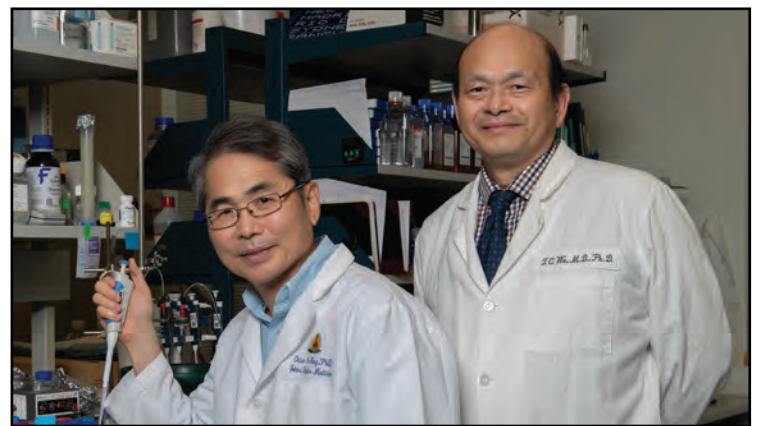
When the COVID-19 epidemic erupted it was clear our educational operations were not designed for the social distancing needed for safe learning. As a result we had to rethink and rework our educational activities. We immediately de-densified our surgical pathology area, increasing shift work in the cutting area and separating our faculty and resident signouts. Our CP residents worked from home for the first two months of the epidemic, but as supply chains improved for PPE, we were able to bring them back to be full time in the hospital starting in July.

The Department also established multiple virtual resources e.g., online courses and live slide sessions, to ensure that the resident

learning experience would continue. Our three chief residents, **Drs. Karin Miller, Nicholas Giraldo-Castillo, and Cherub Kim**, spent countless hours working to implement these changes and keep up resident morale. Medical students were also taken out of their in-person rotations and the school was desperate for learning activities. **Dr. Marissa White** sprang into action and developed an amazing virtual surgical pathology rotation in which over 20 medical students have participated. Our research laboratories closed in March and most of our graduate students were suddenly stuck at home. **Stacey Morgan** and **Peter Chianchiano** kept the students going with open Zoom social hours and Zoom-based continuing educational activities such as journal club and Wednesday student presentation sessions, some of which were co-presented with pathology residents. COVID-19 has changed how we teach, but thanks to our talented staff, trainees and faculty, we have risen to the challenge.

Research Response

Our researchers have also risen to the challenge and many have turned parts of their research programs towards Sars-CoV-2 research. Cutting-edge work to improve diagnostic testing and develop new treatments for COVID-19 has been underway in the Department of Pathology since the first days of the



Drs. Chien-Fu Hung and T.C. Wu

pandemic, and our researchers have remained at the forefront of scientific progress in this area. For example, **Dr. Daniela Čiháková's** lab is working to understand how myocarditis develops as a serious complication of SARS-CoV-2 infection using mouse models and human tissue samples. **Dr. Jody Hooper** rapidly reorganized the Johns Hopkins Autopsy Service to perform focused autopsies on COVID-19 patients, providing much-needed tissue samples from multiple organs as well as blood and fluid samples for researchers. **Dr. Ben Larman** used novel in situ ligation technology in his lab to develop a test for SARS-CoV-2 that can be performed with minimal sample preparation, obviating many of the reagents in short supply in clinical testing labs. Meanwhile, **Dr. Jonathan Schneck** is using engineered magnetic nanoparticle tools called artificial antigen presenting cells (aAPCs) for isolating and expanding human virus-specific T cells, addressing the urgent need for

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OUR NEW FACULTY



Maria P. Bettinotti, Ph.D., D(ABHI), FACMG, is an immunogeneticist and clinical molecular geneticist board-certified by the American Board of Histocompatibility and Immunogenetics and by the American College of Medical Genetics. Dr. Bettinotti is currently Director of the Immunogenetics Laboratory and associate professor of pathology and medicine at the Johns Hopkins University School of Medicine. She has worked in the field of histocompatibility and immunogenetics for 30 years. A major focus of her work is translating research into clinical care, including clinical laboratory practices and policy. Dr. Bettinotti has published more than 50 peer-reviewed articles, reviews and book chapters, and has given numerous invited talks on the effect of HLA polymorphism on disease susceptibility, pharmacogenetics, immunotherapy and transplantation. Her current research is focused on the role of HLA in Hematopoietic Stem Cell transplantation with HLA mismatched donors.



Ivo Franceschetti, M.D., Ph.D., is an assistant professor of pathology at the Johns Hopkins University School of Medicine. His areas of clinical expertise are hematology, coagulation and hematopathology. Dr. Franceschetti received his M.D. and Ph.D. from the Federal University of Rio de Janeiro. After moving to the United States, he worked as staff scientist at the National Institute of Allergy and Infectious Disease (NIAID)/National Institutes of Health (NIH) in the areas of vascular biology, vector biology, molecular biology and malaria. He completed his residency training in anatomic and clinical pathology at Albert Einstein College of Medicine/Montefiore Medical Center in New York, followed by a fellowship in hematopathology at the National Cancer Institute. Dr. Franceschetti joined the faculty in July 2020. He envisions applying his clinical expertise in coagulation and hematopathology in the context of vascular biology, bone marrow and hematolymphoid neoplasms. He has published 111 peer-reviewed publications, 11 review articles and six book chapters and has served as a Chair of an educational subcommittee of the International Society of Thrombosis and Haemostasis (ISTH).



Alison Gareau, Ph.D., completed her B.Sc. in biology at Lake Superior State University in Michigan. She began her graduate studies at Dalhousie University in Halifax, Nova Scotia where her thesis work in the Department of Pathology focused on the role of B cells and antibodies in an experimental model of late cardiac graft rejection. She received a scholarship from the International Society of Heart & Lung Transplantation to establish a collaboration in the Department of Molecular Pathology at the University Medical Center in Utrecht, the Netherlands. This work focused on investigating the pathology of lymphoid structures found surrounding the coronary arteries of explanted cardiac grafts. She completed post-doctoral fellowships at the University of Manitoba under the guidance of Dr. Peter Nickerson and at Alberta Precision Laboratories in the Histocompatibility and Immunogenetics Laboratory. Dr. Gareau joined the faculty in the Johns Hopkins Immunogenetics Laboratory in September 2020. In addition to clinical service, she is enthusiastic about future contributions to the field of transplant immunology research, with particular interest in the role of de novo donor-specific antibodies in graft rejection.



John M. Gross, M.D., M.S., was born and raised in Omaha, Nebraska where he obtained his bachelor's, master's, medical degree and anatomic and clinical pathology residency at Creighton University. Following pathology residency, Dr. Gross pursued specialized fellowship training in bone and soft tissue at the University of Washington in Seattle, followed by additional fellowship training in surgical pathology at the Mayo Clinic in Rochester. In July 2020, Dr. Gross joined the faculty as an assistant professor where he brings expertise in bone and soft tissue and surgical pathology. Dr. Gross has an academic interest in bone and soft tissue tumors and has authored over a half dozen articles and chapters and given national and international presentations on sarcoma pathology.



Scott Krummey, M.D., Ph.D., completed his B.A. in molecular biology at Colgate University in 2007. After a two-year research fellowship at the NIH in the laboratory of Dr. Michael J. Lenardo studying primary immunodeficiencies, he began the M.D./Ph.D. program at Emory University in Atlanta, Georgia. He completed his thesis work with Dr. Mandy L. Ford in the Emory Transplant Center, investigating the role of the cosignaling pathways that shape T cell responses to allografts. From 2016-2020, he completed a clinical pathology residency followed by a histocompatibility and immunogenetics fellowship at Emory. During this time, he also investigated the role of cosignaling pathways on graft-directed T and B cell responses. Dr. Krummey joined the department in September 2020 as an assistant professor in transfusion Medicine with clinical service in the Immunogenetics Laboratory. He is interested in understanding mechanisms of alloimmunity in novel mouse models and in transplant patients, and applying this knowledge to better assess risk for rejection and new approaches to donor-recipient compatibility.

