

**DEPARTMENT OF PATHOLOGY AND LABORATORY MEDICINE
2015-2016 ANNUAL REPORT**

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**DEPARTMENT OF PATHOLOGY AND LABORATORY MEDICINE
FACULTY AND TRAINEE ROSTER
2015-2016**

Chair

J. Charles Jennette, M.D., Brinkhous Distinguished Professor and Chair

Vice Chair

Joan M. Taylor, Ph.D., Professor, Vice Chair for Research, Associate Director of the McAllister Heart Institute

Herbert C. Whinna, M.D., Ph.D., Associate Professor, Vice Chair for Clinical Services, Director of McLendon Laboratories and Coagulation Laboratories

Monte S. Willis, M.D., Ph.D., MBA, Associate Professor, Vice Chair for Academic Affairs

Associate Chair for Administration

Susan P. Evers, M.P.H.

Distinguished Professors

Dwight A. Bellinger, D.V.M., Ph.D. (Fred C. and Lelia B. Owen Distinguished Professor) (Retired April 2016)

Joe W. Grisham, M.D. (Kenan Distinguished Professor, Emeritus)

Nobuyo N. Maeda, Ph.D. (Robert H. Wagner Distinguished Professor)

Marjorie S. Read, Ph.D. (Fred C. & Lelia B. Owen Professor, Emeritus)

Oliver Smithies, D.Phil. (Kay M. & Van L. Weatherspoon Eminent Distinguished Professor)

Richard R. Tidwell, Ph.D. (Kenan Distinguished Professor)

Professors

C. Robert Bagnell, Jr., Ph.D. (Retired December 2015)

Thomas W. Bouldin, M.D.

Frank C. Church, Ph.D.

William B. Coleman, Ph.D.

Leslie G. Dodd, M.D.

Rosann A. Farber, Ph.D.

William K. Funkhouser, M.D., Ph.D.

Peter H. Gilligan, Ph.D.

Virginia L. Godfrey, D.V.M., Ph.D.

Pamela A. Groben, M.D. (Retired May 2016)

Margaret L. Gulley, M.D.

Catherine A. Hammett-Stabler, Ph.D. (Retired June 2016)

Kathleen A. Kaiser-Rogers, Ph.D.

David G. Kaufman, M.D., Ph.D.

William K. Kaufmann, Ph.D.

Hyung-Suk Kim, Ph.D.

Thomas J. Lawton, M.D.

Susan J. Maygarden, M.D.

Melissa B. Miller, Ph.D.

Volker R. Nickeleit, M.D., Ph.D.
Judith N. Nielsen, D.V.M.
Howard M. Reisner, Ph.D.
John L. Schmitz, Ph.D.
Harsharan K. Singh, M.D.
Scott V. Smith, M.D.
Michael D. Topal, Ph.D. (Retired April 2016) (Returned as temporary faculty May 2016)
Cyrus Vaziri, Ph.D.
Karen E. Weck, M.D.
Bernard E. Weissman, Ph.D.
John T. Woolsley, M.D., Ph.D.

Associate Professors

Jessica K. Booker, Ph.D.
Brian C. Cooley, Ph.D.
Georgette A. Dent, M.D.
David A. Eberhard, M.D., Ph.D. (Separated February 2016)
George Fedoriw, M.D.
Craig A. Fletcher, D.V.M., Ph.D.
Susan C. Hadler, M.D., M.S.
Tracy M. Heenan, D.V.M.
Jonathon W. Homeister, M.D., Ph.D.
Peiqi Hu, M.D.
Masao Kakoki, M.D., Ph.D.
Daniel Kenan, M.D., Ph.D.
Mehmet Kesimer, Ph.D.
Ruth A. Lininger, M.D.
Christopher P. Mack, Ph.D.
C. Ryan Miller, M.D., Ph.D.
Yara A. Park, M.D. (Promoted October 2015)
Eizaburo Sasatomi, M.D., Ph.D.
Steven Shipley, D.V.M. (Joined September 2015)
Leigh B. Thorne, M.D., M.H.S.
Dimitri G. Trembath, M.D., Ph.D.
Julia W. Whitaker, D.V.M.
David C. Williams, Jr., M.D., Ph.D.
Alisa S. Wolberg, Ph.D.
Hong Xiao, M.D.
Maimoona B. Zariwala, Ph.D.

Assistant Professors

Silvio Antoniak, Ph.D. (Joined August 2015)
Pablo Ariel, Ph.D. (Joined January 2016)
J. Todd Auman, Ph.D.
Claudia M. Brady, M.H.S.
Zhaokong Cheng, Ph.D. (Joined July 2015) (Separated June 2016)

Kevin E. Greene, M.D.
Johann D. Hertel, M.D.
Brian Klazynski, M.D. (Separated August 2015)
Nichole L. Korpi-Steiner, Ph.D.
Feng Li, Ph.D.
Jiandong Liu, Ph.D.
Stephanie P. Mathews, M.D.
Marshall A. Mazepa, M.D.
Stephanie Montgomery, D.V.M., Ph.D.
Vincent J. Moylan, Jr., M.S.
Siobhan M. O'Connor, M.D.
Nirali M. Patel, M.D.
Li Qian, Ph.D.
Jay S. Raval, M.D.
Marian A. Rollins-Raval, M.D., M.P.H.
Lori R. Scanga, M.D., Ph.D.
Eric Weimer, Ph.D.
Scott Williams, Ph.D.
Yang Yang, Ph.D. (Joined October 2014)
Qing Zhang, Ph.D.

Lecturer

Gayle C. McGhee

Instructor

Steven C. Holmes, B.S., M.H.S.
April E. Kemper, M.S., M.H.S.
Tracie L. Massey, P.A.
Andre Phelan, P.A. (Joined August 2015)

Clinical Faculty (Medical Examiners)

Michelle Aurelius, M.D.
Sandra C. Bishop-Freeman, Ph.D.
Justin O. Brower, Ph.D.
Nabila Haikal, M.D.
Craig Nelson, M.D.
Deborah L. Radisch, M.D.
Lauren Scott, M.D.
Susan E. Venuti, M.D.
Ruth E. Winecker, Ph.D.

Locum Tenens Faculty

Sue Ann Berend, Ph.D. (Joined 2016)

Faculty Emeritus

C. Robert Bagnell, Jr., Ph.D.

Stuart A. Bentley, M.D.
John D. Butts, M.D.
John F. Chapman, Dr.P.H.
Myra L. Collins, M.D., Ph.D.
Marila Cordeiro-Stone, Ph.D.
Robert E. Cross, Ph.D.
Frederic G. Dalldorf, M.D.
Cora-Jean S. Edgell, Ph.D.
James D. Folds, Ph.D.
Donald T. Forman, Ph.D.
Joe W. Grisham, M.D.
J. Ed Hall, Ph.D.
John E. Hammond, Ph.D.
Susan T. Lord, Ph.D.
Nadia N. Malouf, M.D.
William W. McLendon, M.D.
Nancy H. Nye
James R. Pick, D.V.M.
Marjorie S. Read, Ph.D.
Kinuko I. Suzuki, M.D.

