

PathWays

NEWS AND INFORMATION FROM JOHNS HOPKINS PATHOLOGY

December

A Closer Look at the Division of Genitourinary Pathology



Clockwise from L-R: Yuly Ramirez, Jonathan Epstein, Zhiming Yang, Oudai Hassan, Aline Tregnago, Jennifer Collins, Alex Baras, Jessica Forcucci, Walaa Borban

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The Phoenix

I grew up in the shadows of the University of Chicago and quickly learned about the school's mascot—the phoenix. The phoenix (φoenix) is a mythological bird that is cyclically reborn. A new phoenix rises from the fiery ashes of its predecessor, even more beautiful and magnificent than before (see Joseph Nigg's book, *The Phoenix: An Unnatural Biography of a Mythical Beast*). Just as the phoenix is reborn, so are departments periodically “reborn” with changes in leadership, faculty and staff. Indeed, 2016 has been a beautiful year of renewal for our Department of Pathology!

As you will read about on page 8, this year we welcomed nine new faculty and a clinical associate. These talented young people include Eric Gehrie in Transfusion Medicine, “Bear” Huang in Gynecologic Pathology, Aaron James in Bone Pathology, Andrés Matoso in Urologic and Surgical Pathology, David Nauen in Autopsy and Neuropathology, Avi Rosenberg in Renal Pathology, Shuying Sun in Neuropathology, Elizabeth Thompson in Surgical Pathology, Deyin Xing in Gynecologic Pathology, and Swetha Paluru at Howard County. Our new faculty come from diverse backgrounds, and each brings a special expertise, a new vision and a new beginning to the Department. They are our future!

This year we also had several of our faculty members change roles in the Department. Timothy Amukele moved from our Broadway campus to head the clinical labs at our Bayview campus, and Alex Baras moved from our Howard County campus to the Division of Informatics on our Broadway campus.

If all of this wasn't enough, we have three new division directors. Mario Caturegli is the new director of the Immunopathology Division, Elizabeth Montgomery is the new director of the Gastrointestinal/Liver Pathology Division, and T.-C. Wu now leads the Gynecologic Pathology Division. In addition, with the departure of Toby Cornish, Bob Miller agreed to direct Informatics (again!). These new leaders join a fantastic team of division heads in Pathology who bring

their unique talents to move the Department forward.

Finally, with the retirement of Rosemary Hines, Chris Ruley is our new finance director. Chris is also the finance director for Radiology and Pharmacy.

The impact of all of this change is palpable. Total sponsored research (direct and indirect) increased by 18% from FY15 to FY16 (page 20). Since January 1, new or competitive R01 grants have been awarded to Mario Caturegli, Tamara Lotan, Charles Steenberg, Scheherazade Sadegh-Nasseri, Aaron Tobian, and Phil Wong as well as several new or continuing U awards for Dan Chan, Hui Zhang and Zhen Zhang. On the educational side, we are creating an innovative series of new iPad apps (see page 21). The new apps will be on the brain, eye, kidney, thyroid, prostate, and ovary. As was true for the pancreas surgical pathology and pancreas cytopathology apps, these new apps will be available for iPads through the iTunes store and will feature easy-to-follow diagnostic algorithms and hundreds of beautiful figures for unparalleled learning experiences. They will also be translated into Chinese. On the clinical side, we have a new high-end Hamamatsu slide scanner and we are developing our telepathology capabilities.

From the earliest days of William Henry Welch to today, our Department is constantly being renewed (although thankfully not as violently as the phoenix!). Our Department is a beautiful and magnificent and always changing creature. I look forward to an even more exciting 2017!

Now, as we close one chapter, the pen is gradually inking up, preparing itself to write the next. — Mie Hansson



Ralph H. Hruban, M.D.

Not Just Life in Medicine...

When Dr. Tim Amukele is not busy running the clinical laboratories at Bayview, doing research, fielding media interviews and giving TED talks about his drone projects, he can often be found in front of a piano. Tim's love of music started early. At the age of eight, he was already singing as part of a semi-professional quintet called the “Heavenly Band Singers,” one of five Nigerian kids who sang country gospel music complete with a manager and “tour wrangler” (don't bother Googling, there are no incriminating videos online).

He started writing songs at age twelve, and in medical school, in addition to playing gigs most weekends, he co-founded the “Einstein Chamber Music Group.” Despite being an impressive vocalist, Tim is much more at home playing piano and songwriting. He has written 35 songs, a few works for solo piano, and has been featured on five albums in the last few years. But his greatest musical achievement came last fall when his debut album *Night Songs* was released. *Night Songs* “...can be described as neo-soul with a jazz twist—is a collection of songs for and about night; lullabies for adults. This collection of five originals and two covers is a collaboration with longtime friends Onye and Scott Jacoby, a Grammy award-winning producer” (from www.timamukele.com). You can also listen on, www.timamukele.com, and purchase Tim's CD on Amazon and CD Baby websites.



Kidney/Urological Pathology

The Division of Kidney/Urological Pathology has two subdivisions: Urological Pathology and Non-neoplastic Kidney Pathology. Dr. Jonathan Epstein heads the Urological Pathology team, and Dr. Serena Bagnasco leads the Non-neoplastic Kidney group.

Clinical

Neoplastic Urological

Brief History: In the early 1980s, Dr. Patrick Walsh as chair of the Department of Urology developed the anatomical approach to radical prostatectomy. As a result of the decreased morbidity of Dr. Walsh's operation, the number of radical prostatectomy specimens seen at Hopkins went from 10-12 per year to a peak of 1,100 per year a few years ago. Because each patient undergoing radical prostatectomy has to have his diagnostic needle biopsy reviewed, we not only saw a dramatic increase in prostate resection specimens but also in corresponding needle biopsies. Consequently, faculty at Hopkins developed specialized expertise in prostate cancer and a national and international reputation paralleling our Urology clinical colleagues. Although prostate cancer was initially the primary draw for patients to come to Hopkins for surgery, Hopkins soon became widely known for its treatment of other urological disorders, leading to a significant increase in these surgical pathology specimens as well. Annually, we see approximately 1,000 radical prostatectomy specimens and their accompanying diagnostic needle biopsies, mostly from other institutions. An additional 1,000 prostate needle biopsies performed at Hopkins are reviewed yearly both for initial diagnosis and follow-up for active surveillance. Approximately 900 bladder

biopsies and 170 radical cystectomies are also received from Hopkins operating rooms per year. There are relatively fewer but still a substantial number of kidney biopsies and nephrectomies performed for renal neoplasms. In addition, the Division receives approximately 12,000 consults per year, covering the full spectrum of urological pathology from outside the Institution directed to Dr. Epstein.

Clinical Service: Urological pathology specimens removed at Johns Hopkins are primarily dealt with on the routine Surgical Pathology service by one of the eight Surgical Pathology faculty, who although not formally trained in the discipline, have extensive expertise due the high volume of cases seen at Hopkins. In addition, Drs. Tamara Lotan and Angelo De Marzo support the in-house service, and in addition to signing out his own cases, Dr. Epstein serves as the in-house consultant for any difficult GU case. Dr. Pedram Argani receives consultations from all over the world for evaluation of potential translocation renal cell carcinomas.

Dr. Argani has worked with the Hopkins' Cytogenetics Laboratory to set up and validate FISH for both *TFEB* and *TFE3* gene rearrangements, which are used as diagnostic markers for these tumors. Johns Hopkins Pathology is now, to our knowledge, the only department which performs FISH for both *TFEB* and *TFE3* gene rearrangements in a clinical laboratory. Dr. Lotan has worked with the Immunohistochemistry Lab to genetically validate and set up clinical testing for ERG and PTEN aberrations in prostate cancers as prognostic biomarkers.

Non-neoplastic Kidney

Brief History: Renal Pathology at Johns Hopkins has a long and storied history. Renal biopsies for diagnosis only came into use in the 1950s with Dr. Robert Heptinstall, faculty member

CONTINUED ON PAGE 4



Back Row (L-R): Ebrahim Hajipour, Dr. Mohammad Aldoghaifiq, Dion Hicks Jr., Dr. Marco Delsante, Edward Roberts, Lois Anderson, Noralinda Vilorio
Front Row (L-R): Dr. Lorraine Racusen, Dr. Naima Carter-Monroe, Dr. Serena Bagnasco, Dr. Lois Arend, Dr. Avi Rosenberg, Danielle Patterson

and ultimately Pathology Department director at Johns Hopkins, among those at the forefront. Heptinstall's textbook, *Pathology of the Kidney*, updated every several years, remains the authoritative text in the field. Full interpretation of kidney biopsies relies not only on light microscopy but electron microscopy, established at Johns Hopkins in the 1960s by Dr. John Yardley, and also immunofluorescence microscopy, developed in France in the 1970s and quickly implemented at Hopkins by Dr. Kim Solez. Dr. Solez trained in pathology at Johns Hopkins, and was Dr. Heptinstall's protégé. Dr. Heptinstall also had an NIH-funded research laboratory focused on atherosclerosis and ischemic renal injury. Renal transplantation was introduced to Hopkins by Dr. Mel Williams shortly after development of the technique in Boston in the 1960s. Dr. Heptinstall, busy as Department director, turned over the diagnostic service to Dr. Solez, who ran the service until 1982, when he left to become professor and chair of anatomic pathology at the University of Edmonton. Over the ensuing years a number of greats in renal pathology contributed to the service including Drs. Jean Olson, Fred Sanfilippo, Tibor Nadasdy, Mark Haas, and Naima Carter-Monroe. Dr. Lorraine Racusen, who did her renal pathology training at Hopkins, took over the service in 1994. Lorraine brought expertise in ischemic injury and developed clinically-oriented research in renal and transplant pathology. As the diagnostic volume grew, Dr. Serena Bagnasco, who had been an NIH researcher before completing a renal pathology fellowship at Johns Hopkins, was recruited from Emory University where she had continued her groundbreaking research on osmoregulation in renal medullary cells including cloning and transcriptional regulation of the major renal urea transporters, for which she was awarded an NIH R01. Drs. Racusen and Bagnasco were able to recruit Dr. Lois Arend from the University of Cincinnati, where she led the renal biopsy service and did NIH-funded research on renal development. Dr. Arend is now director of Pathology Clinical Fellowships for the Department of Pathology.

Clinical Service: The diagnostic renal biopsy service is one of the largest academic renal biopsy services in the United States and received over 1,600 biopsies last year. Approximately 900 of these were from other institutions. The remainder were in-house cases serving nephrology, renal transplantation, pediatric nephrology, and rheumatology. Renal biopsies are signed out by three faculty members who rotate every two weeks. Currently the service is covered by Drs. Bagnasco and Arend, and Dr. Avi Rosenberg (see page 10) who joined the team in October 2016.