PRIMARY FACULTY CHANGES - 2020-2021

New Faculty

Faculty Name	Rank	Division
Maria Bettinotti, Ph.D.	Associate Professor	Transfusion Medicine
Ivo M.B. Francischetti, M.D., Ph.D.	Assistant Professor	Hematopathology
Alison Gareau, Ph.D.	Assistant Professor	Transfusion Medicine
John M. Gross, M.D., M.S.	Assistant Professor	Surgical Pathology
Scott Krummey, M.D., Ph.D.	Assistant Professor	Transfusion Medicine
Meaghan Morris, M.D., Ph.D.	Assistant Professor	Bayview Pathology
Kevan Salimian, M.D., Ph.D.	Assistant Professor	Bayview Pathology
Alisha Ware, M.D.	Assistant Professor	Hematopathology
Mark Zarella, Ph.D.	Assistant Professor	Informatics

Promotions

Faculty Name	Rank	Division
John K. Boitnott, M.D.	Emeritus	Gastrointestinal/Liver Pathology
Qing Kay Li, M.D., Ph.D.	Professor	Bayview Pathology
Fausto Rodriguez, M.D.	Professor	Neuropathology

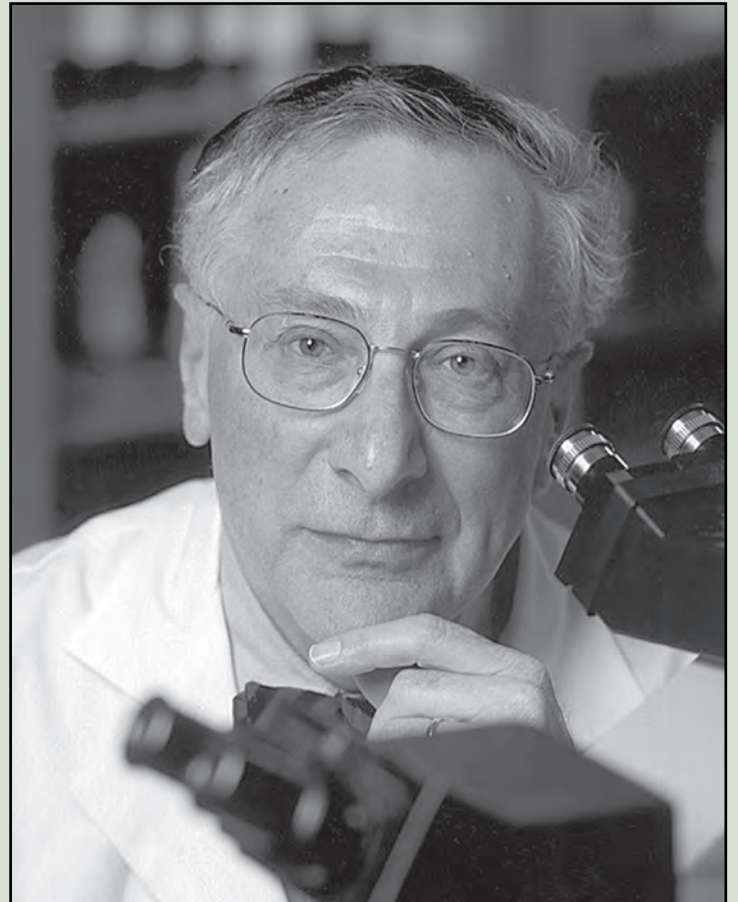
Departures

Faculty Name	Rank	Current Location and New Role
Kathleen Burns, M.D., Ph.D.	Professor	Chair, Department of Oncologic Pathology, Dana-Farber Cancer Institute, Boston, MA
Shenghan Lai, M.D., M.P.H.	Professor	Professor, Epidemiology and Public Health, Institute of Human Virology, University of Maryland, Baltimore, MD
Elizabeth Montgomery, M.D.	Professor	Professor, University of Miami Health System, Miami, FL
Amy Duffield, M.D., Ph.D.	Associate Professor	Attending Pathologist, Memorial Sloan Kettering Cancer Center, New York, NY
Liam Chen, M.D., Ph.D.	Assistant Professor	Associate Professor of Pathology, University of Minnesota, Minneapolis, MN
Eric Gehrie, M.D., S.M.	Assistant Professor	Medical Director, Refactor Health, New Haven, CT
Parvez Lokhadwala, M.D., M.Sc., Ph.D.	Assistant Professor	Medical Director, American Red Cross Greater Chesapeake & Potomac Region, Baltimore, MD

IN MEMORIAM



Belur Bhagavan, M.D.
1934 - 2020



Noel Rose, M.D., Ph.D.
1927 - 2020

NEW DEPUTY DIRECTORS



Charles Eberhart, M.D., Ph.D. **Deputy Director for Faculty Development**

Dr. Eberhart received his M.D. and Ph.D. degrees from UT Southwestern in 1997, with post-graduate clinical training in anatomical pathology and neuropathology here at Johns Hopkins. He

has been a member of the Johns Hopkins University School of Medicine faculty since 2001. Dr. Eberhart leads the divisions of Neuropathology and Ophthalmic Pathology, and is the Charlotte Wilson and Margaret Whitener Professor of Ophthalmology. His clinical work and research both focus on how brain and eye diseases can be better classified and treated. Much of this centers on cancer, including the role of neoplastic stem cells, and how signaling pathways involved in normal development drive tumor initiation and growth.

Dr. Eberhart is one of three senior editors of the WHO Ocular Tumor Classification 4th edition, and he has published over 270 original research articles on diseases of the brain and eye, along with numerous case reports, book chapters and reviews. Finally, he has mentored a wide range of undergraduate and graduate students, as well as clinical and research fellows.

Dr. Eberhart is committed to ensuring all of our faculty, and particularly those who are new to Johns Hopkins, have the tools and support necessary for academic success. He is currently working to establish an expanded mentoring program supporting junior faculty in the Pathology Department. Mentoring committees, tailored to each new faculty member, will provide advice on developing an academic focus, publishing, teaching, networking, research funding and preparing for promotion. He will also seek to assist mid-career faculty who are encountering problems.

Dr. Eberhart is also excited to support **Dr. Bill Clarke**, Chair of the Faculty Recognition and External Achievement Committee, in promoting our faculty for awards and leadership positions in a range of organizations and societies. Finally, working with other members of the departmental promotions committee, he will provide a balanced analysis of candidates' strengths and weaknesses before they go before the university-wide promotion committee.



Tamara Lotan, M.D. **Deputy Director for Research**

Dr. Lotan received her B.A. in applied mathematics from Harvard University in 1998. She obtained her M.D. from the University of Chicago in 2003, and completed a residency in anatomic pathology in 2007. Dr. Lotan came to Johns Hopkins to complete a fellowship

in Urologic Pathology, where she joined the faculty in 2008, and currently serves as a professor in the Departments of Pathology and

Oncology.

Dr. Lotan has an active research laboratory focusing on prostate cancer, as well as more basic studies of oncogenic signaling pathways in epithelial development and tumorigenesis. She has been continuously funded by HHMI, PCF, DoD and NCI over the last decade. Most notably, her group has driven the development of a number of clinical-grade molecular assays that are currently used in routine practice for prediction and prognosis in prostate cancer, and she is currently Co-Chair of the International Society of Urologic Pathology (ISUP) Working Group on Molecular Pathology of Prostate Cancer.

In addition to her own research, Dr. Lotan has taken a keen interest in research training and mentoring within the department, serving as Co-Director of the Pathobiology graduate program with **Dr. Lee Martin** and most recently as PI for the OPTIC T32 Postdoctoral training grant program with Dr. Charles Eberhart.

As Deputy Director for Research, Dr. Lotan will support and advocate for the Department's investigators along the entire trajectory of their careers, from residency to established principal investigator. Her hope is to facilitate key career transitions among our faculty to ensure that they are poised to remain in the top tier in NIH funding and that the Department remains the highest ranked pathology residency program for years to come. To achieve these goals, she will work with **Dr. Ralph Hruban** to recruit the best and the brightest new research faculty, with a focus on strategic priority areas of investigation. The hope is to increase faculty representation in computational pathology and spatial transcriptomics, working with the Department of Biomedical Engineering and the Bloomberg Distinguished Professor program. To ensure a strong faculty recruitment pipeline, Dr. Lotan will work with the Residency Director for Research, **Dr. Aaron James**, to develop the Physician-Scientist Track of the residency program into the #1 program nationally by recruiting the best and brightest physician-scientists and preparing them for research careers in our Department's unique T32 fellowship program. To further this goal, Dr. Lotan will facilitate interactions with the MSTP program and medical school for recruiting purposes. As the Department has done so successfully in the past, we hope to continue to actively recruit the most promising physician-scientists onto our faculty from the ranks of our residency and clinical/research fellowship programs.