Jointly Appointed Faculty

Diane Armao, M.D. (Radiology)
Gregory Bianchi, M.D. (Urology)
Claire M. Doerschuk, M.D. (Medicine)
Ronald J. Falk, M.D. (Medicine)
Ajay Gulati, M.D. (Pediatrics)
Nigel S. Key, M.D., Ch.B. (Medicine)
Nigel Mackman, Ph.D. (Medicine)
Valerie A. Murrah, D.M.D., M.S. (Dentistry)
Timothy C. Nichols, M.D. (Medicine)
Charles M. Perou, Ph.D. (Genetics)
Kathleen W. Rao, Ph.D. (Pediatrics) (Deceased March 2016)
Jonathan Schisler, Ph.D. (Pharmacology) (Joined June 2016)
Darrel W. Stafford, Ph.D. (Biology)
James A. Swenberg, D.V.M., Ph.D. (Environmental Sciences and Engineering)
Melissa Troester, Ph.D., M.P.H. (Epidemiology)
Young E. Whang, M.D., Ph.D. (Medicine)
Elizabeth Wilson, Ph.D. (Pediatrics) (Separated December 2015)

Adjunct Faculty

Araba N. Afenyi-Annan, M.D., M.P.H.
Peter M. Banks, M.D. (Ventana-Roche Corporation)
Jared G. Block, M.D.
Gary A. Boorman, D.V.M., Ph.D. (NIEHS)
Mark E. Brecher, M.D. (Laboratory Corporation of America)

Robert C. Brown, M.D. (Emeritus)
Shu Huey Chaing, Ph.D. (State Dept of Health and Human Services) (Separated June 2016)
Paul Chastain, Ph.D.
Bal Dhungel (December 2015)
Jason Doherty (Kenan Institute of Private Enterprise) (September 2015)
Cherie H. Dunphy, M.D. (Laboratory Corporation of America) (Separated March 2016)
David Eberhard (February 2016)
Jeffrey Everitt, D.V.M. (GlaxoSmithKline)
Thomas H. Fischer, Ph.D.
Kim R. Geisinger, M.D. (Piedmont Pathology Group)
M. David Goodman, M.D.
Oleg Gorkun, Ph.D. (Separated April 2016)
Delores J. Grant, Ph.D. (North Carolina Central University)
Christopher W. Gregory, Ph.D. (Voyager Pharmaceutical) (Separated April 2016)
Susan Hester, Ph.D. (EPA National Health Environmental Effects Research Laboratory)
(September 2015)
W. Carl Jacobs (February 2016)
Harvey Michael Jones, M.D. (July 2015)
John P. Hunt, M.D. (Baystate Medical Center)
Wendell D. Jones, Ph.D. (Expression Analysis/Quintiles)
Michael Kamionek, M.D. (Carolinas Pathology Group) October 2015
Scott Kilpatrick, M.D. (Forsyth Medical Center) (Separated May 2016)
Joe N. Kornegay, D.V.M., Ph.D. (Texas A&M University)
Myla Lai-Goldman, M.D. (Laboratory Corporation of America, Retired)
Thomas G. Lightfoot, M.D. (American Red Cross Blood Services)
Chad A. Livasy, M.D. (Carolinas Pathology Group)
Roger L. Lundblad, Ph.D.
Amil E. Mandal, M.D. (Medical Specialists of St. Augustine)
George Nichols (Caldwell Memorial Hospital and McCrory Cancer Center (August 2015)
(Separated May 2016)
Keith V. Nance, M.D. (Rex Hospital)
Ann Oaks, M.D. (Highpoint Regional Health System) (May 2016)
Thomas M. O'Connell, Ph.D. (LipoScience)
William R. Oliver, M.D. (East Carolina University)
Richard S. Paules, Ph.D. (NIEHS)
Sharon Presnell, Ph.D. (Organovo Inc.) (January 2016)
Xinchun Pi, Ph.D. (Baylor University)
Ashley G. Rivenbark, Ph.D. (UNC Lineberger Comprehensive Cancer Center, UNC Center for
Women's Health, Oxford Science Editing, American Society for Investigative Pathology)
Tara C. Rubinas, M.D. (Laboratory Corporation of America)
W. Eugene Sanders, M.D., MBA (FDA/CDRH)
Gary J. Smith, Ph.D. (Roswell Park Cancer Institute)
Nobuyuki Takahashi, M.D., Ph.D. (Tohoku University, Sendai, Japan)
Paul A. Wade, Ph.D. (NIEHS) (Separated June 2016)
Ruth F. Walters, M.D. (Laboratory Corporation of America)
Carol J. Weida, M.D.

Clinical Fellows

Lauren M. Allen, M.D. (Surgical Pathology)
Alexandra Arreola, Ph.D. (Cytogenetics)
Daniel L. Duncan, M.D. (Hematopathology)
Naomi Lynn Ferguson, M.D. (Molecular Genetic Pathology)
Francois Gougeon, M.D. (Nephropathology)
Ronald R. Henriquez, Ph.D. (Clinical Chemistry)
Kimberly E. Janssen, M.D. (Forensic Pathology)
Ian G.F. King, Ph.D. (Clinical Molecular Genetics)
Alexei Mikhailov, M.D. (Nephropathology)
Nathan D. Montgomery, M.D., Ph.D. (Hematopathology)
Avani A. Pendse, M.D., Ph.D. (Cytopathology)
Rongpong Plonga, M.D., Ph.D. (Clinical Microbiology)
Brooke S. Rambally, M.D. (Cytopathology)
Spencer L. Rusin, M.D. (Surgical Pathology)
Alan M. Sanfilippo, Ph.D. (Clinical Immunology)

Visiting Scholar

Diego Rubio, M.D. (Breast Pathology)

Co-Chief Residents

Christine E. Bookhout, M.D. (PGY IV)
Lindsey E. Matthews, M.D., M.P.H. (PGY IV)
Alexis R. Peedin, M.D. (PGY IV)
Bart B. Singer, M.D. (PGY IV)

Residents

Renee L. Betancourt, M.D. (PGY I)
Cori A. Breslauer, M.D. (PGY I)
Claire H. Edgerly, M.D. (PGY III)
Adil H. Gasim, M.D. (PGY II)
Jonathan M. Hollyfield, M.D. (PGY III)
Julie A. Hull, M.D. (PGY III)
Stephen M. Johnson, M.D. (PGY I)
Sixto M. Leal, M.D., Ph.D. (PGY II)
Tian W. Li, M.D. (PGY II)
Irina Perjar, M.D. (PGY II)
Cara D. Randall, M.D. (PGY I)
Hugh T. Stoddard, M.D. (PGY III)
Jessica P. Vanleer, M.D. (PGY II)

Research Associates

Donald A. Patrick, Ph.D. (Dr. Richard Tidwell)

Postdoctoral Research Fellows

Xue Bai, Ph.D. – Dr. Joan Taylor
Stephanie Bilinovich, Ph.D. – Dr. David Williams
Milton Carpenter, Ph.D. – Dr. Mehmet Kesimer
Yanzhe Gao, Ph.D. – Dr. Cyrus Vaziri
Richa Gupta, Ph.D. – Dr. Mehmet Kesimer
Marlon Lawrence, Ph.D. – Dr. Oliver Smithies
Yuanli Li, Ph.D. – Dr. Mehmet Kesimer (Separated October 2015)
Georgia Radicioni, Ph.D. – Dr. Mehmet Kesimer
Boris Reinhardt-Reidel, Ph.D. – Dr. Mehmet Kesimer
Wei Tang, Ph.D. – Dr. Monte Willis
Patrick Weiser, Ph.D. – Dr. Richard Tidwell (Separated November 2015)

Graduate Students

Sabri Abdelwahab – Dr. Mehmet Kesimer
James Byrnes – Dr. Alisa Wolberg
Rachel Dee – Dr. Joan Taylor
Nicole Fleming – Dr. Jiandong Liu
Ashley Fuller – Dr. Melissa Troester
Michael Henderson – Dr. Nigel Key
Sravya Kattula – Dr. Alisa Wolberg
Kevin D. Mangum – Dr. Christopher Mack
Bethany D. McInturff – Dr. Mehmet Kesimer
Robert McNeill – Dr. Ryan Miller
Zachary Opheim – Dr. Joan Taylor
Krystal Orlanda – Dr. Bernard Weissman
Katherine G. Stember – Dr. Ronald Falk
Haley R. Vaseghi – Dr. Li Qian
Qiang Zhu – Dr. Joan Taylor

RESEARCH AND SCHOLARLY ACCOMPLISHMENTS

Over the past year an excellent record of achievement in research has resulted in publications of original papers and book chapters (abstracts not included). Excellence in research and training has attracted outstanding faculty, residents, postdoctoral fellows, and graduate students, has advanced the understanding of disease, and has enhanced the reputation of the department and institution.