Education

Faculty in the Division are dedicated to teaching, which includes informal teaching using the Socratic Method at the multi-headed microscope or at the bench in research labs, and more formal lectures in classrooms and at conferences. There is a biweekly Urological Pathology journal club at which articles ranging from the basic science to more clinical topics are covered, providing cross-fertilization within the Division.

Fellows from all over the world train in the Division. After their training, international fellows bring urological pathology

expertise back to their native country, where some are now leaders in the field. GU Pathology fellows have come from Israel, Taiwan, Panama, France, Japan, Turkey, Canada, South Korea, Saudi Arabia, Australia, the Philippines, England, and Columbia.

Members of the Division also have leadership positions in education. Dr. Lotan is co-director of the Pathobiology Graduate Program, and Dr. Karen Sfanos co-chairs a weekly journal club for the Pathobiology Program with Dr. Alan Meeker. Dr. Sfanos serves on the Executive Committee, and in 2016 became the admissions committee chair for the Pathobiology Graduate Program.

Our Renal Pathology Fellowship Program is presently one of only three ACGME-accredited fellowship programs in renal pathology nationwide. The program offers one position per year for individuals who have completed residency training in accredited U.S. pathology programs, and most of our recent graduates choose positions in academic pathology departments. Training is also offered in nephropathology to foreign clinical fellows funded by their countries, most recently from Saudi Arabia and Italy.

Dr. Bagnasco organizes the Baltimore Renal Rounds twice a year for local nephrologists and trainees in collaboration with the Maryland National Kidney Foundation. She also organizes a yearly educational meeting in Italy focused on timely topics in transplantation with international expert speakers from United States and Europe, in collaboration with the University of Genova and the Gaslini Pediatric Hospital. Dr. Arend is also an educational ambassador for the International Society of Nephrology and recently provided renal pathology diagnostic guidance and educational expertise to pathologists and nephrologists in Ulaanbaatar, Mongolia!

Research

Neoplastic Uropathology

The Urological Pathology Division is very active in a wide spectrum of research with over 100 publications in the last year. Dr. Epstein tends to publish more clinically-related articles. An example is his recent development and multi-institutional validation study of >20,000 men for a new grading system for prostate cancer that has been adopted by the World Health Organization (WHO) and the College of American Pathologists (CAP), and it will be mandated for use in most pathology departments in the United States.

Dr. Argani's genitourinary research has centered on translocation-associated renal cell carcinoma, of which he is the world's expert. He has also published on other uncommon renal neoplasms, many of which have distinctive genetic alterations. It is quite remarkable that two Hopkins genitourinary pathologists, Drs. Epstein and Argani, were invited to Zurich for the 2016 WHO Classification of Tumours: Pathology and Genetics. Tumours of the Urinary and Male Reproductive System.

Drs. Alan Meeker, Christopher Heaphy and Elizabeth Platz are leading a project in the Hopkins NCI SPORE in prostate cancer to validate and refine their prognostic biomarker assaying telomere

Kurman Professorship Carries on a Tradition of Faculty Giving

By Kimberly Marselas

Midway through his medical career, gynecological pathologist Robert Kurman received an offer to come to Johns Hopkins as the Richard W. TeLinde Distinguished Professor of Gynecological Pathology and Director of the Division of Gynecologic Pathology, one of the oldest and most highly regarded divisions of gynecologic pathology in the U.S. While the Professorship is within the Department of Gynecology and Obstetrics, there is a rich history of close collaboration with the Division of Gynecologic Pathology. “Since the first day I set foot at Johns Hopkins I have never had a single regret,” Kurman says.

Kurman’s clinical work and research involves diagnosing diseases affecting the female reproductive organs and discovering what causes various types of cancers to develop in these sites. He and his colleagues review microscopic slides from patients’ tissues that are sent by medical providers from throughout the U.S. and abroad. “Generally, the question is whether the slides are from a malignant or a benign disease” he says.

“The label of cancer places an enormous emotional burden on the patient and her family,” says Kurman. “It is critical that we make an accurate diagnosis of cancer versus a benign tumor. This can be very difficult at times. The treatment for cancer is often aggressive, removing the uterus and ovaries and leaving younger women sterile and young and older women without the benefit of important hormones that play a key role in their health.”

Today, as Kurman transitions toward retirement after nearly 30 years with the Department of Pathology, he is working to ensure that a new generation of doctors and educators carries on his legacy of life-changing work.

He and his wife have made a gift commitment from their estate that will endow the Robert J. and Carole C. Kurman Professorship in Gynecologic Pathology in the Department of Pathology. The goal is to provide promising researchers incentive and freedom to advance the diagnosis and treatment of gynecological diseases.

“Bob built the best Division of Gynecologic Pathology in the country,” says Ralph Hruban, MD, the Baxley Professor and Director of the Department of Pathology. “He hired world-class faculty who collaborate to provide great patient care, impactful teaching and cutting-edge research. Without a doubt, Bob’s many trainees are his greatest legacy, many of whom now hold leadership positions around the world.”



Bob and Carole Kurman

A History of Generosity, Collaboration

When Kurman first arrived at the Division of Gynecologic Pathology, it consisted of himself and a resident — now the division has more than 40 trainees and junior and senior faculty. The TeLinde Professorship allowed Kurman to extend the division’s research arm. By supporting gynecological pathology faculty and fellows and using seed money to launch pilot studies and generate much-needed data, the faculty nearly quadrupled outside funding during his tenure.

Most recently, Kurman and his colleagues developed a model for ovarian cancer based on a variety of factors, including molecular genetics, that allow gynecologists to develop new approaches to diagnosis and treatment and investigators to explore avenues of research that will lead to new methods of screening and prevention.

T.-C. Wu, MD, PhD, one of Kurman’s first fellows, and an internationally recognized leader in the field of human papillomaviruses and cervical cancer, has succeeded him as Director of the Division of Gynecologic Pathology. He and Hruban say Kurman’s “significant contributions to the field spared many women unnecessary treatments.”

In 2014, Kurman stepped down from the TeLinde Professorship to allow the University to appoint another one of his former fellows, Ie-Ming Shih, MD, PhD, to that position. “He is one of the leading scientists in the field of ovarian cancer and the driving force in our ovarian cancer program, and this has resulted in Hopkins being an international leader in the field.”

Kurman says he remains indebted to Edward Wallach, MD, the professor emeritus and former Director of the Department of Gynecology and Obstetrics who recruited him to Johns Hopkins decades ago. The two were able to work side by side for years.

Kurman notes that because pathologists rarely meet with patients, the patients don’t recognize the critical role pathologists play in establishing a diagnosis to help direct treatment. As a result, grateful patients don’t consider donations, one of the main sources of endowed gifts, to pathology departments. Kurman hopes his and his wife’s gift will spur other faculty members to become benefactors. In doing so, they would carry on a tradition of generosity to ensure that research, teaching and patient care at Johns Hopkins continue to excel.

You, too, can support the future of the Department of Pathology. To learn more about making a gift from your estate, naming the department as a beneficiary of your retirement plan, or establishing a gift that also provides income to you, please contact Amy Helsel, Senior Director of Development, at 443-287-7943 or ahelsel@jhmi.edu.

Dr. Peter Burger - Have a Wonderful Retirement!

After working at Johns Hopkins since 1993, Dr. Peter Burger, professor of pathology, oncology and neurosurgery, retired in December 2015. Spanning a career at Duke and Hopkins, Dr. Burger is a highly respected neuropathologist. Although he no longer signs out clinical cases, Dr. Burger can be seen several days a week in the hospital conducting research studies, attending conferences, and providing sage advice.



Best Wishes, Rosemary!

Rosemary Hines, MBA, DLM(ASCP), retired in August 2016 after 48 years of devoted service to Johns Hopkins. Rosemary began her career at what was then City Hospital. She was hired in the Department of Pathology in 2006, and held the position of director of finance for Pathology and Pharmacy. The Department will always be grateful to Rosemary for her many contributions, and we all wish her good health and much happiness in her retirement.



Barbara Parsons Retires!

Barbara Parsons, MA, MT(ASCP), retired in April 2016 after serving as assistant director of Quality Management in the Department. Barbara oversaw the laboratory compliance standards, SMILE, point-of-care, and led her staff in the transition to CAP laboratory accreditation. Now instead of “digging” through stats, Barbara can be found digging in her garden. Barbara’s contributions to the Department were many and far reaching, and we wish her all the best.



New Faculty

Faculty Name	Rank	Division
Eric A. Gehrie, M.D., S.M.	Assistant Professor	Transfusion Medicine
Chuan-Hsiang "Bear" Huang, M.D., Ph.D.	Assistant Professor	Gynecologic Pathology
Aaron W. James, M.D., Ph.D.	Assistant Professor	Surgical Pathology
Andrés Matoso, M.D.	Assistant Professor	Kidney-Urologic and Surgical Pathology
David Nauen, M.D., Ph.D.	Assistant Professor	Autopsy and Neuropathology
Swetha Paluru, M.D.	Clinical Associate	Howard County General Hospital
Avi Rosenberg, M.D., Ph.D.	Assistant Professor	Kidney-Urologic Pathology
Shuying Sun, Ph.D.	Assistant Professor	Neuropathology
Elizabeth Thompson, M.D., Ph.D.	Assistant Professor	Surgical Pathology
Deyin Xing, M.D., Ph.D.	Assistant Professor	Gynecologic Pathology

Promotions

Faculty Name	Rank	Division
Peter Burger, M.D.	Professor Emeritus	Neuropathology
Karen King, M.D.	Professor	Transfusion Medicine
Ming-Tseh Lin, M.D., Ph.D.	Associate Professor	Molecular Pathology

Departures

Faculty Name	Rank	Current Location
Georges Netto, M.D.	Professor	Professor and Director of Pathology, University of Alabama at Birmingham, Birmingham, AL
Hiroshi Miyamoto, M.D., Ph.D.	Associate Professor	Associate Professor, University of Rochester, Rochester, NY
Toby Cornish, M.D., Ph.D.	Assistant Professor	Associate Professor, University of Colorado, Aurora, CO
Sarah Brooks, M.D.	Assistant	Pathologist, private practice, Charleston, SC
Joshua Menke, M.D.	Assistant	Cytopathology Fellow, University of California San Francisco, San Francisco, CA
Meredith Pittman, M.D., MSci.	Assistant	Assistant Professor, Weill Cornell Medicine, New York, NY
Justin Poling, M.D.	Assistant	Pathologist, Williamson Medical Center, Brentwood, TN
Congli Wang, M.D.	Assistant	Assistant Professor, Temple University, Philadelphia, PA



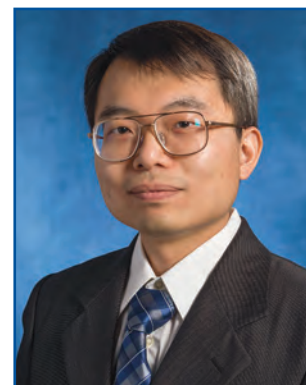
Eric A. Gehrie, M.D., joined the Division of Transfusion Medicine in October 2016. Dr. Gehrie is a native of Chicago, Illinois and a graduate of the University of Chicago. As a medical student at Mount Sinai School of Medicine in New York City, Dr. Gehrie helped identify novel mutations and sequence variants in the uroporphyrinogen decarboxylase gene that contribute to the “sporadic” form of porphyria cutanea tarda. Later in medical school, Eric was awarded a Howard Hughes Medical Institute Medical Student Research Fellowship to work on the role of various dendritic cells in the development of immune tolerance to solid organ allografts.