For established faculty, Dr. Lotan will work in partnership with **Dr. Charles Eberhart** to ensure research faculty satisfaction and retention by providing outstanding mentorship, fostering a vibrant research community and promoting impactful work. Finally, she will continue to promote an environment of diversity and inclusion among the Department's research trainees and faculty, as this is a critical mandate not only for the Department, but for the institution as a whole.

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NEW DEPUTY DIRECTORS



Karen Sfanos, Ph.D. **Deputy Director for Education**

Dr. Karen Sandell Sfanos is an associate professor of pathology, oncology, and urology at the Johns Hopkins University School of Medicine, The Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins, and The Brady Urological Research Institute. She earned a bachelor's and a master's degree at the Florida Institute of Technology in Melbourne, Florida, and a Ph.D. from the Cellular and Molecular Medicine graduate program at the Johns Hopkins University School of Medicine. Dr. Sfanos completed a postdoctoral fellowship in the Department of Pathology at Johns Hopkins before joining the faculty in 2011. The Sfanos laboratory studies the influence of the human microbiome, infections, and chronic inflammation on prostate cancer development. Ongoing studies in the lab focus on the influence of the microbiome (both gastrointestinal and genitourinary) on cancer risk and/or resistance to cancer therapy.

Karen has been actively involved in educational activities from multiple fronts: teaching, mentoring, advising, course development, admissions, and program leadership. She has been active in graduate training both the Pathobiology and Cellular and Molecular Medicine graduate programs and serves as the Chair of the Pathobiology Admissions Committee. She has mentored a wide range of undergraduate and graduate students, medical students, and clinical and research fellows. She also actively participates as a lecturer in graduate program courses and serves as a Co-Director and Co-Leader of courses for graduate students and medical students within the School of Medicine.

As Deputy Director for Educational Affairs, Karen will work with directors of departmental educational programs (undergraduate medical education, graduate education, residency, fellowship, interprofessional education, and continuing medical education) to further support these programs and develop curriculum and optimization of instructional modalities. She will also contribute to supporting residents who have chosen to concentrate on the Educational Track and to mentoring faculty who have chosen to pursue an educational path to promotion. Her core value in education is to foster an inclusive and diverse learning environment that is accessible to all trainees. Her key vision in this new role is to assure that all trainees and junior faculty achieve personal success and move to the next step of their individual career paths.

PATHOLOGY RESEARCH ADVISORY COMMITTEE

Under the leadership of **Dr. Daniela Čiháková**, the Research Advisory Committee (RAC) strives to help faculty in the Department of Pathology to succeed in research. The RAC's members are **Drs. Angelo De Marzo, Charles Eberhart, James Eshleman, Mary Glenn Fowler, Ralph Hruban, Tamara Lotan, Richard Roden, Jonathan Schneck, Charles Steenbergen, Aaron Tobian, Philip Wong, and Hui Zhang.**

The RAC's key goal is to promote success in research of junior faculty in the Department of Pathology. The RAC members help junior faculty frame their main research objectives and goals.

The RAC helps to identify possible collaborators that might help new faculty hires in their research.

The RAC also ensures that junior faculty have experienced mentors. The RAC identifies faculty in need of a mentoring committee, which is then set up and directed by Dr. Charles Eberhart (see page 9). The RAC shares written summaries of each meeting with the junior faculty member and follows up on its recommendations.

In addition to its engagement with junior faculty, the RAC helps faculty at all stages with their grant submissions. All Department of Pathology faculty can request a review of their specific aims or a whole grant proposal from the RAC.

The department has editorial help available for improving larger grants, and the RAC can suggest this help for grants that could benefit from it.

The RAC also evaluates project proposals by residents and fellows for several research and teaching projects supported by endowments, such as the Sanfilippo, Hill, Hutchins, and Mabel Smith grants. These grants have a "rolling" application process, and RAC encourages all eligible trainees to submit their proposals.

Many research labs have been struggling recently due to the COVID-19 pandemic. Common issues include reduced productivity due to safety occupancy measures, work-life balance issues, as well as fundraising challenges at the grant agencies. These challenges will likely continue for some time. Nonetheless, the RAC members are determined to help all Department of Pathology faculty to keep our Department's research strong.



THE PATHOLOGY HOUSESTAFF 2020-2021



Katya Dombrowski was raised in Glen Ridge, New Jersey. She attended Princeton University where she graduated with a B.A. in psychology and neuroscience. Working under Dr. Yael Niv, she completed her senior thesis on the process of human decision-making. After college, she worked at a federally qualified health center in Long Branch, New Jersey and then a private internist's office in Washington, DC. Katya earned her medical degree from Albert Einstein College of Medicine in the Bronx. While there, she became involved in the student-run free clinic, working first as an in-house HIV counselor. This work in HIV helped springboard her into pursuing research on the effects of perinatal HIV on neurocognitive development. It also motivated her to travel to Tanzania for a summer, where she worked with a local NGO supporting women and children affected by the virus, reinforcing her interest in global health. Katya enjoys cooking, reading, traveling, binge watching TV with her cat Zoe, and trying new restaurants with her partner, Jameson. Katya is pursuing AP/CP training.



Tait Huso, grew up northern Baltimore County, Maryland before making his way to Penn State. There he studied biochemistry and molecular biology and became interested in the field of medicine. During summers as an undergraduate, Tait worked in Linda Smith-Resar's laboratory at Johns Hopkins where he contributed to understanding the cellular pathways dysregulated by the HMGA oncoproteins. After graduating from Penn State, Tait spent a year and a half continuing this research before pursuing medical training at Northwestern University's Feinberg School of Medicine. In medical school, his research interests focused on exploring healthcare fragmentation and the negative effects it exerts on patients with chronic health conditions such as sickle cell anemia. Outside of the hospital and laboratory, Tait enjoys road tripping across the upper Midwest to visit family, fly-fishing local rivers, playing pick-up basketball, and tackling ambitious small-scale agriculture projects such as beekeeping. Tait is pursuing AP/CP training.



Jae Lee was born in Seoul, South Korea and grew up in Fairfax, Virginia. He received his A.B. in chemistry at Princeton University. After college, he conducted research on multiple sclerosis at the National Institutes of Health for two years in the laboratory of Michael Lenardo. Jae then completed the M.D./Ph.D. program at the Perelman School of Medicine at the University of Pennsylvania. For his Ph.D. research, Jae identified an intercellular inflammatory network underpinned by hepatocytes that directs metastatic spread of cancer cells to the liver in the laboratory of Gregory Beatty. During medical school, Jae served as the co-chair of the Oncology Interest Group and co-regional director of the Asian-Pacific American Medical Student Association. Jae enjoys traveling with his wife and family; playing tennis, squash, and soccer; and visiting art museums. He is pursuing AP only training.



Lorena Marcano-Bonilla was born and raised in Guaynabo, Puerto Rico. She attended the University of Puerto Rico Río Piedras Campus, where she received the degree of B.S. in cellular and molecular biology. She earned her M.D. from the University of Puerto Rico School of Medicine and her Ph.D. from Mayo Clinic Graduate School of Biomedical Sciences. During graduate school, her thesis project examined the association of biliary tract cancer risk and mortality with use of low-dose aspirin, nonaspirin NSAIDs, statins and metformin in the Swedish population. Lorena enjoys outdoors activities including hiking, playing tennis and volleyball, as well as cooking and spending time with her family. Lorena is pursuing AP/CP training.



Michael Mikula was born in Princeton, New Jersey and grew up in nearby Cranbury, New Jersey. He graduated from Loyola University Maryland in Baltimore with a bachelor's degree in biology and chemistry. While at Loyola, his senior research focused on the endocellulase Cel5a of *Thermobifida fusca*. After college, Mike worked in materials chemistry research at Henkel Corporation, focusing on enhancing the efficiency of LED lights. He then earned a M.S. in physiology and biophysics from Georgetown University and went on to attend medical school at Albany Medical College in Albany, New York. Mike was inspired to enter pathology by several pathology educators at Albany Medical College. In his free time, Mike is a wannabe powerlifter, consistently working towards upping his squat, bench, and deadlift. He enjoys movies and is currently watching the Lord of the Rings extended edition with a small group while socially distancing. He also enjoys hiking and managed to take in some of what upstate New York has to offer while there. Mike is pursuing AP/CP training.

continued on page 14



Help support discovery and receive extra income in retirement.