SILVIO ANTONIAK, Ph.D.

Currently, Dr. Antoniak is working in collaboration with Dr. Nigel Mackman (UNC) on the role of TF for lung hemostasis during influenza A infection. Dr. Antoniak found that reduced TF expression as well as anticoagulation was associated with increased pulmonary bleeding and mortality in mice during influenza A infection. In addition, they are working on the role of the coagulation-dependent signaling in virus infections. They observed that deficiency of the thrombin receptor (proteinase-activated receptor 1, PAR-1) resulted in reduced innate immune responses to an artificial toll-like receptor 3 (TLR3) stimulation in mice in vivo. Furthermore, they found that lack of PAR-1 and PAR-1 activation reduces specifically the expression of CXCL1/IL-8 after TLR3 or TLR4 stimulation as well as influenza A infection. How PAR-1 modulates this expression is unclear and is currently investigated. In a recent publication they showed that PAR-1 enhances interferon responses after virus infection which limited virus replication. Newer data suggest that PAR-1 can directly reduce virus replication/load by an interferon-independent mechanism. PAR-1 stimulation can reduce virus uptake and further improves survival of cells after infection without altering the anti-viral interferon responses. Data showed that PAR-1 block autophagic processes in certain cell types which limit virus replication. Besides PAR-1, Dr. Antoniak is working on the role of PAR-2 in virus infection. In collaboration with Dr. Rauch in Berlin (Germany) and Dr. Mackman, they showed that activation of PAR-2 reduces innate immune responses in viral myocarditis. They are now investigating the cell-specific role of PAR-2 and PAR-1 in myocarditis and influenza A. Besides Dr. Antoniak's interest in virus infections, he is working on the role of PARs in chemotherapy-induced heart failure. He found that matrix metalloproteinase 13-mediated PAR-1 activation leads to the development of heart failure in mice receiving the anti-cancer drug doxorubicin. This observation might lead to a possible therapeutic strategy to reduce chemotherapy-associated cardiac injury by inhibiting PAR-1. His work is highly translational and is pointing to potential new therapeutic strategies with regard to important cardiovascular diseases such as myocardial infarction (PAR-2 inhibition), chemotherapy-induced heart failure (PAR-1 inhibition), and myocarditis (PAR-2 inhibition).

PABLO ARIEL, Ph.D.

Dr. Ariel's mission is to provide outstanding support to other researchers at UNC for light and electron microscopy. To accomplish this, he teaches researchers how to use the systems available in the core laboratory efficiently, he maintains the systems in optimal working conditions, investigates new systems and upgrades to maintain the laboratory on the cutting edge, and supports the professional development of his team, that works side-by-side with him to accomplish these goals. His main goals for the laboratory in the coming year are to install a new light-sheet system and ramp up usage of this microscope and implement iLabs, an integrated lab management, calendaring, and reporting system.

JAMES TODD AUMAN, Ph.D.

Dr. Todd Auman's research efforts are focused on two main areas. First, he investigates expression patterns in human tumors to determine if there are expression-based cancer subtypes. He uses RNA sequencing data from the TCGA project in various cancer types to do this analysis. In addition, he examines the correlation of expression patterns for specific genes or groups of genes with clinical parameters and other genomic data in an effort to elucidate potential molecular tumor subtypes. The end goal of this research effort is identify tumor subtypes that provide prognostic or diagnostic information that impact treatment options. His other research efforts are focused on investigating the role of pharmacogenomic DNA variants on response to chemotherapeutic agents in cancer patients. Working with the UNCSeq clinical trial, they are profiling over 60 DNA variants with known importance to the response to chemotherapeutics. The goal of this effort is to be able to use the knowledge of a cancer patient's pharmacogenomic variant profile to help guide chemotherapy options in an effort to individualize the patient's therapy to be more efficacious while limiting unwarranted toxicities. During the coming year, Dr. Auman's plan to focus his efforts on investigating expression patterns in cervical cancer and profiling pharmacogenomic variants in UNC cancer patients. In addition, he plans to collaborate with other UNC researchers to investigate the utility of sequencing plasma for cell-free cancer DNA variants, with the goal of being able to use this data to evaluate cancer recurrence and tumor heterogeneity. The process of profiling of cfDNA is progressing and he is actively collaborating with other researchers in the UNC Lineberger Comprehensive Cancer Center to advance this area of research.

C. ROBERT BAGNELL, JR., Ph.D.

Dr. Bob Bagnell provided outstanding leadership of the Microscopy Services Laboratory until his retirement December 31, 2015.

DWIGHT A. BELLINGER, D.V.M., Ph.D.

Dr. Bellinger continued his research in the areas of hematology and cardiovascular disease until his retirement April 30, 2016.

JESSICA K. BOOKER, Ph.D.

Dr. Booker's area of research is focused on the development and validation of molecular methods for expansion and improvement of clinical testing. Particular areas of interest are inherited diseases as well as somatic mutations that arise in cancer and provide potential therapeutic targets. With the integration of next generation sequencing into the clinical arena, the latest clinical diagnostics now available to UNC patients include BRCA1 and BRCA2 testing by massively parallel sequencing and MLPA for hereditary breast and ovarian cancer syndrome. Dr. Booker is involved in two major research efforts employing whole exome sequencing. NC GENES is focused on pediatric and adult patients with an unidentified cause of an apparently genetic disease, and NC NEXUS, which is North Carolina Newborn Exome Sequencing for Universal Screening. Plans for the coming year include continuing efforts to create a solid infrastructure to support the significant increase in next generation sequencing in the clinical arena. Goals include publication of a book chapter and several scientific papers.

THOMAS W. BOULDIN, M.D.

For the coming year, Dr. Bouldin will continue to be heavily involved in all aspects of the diagnostic neuropathology services at UNC Hospitals. These services include surgical neuropathology, autopsy neuropathology, the nerve-biopsy service, and ophthalmic pathology.

CLAUDIA M. BRADY, M.H.S.

Ms. Brady's current daily duties and responsibilities include dissection and description of surgical pathology specimens and teaching pathology residents the same. In addition to this, she provides gross room orientations and safety training each July for the incoming new residents. Annually, she reviews the gross template manual to ensure accurate information is being documented in the patient's pathology report according to CAP guidelines. She is currently a Subject Matter Expert (SME) for anatomic pathology as UNC Healthcare went live with the EPIC Beaker module in April 2016. In this role, she works with other SMEs throughout the healthcare system in addition to various administrators and the Beaker Foundation team to formulate a product that is functional and stylized for pathology at UNC. After the build phase, they conducted an extensive testing phase to ensure all procedures and protocols were in accordance with UNC standards. An Anatomic Pathology laboratory with remote frozen section services opened at the UNC HealthCare Hillsborough Campus in August of 2015. Ms. Brady was involved in the design, validations, and accreditation processes. As the main Anatomic Pathology contact for the laboratory, she continues to work closely with the medical staff and nurses to implement proper procedures and communications between the operating rooms and clinics to ensure that pathology specimens get documented and handled properly and in a timely, efficient manner.

FRANK C. CHURCH, Ph.D.