In 2010, Dr. Gehrie moved to Nashville, Tennessee to pursue a pathology residency at Vanderbilt University. While at Vanderbilt, he evaluated the capacity of the complement inhibitor eculizumab to treat complement mediated hemolysis caused by exposure to the venom of the brown recluse spider. In 2013, Dr. Gehrie moved to Yale where he completed his clinical pathology residency as well as a clinical fellowship in Blood Banking/Transfusion Medicine. He joined the faculty of Yale Medical School in 2015 as an instructor in the Division of Transfusion Medicine. While at Yale, Dr. Gehrie was a co-investigator of the Recipient Epidemiology and Donor Evaluation Study-III (REDS-III) project, as well as co-investigator of a Phase IV clinical trial to evaluate the safety of a pathogen-inactivated platelet product. He also served as the clinical lead of a hospital-sanctioned “clinical redesign” initiative designed to reduce waste of blood components and clotting factors at Yale-New Haven Hospital. At Hopkins, Dr. Gehrie will play an active role on the transfusion service and will continue to work on transfusion-focused clinical trials.

Chuan-Hsiang (Bear) Huang, M.D., Ph.D., joined the division of Gynecologic Pathology in July 2016. Dr. Huang received his M.D. from National Taiwan University and completed two years of residency in internal medicine before joining the Graduate Program in Immunology here at Johns Hopkins. His Ph.D. work, conducted in the labs of Mario Amzel and Bert Vogelstein, focused on structural studies of PI3K, one of the most frequently mutated proteins in human cancers and an important drug target. Using X-ray diffraction methods, Dr. Huang determined the first crystal structure of the PI3K heterodimer, elucidating the basis of PI3K overactivation in cancers.

To further understand the cellular biology of PI3K signaling, Dr. Huang conducted his postdoctoral research in the Devreotes lab, and studied the mechanism of cell migration and chemotaxis using Dictyostelium and human neutrophils as models. In collaboration with Pablo Iglesias, he combined single cell imaging with quantitative modeling to reveal the dynamic properties of the Ras-PI3K signaling network, how the network couples to the cytoskeleton during cell migration, and how chemotactic cues bias this coupling to guide movement. In his ongoing research, Dr. Huang is collaborating with Dr. T.-C. Wu to extend these findings to the migration of cancer cells both in vitro and in vivo, and to understand the role of PI3K signaling in cancer metastasis from cellular to organismal levels.

Dr. Huang has numerous publications, including papers in Science, PNAS, and Nature Communications. He has received numerous awards, including the Silver Medal in the 33rd International Mathematical Olympiad, the Mette Strand Award, the Julian Baumert Thesis Award, and the Harold L. Plotnick Fellowship.



Aaron W. James, M.D., Ph.D., was welcomed as an assistant professor of pathology in the Division of Surgical Pathology in August 2016. Dr. James was born and raised in Palo Alto, California and graduated from the University of California, Berkeley, with a B.A. in English literature. He earned his M.D. from the University of California, San Francisco with research at Stanford University. His thesis work focused on the mechanisms of ossification in cranial suture biology. Dr. James then moved to the University of California, Los Angeles where he completed residency training in anatomic pathology, and fellowships in orthopaedic pathology and surgical pathology. His Ph.D. dissertation was on purified stem cell fractions for bone repair. His clinical interests will focus on orthopaedic pathology, and his research efforts will examine novel mechanisms for cell- and protein-based bone tissue engineering and regeneration.

By Mario Caturegli and Ralph Hruban

In his 1929 collection of short stories *Everything is Different*, the Hungarian author Frigyes Karinthy introduced the concept that every person on this planet is “linked” to every other person by at most six degrees of separation. This theory was expanded upon over the ensuing decades and became wildly popular in the 1990s, thanks to John Guare’s play *Six Degrees of Separation* and the movie that followed.

When a president of the United States is elected, there is a flurry of investigation into the new president’s ancestry, often uncovering links to individuals with special meaning. The Irish author and filmmaker Gabriel Murray uncovered an interesting connection between President Barack Obama’s Irish ancestors and the Baxley family of Baltimore, Maryland (Murray 2012). In his documentary and book *Obama’s Irish Roots: The Lost History*, Murray noted that just as President Obama dedicated his presidency to health care reform, so too did several members of the Baxley family dedicate their careers to improving health delivery (Miller 1996).

The Obama-Baxley connection can be traced as follows. (<http://pathology.jhu.edu/department/about/history/obama-baxley.cfm>) The 44th President’s great-great-grandmother was Mary Anne Kearney (1869-1936), and Mary Anne Kearney’s great-grandfather was William Kearney (1762-1828). In 1790, when George Washington was president and signed the Naturalization Act (the first attempt of the government to regulate immigration), William’s brother Thomas Kearney (1765-1846) emigrated from Moneygall, Ireland to Maryland, where he married Sarah Baxley (1774-1845).

Several members of the Baxley family played important roles in improving health care in Maryland and the nation (Miller 1996). For example, Jackson Brown Baxley (1814-1896),

Sarah’s nephew, helped to establish the Maryland College of Pharmacy and advocated for laws requiring the registration of pharmacists, and Henry Willis Baxley (1803-1876), Jackson Brown’s brother, founded in 1839 the Baltimore College of Dental Surgery, the first school of dentistry in the United States. What does all of this have to do with our Department? In 1876, Henry Willis Baxley (figure) left a bequest of \$23,836.52 to the trustees of the Johns Hopkins University “to endow any medical professorship that they might think proper.” The fund was kept intact and invested for 25 years until March 1901 when the University used it to establish the Baxley Professorship of Pathology. This was the first endowed professorship in the School of Medicine (SOM), and Dr. William Henry Welch (1850-1934), the first director of the Department of Pathology and first dean of the SOM, was the first to hold the professorship (Flexner 1941). Welch, through his leadership as the first dean and director of Pathology in the School of Medicine, and as the Baxley Professor of Pathology, transformed American medicine, and thanks to Welch, medicine in America would forever

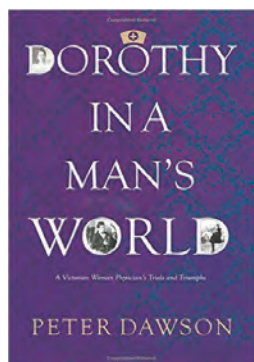
be viewed through the lens of science. President Barack Obama, Henry Willis Baxley, William Henry Welch, and the holder of the Baxley Chair (the Director of the Department of Pathology) are forever linked.



Henry Willis Baxley
Courtesy of the Maryland Historical Society

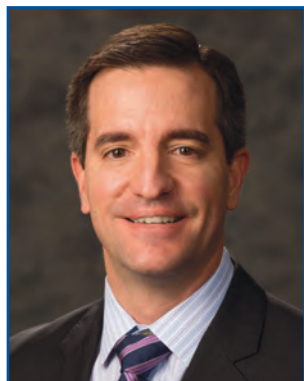
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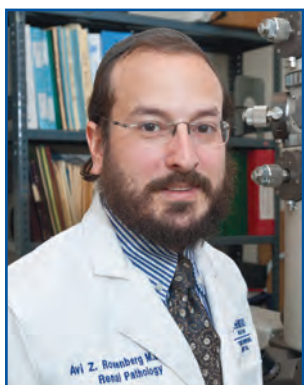
Dorothy Reed Mendenhall: Dorothy in a Man’s World

Dorothy in a Man’s World: A Victorian Woman Physician’s Trials and Triumphs, the biography of Dr. Dorothy Reed Mendenhall who completed her fellowship in Pathology serving under Dr. William Welch after graduating fourth in her class from the Johns Hopkins Medical School in 1900, was published recently. Dr. Mendenhall had a long and groundbreaking career in research, pathology, and maternal and child health. Dr. Peter Dawson showcases one of medicine’s great female pioneers who overcame many obstacles in the male-dominated field of medicine, to discover the cell of Hodgkin’s disease. Dr. Dawson worked with the Alan Chesney Medical Archives for his research and the late Drs. Risa Mann and Grover Hutchins showed him the microscope slides from the original cases of Hodgkin’s disease.



Andrés Matoso, M.D., will join the Divisions of Surgical Pathology and Urologic Pathology on January 1, 2017. Dr. Matoso received his M.D. in 2001 from the University of Buenos Aires in Argentina. After completing residency training in urology, Dr. Matoso moved to the United States and completed a postdoctoral research fellowship in cancer biology at Cornell University. Subsequently, he completed his residency training in anatomic and clinical pathology at Brown University, followed by subspecialty training in gastrointestinal and liver pathology, also at Brown. Dr. Matoso then came to Hopkins in 2013 for a fellowship in urologic pathology. Dr. Matoso's clinical focus is diagnostic surgical pathology with emphasis in urologic, gastrointestinal, and liver pathology. In gastrointestinal pathology, his research has focused in the identification of biomarkers of eosinophilic esophagitis. In urologic pathology, his research interests include the clinicopathologic characterization of unusual urologic diseases and urologic cancers. An author of more than thirty papers and two book chapters, Dr. Matoso has received a number of awards for his work, including the Stowell-Orbison Award from the United States and Canadian Academy of Pathology.