We all want to find that balance, a means to give back to the Department of Pathology and still meet our own financial goals. When you establish a charitable gift annuity, you benefit now and enable the next generation of researchers to discover new insights, therapies, and cures.

The goal of gift planning is to fulfill your philanthropic wishes in coordination with your overall financial and estate planning. A charitable gift annuity supports the future of the Department of Pathology and provides lifetime income to you or a loved one, along with significant tax benefits.

Contact Amy Helsel for a personal proposal, or visit our website to calculate your income and benefits.

Amy Helsel
Senior Director of Development and Alumni Relations
Department of Pathology
443-287-7943
ahelsel@jhmi.edu
giving.jhu.edu/giftplanning

Private philanthropy is critical to our educational and research missions. The smiling faces of the fellowship recipients below tell the story. In addition to these fellowships, there are several funds that support trainee and junior faculty research.

2020-2021 FELLOWSHIP RECIPIENTS



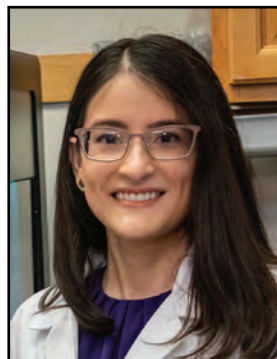
Paula Chalan, Ph.D.
*Walter and Jean Boek
Autoimmune Research Fellow*



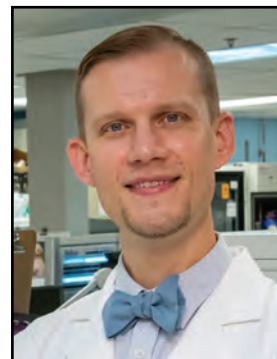
José Valentin Rodríguez León, M.D.
John K. Boitnott Fellow



Nicholas Rogers, M.D.
Michael J. Borowitz Fellow



Nadia Ayala-Lopez, Ph.D., MLS
Daniel W. Chan Fellow



David Gaston, M.D., Ph.D.
Patricia Cbaracbe Fellow



Daniel Russell, M.D.
Jonathan I. Epstein Fellow



Susan Shyu, M.D.
Yener S. Erozan Fellow



Alicia Braxton, D.V.M.
*Sol Goldman Fellow
in Pancreatic Cancer*



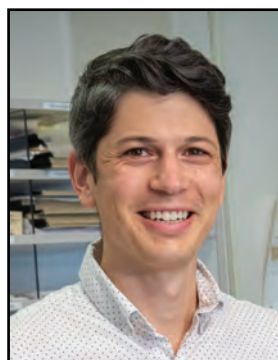
Vamsi Parimi, M.D., M.P.H.
Constance A. Griffin Fellow



Elizabeth Crowe, M.D.
Paul M. Ness Fellow



Elena Sabini, M.D.
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Jacqueline Birkness, M.D.
John H. Yardley Fellow

Please consider supporting one or more of our funds or fellowships. If you have any questions, please contact **Dr. Ralph Hruban** (rhruban@jhmi.edu or 410-955-9791). If you would like to donate to one of these funds, please visit our secure site at <https://secure.jhu.edu/form/pathol>, or send your tax-deductible contributions payable to “Johns Hopkins University” to:

Department of Pathology
Attn: Rob Kahl
The Johns Hopkins Hospital
600 North Wolfe Street, Carnegie 424
Baltimore, MD 21287-6417

THE PATHOLOGY HOUSESTAFF 2020-2021



Jason Murray still wants to be an astronaut when he grows up and, barring that, wants to similarly stimulate his sense of exploration. Thus, his path through life so far has consisted primarily of professional studenthood with his undergraduate schooling at Georgia Tech where he double majored in chemical engineering and biochemistry, a Ph.D. studying protein translation and ribosomes at the National Institutes of Health and Cambridge, followed by medical school at Johns Hopkins. His most recent academic interests revolve around ectopic pregnancy and placental biology, leading him to residency in pathology. In addition to copious time spent in school, Jason enjoys hiking and backpacking (preferably in remote locations), cooking (eating), baking (eating lots), and traveling to visit friends (particularly those with children who want piggyback rides). Other notable accomplishments include being kicked out of a dorm (for BBQing too much), being banned from watching Disney movies (because he would sing along), and earning the nickname mama-J. Jason is currently pursuing AP training.



Abigail Norwood is a cheesehead from Green Bay, Wisconsin. She received her B.S. in clinical laboratory science from the University of Wisconsin-Madison. After graduation she moved to Port-au-Prince, Haiti to teach at a tuition-free boarding school, an experience which strongly influenced her decision to pursue postgraduate studies. She earned her M.D. from Georgetown University School of Medicine in Washington, DC. She is proud of her role in designing and implementing a new pathology clerkship for fourth-year medical students. Her academic interests include increasing the visibility of pathology and promoting more collaboration across specialties to improve patient care. She was also an active member of Georgetown's student mentorship programs, Health Justice Scholars, and Physicians for Human Rights. Abi enjoys being in the outdoors, bicycling, and skiing. Her idea of having fun includes live music, DIY crafts, and sipping Sagamore Spirit whiskey. Abi is pursuing AP/CP training.



Kevin Toomer was born and raised in Miami, Florida. He attended Cornell University in Ithaca, New York, where he pursued research exploring molecular evolution of the bacterial endosymbionts within arbuscular mycorrhizal fungi. After graduating from Cornell with a bachelor's degree in biological sciences, he enrolled in the Medical Scientist Training Program at the University of Miami Miller School of Medicine. His early clinical training helped solidify a research interest in immunology, as he began to recognize inflammation as a unifying mechanism behind diverse disease processes. For his Ph.D. project, he studied the roles of interleukin-2 in functional programming, subset heterogeneity, and maintenance of regulatory T cells, an area of immense therapeutic relevance in the context of autoimmune disease. Kevin has been the recipient of various awards including the NRSA Individual Predoctoral MD/PhD Fellowship (F31) and an undergraduate Biology Research Fellowship Award sponsored by the National Science Foundation. Outside of science and medicine, Kevin enjoys artistic hobbies including drawing, painting, and woodcarving. He is also an avid reader of historical nonfiction and enjoys touring museums and historical sites. Kevin is pursuing AP/CP training.



Eric Young was born in New York and was raised in Menasha, Wisconsin. He graduated with a B.S. in genetics, cell biology and development from the University of Minnesota. After graduation, he managed the university's Zebrafish Core Facility before moving to Houston, Texas. There, Eric spent three years researching soft tissue sarcoma at the University of Texas MD Anderson Cancer Center. He graduated from the M.D./Ph.D. program at the University of Kansas School of Medicine in Kansas City, Kansas. For his thesis work, he studied the role of ITIH5 in suppressing pancreatic cancer metastasis to the liver. His current research interests include solid tumor biology, liver metastasis, and developmental biology. He enjoys gardening, cooking, the outdoors and spending time with friends and family—especially his wife, son and dog. Eric is pursuing AP training and the Physician-Scientist Training Program track.



Thomas Zaikos was born in Toronto, Ontario, Canada. He attended St. Bonaventure University in Olean, New York where he competed on the men's soccer and hockey teams and graduated with a B.S. in biochemistry. Thomas enrolled in the M.D. program at the George Washington University (GWU) in 2010. In 2012, Thomas took a leave of absence to pursue a Ph.D. at the University of Michigan in the laboratory of Kathleen L. Collins, M.D., Ph.D. where his thesis focused on HIV persistence and cure strategies. Thomas received several awards throughout his training including the Howard Hughes Medical Institute International Student Research Fellowship. Thomas returned to GWU in 2018, and earned his M.D. in 2020. Outside of medicine, Thomas enjoys playing and coaching soccer, golfing, and drinking great coffee. Thomas is pursuing AP/NP training.



Meaghan Morris, M.D., Ph.D., earned her M.D. and Ph.D. degrees from the Johns Hopkins University School of Medicine. Her doctoral work investigated mechanisms of neurodegenerative disease under the dual mentorship of Dr. Gerald Hart at Johns Hopkins and Dr. Lennart Mucke at The Gladstone Institute of Neurological Disease in San Francisco, California. She went on to a combined anatomic pathology residency and neuropathology fellowship at the Johns Hopkins University School of Medicine. In July 2020, Dr. Morris joined the faculty in the Division of Bayview Surgical Pathology and the Division of Neuropathology. Her research program combines insights from brain tissue donated by patients with age-related neurodegenerative diseases, studies in cell culture models, and cutting edge molecular techniques to uncover new pathways involved in Alzheimer's disease. Currently, her research is focused on how neuronal function and neuronal synapses are regulated by the microtubule-associated protein tau, a key pathologic protein which aggregates in Alzheimer's disease and related dementias.