The *basic science* research conducted by Dr. Church is concerned with proteases and their inhibitors in human biology and in various disease processes, focused in the arena of hemostasis-thrombosis. For more than 25 years Dr. Church's laboratory has performed structure to activity studies with heparin-binding serpins (serine protease inhibitors) antithrombin, heparin cofactor II, protein C inhibitor, and plasminogen activator inhibitor-1. They are characterizing the Tidwell Library of di-cationic compounds ("pentaminidine-like") for potential therapeutic anticoagulant activities. Dr. Church's *educational science* research area involves developing and assessing both qualitative and quantitative measures of student learning in undergraduate biology and in medical school courses by advancing the paradigm that Active/Engaged Learning (using conversation, cooperation, collaboration, and collegiality) will bolster a student's motivation to matriculate to and successfully navigate through medical school.

WILLIAM B. COLEMAN, Ph.D.

For the last few years, Dr. Coleman's laboratory has focused on molecular mechanisms (genetic and epigenetic) of neoplastic transformation in breast, and implications for breast cancer treatment and prevention. They have investigated epigenetic mechanisms underlying human breast cancer development by examining breast cancers that exhibit high rates of gene expression loss due to hypermethylation defects and those that lack methylation-dependent loss of gene expression. Their results suggest that ER-negative breast cancers (triple-negative breast cancers) exhibit a higher magnitude of methylation-dependent gene silencing than ER-positive breast

cancers. Further, the hypermethylation defect expressed by ER-negative breast cancers is associated with overexpression of DNMT3b protein and elevated DNMT activity leading to concurrent aberrant methylation of numerous genes. This hypermethylator breast cancer type is strongly associated with the basal-like and claudin-low molecular subtypes of triple-negative breast cancer. The mechanism accounting for overexpression of DNMT3b in hypermethylator cell lines and primary basal-like breast cancers is related to concurrent loss of several microRNAs that normally regulate DNMT3b mRNA post-transcriptionally.

BRIAN C. COOLEY, Ph.D.

Dr. Cooley's research has focused on investigating the initiation and propagation of thrombosis in large arteries and veins to determine common and differing features for these clinically disparate pathologies. Recent studies have also expanded into evaluation of hemostatic clotting. A major experimental approach uses a custom-designed intravital fluorescence microscope system. Recent findings have identified unique thrombotic responses dependent upon the induction mechanism of the thrombus – free radical injury to the vessel, mechanical vessel injuries, and intra-luminal collagen exposure to blood flow – and the modulation of thrombosis by the relative degree of injury. Another active area of research is the study of vein graft disease, looking at the development of stenosis-inducing neointimal overgrowth (often called negative vascular remodeling) that develops in nearly half of patients undergoing vein grafting for coronary bypass and lower limb claudication. Recent work has identified an endothelial-to-mesenchymal transition process for the development of vein graft neointima, mediated by a TGFbeta-Smad2/3-Slug signaling pathway. Future studies will explore this phenomenon and look at flow-mediated modulation of the remodeling response, to identify new approaches for preventing stenosis-associated vein graft failure.

GEORGETTE A. DENT, M.D.

Dr. Dent is working with the American Medical Association (AMA) on a collaborative research project known as Innovative Strategies to Transform the Education of Physicians (ISTEP). The primary objective of the project is to study the educational learning environment of medical schools using instruments that access the values, feelings, and perspectives of students as related to their education. The goal of the project is to determine the factors that are most influential in the professional development of medical students and physicians. Almost fifty medical schools are participating in this project. Dr. Dent is also collaborating with the School of Medicine Offices of Medical Education and the School of Veterinary Medicine at North Carolina State University to study the impact of social networking on the career and personal development of professional students.

LESLIE G. DODD, M.D.

Dr. Dodd will continue in teaching and service roles. Other obligations such as committee work and editorial boards have become excessive and have become as much of a time commitment as actual service work. Hence, she has no plans to take on any additional roles in the near future. Dr. Dodd now finds mentoring young faculty and higher level trainees (fellows) the most gratifying aspect of the job. She continues to participate in academic activities, but has started to provide these opportunities to junior faculty and/or trainees that want to take advantage. In the upcoming period, Dr. Dodd will be course director for a three day ASCP course on Bone and Soft Tissue (this will launch Spring 2017).

ROSANN A. FARBER, Ph.D.

Dr. Farber's major activities are as Associate Chair for Faculty Affairs in the Department of Genetics and Director of the UNC American Board of Medical Genetics & Genomics (ABMGG) Postdoctoral Training Programs. During 2015, she had a major role in applications for the following appointments and promotions in Genetics: 1 appointment as tenured Full Professor (from fixed-term), 6 promotions from Assistant Professor to tenured Associate Professor, 2 reappointments to second-terms as tenure-track Assistant Professor, 2 new appointments of tenure-track Assistant Professor, and 2 promotions from Research Assistant Professor to Research Associate Professor. The Postdoctoral Training programs went through the ABMGG reaccreditation process last Fall and the annual report was filed in September, as required every year except those in which we go through accreditation. There has been a recent decision by the ABMGG that all programs in Clinical Cytogenetics and Clinical Molecular Genetics will be merged into 2-year programs in Laboratory Genetics and Genomics (LGG), effective July 1, 2017. Although Dr. Farber believes that "cramming" what has previously been 3-4 years of training in both fields into a 2-year period is not a good idea, the program will apply for accreditation in LGG. Guidelines or a deadline for this application are not yet available, and Dr. Farber hopes that it will be possible to modify only slightly the documents that were put together for the recent reaccreditation. The biggest challenge will be in designing a 2-year schedule for fellows that will incorporate all of the milestones that were previously achieved over the longer period of time.

GEORGE FEDORIW, M.D.

Dr. Fedoriw serves as the Director of Hematopathology. His research is primarily focused on understanding the role of B-cells in the bone marrow transplant setting and B-cell activation in patients with HIV infection. His studies hope to clarify aspects of lymphoid development, and B-cell reconstitution and activation to ultimately improve patient diagnosis and clinical outcome. Dr. Fedoriw has developed a close collaboration with investigators in the UNC Center for AIDS Research and helped establish a leading pathology laboratory in Sub-Saharan Africa. In addition to real-time improved care for patients in Malawi, histopathologic and genomic characterization of the tumors is now underway. Dr. Fedoriw hopes to continue investigating lymphoma biology and expand to identification of biomarkers of disease. Data collected from the whole transcriptome sequencing of HIV-associated Diffuse Large B cell Lymphoma from these patients are complete are being prepared for publication. He also actively provides research support for collaborators in the Lineberger Comprehensive Cancer Center and the School of Pharmacy.

CRAIG A. FLETCHER, D.V.M., Ph.D.

As Director of Division of Laboratory Animal Medicine and Assistant Dean for Animal Research Resources, Dr. Fletcher provides oversight of animal care for the research animals at UNC. DLAM staff currently consists of approximately 160 employees. DLAM operates 18 laboratory animal facilities on campus and in nearby off-campus locations. In addition, he provides oversight of animal facility design and renovation, research programmatic planning, and animal research operations management. UNC has maintained accreditation for the entire campus with the Association for the Assessment and Accreditation of Laboratory Animal Care, International (AAALAC International) since 1989. Federal regulations, as well as AAALAC requirements for accreditation, require adequate veterinary care for all research animals. DLAM

completed a successful AAALAC visit in 2014 and the University remains fully accredited until 2017 and the division has started preparation for the site visit next year. Dr. Fletcher is also a member of Institutional Animal Care and Use Committee, Institutional Biosafety Committee, Facilities Planning committee, and the University Safety and Security Committee. Dr. Fletcher's teaching duties include training graduate students and residents in the laboratory animal medicine program. He currently teaches in the Pathobiology and Translational Science program (in PATH 714L). UNC also has an NIH-funded, ACLAM- certified residency training program in laboratory animal medicine. In addition, UNC is part of a joint ACLAM- certified residency training program between Duke, NCSU, Glaxo Smith Kline and NIEHS. In the research arena, Dr. Fletcher is collaborating with Dr. Nigel Mackman (in the McAllister Heart Institute) investigating the role of tissue factor (TF) and platelets in viral infection. Viral infections lead to activation of coagulation, and it has been reported that influenza virus infection is associated with activation of coagulation and the increased risk for thrombotic events, such as myocardial infarction. While lethal IAV infection is associated with both lung and systemic activation of coagulation, excessive influenza virus replication leads to massive immune cell infiltration causing severe lung tissue injury resulting in bleeding. They are studying the roles of platelet factor 4 (PF4) in maintaining lung hemostasis and thrombosis during influenza virus infection using a mouse model that lacks PF4.