David Nauen, M.D., Ph.D., trained in the M.D./Ph.D. program at the University of Pittsburgh/Carnegie Mellon where he studied spike-timing-dependent long-term plasticity, a reductionist model for memory. He developed a method to record action potential-evoked synaptic transmission at individual synaptic contacts. After five years trying to understand the behavior of the neurons seen through his microscope and several fascinating pathology rotations, Dr. Nauen came to Baltimore for residency training. Working closely with collaborators in the Institute for Cell Engineering, Neurosurgery, and Biomedical Engineering, Dr. Nauen's studies involve molecular and functional analyses of hippocampal tissue. The dentate gyrus is one of two brain areas that undergo neurogenesis throughout life, and Dr. Nauen is building a research program focused on understanding the contribution of this process to the development of medial temporal lobe epilepsy and to injury response more generally. Dr. Nauen joined our faculty in the Division of Autopsy with a secondary appointment in Neurology in May 2016.



Avi Rosenberg, M.D., Ph.D., was born and raised in Brooklyn, New York, and he graduated from Brooklyn College (CUNY) with a B.A./B.S. in chemistry and biology while exploring medieval English literature and archeology. Dr. Rosenberg continued his training in the Medical Scientist Training Program at Stony Brook University/Cold Spring Harbor Laboratory where he studied the role of polarity regulators, in particular Scribble, in breast development and neoplasia in the laboratory of Senthil Muthuswamy. He then moved to the NIH for AP residency where his clinical interest shifted to primary kidney disease. He then pursued advanced fellowship training in renal pathology here at Johns Hopkins and pediatric pathology at Children's National Medical Center in Washington, D.C.

Dr. Rosenberg's research has focused on experimental models of chronic kidney disease (CKD) and the pathology aspects of nephrotic syndrome cohorts. Recognizing the need for tools to study biomolecules in small tissue samples (i.e., kidney biopsies) led to his work with Michael Tangrea and Michael Emmert-Buck, to establish expression microdissection (xMD) as a useful tool for simplifying complex tissues for

omic studies and to target mass spectrometric approaches to study matrix proteins. Dr. Rosenberg returned to Hopkins in October 2016 to join our faculty as a renal pathologist and establish a renal pathobiology effort focused on cellular and biochemical mechanisms of progressive matrix remodeling in CKD using *in vitro* systems, animal models, and clinical cohorts.

CELEBRATING HOPKINS HISTORY: A VIDEO PROJECT

The Johns Hopkins School of Medicine brought science to medicine in America. However, many people do not know how it became such a powerhouse in the field of medicine. Who started this incredible hospital and medical school? Who shaped its first few years as a fledgling hospital? How did these people shape the practice of medicine in the United States? Through a series of short videos, a glimpse is provided into the lives and accomplishments of some of the Hopkins "Greats" who made The Johns Hopkins Hospital and School of Medicine what they are today.

The project was the idea of third-year medical student Jessica Ruck. Although she was familiar with Hopkins outstanding reputation when she came as a first-year medical student, she and many classmates weren't as familiar with the people who started and influenced the growth of this unique institution. Jessica teamed up with Jon Christofersen, medical videographer, and Norm Barker, professor of pathology, to produce a series of short film interviews.

Visit the website and enjoy the history of Hopkins!

<http://pathology.jhu.edu/departments/about/history/celebratehistory.cfm>

The interviews include:

Mary Elizabeth Garrett: A New Vision for Medical Education

Kathleen Waters Sander, Ph.D.

William H. Welch: Medicine as a Science

Ralph H. Hruban, M.D.

Sir William Osler: The Father of Modern Medicine

Stephen C. Achuff, M.D.

William Stewart Halsted: The Birth of American Surgery

John L. Cameron, M.D.

Dr. Howard Kelly: Innovation in Gynecology

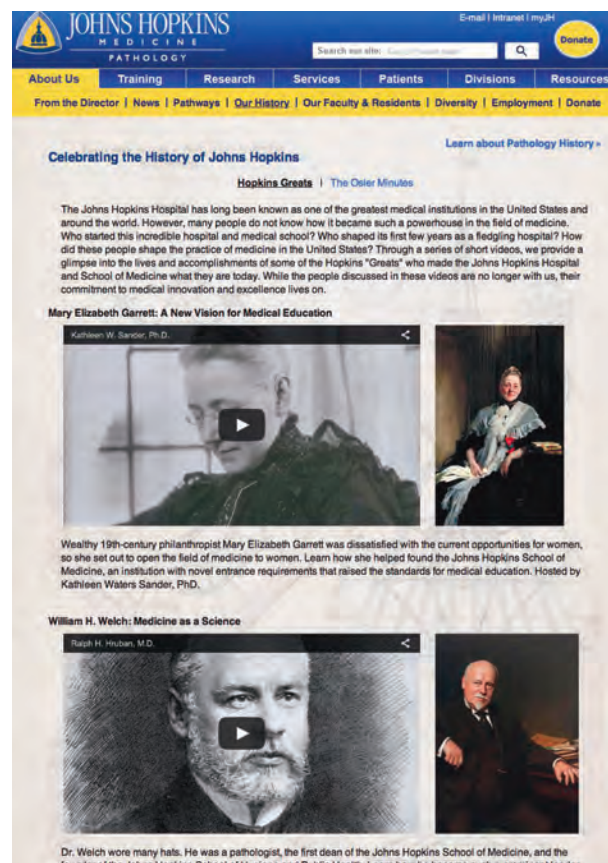
John A. Rock, M.D., MSPH

Vivien Thomas: Breaking Racial Barriers

Levi Watkins, Jr., M.D.

John Shaw Billings: Surgeon and Hospital Designer

Mr. Neil Grauer



Christopher Ruley Joins Pathology as Director of Finance

Chris Ruley joined the Department of Pathology in September 2016 as the director of finance. Chris succeeded Rosemary Hines. Chris started in the Hospital accounting department in 2004, and in November marked twelve years of working at Hopkins. After an internal move to the Hospital budget office, Chris worked with the Pathology finance team to establish the Department's budget. In July of 2013, Chris was named the assistant director of finance for Anesthesia, and in late 2015, Chris was promoted to director of finance for Radiology and successor to Rosemary as director of finance for Pathology and Pharmacy. Chris is excited to join the Pathology team as the Department has a number of interesting and exciting projects going on. Chris's father-in-law, Mike Baldwin, worked in the Transfusion Medicine for 30 years, so Chris has some familiarity with the inner workings of the Department. In his spare time, Chris enjoys bowling, watching Ravens and Orioles games, and spending time with his family. Chris looks forward to meeting and working with everyone.

With the uncertainties caused by decreased NIH funding and rapidly changing clinical practices, private philanthropy has become critical to our educational and research missions. The smiling faces of the fellowship recipients (opposite page) tell the story. In addition to these fellowships, we have several funds that support trainee and junior faculty research.

The Joseph Eggleston Fund in Surgical Pathology

The *Joseph Eggleston* Fund in Surgical Pathology honors one of the true giants in the field of surgical pathology. Dr. Eggleston was not only a leading authority on the pathology of lung cancer, but he also educated a generation of outstanding surgical pathologists. This year's grantee is *Lisa M. Rooper, M.D.* – *“Evaluation of INSM1 as a novel nuclear marker for neuroendocrine differentiation.”*

Gary S. Hill, M.D. Renal Pathology Research Award

The Gary S. Hill, M.D. Renal Pathology Fund was established by family and friends in memory of Gary S. Hill, and provides support to medical students, residents, fellows and junior faculty for their research in renal pathology. This year's recipient is *Angel (Yunjie) Li, M.D.* – *“Evaluation of our unique collection of oncocytic renal cell carcinomas in young patients for TFE3/TFEB gene fusions immunohistochemistry and FISH.”*

The Grover M. Hutchins, M.D. Memorial Fund

The family and friends of Grover Hutchins have joined together to establish The *Grover M. Hutchins, M.D.* Memorial Fund. Grover spent 56 years at Johns Hopkins and had a profound impact on our residency training program, and greatly advanced the understanding of cardiovascular and pediatric diseases. The most recent recipient was *David W. Nauen, M.D., Ph.D.* – *“to recognize his excellent work on the Autopsy service and his research in pediatric pathology, particularly the origins of epilepsy.”*

Catherine and Constantinos J. Limas Research Award

This is a donor-sponsored award supporting a faculty member. This year's recipient is *Aaron W. James, M.D., Ph.D.*, who is pursuing his study of *“Novel molecular mechanisms for engineering bone regeneration.”*

Risa B. Mann Residents Award

The family, colleagues, and friends of Risa B. Mann, M.D. joined together to create the Risa B. Mann Fund for Residents to honor the life and contributions of Risa to the Department. This fund provides support for resident research and education in the Department of Pathology. This year's recipient is *Jennifer Bynum, M.D.* – *“Design and implement an educational program for residents to improve resident teaching skills, based on previously studied methods of medical education, modern theories of teaching and learning, and novel, pathology-specific modules.”*

Nancy M. Nath Pathobiology Teaching Award

This award was established in 2016. It is selected by the students and given to a faculty member for outstanding teaching. This year's award recipient is *Angelo De Marzo, M.D., Ph.D.*

Quality Initiatives and Performance Improvement Research Award

The Quality Initiatives Award was established by the Department of Pathology and is given to the resident with the best quality improvement project for that academic year. Projects are judged by investigation of a baseline measure, application of an intervention, and measurement of results, as well as impact to the Department. This year's recipient is *Armen H. Khararjian, M.D.* – *“Prospective identification of Helicobacter pylori in routine gastric biopsies without reflex ancillary stains is cost-efficient for our healthcare system.”*

The Fred and Janet Sanfilippo Research Fund

The Fred and Janet Sanfilippo Research Fund honors the many contributions of our former director, *Fred Sanfilippo, M.D., Ph.D.*, to the Department of Pathology, as well as his many contributions to the field of organ transplantation pathology. The fund supports innovative research by our residents and fellows. This year's recipient is *Michael C. Haffner, M.D., Ph.D.* – *“Development of a novel platform technology for the detection of DNA methylation in situ.”*

The Mabel Smith Endowment for Resident Research and Education

The Mabel Smith Fund is used to support special courses, research projects, travel, and other needs of our residents. This year's grantee is *Margaret Cocks, M.D., Ph.D.* – *“Examination of PD-L1 expression in vulvar squamous cell carcinoma.”*

The Gerald S. Spear JHU-UCI Medical Student Pathology Fellowship

This program was established in 2005 to commemorate Dr. Spear's retirement. The Spear Fellowship provides a UC Irvine student with the opportunity to participate in a one-month elective in the Department of Pathology at Johns Hopkins. The goal is to inspire respect for, and possibly a career in pathology. *Alex Klebba* was this year's recipient.