Kevan Salimian, M.D., Ph.D., is an assistant professor of pathology at the Johns Hopkins University School of Medicine. His areas of clinical expertise include general surgical pathology and gastrointestinal and liver pathology. Dr. Salimian was born and raised on the eastern shore of Maryland. In 2003, he attended the University of Maryland, College Park as a Banneker/Key scholar where he received his undergraduate degrees in biochemistry and cell biology and molecular genetics. In 2007, he attended the University of Pennsylvania, where he pursued an M.D./Ph.D. His Ph.D. work focused on two proteins, CENP-A and Aurora B, which play critical roles in regulating cell division in eukaryotes. He subsequently completed his residency in anatomic and clinical pathology at the Johns Hopkins School of Medicine and served as Chief Resident in his final year. He went on to complete the Advanced Specialty Training Program in gastrointestinal and liver pathology at Johns Hopkins. His research interests focus on diagnostic gastrointestinal pathology. He is also deeply committed to pathology education geared towards patients, medical students and pathology residents.



Alisha Ware, M.D., is an assistant professor of pathology at the Johns Hopkins University School of Medicine. Dr. Ware earned her medical degree at the University of Virginia. She completed an anatomic and clinical pathology residency and a hematopathology fellowship at the Johns Hopkins University School of Medicine and served as Chief Resident in her final year. Her areas of expertise include the diagnosis of hematologic malignancies. Dr. Ware is a clinical-educator and an active member of the Department of Pathology Educational Advisory Committee. Her interests include graduate and undergraduate pathology medical education. She also focuses on promoting diversity, inclusion, and equity in medical education and in the field of pathology, and she works closely with the Pathology and House Staff Diversity Committees. Dr. Ware is invested in medical trainee well-being, and she currently advises the Pathology Resident Wellness Committee.



Mark Zarella, Ph.D., received his B.S. in physics at the University of Massachusetts and Ph.D. in neuroscience at the State University of New York in 2011, followed by a postdoctoral fellowship at the University of Rochester. His research focus at SUNY was on cortical networks in the visual system, of which imaging and computation were important components. He carries that expertise forward to digital pathology, inspired heavily by human vision and methods in vision research to develop (and explain) computer vision and artificial neural networks. Dr. Zarella joined the Division of Informatics as associate director in March 2020. He is a member of the Board of Directors of the Digital Pathology Association and serves on committees for the College of American Pathologists in the areas of whole-slide imaging, in vivo microscopy, and artificial intelligence.

GRADUATE TRAINING PROGRAM IN PATHOBIOLOGY 2020-2021



Niklas Bachmann is from the Munich area in Germany, and, after studying mechanical engineering in Oxford, United Kingdom and Munich, Germany, he moved to the Netherlands where he completed his B.Sc. in nanobiology at the Delft University of Technology. As an undergraduate, he worked in the Iwasaki Lab at the Tokyo

Institute of Technology and the Wyman Lab at the Erasmus University Rotterdam, both of which focused on DNA damage repair and particularly homologous recombination, in yeast and mammalian cells, respectively. After graduation, he moved to Chicago and joined the Campbell Lab at the Loyola University Chicago. During this time, he studied the mechanisms and interactions underlying the nuclear import of HIV-1 in nondividing cells. He then joined the Golovkina Lab at the University of Chicago as a Research Assistant, and contributed to various projects surrounding immunity against and susceptibility to retroviral diseases in mice, although his main project dealt with the possible contribution of non-classical MHC class II protein H2-O (HLA-DO in humans) to susceptibility to auto-immune diseases such as lupus. Whenever he is not in the lab, Nik is usually out hiking, traveling, or relaxing in some park with music and food.



Megan Hess is from Fairfax, Virginia and received her bachelor's degree from Creighton University in Omaha, Nebraska. During her undergraduate studies, Megan majored in biology and contributed to several microbiology research projects. In her junior year, Megan studied urinary tract pathogen

Proteus mirabilis in the lab of Dr. Chuck Deutch. Megan tested herbal supplements and found three to partially inhibit urease activity in *mirabilis*. Megan later worked in the lab of Dr. Travis Bourret and investigated the susceptibility of transketolase mutants to polymyxin B in *Salmonella enterica* serovar Thyphimurium. After graduation, Megan worked as a post-baccalaureate fellow in the lab of Dr. Howard Young at the National Cancer Institute in Frederick, Maryland. Megan led a project investigating regulatory T cells (Tregs) in the context of chronic inflammation and autoimmunity. Megan characterized Tregs from the ARE-Del model using flow cytometry and found an unexpected increase in the overall Treg population. Her latest efforts focused on a functional assay to test the suppressive ability of Tregs from ARE-Del mice. Megan is interested in clinical immunology/microbiology research, especially as it applies to developing predictive biomarkers. Outside of the lab, Megan enjoys playing roller derby, birdwatching, and taking care of her plants.



Stephan Brown is from Baltimore, Maryland and graduated from Gettysburg College with a B.S. in biochemistry and molecular biology. At Gettysburg, he researched surfactant-like protein interactions with lipid membranes and explored their potential as novel therapeutics. During

summers, he worked in two neuroscience labs at Hopkins studying cortical laminar innervation patterning and neuronal mRNA transcript localization. After graduating in 2017, he worked as a research technician in the Zahnow lab at Hopkins, where he developed an appreciation for translational research. His work focused on developing and understanding the mechanisms of novel epigenetic therapies for breast and ovarian cancer. His more recent research was focused on understanding how epigenetic and genetic changes induced by ethanol consumption can lead to breast cancer. Stephen's research interests are profoundly impacted by the diversity of his experiences, and he is interested in studying neurodegenerative disorders with an emphasis on epigenetics. Stephen enjoys photography, biking, music, and exploring new places.



Si-Sim Kang, obtained her bachelor's degree in life science from National Taiwan University in 2018. As an undergraduate, Si-Sim worked on a project focusing on a specific population of foxp3-T cells that exert regulatory functions after co-culturing with B cells in Dr. Bor-Luen Chiang's lab

at National Taiwan University. During the summer of her junior year, she participated in the Biological Undergraduate Summer School program at the University of Zurich. Si-Sim worked full-time with Dr. W. Wei-Lynn Wong on a project to understand how the X-linked inhibitor of apoptotic protein (XIAP) participates in necroptosis. After undertaking this project she decided to pursue a career in biomedical research. Si-Sim received a master's degree in immunology at National Taiwan University in 2020. She worked with Dr. Chiang again studying the application of mesenchymal stem cell (MSC) therapy for primary biliary cholangitis using a murine model of autoimmune cholangitis. In her thesis, she showed how the administration of MSCs can affect the composition of the liver lymphocyte subpopulation and ameliorate the disease outcome. In her free time, Si-Sim enjoys reading, hiking, traveling and playing the piano.



Che-Min (Mason) Lo, is from Hsinchu, Taiwan and received his B.S. and M.S. degrees from Tunghai University in 2016. Fascinated by the underlying mechanisms of diseases, he joined Dr. Mingli Hsieh's Lab in the field of molecular medicine in his sophomore year. After discovering it was so interesting to uncover human CAVIII gene regulation in the cells harboring A8344G mtDNA point mutation (MERRF disease model), he decided to enter graduate school. His graduate thesis resulted in a journal paper as first author. After building a solid foundation in biochemistry, cellular and molecular biology, he decided to become a translational researcher. He became a Research Assistant working in the Microbiology and Genomics Lab of Taichung Veteran General Hospital in 2017. In the process of discovering biomarkers for patients with latent tuberculosis infection, he found his passion of studying the host-pathogen interaction on the molecular level. In 2019, Che-Min took a position in the Toxicology Division at China Medical University Hospital to learn more about clinical tests. He conducted a project to optimize and set up an immunochromatographic strip for testing viper envenomation and established a proper condition for rapid identification of viper snakebites. In his free time, Che-Min enjoys jogging, going to the gym but not too often, and outdoor activities. Che-Min is our Margaret Lee student this year.