WILLIAM K. FUNKHOUSER, M.D., Ph.D.

Dr. Funkhouser is collaborating with other members of the CAP Molecular Oncology Committee to collect data on proficiency testing of colorectal carcinoma, and will write a paper in 2016 on inter-laboratory testing reproducibility for the DNA mismatch repair tests, MSI and dMMR protein IHC. Dr. Funkhouser has completed data collection on a web-based survey of 22 Pathologists diagnosing 54 virtual cases of non-small cell lung carcinoma using 4 different classification schemes, the goal being to demonstrate whether the addition of immunostains and mucin stains improves inter-Pathologist diagnostic reproducibility compared to H&E diagnosis alone. Dr. Funkhouser is serving as an expert panelist on the CAP/AMP/ASCO committee, and is currently participating in the writing of guidelines for testing of colorectal carcinoma.

PETER H. GILLIGAN, Ph.D.

Dr. Gilligan's studies are ongoing to determine if updated databases will allow more precise identification of glucose non-fermenters and rapidly growing mycobacteria using MALFI-TOF mass spectroscopy. Evaluation of a newly developed isolation medium will determine if this medium is more sensitive for detection of rapidly growing mycobacteria from the respiratory tract of CF patients compared to standard medium and if these organism will be accurately identified by MALDI-TOF from this medium. Finally MALDI-TOF is allowing more accurate identification of gram positive rods to the genus and often species level. A study to determine the clinical significance of these organisms is ongoing. Members of the bacteriology section of CMIL are continuing studies to determine the role of rapidly growing mycobacterium in CF patients. Investigations into the clinical significance of speciation of infrequently encountered organism by the MALDI-TOF mass spectroscopy continue in the bacteriology section.

VIRGINIA L. GODFREY, D.V.M., Ph.D.

Dr. Godfrey continues to provide collaborative pathology evaluations for colleagues in the Medical School faculty, particularly members of the UNC Lineberger Comprehensive Cancer

Center. Many of these collaborations are initiated by diagnostic necropsies of sick animals referred to the DLAM clinical services. Recent and continuing projects include morphologic evaluations of: (i) pig models of atherosclerosis and Type II diabetes (Nichols), (ii) interactions of Brg 1 and intestinal flora in mouse models of IBD (Bultman), (iii) dog models of hemophilia (Nichols), (iv) mouse models of tuberculosis (Braunstein), and (v) various mouse tumor models. She also assists in characterization of new mouse models through the interactions with the National Gnotobiotic Rodent Resource (Sartor), the Mutant Mouse Regional Resource Center (MMRRC) at UNC (Magnuson), and the Collaborative Cross (Pardo Manuel de Villena). In particular, her initial characterizations of spontaneous lesions in CC mice have led to new models of bronchiectasis, patent ductus arteriosus, Hodgkins like lymphoma, and chronic colitis.

KEVIN G. GREENE, M.D.

Dr. Greene is part of a team of researchers that is preparing a Specialized Programs of Research Excellence (SPORE) grant submission to study pancreatic cancer. The anticipated submission date is January 2017. Dr. Greene is collaborating with colleagues in the Molecular Pathology and Genetics Laboratory to study multiple aspects of gastric carcinoma. One aim of these studies is to develop a classification system that is based on molecular subtyping. Dr. Greene is collaborating with a colleague in the Department of Cell Biology and Physiology to define the role of CD73 in liver injury and neoplasia, with a goal to obtain grant funding to support multiple studies. Lastly, Dr. Greene is involved in the early stages of a multi-institutional project seeking to better understand fibrolamellar hepatocellular carcinoma (FLHCC). A separate study on FLHCC that was conducted with researchers at UNC will result in a manuscript submission this year.

PAMELA A. GROBEN, M.D.

Dr. Groben retired May 16, 2016.

MARGARET L. GULLEY, M.D.

Dr. Margaret Gulley's research aims to (i) understand the molecular basis of Epstein-Barr virus (EBV)-related malignancy, and (ii) develop novel laboratory tests to help manage affected patients. To advance these goals, they recently applied a new microRNA expression profiling system to show how EBV and human microRNA profiles (in paraffin-embedded tissue and in plasma) associated with gastric cancer diagnosis. Resident and fellow collaborators presented three posters on this work at the 2015 Association for Molecular Pathology Meeting. In related work at a national level, Dr. Gulley leads pathogen analysis for The Cancer Genome Atlas (TCGA) Network's genomic study of esophageal adenocarcinoma. In the UNCH clinical laboratory, new genomic tests for myeloid neoplasia and to predict risk of heritable breast/ovarian cancer were launched this year. Raw data is analyzed and reports drafted by pathologist trainees who develop skills in this area of medicine that may someday be as vital to pathology practice as the H&E stain has been for the past century. Her campus-wide support of medical laboratory services for faculty investigators enhances clinical translation of scientific discoveries made locally, reinforcing the important role of pathologists in advancing medical care using modern laboratory tools. In the coming year, Dr. Gulley will continue to develop and refine standard operating procedures and collect evidence of performance that is required to implement new laboratory services in the clinical realm. Trainees involved in all of these activities are better prepared to practice laboratory medicine and to become competent, confident

directors of research and clinical laboratory services. Substantial progress was made in the past year. They measured EBV and human microRNAs in formalin fixed paraffin embedded tissue and in matched serial plasma specimens of patients with infected tumors and in controls to explore how “liquid biopsies” might be used in future studies to monitor tumor burden during therapy, and to screen high-risk populations. In another study, genomic DNA sequencing was applied to formalin fixed cancer tissues and to premalignant lesions to demonstrate how frequently mutation is evident in lesions adjacent to cancer tissue, which supports future studies of early detection and cancer prevention. In work of a more general nature, she teams with TraCS and UNC Lineberger Comprehensive Cancer Center leaders to improve laboratory services for campus investigators and to help translate basic science discoveries into the clinical realm, reinforcing the important role of pathologists in advancing medical practice using modern genomic tools. Five next-generation sequencing assays are now validated in McLendon Clinical Laboratories (solid tumor, myeloid neoplasia, gastric cancer, heritable cancer risk, HLA). They will also enhance productivity of local clinical investigators by making tissue/lab/pathologist resources available for team science. Trainees involved in these projects are prepared to practice modern laboratory medicine and to become leaders in translational genomics. Milestone-based evaluations of trainees were implemented this year to help assure that each resident and fellow acquires the skills and experience required for current pathology practice.

SUSAN C. HADLER, M.D., M.S.

Dr. Susan Hadler’s efforts in the Medical School are centered around teaching and curriculum. She is involved in teaching 1st, 2nd, and 4th year medical students in multiple courses, as well as Pathology and Toxicology graduate students and Physical Therapy graduate students. She serves on a number of medical school curriculum-related committees. Her efforts in the Dental School are also centered on teaching; she teaches 1st year dental students in multiple courses. She also serves on the several dental school committees

CATHERINE A. HAMMETT-STABLER, Ph.D.