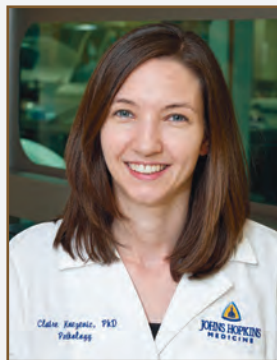
John K. Boitnott Fellow
Yaman Tarabishy



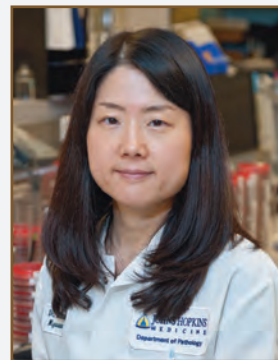
Michael J. Borowitz Fellow
Linda Okonkwo



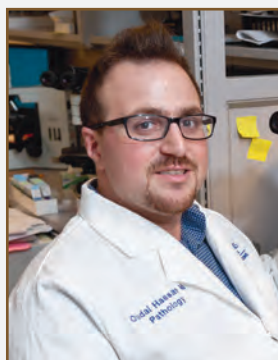
Peter C. Burger Fellow
Andrew Guajardo



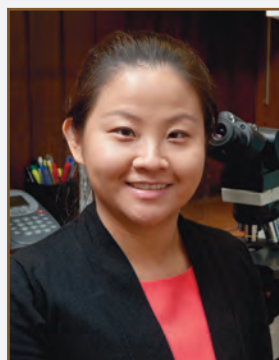
Daniel W. Chan Fellow
Claire Knezevic



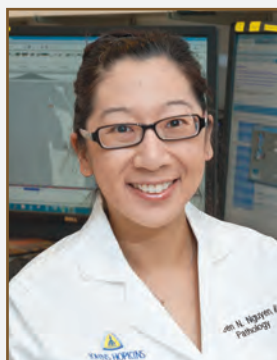
Patricia Charache Fellow
Masako Mizusawa



Jonathan I. Epstein Fellow
Oudai Hassan



Yener S. Erozan Fellow
Amy Zhou



Constance A. Griffin Fellow
Doreen Nguyen



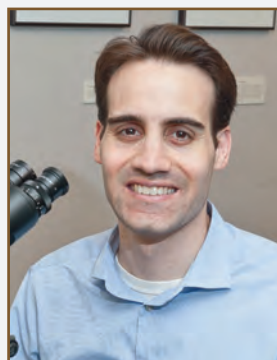
Paul M. Ness Fellow
Parvez Lokhandwala



Lorraine Parent Racusen Fellow
Marco Delsante



Dorothy L. Rosenthal Fellow
Mohammed Lilo



John H. Yardley Fellow
Kevin Waters

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 online, please visit our secure site at <http://pathology.jhu.edu/departments/giving.cfm>, or please 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



Shuying Sun, Ph.D., joined our faculty in the Division of Neuropathology in July 2016, coming from the Ludwig Institute for Cancer Research at the University of California at San Diego. Dr. Sun received her B.S. degree from Shandong University in China, and her Ph.D. from Stony Brook University, where she worked in the laboratory of Adrian Krainer at the Cold Spring Harbor Laboratory, and trained in basic molecular mechanisms of post-transcriptional RNA processing.

As a K99/R00 grant recipient and author of papers in PNAS, Nature Genetics, and Nature Communications, Dr. Sun's research here at Hopkins will focus on disease mechanisms of neurodegenerative disorders and advanced novel RNA-targeting therapy using her knowledge of RNA biology and technology. In particular, she will focus on a C9orf72 hexanucleotide repeat expansion seen in amyotrophic lateral sclerosis and frontotemporal dementia.

Elizabeth Thompson, M.D., Ph.D., was born and raised in Galveston, Texas, and graduated from the College of William and Mary with a B.S. in biology. She then earned her M.D. and Ph.D. degrees from the University of Virginia where her thesis work focused on CD8 T cell responses to melanoma and differences in the tumor immune microenvironment based on tumor location. Dr. Thompson completed her pathology residency at Hopkins and served as chief resident from 2014-2015. Her clinical interests focus on pancreatic pathology, and her research efforts will center on the immune microenvironment of pancreatic tumors and on the development of strategies for immunotherapy in pancreatic cancer. Dr. Thompson joined the Division of Surgical Pathology in July 2016.



Deyin Xing, M.D., Ph.D., joined our faculty as an assistant professor in the Division of Gynecologic Pathology in July 2016. Dr. Xing earned his medical degree in 1999 from Nankai University in Tianjin, China. Following medical school, he spent three years completing a doctoral degree in oncology at Peking Union Medical College in Beijing. In 2003, he joined the laboratory of Dr. Sandra Orsulic as a research fellow in the department of pathology at the Massachusetts General Hospital/Harvard Medical School. Dr. Xing's research focused on the development of genetically engineered mouse models of ovarian cancer and of leiomyosarcoma. These mouse models, designed to recapitulate the human disease, provided insight into the initiation, progression and targeted therapies of ovarian cancer and leiomyosarcomas. In 2007, Dr. Xing joined the laboratory of Nobel Prize laureate Dr. Phillip Sharp at the David H. Koch Institute for Integrative Cancer Research at Massachusetts Institute of Technology. As a postdoctoral associate, his translational research at MIT involved the delivery of siRNAs to silence genes in genetically defined murine ovarian tumor models.

Dr. Xing resumed his clinical career as an anatomic pathology resident in 2011 in the department of pathology at the University of Alabama at Birmingham. In 2014, he came to Hopkins and completed a gynecologic pathology fellowship. Dr. Xing's clinical and translational research will focus on novel diagnostic and prognostic markers of gynecologic neoplasms, pathway and molecule-based personalized medicine, and cancer epigenetics.

Clinical Associate

Swetha Paluru, M.D., completed her M.B.B.S. degree from the Government Medical College in Anantapur, India, followed by residency training from the University of Miami at Jackson Memorial Hospital in Miami, Florida. Dr. Paluru then came to Hopkins to pursue an advanced fellowship in Surgical Pathology and Genitourinary Pathology. Dr. Paluru joined the faculty at Howard County General Hospital in May 2016.



Drs. Alan Meeker, Christopher Heaphy and Elizabeth Platz are leading a project in the Hopkins NCI SPORE in prostate cancer to validate and refine their prognostic biomarker assaying telomere shortening. A related project, examining telomere length and the risk of prostate cancer in the Prostate Cancer Prevention Trial, revealed that stromal telomere shortening appears to be related to the presence of prostate cancer on needle biopsy. Dr. Heaphy's laboratory also focuses on tissue-based measurements of telomere lengths and variation in prostate cell populations and evaluates associations with outcomes. One aspect of his research aims to understand the mechanistic underpinnings of the association between telomere abnormalities and prostate cancer racial disparities. His lab has also initiated a study to generate the first ALT-positive prostate cancer cell line (using CRISPR cas9 gene editing) to investigate the potential therapeutic value of inhibiting selected pathways for treatment of ALT-positive cancers.

Dr. Lotan's laboratory continues to work on the role of PTEN and PI3K/mTOR signaling in epithelial development and tumorigenesis. Dr. Lotan currently leads a number of cross-institutional projects to examine the utility of PTEN as a prognostic and predictive biomarker, including collaborations with Memorial Sloan Kettering Cancer Center, with Stanford University, and with a group in Hamburg, Germany.

Dr. De Marzo is a co-PI of a multi-PI U01 involving a multidisciplinary team that is designed to profile indolent vs.

aggressive human prostate cancer and to become part of a network of sites that are profiling "screen detected" vs. "interval" cancers from multiple sites. Dr. De Marzo continues to serve as the PI of the SPORE Pathology Core as well as the Department of Defense (DOD) PCBN network site, and is co-PI for the DOD PCBN Coordinating Center. He also serves as the associate director for Pathology Cancer Research at Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins.

Dr. Sfanos' laboratory focuses on the role of infections and inflammation in prostate cancer development and progression. Her research has recently expanded to include studies on the role of the gastrointestinal and urinary microbiome in prostate disease. Dr. Sfanos has several ongoing grants from the V Foundation and the DOD PCRP, and she serves as a co-PI with Dr. De Marzo on a DOD-funded multi-institutional prostate cancer biorepository and biospecimen science effort, the Prostate Cancer Biorepository Network.

Non-neoplastic Kidney

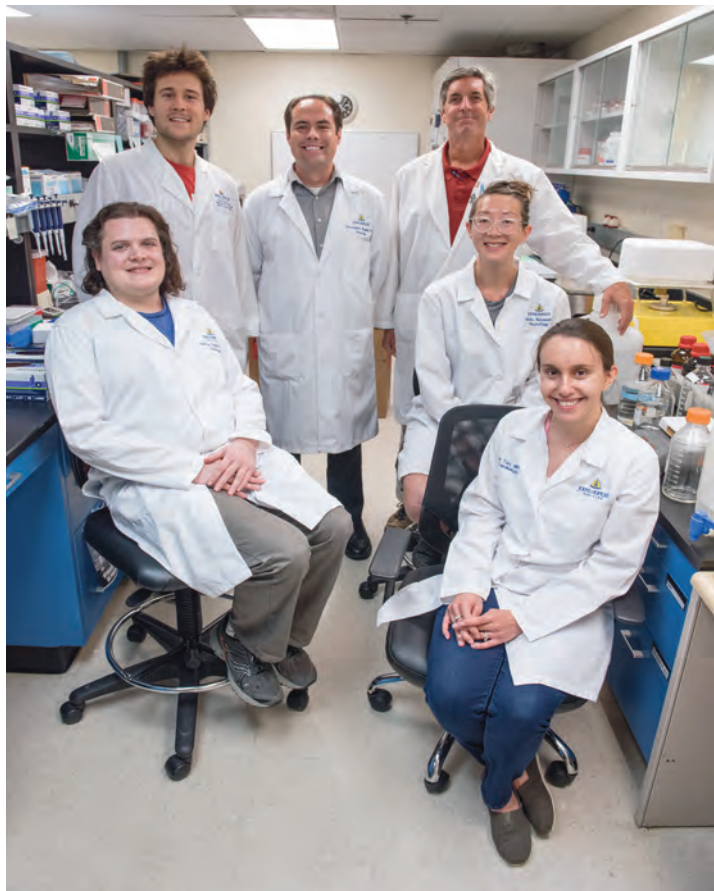
Faculty members of the Renal Pathology Section are actively involved in several clinical and basic research projects with Johns Hopkins and external collaborators and published more than 20 peer-reviewed articles in the last year.