Maria Alejandra (Ale) Trujillo is originally from Medellin, Colombia. She received her B.S. in biology from High Point University in 2016. During her undergraduate studies, Ale developed an interest in cellular and molecular biology as she conducted research on membrane trafficking in *S. cerevisiae*. Additionally, Ale studied the pathogenesis of cancer and neurodegenerative diseases. After graduation, Ale began to work as a research technologist for Drs. Laura Wood and Nicholas Roberts here at Hopkins. During this time, Ale pioneered an IPMN organoid biobank and established widely used pancreatic cancer organoid protocols. Ale's curiosity in cancer pathology led her to enroll in the Pathobiology program and continue in the Wood laboratory where she is currently exploring KRAS gene polyclonality in normal pancreas and the effects of exosomes on pancreatic tumorigenesis.



Amanda Loftin, is a veterinarian from Los Angeles, California working to apply her specialized training in animal medicine to model human physiology and disease. Amanda received her B.S. degree from UCLA. Her research at the UCLA Orthopaedic Hospital Research Center focused on developing in vivo animal models to study the treatment and prevention of orthopaedic implant infection and pioneering new implant coatings to prevent surgical infections. She received a One Health Symposium presenter award for this work. Driven by her desire to bring a comparative approach to research, she received her D.V.M. from UC Davis School of Veterinary Medicine. As a doctorate student, she was awarded a T35 institutional training grant, which supported her studies on satellite muscle regeneration at Stanford University School of Medicine. A Summer Cancer Research Training Award from the National Cancer Institute brought her to the Laboratory of Viral Diseases where she studied the immunopathogenesis of HIV. These experiences, combined with her love for education motivated her to develop programs at UCLA Health and UC Davis that helped bridge the gap between veterinarians, physicians and scientists. Amanda has an interest in utilizing animal models to quickly and safely move discoveries from the bench to the bedside. Outside the laboratory, Amanda enjoys tending to her indoor garden, artwork, and exploring new breweries. Currently, she is enjoying the challenge of teaching her blind husky to navigate Baltimore and is looking forward to volunteering with organizations that provide veterinary care.

Our Pathobiology Ph.D. students are trained rigorously in human disease pathology, basic cell biology, molecular biology, genetics, microbiology and mechanisms using real human specimens; their research is continuously benchmarked against this “gold standard” of clinical disease.

This training approach leverages our clinical roots in the Department of Pathology at Johns Hopkins—the #1 NIH-funded Pathology department in the country—which gives our students unparalleled access to human tissues and specimens. Thus, the work of our students remains grounded in human disease pathology from start to finish.

HAPPY 100TH BIRTHDAY!

Dr. Robert Heptinstall ("Heppy") turned 100 on July 22, 2020. Heppy was the Baxley Professor and Director of the Department for almost twenty years (1969-1988). An expert in renal pathology, he wrote the standard textbook "Pathology of the Kidney," now in its seventh edition.

Dr. Ralph Hruban presented Heppy with a box of birthday wishes collected from friends, colleagues and family members from around the world. Later in the day, Heppy's surviving children presented him a cake decorated with an American flag and a British flag and a performance from a bagpiper.

If you would like to honor Dr. Robert Heptinstall's legacy, please consider making a tax-deductible contribution in his honor to the Robert H. Heptinstall Fellowship Fund with the enclosed envelope or through our secured online giving form at <https://pathology.jhu.edu/donate>.



BLAST FROM THE PAST



WHO IS THIS?

Answer on page 23

HONORING PAUL M. NESS, M.D.



Paul M. Ness, M.D.

To mark the upcoming retirement in 2021 of **Dr. Paul Ness**, colleagues and friends have established a new endowment in the Department of Pathology—The Paul M. Ness, M.D. Visiting Professorship in Transfusion Medicine—to honor his legacy as an exceptional physician-scientist, medical educator, and leader at Johns Hopkins and in the field of Transfusion Medicine. Paul is a luminary in the field of Transfusion Medicine, having served as Director of the Johns Hopkins Division of Transfusion Medicine in the Department of Pathology for 38 years and leading the Chesapeake Region American Red Cross for 15 years during the heart of the HIV epidemic.

Throughout his remarkable career, Paul participated in a number of seminal NIH funded studies assessing the initial risk of transfusion transmitted HIV and hepatitis in the United States, Asia, and Africa; served as Editor of the journal *Transfusion*, and was President of the American Association of Blood Banks. Most importantly, Paul has been a tremendous colleague, friend and mentor to fellows, faculty members and colleagues around the world, always willing to share his time and valuable insight.

The Paul M. Ness, M.D. Visiting Professorship in Transfusion Medicine will provide an important educational component for the Department of Pathology's curriculum, inviting world-class leaders in Transfusion Medicine to educate Pathology faculty, residents, and fellows. If you would like to honor Paul, recognizing him for his remarkable career and dedication to medical education, please consider making a tax-deductible contribution to the Paul M. Ness, M.D. Visiting Professorship Fund through the secure online giving page—<https://secure.jhu.edu/form/NessVPFund>.

AN INCREDIBLE JOURNEY: THE DEPARTMENT OF PATHOLOGY'S RESPONSE TO THE COVID-19 PANDEMIC *Continued from page 5*

analysis of immune responses to the COVID-19 pandemic. Finally, **Dr. T.C. Wu and Dr. Chien-Fu Hung** are working on a COVID-19 vaccine, leveraging their experience from 20 years ago when Wu and Hung worked on a vaccine for another coronavirus that originated in China—SARS. You can learn about some of our efforts on the web at <https://pathology.jhu.edu/research/covid-19-research>.

Weekly Faculty Meetings

Adjusting to the COVID-19 pandemic presented a challenge to the entire department. Initially, there was considerable confusion about how we were supposed to work, what social distancing meant for pathology faculty and staff, and how our efforts were to fit with those of the institution. Many faculty felt that reasoning behind institutional decisions was not clearly communicated to them. In response to this, beginning on April 1, the Department held a series of weekly faculty meetings, led by **Dr. Michael Borowitz**, designed to keep faculty

informed, and to allow faculty to raise questions and concerns. Over the next 16 weeks these meeting provided updates on bed status; redeployment; case rates at Johns Hopkins Medicine and statewide; testing; and financial pressures on both the institution and department. They also provided information on wellness-associated resources available to faculty. Often, select faculty gave short presentations on diverse timely topics including a primer on epidemiology; an update on convalescent plasma studies; and tips for online teaching and interviewing resident applicants. One session was devoted to a faculty member's moving account of personal experience with the early rampant COVID-19 outbreak in a Brooklyn neighborhood. Keeping lines of communication open helped faculty adjust to this "new normal."

In addition, **Dr. Ralph Hruban** initiated a series of weekly emails to the faculty and staff. These emails focused more on inspiration than information. Wonderfully, while Dr. Hruban composed many of these emails, **Drs. Tasha Larman, Charles Eberhart, Ashley Cimino-Mathews, Aaron James, Tish Simner, Ed McCarthy and Laura Wood** also contributed.

You can see some of the many ways the Department responded to the pandemic. The pandemic isn't over yet, but the Department should all be proud of the many ways it has risen to this challenge! ■