Dr. Hammett-Stabler’s focus is in the improvement of clinical laboratory services and patient safety: Two initiatives toward the development of practice guidelines related to the laboratory support of pain management and addiction programs (one evidence-based, the other consensus based) have recently begun the final review and public discussion phases. She continues collaborations with faculty within the UNC/NCSU Biomedical Engineering Department and is serving as the CRASH clinical lead (advisor) to Brian Cummins, PhD, postdoctoral research scholar in the Joint Department of Biomedical Engineering (North Carolina State University and the University of North Carolina). CRASH (Commercialization Readiness Assessment and Accelerator for Solutions in Healthcare) is an intense 10-week program developed by the Consortia for Improving Medicine with Innovation and Technology (Boston, MA) to address unique challenges in healthcare commercialization.

TRACY M. HEENAN, D.V.M.

Since 1994 under the direction of Dr. Tracy Heenan, the Office of Animal Care and Use (OACU) has provided excellent service to animal research community, ensuring humane animal care and use, facilitating the application review process, providing exemplary training of research personnel, and conducting fair and thorough investigations of animal welfare concerns and noncompliance while still working to establish rapport with researchers and fostering animal

research. The necessity of providing fair and thorough customer service is one of OACU's guiding principles. The OACU serves an essential role in educating and advising faculty, students, research personnel, IACUC, Division of Laboratory Animal Medicine (DLAM) personnel, and Department of Environment Health and Safety (EHS) representatives regarding proper animal care and use policies and practices. The Director will continue to serve as an integral link between the IACUC and the Office of the Vice Chancellor for Research (VCR), DLAM, EHS, and the University Employee Occupational Health Clinic and will work to enhance all levels of communication between these groups

JOHANN D. HERTEL, M.D.

Dr. Johann Hertel is a board certified cytopathologist and surgical pathologist. In addition to cytopathology Dr. Hertel subspecialty focus is in breast and GI pathology. Dr. Hertel's research interest and activities are focused on quality control and molecular testing in cytopathology.

STEVEN C. HOLMES, B.S., M.H.S.

Steven Holmes' area of expertise is in surgical pathology and gross anatomy. With this knowledge he is able to fulfill his role as an instructor to residents, medical students, prospective applicants and Pathologists' Assistant students. His instruction includes but not limited to identifying and proper orientation of specimens as well as proper conduct and safety training in the laboratory. These skills are needed for handling simple biopsies up to complex surgical resections. Due to the high volume of specimens, his training also includes proper time management without adversely affecting patient care. In the upcoming year, he envisions an even more hands on role with the departmental staff regarding staff instruction through laboratory bench work, conference planning and via meetings. He also plans to take a more active role in the frozen section room and learn the connection amongst the other labs with surgical pathology. Throughout the year, the growth, maturation, and improved skill level of residents in the surgical pathology laboratory is a reflection of my success as a clinical instructor. He has accomplished his goals at becoming a more effective/leader in the gross room. In addition, he has improved on his efficiency in the frozen section laboratory. During the upcoming year, he will increase his duties within the remote laboratory at the Hillsborough location. These duties include, but aren't limited to accessioning of specimens and prompt/efficient handling of specimens and slide preparation for remote diagnoses by the pathologists.

JONATHON W. HOMEISTER, M.D., Ph.D.

Dr. Jonathon Homeister's research program has two major goals. The first is to utilize leukocyte lineage-specific gene targeting in murine experimental models to investigate $\alpha(1,3)$ -fucosyltransferase (FUT) gene function in the development of atherosclerotic cardiovascular disease. They are using these mice and other mice made deficient in FUT-IV and FUT-VII in all tissues to define a role for the selectin adhesion molecules and their fucosylated ligands in the development and progression of atherosclerosis. These mouse stains will be used to continue their studies that define the selectin-dependent contribution of several leukocyte lineages to the atherosclerotic disease process, as well as to homeostasis of the circulating counts of granulocytes and monocytes. The second goal is to determine the mechanisms whereby the FUTs regulate hemostasis and thrombosis. These studies are to elucidate the mechanisms whereby fucosylation of selectin ligands and/or other blood molecules alters coagulation and thrombosis.

These studies also utilize the mouse strains described above to modulate generalized and leukocyte lineage-specific FUT expression.

PEIQI HU, M.D.

Dr. Hu's research aims at understanding of molecular mechanisms of immune mediated kidney diseases with emphasis on antineutrophil cytoplasmic autoantibody (ANCA) induced glomerulonephritis and vasculitis (ANCA disease). He and his collaborators recently generated a mouse model of lung granulomatosis induced by anti-myeloperoxidase antibody (anti-MPO) that closely mimics the early acute pulmonary lesions of human ANCA granulomatosis. By using this model, they are elucidating the nature of the anti-MPO exposure and the modulation of the innate immune system that result in granulomatosis. Dr. Hu's research approaches include (i) investigating the role of the kinin system and their inhibitors in pathogenesis and therapeutic interventions of ANCA disease, (ii) epitope excision and mass-spec-based epitope mapping for identifying specific epitopes that are targeted by pathogenic anti-MPO antibodies, (iii) microarray and taqman PCR-based gene expression analysis on the mouse strains susceptible or resistant to anti-MPO induced crescentic glomerulonephritis to identify candidate genes responsible for the disease susceptibility.

J. CHARLES JENNETTE, M.D.

Dr. Jennette's research is focused on elucidating the clinical and pathologic features, pathogenesis and etiology of immune-mediated vascular inflammation, especially vasculitis and glomerulonephritis induced by anti-neutrophil cytoplasmic autoantibodies (ANCA). Dr. Jennette is a co-investigator in multiple ongoing NIH-funded clinical and translational research consortia focused on glomerular diseases including CureGN and NEPTUNE. Dr. Jennette's basic research (which has been continuously funded by the NIH since 1989) focuses on the pathogenesis of inflammatory glomerular and vascular disease caused by anti-neutrophil cytoplasmic autoantibodies (ANCA). A major experimental tool that is used is an animal model of ANCA disease discovered in his laboratory that is induced by injecting mouse anti-myeloperoxidase (anti-MPO) IgG antibodies or anti-MPO leukocytes into mice. Prior studies have demonstrated that ANCA disease in this animal model is mediated by ANCA IgG alone, requires neutrophils but does not require T-cells to induce or granulomatous inflammation, is modulated by Fc receptors, is influenced by genetic regulation of innate immunity, and requires alternative complement pathway activation and C5a receptor engagement. Current research is discovering an important pathogenic role for the kinin system including bradykinin receptor engagement on neutrophils, demonstrates that ANCA with different epitope specificity have different pathogenic potential, and reveals an iconoclastic mechanism for ANCA-induced granulomatosis that involves ANCA-activated neutrophils rather than T-lymphocytes.

KATHLEEN A. KAISER-ROGERS, Ph.D.

Dr. Kathleen Kaiser-Rogers continues to characterize the chromosome rearrangements of some of the more interesting patients referred to the UNC Hospitals Cytogenetics Laboratory using both traditional and molecular cytogenetic techniques, including fluorescence in situ hybridization (FISH) and chromosome microarray analysis (CMA). The rearrangements and corresponding phenotypes observed in one of these patients were reported at the March 2016 American College of Medical Genetics and Genomics (ABMG) meeting, and a patient with a

1q43 to 1q44 deletion and hemiconvulsion-hemiparesis-epilepsy was recently described in *Frontiers in Neurology*. Additionally a manuscript describing the karyotypic abnormalities associated with Epstein Barr Virus status in classical Hodgkin lymphoma has recently been submitted for publication to *Cancer Genetics* by co-author Dr. Nate Montgomery. Dr. Kaiser-Rogers also continues to function as a resource for researchers with an interest in using cytogenetic technologies in their research projects. She currently serves as a Vice Chair on the CAP Cytogenetic Resource Committee and as the CAP-ACMG Liaison for the ACMG Laboratory Quality Assurance Committee. Additionally, she continues to Chair the ACMG Salary Survey Workgroup which published a 95 page document in May/June 2016 regarding the compensation of American Board of Medical Genetics and Genomics, and Molecular Genetic Pathology certified MD/DO and PhD Medical Geneticists in the United States.