Dr. Bagnasco's main research interest is renal transplant pathology. She will be the pathologist who reviews allograft biopsies for the HOPE HIV-to-HIV multicenter transplant study. She is also a reviewer of biopsies for patients enrolled in one of the centers for the multicenter CureGN NIH-funded study. She is co-chair of two Banff transplant working groups that focus on highly sensitized renal transplant recipients and recurrent disease respectively, and was co-investigator on a multicenter clinical trial sponsored by Alexion. She is also one of the pathologists in the NIH-funded NEPTUNE study pioneering the use of digital pathology for multicenter studies of renal glomerular diseases.

Dr. Arend's research includes studies in collaboration with several nephrologists on systemic sclerosis and ANCA-related small vessel vasculitis. She and Dr. Bagnasco are co-investigators on a multicenter grant to study HIV-related renal disease to develop panels of urine biomarkers that detect kidney injury at the earliest stages, and to identify and quantify tenofovir-associated kidney injury. Dr. Arend is also involved in renal transplant research in collaboration with Transplant Surgery and Nephrology.

New Faculty

We are pleased that two new outstanding pathologists will join the division this year (see page 10). Dr. Avi Rosenberg joined our faculty in October 2016 on the Nephropathology service. Dr. Andrés Matoso is scheduled to join the Division in January 2017 and he will focus on urological pathology.



Back Row: (L-R) Anthony Rizzo, Christopher Heaphy, Alan Meeker
Front Row: (L-R) Walter Barry, Mindy Graham, Jacqueline Brosnan-Cashman



Caitlin Alexander, M.D., was born and raised in Kansas City, Missouri. She attended the University of Missouri and majored in biology and theatre. Caitlin stayed at the University of Missouri for a master's in public health before attending Columbia University College of Physicians and Surgeons. While at Columbia, she received the Karl Perzin Excellence in Pathology Award and was actively involved in improving medical education in histology. Throughout medical school she also worked at the CHHMP clinic, a free student-run clinic targeting the homeless population in Harlem. Caitlin is pursuing AP/CP training.



Jacqueline (Jackie) Birkness, M.D., was born and raised in Lancaster County, Pennsylvania. She attended college at Johns Hopkins University, where she received a B.S. in molecular and cellular biology. During her time at Hopkins, she studied development of the retina in a mouse model. After graduating, she worked as a laboratory technician before beginning medical school. Jackie attended University of Pittsburgh School of Medicine, and was an active member of the Pathology Medical Student Interest Group throughout medical school. She also studied chromosomal instability in esophageal and gastric adenocarcinomas using fluorescent *in-situ* hybridization. In her senior year, she received the ASCP Award for Academic Excellence and Achievement in Pathology. Jackie is pursuing AP/CP training.



David Borzik, M.D., was born and raised in the Mississippi Delta. He received his degree in biochemistry at the University of Mississippi where he researched the kinetics of epithelial and neural cell adhesion molecules. He then received his medical degree from the University of Mississippi Medical Center. During this time David spent much of his focus advocating for Mississippi's underserved LGBT patient population, including founding the campus' first Gay Straight Alliance, expanding institutional nondiscrimination policies, establishing referral networks, advancing the medical school curriculum to include more robust training on sexuality and gender. David is pursuing AP/CP training.



Eugene Brooks, M.D., M.S., was born and raised in El Paso, Texas. He attended California State University - Fullerton where he pursued a B.S. in biochemistry. As an undergraduate, Eugene played for the men's Division I soccer team and worked in an after-school program for the community of Fullerton, California. The college named him male student athlete of the year and he earned a spot on ESPN The Magazine All-American Academic Soccer Team. Eugene headed to Marshall University in Huntington, West Virginia for graduate study. While at Marshall, he earned a M.S. in forensic science with emphasis in forensic biology, forensic chemistry, crime scene investigation and computer forensics. He returned to California to work as a criminalist in the forensic biology section of the Los Angeles County Sheriff's Crime Laboratory. It was during this time that he gained an interest in pathology and decided to return to Marshall University to pursue his M.D. There he engaged in research to study the use of ascorbic acid to reduce HIF-1 in human melanoma. He is pursuing AP/CP training.



Mark Hopkins, M.D., was raised in Mossyrock, Washington, a small community of about 500 in the Cascade foothills. He attended Washington State University where he received his B.S. in chemistry. While at WSU, he worked in the lab of Dr. Clifford Berkman and investigated experimental small molecule inhibitors of prostate cancer enzymes to be used as novel imaging and therapeutic agents. He went on to attend the University of Colorado School of Medicine where he was the president of the Pathology Student Interest Group. His academic interests include the role of both germline and acquired mutations on gynecologic malignancies, particularly ovarian cancers. Mark is pursuing AP/CP training.



Daniel Miller, M.D., Ph.D., was born and raised in St. Louis, Missouri. He played lacrosse as an undergraduate at Regis University in Denver, Colorado, where he studied ecology with the plan of teaching high school biology. He spent four years between college and medical school serving for AmeriCorps, followed by post-baccalaureate coursework and a position as a research technician in a basic science molecular biology laboratory where he developed a strong interest in biomedical research. He attended the University of Missouri School of Medicine and completed both a post-sophomore fellowship in pathology, as well as a Ph.D. His Ph.D. thesis was completed with the support of an individual NRSA (F31) grant from the NIH and addressed microRNA biology in HPV-associated tumors of the head and neck. Daniel is pursuing AP-only training.



Karin Miller, M.D., was born and raised in Columbus, Ohio. She attended Brown University where she received an A.B. in Middle Eastern studies. She also studied abroad in Salalah, Oman and Alexandria, Egypt. After graduation, Karin interned at Think Tank in Washington, D.C., where she focused on health policy research. Karin received her M.D. from The Ohio State University College of Medicine. During medical school, she participated in research in gynecologic surgical pathology, and helped build a tissue microarray of endometrial cancers. Karin is pursuing AP/CP training.



Robert (Robby) Moore, M.D., grew up in Cambridge, Massachusetts. He received his B.A. in biology and Latin from Tufts University. For three years after college, Robby worked in the Transplantation Research Center at Brigham and Women's Hospital, where he studied the utility of mesenchymal stem cells in type 1 diabetes. He received his M.D. from Tulane University School of Medicine. During medical school, he developed a history of medicine elective course, and participated in basic and translational research projects, studying biomarkers and novel treatments for thyroid cancer. Robby is pursuing AP/CP training.



Meaghan Morris, M.D., was born in Washington, D.C., and raised in Springfield, Virginia. She received her B.S. in chemistry from Boston College where she also competed in varsity fencing. She then attended the Johns Hopkins School of Medicine in the MSTP program. For her Ph.D. research, she traveled to San Francisco to study mouse models of dementia at the Gladstone Institute of Neurologic Disease in the lab of Dr. Lennart Mucke. In medical school she earned the William Welch Award in Pathology in 2015 and was elected to Alpha Omega Alpha. Meaghan is pursuing AP/NP training.



Amy Plotkin, M.D., Ph.D., was born in Nashville, Tennessee on the eve of her father's medical school anatomy final. Thus, a precedent was set for her interest in medicine and impeccable timing. She then moved every one to four years, as most Army children do. She attended Washington and Jefferson College in Washington, Pennsylvania and during this time was a member of the swim team. She majored in biochemistry and Spanish, both of which would serve useful during her M.D./Ph.D. years at the University of Miami. Her Ph.D. was in cancer biology and concerned the transcriptional regulation of estrogen receptor in response to hyperactive growth factor signaling in breast cancer. Amy is pursuing AP-only training.



Ankit Rajgariah, M.D., was born and raised in Houston, Texas. He attended Duke University where he received his B.S.E. in biomedical engineering. At Duke, he was a Pratt undergraduate research fellow, and studied targeted genome editing using zinc finger nucleases for applications in bone regeneration. Ankit earned his medical degree from Baylor College of Medicine. He was president of the Pathology Student Interest Group, and mentored students interested in the field and connected them to members of the department. During his time at Baylor, he studied Epstein-Barr virus-associated smooth muscle tumors in immunocompromised patients. Ankit is pursuing AP/CP training.



Nicholas (Nick) Rogers, M.D., was born in California but grew up in Overland Park, Kansas. He attended Harding University in Searcy, Arkansas where he graduated with a degree in political science, competed on the Quiz Bowl Team, and spent a semester in France. He received his M.D. from the University of Arkansas for Medical Sciences, where he was elected into Alpha Omega Alpha. He was also awarded the Schlumberger Award for performance in pathology and was an active member in the SCOPE pathology student group. Nick is pursuing AP/CP training.



Ye Eun Jeong is from Seoul, South Korea. She specialized in life sciences at Korea University, and received her Pharm.D. from Duksung Women's University in 2016. As an undergraduate research assistant, she participated in an animal study to research the vascularization degree in diabetic immunodeficient mice using co-injected human ECFCs and MPCs. Ye Eun is interested in cardiovascular diseases and translational research. She hopes to elucidate novel regulatory mechanisms which induce cardiac diseases and remodeling, and identify the potential therapeutic targets for cardioprotection. Ye Eun is our Margaret Lee student this year.



Monika Looney is originally from Silver Spring, Maryland. In 2016 she received her B.S. in biology, with a specialization in microbiology, and in psychology from the University of Maryland, College Park. While an undergraduate at the University of Maryland, she participated in research that focused on the genetic mechanisms responsible for regulating cell-to-cell variation within a tissue in the nematode *Caenorhabditis elegans*. Monika's interest in infectious disease grew while taking classes such as microbial pathogenesis and virology, and especially during a trip to Kenya, where she worked with the St. James Memorial Medical Clinic and the Don Amolo Memorial Kids Ark for children with HIV to find ways to improve the quality of care available to people with HIV. At Hopkins she is focusing her research on HIV or TB.



Emily Maggioncalda was born and raised in Southeast Michigan and attended the University of Michigan. In 2016 she received her B.S. in microbiology with a minor in statistics. During undergraduate school she completed an honors thesis on the development of an in vitro multispecies biofilm model system for cystic fibrosis lung infections. This project solidified her interest in human disease with a focus on therapeutics and preventative treatments.