Weekly faculty zoom meeting

NEW GRANTS AND CONTRACTS AWARDED TO PATHOLOGY FACULTY

10/3/2019 - 10/12/2020

Faculty Member	Award Type	Agency	Dates	Total
Alberts, Marilyn	P30 Grant	NIH/NIA	4/15/20 - 2/28/25	15,875,174
Ali, Syed	Contract	CG Oncology	8/6/20 - 8/5/21	50,000
Amukele, Timothy	Grant	TEDCO	2/5/20 - 12/4/20	115,000
Baras, Alexander	Grant	The Mark Foundation for Cancer Research	11/1/19 - 1/31/21	249,231
Baras, Alexander	Contract	Proscia, Inc.	10/25/19 - 10/24/20	252,000
Bloch, Evan	K23 Grant	NIH/NHLBI	5/1/20 - 4/30/25	881,503
Carroll, Karen	Contract	Genefluidics, Inc.	10/1/19 - 1/31/20	15,000
Carroll, Karen	Contract	Becton Dickinson	11/4/19 - 2/28/21	31,041
Carroll, Karen	Contract	Meridian Bioscience	8/31/20 - 12/2/20	63,897
Cihakova, Daniela	R01 Grant	NIH/NHLBI	9/15/20 - 6/30/24	2,346,778
Clarke, William	Contract	Nova Biomedical	5/1/19 - 10/31/20	123,636
Eberhart, Charles	Grant	Alex's Lemonade Stand Foundation	1/15/20 - 7/15/22	392,363
Epstein, Jonathan	Contract	CG Oncology	8/25/20 - 8/24/21	65,000
Eshleman, James	Grant	The Stringer Foundation	07/01/20 - 6/30/21	150,000
Francischetti, Ivo	Contract	Siemens Healthcare Diagnostics	2/4/20 - 2/3/21	47,304
Gocke, Chris	Grant	State of Maryland	9/1/20 - 6/30/21	1,500,000
Goggins, Michael	R01 Grant	NIH/NCI	7/1/20 - 6/30/25	2,085,030
Hamad, Abdel	R01 Grant	NIH/NIDDK	3/1/20 - 2/28/24	2,006,521
Huang, Bear	Grant	WW Smith Charitable Trust	1/1/20 - 12/31/20	99,465
Huang, Bear	R01 Grant	NIH/NIGMS	4/1/20 - 3/31/25	1,719,375
Hung, Chien-Fu	R21 Grant	NIH/NCI	3/1/20 - 2/28/22	421,042
Hung, Chien-Fu	R21 Grant	NIH/NIDC	7/1/20 - 6/30/22	450,376
James, Aaron	Contract	NovaDip Biosciences	9/1/19 - 8/31/20	57,804
James, Aaron	Grant	Department of Defense	9/1/20 - 8/31/22	655,000
James, Aaron	Grant	Department of Defense	9/30/20 - 9/29/22	750,000
Koliatsos, Vassilis	Grant	TEDCO	06/30/20 - 06/29/21	245,000
Krummey, Scott	R00 Grant	NIH/NIAID	9/1/20 - 8/31/22	489,300
Larman, Harry	R01 Grant	NIH/NIGMS	4/1/20 - 3/31/24	1,853,269
Larman, Harry	Contract	Alchemab Therapeutics	4/21/20 - 4/20/21	86,000
Le, Anne	Contract	Peptron Inc.	2/14/20 - 8/13/20	20,625
Mostafa, Heba	Contract	Diasorin, Inc.	1/9/20 - 12/31/20	29,007
Mostafa, Heba	Contract	Bio-Rad Laboratories	4/4/20 - 4/3/21	10,000
Mostafa, Heba	Contract	MDC Associates	8/24/20 - 8/23/21	18,161
Nachman, Sharon	Contract	GlaxoSmithKline	2/1/19 - 6/30/24	5,676,089
Nauen, David	R21 Grant	NIH/NINDS	7/1/20 - 6/30/22	435,651
Parrish, Nikki	Contract	Thermo Fisher Scientific	2/28/20 - 2/27/21	2,000
Parrish, Nikki	Contract	Becton Dickinson	8/13/20 - 8/12/21	41,361
Peng, Shiwen	R50 Grant	NIH/NCI	9/1/20 - 8/31/25	489,630
Sfanos, Karen	Grant	Prostate Cancer Foundation	10/11/19 - 10/10/21	2,000,000
Sfanos, Karen	Grant	Department of Defense	5/1/20 - 4/30/23	1,222,466
Simner, Trish	Contract	Becton Dickinson	12/12/19 - 12/11/20	206,434
Simner, Trish	Contract	Roche Molecular Systems	1/16/20 - 1/15/21	19,368
Simner, Trish	Contract	Becton Dickinson	2/25/20 - 1/31/21	240,947
Simner, Trish	Contract	Becton Dickinson	6/24/20 - 12/31/21	225,000
Simner, Trish	Contract	Becton Dickinson	6/24/20 - 12/31/21	260,000
Sokoll, Lori	NIH contract	NIH/NIAID - pSMILE program	11/15/19 - 11/14/21	283,334
Sokoll, Lori	Contract	Abbott Labs	1/9/20 - 1/8/25	27,000
Sun, Shuying	RF1 Grant	NIH/NINDS	3/1/20 - 2/28/25	3,156,336
Wong, Phil	Grant	TEDCO	12/27/19 - 9/27/20	115,000
Wood, Laura	Grant	AACR	7/1/20 - 06/30/23	225,000
Zhang, Hui	Contract	Leidos, Inc. - service agreement	10/22/19 - 8/31/20	255,000
Zhang, Hui	Contract	Leidos, Inc. - service agreement	3/17/20 - 12/31/20	206,250
Zhang, Hui	Contract	Washington University - service agreement	4/10/20 - 12/31/20	285,500
Zhang, Sean	Contract	IMMY	6/15/20 - 12/15/20	15,899

74,902,167

AWARDS & RECOGNITION



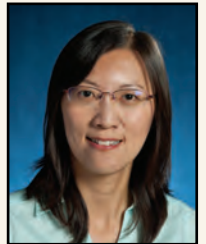
Eric Gehrie, M.D., was inducted into the American Society of Clinical Pathology (ASCP) Hall of Fame at the ASCP 2020 Virtual Annual Meeting and was recognized as an ASCP 2020 Choosing Wisely Champion for exemplary work to reduce overuse and improve healthcare in the United States.

Ralph Hruban, M.D., served as co-leader for The Cancer Genome Atlas project to catalog the genomic changes in pancreatic cancer. The TCGA team leaders received the 2020 American Association for Cancer Research 2020 Team Science Award.



Paul Ness, M.D., was appointed a member on the Advisory Committee on Blood & Tissue Safety & Availability of the U.S. Department of Health and Human Services.

Shuying Sun, Ph.D., received the Johns Hopkins Catalyst Award from the Office of the Provost. These awards support the research and creative endeavors of early career faculty across Johns Hopkins. The goal of the Catalyst Award is to launch these faculty members on a path to a sustainable and rewarding academic career.



Deyin Xing, M.D., Ph.D., received the 2020 Clinician Scientist Award from the Johns Hopkins School of Medicine. This award acknowledges his achievements to date, support of his proposed research, and a commitment to his career development as a clinician scientist.

Mark Zarella, Ph.D., was elected to the Board of Directors of the Digital Pathology Association (DPA). The DPA is a nonprofit organization comprised of pathologists and scientists dedicated to promoting the awareness, education, and adoption of digital pathology and AI in healthcare and life sciences.



NEW ENDOWED PROFESSORS



Alexander S. Baras, M.D., Ph.D. - *The Inaugural León Troper, M.D. Professor in Computational Pathology in the Department of Pathology.* This newly endowed professorship is funded by Dennis Troper and Susan Wojcicki.

James R. Eshelman, M.D., Ph.D. - *The Inaugural Ralph H. Hruban, M.D. Professor in Pancreatic Cancer Research in the Department of Pathology.* This newly endowed professorship was funded by private donors.



Andrea Richardson, M.D., Ph.D. - *The Inaugural Peter and Judy Kovler Professor in Breast Cancer Research in the Department of Pathology.* This newly endowed professorship was funded by Peter and Judy Kovler. Dr. Kovler is the Chair of the Sibley Memorial Hospital Foundation Board of Trustees and Mr. Kovler is a member of the Johns Hopkins Sidney Kimmel Comprehensive Cancer Center Advisory Board.

CORE LAB'S RESPONSE TO COVID-19

The COVID-19 pandemic presented a number of challenges to the Core Laboratory at Johns Hopkins. First, without the ability to safely draw blood in a highly infectious setting, there could be no diagnostic testing. This responsibility fell entirely on our phlebotomy staff for all non-ICU COVID-19 positive patients. The Core Lab phlebotomy team played a critical role, and emerged as true frontline heroes. The training and transitioning of phlebotomists to COVID-19 care involved special biocontainment unit training by two members of our Core Lab safety team and four members of our biocontainment unit team. The training involved donning and doffing techniques as well as observation of our phlebotomists while they were working with COVID-19 patients. Doing this was challenging and stressful given the high acuity of illness of the patients and the potential for exposure. In addition, the staff worked under a time clock since they had to race between floors to draw stat bloods and blood cultures. Approximately 50 phlebotomists were specially trained to serve our COVID-19 units 24/7. During the height of The Johns Hopkins Hospital pandemic, our phlebotomists serviced over 9,000 collections a month. None of our staff became infected—a testimony to their meticulous training and adherence to safe practices instituted by the hospital and phlebotomy leadership. Second, many patients with COVID-19 develop significant coagulation abnormalities, and coagulation diagnostic testing and monitoring of anticoagulant levels is critical to their care. With **Dr. Thomas Kickler** serving on the International Hemostasis Advisory Board for the coronavirus, we learned early from our international colleagues of the surprising high thrombotic complications of the infection and started to prepare at Hopkins and affiliates as early as January for the surge. While it's not unusual for infections to raise the risk of clotting, COVID-19 is associated with an unprecedented range of clotting-related disorders in affected patients. From benign skin lesions on the feet, to life-threatening thrombotic events, the infection is associated with a strikingly high prevalence of deadly blood clots. Studies show that about 25% or even up to 70% of critically



Dr. Thomas Kickler, Rosemary Ross, and Jayesh Jani

ill patients have confirmed venous thromboembolism (VTE) or pulmonary embolism (PE). Another study found that approximately 70% of COVID-19 patients who died had disseminated intravascular. Thus one of the most important therapeutic strategies was safe anticoagulation, not an easy task in patients with multiple problems, but one safely done with skillful coagulation testing.