MASAO KAKOKI, M.D., Ph.D.

Dr. Kakoki has 25 years of experience as a physician-scientist in nephrology, of which the last 15 years have been devoted to molecular biology with emphasis on understanding the molecular mechanisms that are responsible for cardiovascular and renal dysfunction in diabetes mellitus using genetically altered mice. Dr. Kakoki has studied Akita diabetic mice having 5 graded levels of Elmo1 (engulfment and cell motility protein 1), and reported that the genetic insufficiency of Elmo1 abolishes the decrease in glomerular filtration rate (GFR), renal histological changes and albuminuria, despite no changes in plasma glucose levels. He is also studying the cardiac phenotype of Akita diabetic mice having graded levels of Elmo1, and collaborates with other laboratories by offering the mice that have been generated.

DAVID G. KAUFMAN, M.D., Ph.D.

Dr. Kaufman is working on a translational research study to determine the efficacy of chemotherapy in women undergoing drug therapy for breast cancer based on DNA damage in circulating cancer cells recovered from the patients. He has developed a method to quantify DNA damage significantly in extended DNA fibers from as few as five cells. He has also shown that he can recover circulating tumor cells from mice bearing transplanted human breast cancers and that he can detect excess DNA damage in these cells if these mice were treated with chemotherapeutic drugs. As originally developed these methods are very time consuming, but he has automated the three steps of the analysis yielding a much reduced analysis time. Concurrently he is trying to develop a microfluidic technique to make these measurements in continuous flow mode that would be suitable for use in a clinical pathology lab at much lower cost and with much shorter turn-around time. This latter work is being done in collaboration with Dr. Steven Soper from the Department of Biomedical Engineering. Recent process has shown it is possible to separate tumor cell subtypes from heterogeneous cancers and each subtype can be evaluated separately. This work initially was supported by an NC TraCS grant and applications for future support have been submitted to the NIH. He is also doing a translational research study to try to find an immunohistochemical test to distinguish functional endometrial hyperplasias from premalignant endometrial intraepithelial neoplasia (EIN). The morphology of hyperplasia and EIN are sufficiently similar to be incorrectly diagnosed with notable frequency. Morphometric studies have shown that EIN has quantitatively less stroma between glands than typical hyperplasias. Since most surgical pathologists do not morphometry in routine diagnosis, a simple immunohistochemistry test would be a valuable aid to diagnosis. He has analyzed gene expression in co-cultures of endometrial epithelial and stromal cells where

the ratio of stromal to epithelial cells was varied to resemble hyperplasias and EIN. He is now doing immunohistochemical studies of tissue microarrays of normal, hyperplastic, and neoplastic endometrium targeting the gene products of the relatively few (and related) gene products found to be abnormally expressed in the gene expression study. This study was supported by an NC TraCS grant and now it continues with support from the American Cancer Research Center and Foundation.

WILLIAM K. KAUFMANN, Ph.D.

Dr. Kaufmann is in his final year of phased retirement. He is completing a paper with Drs. Jackie Bower and Charles Perou that reports on defects in specific types of cell cycle checkpoints in distinct breast cancer subtypes. He is trying to develop a molecular test for residual acute myeloid leukemia with Drs. Peggy Gulley and Neil Hayes that uses targeted next-generation DNA sequencing. They submitted one STTR application in April 2016 and another in September 2016. Dr. Kaufmann has served on an NCI study section to review proposals for innovative molecular technologies. He helped prepare an amended application for an NIEHS Center Grant which was awarded 6/1/16.

APRIL E. KEMPER, M.H.S.

Ms. Kemper is in her sixth year with the department. She ran several gross conferences this year, including the introduction to grossing conference for the 1st years. She assisted medical students and others in the gross room, answering questions and grossing requests. She is responsible for ordering supplies for the gross room and for keeping things stocked and organized. Her efforts this past year have continued to focus on teaching gross pathology and grossing the increasing number of surgical specimens. With the implementation of Beaker and the increased work load, more time has been spent learning the new system and working out glitches as they arise. She plans to continue to provide the department and the patients of UNC hospitals with organized, attention to detail, efficient, high quality grossing.

DANIEL J. KENAN, M.D.

Dr. Kenan's clinical service is focused on the UNC Nephropathology Service, which includes a weekly kidney biopsy teaching conference involving Nephrology fellows and attendings as well as medical students and residents. In the coming year he will continue his role of clinical service in Nephropathology. His basic research activities have focused on BK polyomavirus (BKPV) and mechanisms of infection and latency in renal allografts as well as its role in promoting aggressive urothelial neoplasms. His studies have shown that these neoplasms are linked to integration of the BKPV genome into the host cell chromosome and further suggest a mechanism for oncogenesis centered on up-regulation of the BKPV large T antigen. In the coming year he plans to expand the number of cases for which DNA data can be obtained. In addition, he is beginning to incorporate RNA and protein expression studies in order to better understand mechanisms of BKPV latency, reactivation, and oncogenesis as they relate to both polyomavirus nephropathy and malignancy.

MEHMET KESIMER, Ph.D.

Dr. Kesimer has a pending R35 (outstanding emerging investigator) and an R01 as PI. He will continue to look for external funds to extend my research on new ideas especially in the area of

extracellular vesicles and their role in lungs innate defense and remodeling and role of mucins in CF pathogenesis. He will be a core project leader for a tPPG and the SPIROMICS2 project.

HYUNG-SUK KIM, Ph.D.

To understand homeostatic responses to the genetic change in animal models, molecular phenotyping procedures were developed based upon gene expression analyses using high-throughput real-time RT-PCR methods. Dr. Kim's results in published works demonstrate the power for recognizing subtle phenotypic changes in animals even with minimal genetic differences. Currently Dr. Kim is the director of gene expression core facility and collaborates with many researchers. After 28 years working at Department of Pathology and Laboratory Medicine, Dr. Kim will retire as Research Professor and Core director on September 1st, 2016.

NICHOLE L. KORPI-STEINER, Ph.D.

Dr. Korpi-Steiner's research is focused on clinical point-of-care and laboratory test performance characteristics, quality assurance and test utilization practices. She recently partnered with the Department of Respiratory Therapy and industry to conduct a clinical trial with the aim of evaluating the analytical performance characteristics of a new point of care blood gas analyzer (GEM Premier 5000), which is not yet available on the market, in an intensive care unit setting. Study findings will be submitted to the Food and Drug Administration by the manufacturer seeking approval of this medical device. She presented these study findings in September 2016 at the Critical and Point of Care Testing International Meeting in Copenhagen, Denmark. Dr. Korpi-Steiner is currently the principle investigator of another clinical trial in collaboration with the Departments of Pulmonary and Critical Care Medicine and Nursing with the aim of evaluating capillary whole blood glucose meter test performance in critically ill patients. This clinical study is multi-disciplinary, challenging to perform, and is expected to take 1 year to complete. Study findings will be submitted to the Food and Drug Administration by the manufacturer seeking approval for professional use of this medical device in critically ill patient populations. Her goals for the upcoming year are to complete this clinical trial, publish findings from ongoing lean six sigma quality improvement projects, and maintain high-quality Core Laboratory testing and educational activities while we seek to hire a Clinical Chemist faculty member.

THOMAS J. LAWTON, M.D.