Katherine (Katie) Marshall is from Frederick, Maryland. She received her B.S. in biochemistry from the University of Maryland, College Park in 2015. While in college, she worked in reagent manufacturing at Wellstat Diagnostics, a company that developed point-of-care diagnostic systems. She also participated in an undergraduate research project working to optimize crystallization conditions for mutant biotin ligase. In her final year of college and following graduation, she worked in the Neurotherapeutics Development Unit at NIH. There, she was involved in various projects including the development of screening assays to discover compounds that are neuroprotective or induce proliferation in neural stem cells. During this time, she became interested in the cellular and molecular mechanisms that contribute to neurological disorders.



Daniel Monaco is from Herndon, Virginia. In 2016 he received his B.S. in biomedical engineering from the University of Virginia. While at UVA, Daniel participated in multiple projects focused on early stage pancreatic cancer detection and Salmonella food contamination using viruses. Additionally, he spent two summers working at The MITRE Corporation designing novel methods to remove bacteria from hospital surfaces using glycoproteins and tagging pharmaceutical components with quantum dots.

The Second Annual Fred and Janet Sanfilippo Visiting Professor Lecture was presented by Dr. Ronald Weinstein, professor of pathology and former chair of pathology at the University of Arizona. He is best known for his work in telemedicine and telepathology (he is credited with coining the latter term) and has built perhaps the most comprehensive telemedicine program in the country. His talk for the Sanfilippo lecture, “Flexner 3.0—Democratization of Medical Knowledge for the 21st Century,” reflected work he began nearly forty years ago when he designed a pathology curriculum for K-12 education and implemented courses for both middle school and high school (Academic Pathology 3:1-15, 2016). In his presentation, he noted how fitting it was that he was asked to give this lecture at Johns Hopkins, given that “Flexner 1.0” highlighted Hopkins as a model for medical education.

His lecture can be viewed here: <https://swtrc.wistia.com/medias/9pmhcqdg3l>.



The Fourth Annual Pathology Educational Symposium

The Fourth Annual Pathology Educational Symposium was held on October 25-27, 2016, and attracted nearly 700 attendees, including faculty, staff and trainees from The Johns Hopkins Hospital, Johns Hopkins Bayview, Howard County General, Suburban and Sibley. A total of forty-one presentations were given on a wide range of topics. Several sessions were broadcast live to the Pathology Department at Johns Hopkins All Children’s Hospital, and a session from All Children’s was webcast to the Symposium. The keynote presentation was given by Dr. Ralph Hruban, “Three Women Who Helped Make Hopkins Great.” Thank you to all the presenters and volunteers for making the 2016 Symposium a successful educational event for Pathology!



BLAST FROM THE PAST



Who are they?
What are they doing?

Answer on page 23



Have you moved or are in the process of moving?
Have you changed your E-mail address?

If so, please email **Ellen Winslow** at ewinslo1@jhmi.edu, and let her know your new address and updated email address. We don’t want you to miss an issue of PathWays.

We respect your privacy by never sharing your name with other organizations. If you prefer not to receive mail from us, please send us a note or email telling us so and we will promptly remove you from our mailing list.

NEW GRANTS AND CONTRACTS AWARDED TO PATHOLOGY FACULTY - 10/6/15 - 10/6/16

Faculty Member	Award Type	Agency	Dates	Total Funding
Anders, Robert	Contract	Five Prime Therapeutics, Inc.	8/5/16 - 8/5/18	259,759
Burns, Kathleen	Contract	Juno Therapeutics	8/1/16 - 7/31/18	841,780
Carroll, Karen	Contract	Accelerate Diagnostic Inc.	9/10/15 - 9/9/20	128,717
Caturegli, Patrizio	R01 Grant	NIH/NCI	2/1/16 - 1/31/21	1,852,875
Caturegli, Patrizio	Contract	MYMD Pharmaceuticals	3/23/16 - 3/22/17	129,000
Chan, Daniel	U24 Grant	NIH/NCI	4/1/16 - 3/31/21	2,592,000
Chan, Daniel	U24 Grant	NIH/NCI	9/1/16 - 8/31/21	5,299,830
Clarke, William	Contract	Thermo Fisher Scientific	3/29/16 - 3/28/18	130,712
Clarke, William	Contract	Siemens Healthcare Diagnostics	9/1/16 - 9/30/16	15,744
De Marzo, Angelo	Contract	Janssen Research & Development LLC	12/23/15 - 12/22/17	3,606,877
Eberhart, Charles	Grant	Alex's Lemonade Stand Foundation	9/1/16 - 8/31/18	250,000
Eshleman, James	Contract	Blueprint Medicines Corporation	12/14/15 - 12/13/16	80,000
Eshleman, James	Grant	The Stringer Foundation	7/1/16 - 6/30/17	150,000
Fowler, Mary Glenn	Grant	Fogarty International Center	8/15/16 - 7/31/19	288,687
Goggins, Michael	U01 Grant	NIH/NCI	7/1/16 - 6/30/21	5,026,794
Hung, Chien-Fu	Contract	Hookipa Biotech	3/21/16 - 9/30/16	223,600
Hung, Chien-Fu	Contract	PapiVax	7/11/16 - 7/10/18	136,000
Kickler, Thomas	Contract	Bayer AG Corporation	10/27/15 - 10/26/16	5,850
Lai, Shenghan	U01 Grant	NIDA	6/1/16 - 5/31/17	1,371,707
Larman, Ben	R21 Grant	NIH/NCI	7/1/16 - 6/30/19	648,000
Larman, Ben	Grant	Prostate Cancer Foundation	7/1/16 - 6/30/19	225,000
Lotan, Tamara	R01 Grant	NIH/NCI	2/1/16 - 1/31/21	1,847,202
Lotan, Tamara	Contract	Ventana Medical Systems	12/17/15 - 1/31/16	3,440
Machairaki, Vasiliki	Contract	Sanofi	1/1/16 - 12/31/16	100,000
Ness, Paul	Contract	Grifols Therapeutics	3/1/16 - 9/1/17	30,500
Ness, Paul	Grant	AABB	1/1/16 - 12/31/17	272,777
Olson, Matthew	Contract	Mikroscan Technologies	8/1/16 - 11/30/16	55,914
Richardson, Andrea	Grant	Breast Cancer Research Foundation	10/1/15 - 9/30/16	275,092
Richardson, Andrea	Grant	Breast Cancer Research Foundation	10/1/16 - 9/30/17	250,000
Sadegh-Nasseri, Scheherazade	R01 Grant	NIH/NIAID	4/1/16 - 3/31/20	1,620,000
Simner, Trish	Contract	Cellex Inc.	12/1/15 - 12/31/16	50,000
Simner, Trish	Contract	Biomerieux Inc.	4/1/16 - 11/30/16	86,256
Steenbergen, Charles	R01 Grant	NIH/NHLBI	12/1/15 - 11/30/19	1,620,000
Sun, Shuying	Grant	Target ALS	7/1/16 - 10/31/16	16,558
Sun, Shuying	R00 Grant	NIH/NINDS	9/1/16 - 7/31/19	733,868
Tobian, Aaron	R01 Grant	NIH/NIAID	12/1/15 - 11/30/20	3,888,895
VandenBussche, Chris	Contract	Sienna Cancer Diagnostics	6/1/16 - 11/30/17	164,598
Wong, Philip	Grant	Amyotrophic Lateral Sclerosis Association	8/1/15 - 7/31/17	160,000
Wong, Philip	R01 Grant	NIH/NINDS	2/1/16 - 11/30/20	1,822,500
Wood, Laura	Grant	AACR	7/1/16 - 6/30/18	150,000
Wood, Laura	K08 Grant	NIH/NIDDK	7/1/16 - 6/30/21	787,740
Zhang, Hui	U01 Grant	NIH/NCI	4/1/16 - 3/31/21	2,744,090
Zhang, Hui	R21 Grant	NIH/NIAID	12/1/15 - 11/30/16	445,500
Zhang, Sean	Contract	Niche Diagnostics	3/1/16 - 11/30/16	30,807
Zhang, Zhen	U01 Grant	NIH/NCI	4/1/16 - 3/31/21	2,229,308

Total 42,647,977



**Johns Hopkins Pathology
Atlases for the iPad**

The Johns Hopkins Pathology Atlases are iPad apps designed to teach residents, fellows, and practicing pathologists the intricacies of diagnostic pathology. These Apps cover a wide range of entities from benign to malignant and common to rare. The apps are composed of different modules, some of which include:

- Interactive Teaching Algorithms
- Side-by-Side Comparisons of Key Diagnostic Features
- Flashcards and Quizzes with Immediate Feedback
- Searchable Atlases with Hundreds of the Highest Quality Images Found in Any Educational Resource!

Teaching Algorithm: The teaching algorithm is a tool to aid in the diagnosis and grading of cancer. The algorithms consist of a series of usually dichotomous decision points focusing on current diagnostic concepts.

Image Atlas: The image atlas contains hundreds of high-resolution color images, both histologic and radiographic, with captions authored by leading experts. The images can be viewed by diagnosis or by features (these features reinforce the diagnostic features used in the algorithm), and the atlas can be searched using a keyword search.

Quiz: The interactive quiz contains multiple-choice questions with answers and teaching points for self-study.

Flashcards: The flashcard module allows you to view a randomly generated assortment of images from the image bank and subsequently view the diagnosis and caption by simply “flipping” the card over.

The Johns Hopkins Pathology Atlases Currently available in the Apple App Store!

The Johns Hopkins Atlas of Pancreatic Pathology
The Johns Hopkins Atlas of Pancreatic Cytopathology

New Atlases Available – Winter 2016

The Johns Hopkins Atlas of Neuropathology
The Johns Hopkins Atlas of Prostate Pathology

More Coming in – 2017

The Johns Hopkins Atlas of Ophthalmic Pathology
The Johns Hopkins Atlas of Thyroid Pathology
The Johns Hopkins Atlas of Ovarian Pathology
The Johns Hopkins Atlas of Renal Transplant Pathology
The Johns Hopkins Atlas of Dermatopathology

THE MOLECULAR DIAGNOSTICS LABORATORY RELOCATED

The Molecular Diagnostics Laboratory relocated in September 2016 from its previous home in the Park Building to a newly constructed, state-of-the-art facility located at 1812 Ashland Avenue in the Science + Technology Park at Johns Hopkins. At this location, the Molecular Diagnostics Lab joins both the DNA Diagnostic Lab and the Center for Inherited Disease Research in an exciting, collaborative environment under the new institution of Johns Hopkins Genomics, a joint effort of the McKusick-Nathans Institute of Genetic Medicine and the Department of Pathology. The lab will continue to provide clinical molecular testing for hematologic malignancies and solid tumors to Johns Hopkins Hospital and its affiliates as well as outside referring institutions. As a member of Johns Hopkins Genomics, the lab expects to take advantage of shared resources and expertise to enhance validation of cutting-edge clinical assays. To contact the lab with any questions, please email molecularpathresults@jhmi.edu or call 410-955-8363.