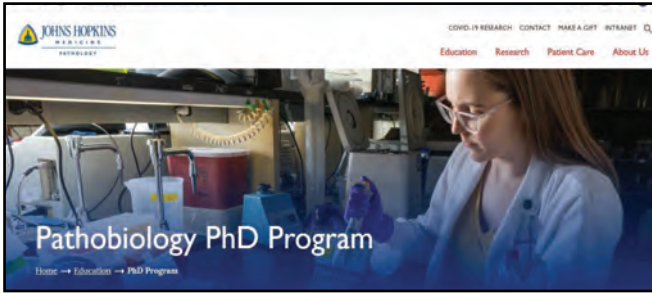
We were able to provide fast turnaround time of markers of coagulation that were sensitive and adapted for use in this population. We also provided accurate measurements of heparin therapy that allowed us to single out patients who may not respond to heparin therapy. Consequently, we fast tracked our validation of coagulation analyzers that allow us to perform 650 assays per hour, and we developed enhanced chromogenic assay for heparin and for high factor VIII levels, which alerted physicians to heparin resistance caused by cytokine storm. Significantly, we found that our quantitative d-dimer test was sensitive in detecting pathologic clotting in comparison to ultra sound or MRI. For this reason, serial monitoring of d-dimer to assess response to therapy or worsening of the clinical condition was performed around the clock. Our newly developed heparin assays were advantageous for monitoring heparin in disseminated intravascular coagulation because we no longer add antithrombin. This is especially important in measuring the biologic effect of heparin since antithrombin is low or absent in disseminated intravascular coagulation.

Especially important to standardizing management of hemostasis was our involvement in developing order sets to manage these patients in accordance with the International Advisory Committee's recommendations. This extra testing increased our workload about 100 percent, and needed support from all shift workers around the clock. Despite this, and thru the hard work of the staff and our advanced technology, we met the needs of our patients! While the Core Laboratory was heavily impacted, the other coagulation laboratories in the Hopkins health system were as well. These affiliate laboratories also successfully met our patients needs in large part because of harmonization of instrumentation and methodologies at our affiliate hospitals and spearheaded by our coagulation team, under **Mr. Jayesh Jani and Ms. Danna Anderson's** supervision. Now that the acuity of illness has abated our coagulation laboratory along with point of care coagulation is busy in monitoring outpatient anticoagulation therapy that must be continued for several months after recovery from a thrombus.



Ruth Umali and Latina Arzola Silva

PATHOLOGY WEB TEAM NEWS



New educational websites highlight our promising trainees

received new informative websites in Summer 2020; potential trainees cannot visit in-person due to COVID, but instead visit these sites to see the excitement that we have for education, along with the quality and breadth of education that our department offers.

For those who want to donate to the department, the new giving page on our website makes that easy! Simply visit <https://pathology.jhu.edu/donate> to see how you can contribute.

The past year has been one of beautiful enhancements to our Pathology websites. Our engaging mobile-responsive homepage (<https://pathology.jhu.edu/>), debuted in December 2019, offers a fresh face for the Department's varied activities. The crisp videos at the top of the homepage illustrate the training, teamwork, research and clinical excellence in our department—as well as our diversity.

Students and faculty across the department worked hard this year to refresh our educational program websites (<https://pathology.jhu.edu/education>) with our new design. Our residency, fellowships, and PhD programs all

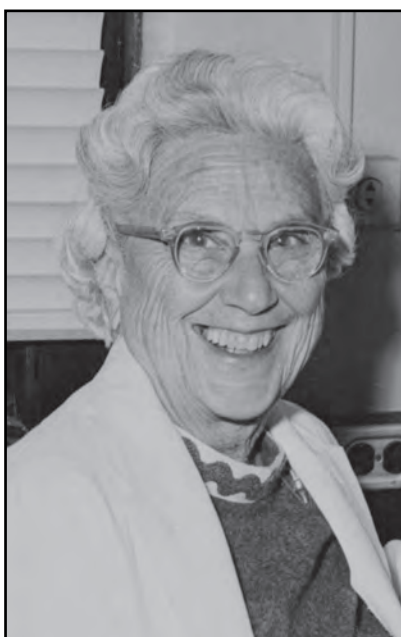
MAGNIFICENT OBSESSION

In addition to a passion for studying pancreatic cancer, **Dr. Ralph Hruban**, loves to study medical history, particularly the history of Johns Hopkins Medicine. “Not only did the founders of Hopkins Medicine bring modern, science-based medicine to America, but there are some incredible inspiring stories of visionaries who overcame unimaginable obstacles that have lessons for us today.” In this spirit, Ralph completed a series of Zoom lectures “Lessons for Today from Nine Greats Who Helped Create Hopkins Medicine,” for the Hopkins At Home Series. (<https://events.jhu.edu/form/HAHNineGreats>). Ralph hopes to use these lectures as the basis of a book on Hopkins history.

In 2011, Ralph, together with **Norman Barker and Alan Wu** (son of **Dr. T.C. Wu**), completed a documentary on **William Stewart Halsted**, the first Director of Surgery at Hopkins (<http://HalstedTheDocumentary.org>). This documentary aired on most PBS stations.



BLAST FROM THE PAST (from page 18)



Who is this? Ella Oppenheimer, M.D.

A pioneer in the field of pediatric pathology and an amateur conchologist, Ella worked in the Department of Pathology at Johns Hopkins from 1924 to 1980.

Her main research interests focused on epituberculosis, vaccinia, rubella, congenital heart disease, endocardial fibroelastosis, and cystic fibrosis.

Ella is eponymously remembered for her description of Landing-Oppenheimer syndrome in 1959.



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<http://pathology.jhu.edu>

CALENDAR OF EVENTS

Mondays from 8:30 – 9:30 a.m.
Pathology Grand Rounds
Now Available to Pathology Alumni
<https://hopkinscme.cloud-cme.com/default.aspx>

March 13 – 18, 2021
United States and Canadian Academy
of Pathology - Virtual
110th Annual Meeting

March 10, 2021, Noon – 4:00 p.m.
2021 Pathology Young Investigators' Day
Turner Concourse
Johns Hopkins University School
of Medicine
Baltimore, Maryland

April 7, 2021, 5:30 p.m.
Pathology Awards Presentation
Chevy Chase Auditorium and Arcade Room
The Johns Hopkins Hospital
Baltimore, Maryland

April 30, 2021, 7:00 p.m.
Pathology Awards Dinner
Royal Sonesta Harbor Court Hotel
550 Light Street
Baltimore, Maryland

2020

PATHOLOGY YOUNG INVESTIGATORS' DAY AWARDEES

Congratulations to the Top Award Recipients

Basic: Mohanraj Sadasivam, Ph.D.

Clinical: John Lin, B.S.

Translational: David Clark, Ph.D.

For Excellence in Basic Research

Mohanraj Sadasivam, Ph.D.

Rizan Ahmed, Ph.D.

Tianyu Cao, B.M.

Zahra Omidian, DVM, Ph.D.

J. David Peske, M.D., Ph.D.

Taejoon Won, Ph.D.

Megan Wood, B.S.

For Excellence in Clinical Research

John Lin, B.S.

Rajeswari Jayakumar, M.D.

For Excellence in Translational Research

David Clark, Ph.D.

Jiayu Chen, B.A.

Nicolas Giraldo-Castillo, M.D., Ph.D.

Ariel Isser, B.S.

Janielle Maynard, Ph.D.

Stefano Negri, M.D.

Khoa Pham, M.D.

Yangying Zhou, M.D.