Norm Barker, M.A., M.S., R.B.P., received the Charles Foster Memorial Award for excellence in photomicrography for the second year in a row at the 81st annual meeting of the BioCommunications Association. He also won two awards of excellence and two citations of merit for his scientific photographs from the International BioImages 2016 Salon.

Barbara Crain, M.D., Emeritus Associate Professor of Pathology, was one of two recipients of the American Association of Neuropathologists Award for Meritorious Services to Neuropathology at the annual AANP meeting in June 2016. This award recognizes members who have made significant contributions to the advancement of knowledge in neuropathology and provided service to the AANP.



Karen Carroll, M.D., was elected chairperson of Division C of the American Society for Microbiology.

Marc K. Halushka, M.D., Ph.D., received the Barry Wood Award for Excellence in Teaching from the Johns Hopkins University School of Medicine Class of 2017. This award is given annually to two faculty members in the pre-clinical curriculum who were thought to be the most inspirational and/or effective teachers by students.



Allison Hanford, a Ph.D. candidate in the Pathobiology Program, received the Golden Microscope Award for the best talk by a senior student at the annual Pathobiology Graduate Program retreat in September 2016.

Ralph Hruban, M.D., gave The William O. Russell Lectureship and received the Joanne Vandenberg Hill Award for outstanding achievement in pathology from the University of Texas MD Anderson Cancer Center in January 2016. He also was the 39th recipient of the Fred W. Steward Award for outstanding contributions to the understanding of human neoplastic diseases from Memorial Sloan Kettering Cancer Center at their annual alumni meeting in October 2016.



Andrew Layman, a fourth-year Johns Hopkins medical student, was awarded an ASCP Academic Excellence and Achievement in Pathology Award for medical students who have shown leadership qualities and dedication to the field of pathology. Andrew also won the William H. Welch Award for Outstanding Performance in Pathology by a Johns Hopkins Medical Student.

Mohammed Lilo, M.D., received a Foundation Resident and Fellow Travel Scholarship for the 2016 Annual Scientific Meeting in New Orleans. The scholarship is awarded based on achievements during training that demonstrate initiative, leadership, commitment, and a keen interest and love for cytopathology.



Alexandra Valsamakis, M.D., Ph.D., was elected president of the Pan American Society for Clinical Virology. She will serve as president through 2016, and then serve as past president for a five-year cycle of service. PASCV aims are to foster the development of new techniques for rapid viral diagnosis, improve quality control for reagents, sponsor training programs, scientific meetings and symposia, disseminate relevant information, coordinate activities with other organizations, and encourage collaborative research. In recent years the PASCV has expanded its role to encompass all areas of clinical virology: viral pathogenesis, manifestations of disease, laboratory diagnosis, prevention, and therapy.

T.-C. Wu, M.D., M.P.H., Ph.D., was elected as an Academician of the Academia Sinica at its biennial convocation in July 2016. This award is considered the highest honor in academia in Taiwan, Republic of China. Dr. Wu was one of twenty new and two honorary academicians elected.



Over the past year, the Pathology web team—Aidel Weisberg, RJ Malacas, and Rod Julius—began a number of exciting new initiatives. Did you notice the new “Find Faculty & Staff” search box on the Pathology homepage? It searches the Hopkins central directory to provide contact information for faculty or staff members within the Department. PathPhoto relaunched their website this year, designed in collaboration with PathPhoto’s graphic artists. New research lab websites (The Larman Laboratory, The Cihakova Laboratory, The Halushka Laboratory, The Wood Laboratory) are being built on a WordPress platform, allowing faculty members to easily edit their own content. This year, our web team established collaborations with other teams across the University to exchange ideas and evaluate technologies. We also observed users navigate our site during usability testing sessions, where we checked that site navigation is working as intended and that users can find what they’re looking for. And have you seen the new Pathology homepage, designed so that you can find things more easily?

In addition to our new projects, we made headway on other projects as well. We migrated numerous Access databases to a new version of SQLServer and continued moving all Pathology sites under the Pathology header and footer to improve visitor orientation. Additionally, many disease-specific websites were updated and redesigned, and we responded to site usability feedback from the engaged user community on the Surgical Pathology Case Conference site by making improvements to the new site.

We’d like to thank the Web Steering Committee for their insights and direction as we continue to improve our web presence. We welcome feedback on our recent web efforts, as well as suggestions of ideas that you’d like to see on the website. Contact the web team at pathwebteam@jhmi.edu.



Congratulations to graphic artist Sharon Blackburn on her recent retirement. Sharon started in Pathology Photography in July 1987. She and her husband, Richard, have recently purchased a new RV and plan to take the U.S. by storm. Good luck and send some postcards.

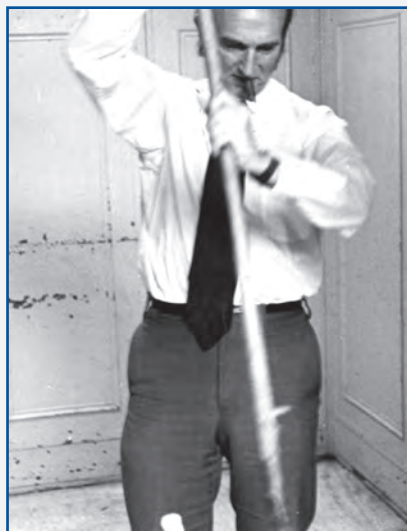
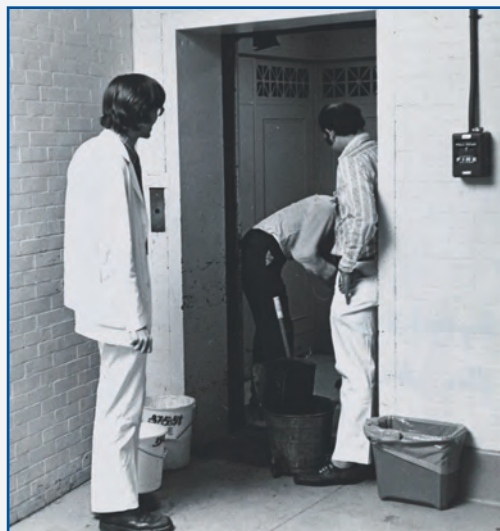
Pathology Photography is pleased to announce our new website is up and running. Working closely with the Pathology web team, we were able to get our vision on the web. To see the new website, go to <http://photography.jhu.edu>

Pathology Photography has seen a large increase in posters being printed on fabric.

Why Pathology Photography for fabric poster printing?

1. **Economical** - Path Photo does not charge a higher price for fabric posters. Most other printing facilities charge more for fabric.
2. **Convenience** - We are on a 1 day turnaround for our poster printing, including fabric posters. Most other printing facilities are on 3-5 day services.
3. **Attentive** - We pride ourselves on our attention to detail. We notify our clients if we find spelling errors, mismatched color, and/or image resolution issues.

BLAST FROM THE PAST (from page 14)



We believe these photographs were taken in 1976. There was a strike at The Johns Hopkins Hospital by the 1199E Union that affected nutrition services, patient transportation, housekeeping, etc., and in an effort to maintain the Department, faculty and residents were asked to pitch in. In the first photograph Robert Heptinstall (“Heppy”), then Baxley Professor and Director of Pathology, is pictured with pathology residents Stan Hamilton and David Keren, illustrating that faculty were better at mopping than housestaff. The second photo is a closer view of Heppy, cigar in mouth, rinsing a mop.

CALENDAR OF EVENTS

March 5, 2017

United States and Canadian Academy
of Pathology
106th Annual Meeting Fellowship Fair
Henry B. Gonzalez Convention Center,
Room 221
San Antonio, Texas

March 6, 2017, 5:30 – 7:30 p.m.

United States and Canadian Academy
of Pathology
Johns Hopkins Pathology
Alumni Reception
San Antonio, Texas

March 23, 2017, Noon – 4:00 p.m.

2017 Pathology Young Investigators' Day
Lecture: Tilghman Auditorium
Poster Presentation: Turner Concourse
Johns Hopkins University School of Medicine
Baltimore, Maryland

April 27, 2017 – 5:30 p.m.

Pathology Awards Presentation
Chevy Chase Auditorium and Arcade Room
The Johns Hopkins Hospital
Baltimore, Maryland

May 5, 2017 – 7:00 p.m.

Pathology Awards Dinner
Baltimore Marriott Waterfront Hotel
Baltimore, Maryland

Department of Pathology

The Johns Hopkins University

School of Medicine

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<http://pathology.jhu.edu>

2016 PATHOLOGY YOUNG INVESTIGATORS' DAY AWARDEES

Congratulations to the Top Award Recipients

Basic: Nelson Song, B.S. and Jonathan Ling, B.S.

Clinical: Lisa Rooper, M.D.

Translational: Michael Haffner, M.D., Ph.D.

For Excellence in Basic Research For Excellence in Clinical Research

Nianbin (Nelson) Song, B.S.

Jonathan Ling, B.S.

Mindy Kim Graham, Ph.D.

Tatsuo Hata, M.D.

Rosie Jiang, B.S.

Byunghak Kang, D.V.M.

Chih-Ping Mao, B.S.

Yoshihisa Matsushita, Ph.D.

Youngran Park, B.S.

Corey M. Porter, B.S.

Bo-Yi Sung, M.D.

Robin A. Welsh, M.S.

Lisa Rooper, M.D.

Allison B. Chambliss, M.D.

Genevieve M. Crane, M.D., Ph.D.

Thomas J. Gniadek, M.D., Ph.D.

Armen Khararjian, M.D., M.B.A.

Emily R. Nelson, M.D.

Elizabeth Thompson, M.D., Ph.D.

Kevin M. Waters, M.D., Ph.D.

For Excellence in Translational Research

Michael Haffner, M.D., Ph.D.

Javier A. Baena-Del Valle, M.D.

Jacqueline A. Brosnan-Cashman, Ph.D.

Marija Debeljak, B.S.

Nicola Diny, M.S.

Allison R. Hanaford, B.S.

Heidi A. Hempel, B.S.

Harpreet Kaur, Ph.D.

Brad A. Poore, B.S.

Samantha L. Semenkow, B.Sc.

Shisheng Sun, Ph.D.

Change of address? Email ewinslo1@jhmi.edu