Dr. Lawton continues his interest and research on high-risk lesions of the breast. His abstract on intraductal papillary lesions of the breast with resident Dr. Christine Bookhout and Dr. Sheryl Jordan of Breast Imaging at UNC was presented at the 2016 Annual Meeting of the USCAP in March. An expanded study including benign papillomas from Duke University has been submitted as an abstract to the 102nd Annual meeting of the Radiological Society of North America. Dr. Lawton is a co-investigator with Dr. Sarah Nyante in Radiology on a NC TraCS pilot grant entitled "Expression of Breast Extracellular Matrix Proteins in Lobular Carcinoma in Situ." Dr. Lawton presented a talk entitled "In Situ Lobular Neoplasia: Current Concepts and Controversies" at the 1st International Conference on Invasive Lobular Carcinoma hosted at the University of Pittsburgh (Fall 2016). Dr. Lawton is a pathologist co-investigator on an R01 grant submission with Co-PIs Drs. Perou and Carey on "the role of tumor and immune microenvironmental factors in determining sensitivity to HER2-targeting and benefit of dual

HER2-targeting using RNA- and DNA-based studies on human breast cancer samples from women participating in neoadjuvant clinical trials in HER2-positive disease.”

RUTH A. LININGER, M.D.

Dr. Lininger is a pathologist with a background in public health and medical research, training in integrative medicine and business, and an interest in leadership, innovation, and entrepreneurship. She currently provides clinical diagnostic services at UNC as a surgical pathologist specializing in gynecologic and breast pathology. She teaches residents, medical students, and graduate students, and works with medical colleagues in multidisciplinary conferences as part of a multidisciplinary clinical team providing state-of-the-art western health care in a tertiary care setting. Her research interests have been in molecular epidemiology and molecular carcinogenesis, and now in improving medical care and adding value by incorporating integrative medicine. She is researching the scientific basis of integrative medical therapies, focusing on cancer treatments, treatment of drug resistant infectious disease, and improving chronic disease by applying functional medicine, nutrition, and lifestyle changes. She has an interest in developing online education programs in integrative care for physicians, and is working with the Deans Office, Program on Integrative Medicine, and Department of Physical Medicine and Rehabilitation to provide leadership to expand integrative care services to bring value to UNC Healthcare and patients in the UNC Healthcare network. She provides private outside consult service focusing on gynecologic and breast pathology and is the major consultant for difficult gynecologic and breast pathology cases for a number of regional reference laboratories. She is the physician spearheading the development of anatomic pathology outreach to facility physician retention and recruitment. She also participates in the business and fiscal aspects of surgical pathology billing and coding, helping to understand and apply new federal Medicare rules, including ACA rules, regarding pathology, value-based care, and alternative payment model reimbursement rule changes, including MIPPS and MACRA (and others) to understand health care trends, and maximize reimbursement. Goals for the coming year include moving into a greater leadership role in the department and in the hospital leadership where she can help to bring value to the health care system and greater health to the patients/clients we serve.

FENG LI, PhD.

Dr. Li is a research assistant professor and her current research is focused on hypertension especially pregnancy-related hypertension, preeclampsia. She recently published a paper in Proceedings of the National Academy of Sciences reporting that nicotinamide benefits both dams and pups in contrasting preeclampsia models (<https://www.ncbi.nlm.nih.gov/pubmed/27821757>). Now, she is studying the potential different roles of maternal/embryonic endothelin-1 in preeclampsia and plans to publish these data in 2017. She is also studying whether there is a positive feedback between endothelin-1 and sFlt-1. In 2017, she will be studying the role of endothelin-1 on trophoblast cell differentiation and consequential effects on trophoblast cell invasion, and whether nicotinamide affects trophoblast cells differentiation and/or invasion.

JIANDONG LIU, Ph.D.

Congenital heart diseases are one of the most common birth defects in humans, and these arise from developmental defects during embryogenesis. Many of these diseases have a genetic component, but they might also be affected by environmental factors such as mechanical forces.

Dr. Liu's research goal is to study on the molecular mechanisms that link mechanical forces and genetic factors to the morphogenesis of the heart. Their studies using zebrafish as a model system serve as the basic foundation to address the key questions in cardiac development and function, and could provide novel therapeutic interventions for cardiac diseases. His plan for the coming year is to publish three to four peer-reviewed articles, apply for NIH R01 grant and participate in departmental and MHI seminars/activities and continue serving on various committees.

CHRISTOPHER P. MACK, Ph.D.

The overall goal of the Mack lab is to identify the signaling pathways and transcription mechanisms that regulate smooth muscle cell (SMC) differentiation. They have shown that nuclear localization of the myocardin family of SRF co-factors by RhoA signaling is an important mechanism by which extrinsic factors regulate SMC-specific transcription. Their current studies are focused on identifying the signaling pathways upstream and downstream of RhoA that regulate SMC transcription with a particular focus on the role of this pathway in the nucleus. The Mack lab is also examining the role of histone and DNA methylation on the control of SMC-specific gene expression and is attempting to identify the specific chromatin modifying enzymes and chromatin readers that mediate these effects. In collaboration with the Taylor lab, a major new goal is to identify genetic polymorphisms that regulate the expression of Graf3, a novel SMC-specific, Rho-specific GAP that is critical for blood pressure homeostasis. They hope that their *in vitro* and *in vivo* studies will lead to therapeutic targets for several cardiovascular pathologies that involve altered SMC phenotype including atherosclerosis, restenosis, and hypertension.

NOBUYO N. MAEDA, Ph.D.

Pathogenesis of atherosclerosis is complex and a large number of genetic factors contribute to determine the susceptibility to the disease. Using hyperlipidemic apolipoprotein E-deficient mice that develop spontaneous and human-like atherosclerotic plaques, Dr. Maeda has explored how genetic factors modify plaque development in a vascular location-specific manner. Systematic genetic analyses of the F2 progeny from crosses of apoE-null mice on three inbred strains (C57BL/6, 129/SvEv, and DBA2) identified several quantitative trait loci that affect susceptibility for plaque development in the aortic arch independent of the loci for atherosclerosis in the aortic root. In addition to establishing congenic backcrossed lines, Dr. Maeda is examining the effects of genetic variations several candidate genes on the plaque development at gene and protein levels *in vivo* in mice and *in vitro* in cultured cells. For example, they have successfully determined that a reduced expression but not the protein structure variation of *Mertk* promotes plaque development in DBA/2J mice, compared in 129SvEv mice. *Mertk* encodes for a membrane tyrosine kinase important for the clearance of apoptotic/necrotic cells (efferocytosis). Thus, the results show that efferocytosis is atheroprotective in the early stages of plaque formation, not only in late stages as previously reported. In the coming year Dr. Maeda will continue to examine variations in other candidate genes including the *Stab2* gene encoding for a scavenger receptor for macromolecules such as modified LDLs apoptotic cells, and hyaluronans. Additionally, they will be exploring the relationships between loci identified in human GWAS for carotid intimal media thickness and mouse QTLs for aortic arch/brachiocephalic artery in collaboration with Dr. Franceschini at the UNC Gillings School of Global Public Health.

TRACIE L. MASSEY, B.S., PA.

Tracie Massey is primarily responsible for triaging and banking specimens for the Tissue Procurement Facility. She has increased the number of specimens banked from about 20% to 60-80%. Her goal is to have 95-98% of the consented cases banked. Tracie has become the clinical instructor of the Frozen Section Room. She has standardized the work flow and implemented the lean concept. She is now the sole instructor responsible for training all first year residents, as well as assisting/training 2nd-4th year residents and fellows, in the frozen section room. Starting 2014, Tracie covered 3 months (6 rotations) per year of frozen section bench coverage alone with no resident to allow the residents to cover other areas of their program requirements. In July 2016, this increased to more than 6 months of the year. Tracie has now taken on the responsibility for the QA portion of the frozen section room. This includes assures all the billing is correct for all the frozen sections cases, entering the TAT in the database and entering any exemptions for cases going over 20 minutes and entering the Intra-operative versus Final Diagnosis in both Beaker and the data base. In the past, the frozen section room has been deficient in the TAT are for the CAP inspection. Since Tracie has taken over we are 100% compliant in all areas. Tracie covers the frozen section bench to allow the resident on service to be trained for renal biopsies, for the RISE exam, and for residents to take vacation.

STEPHANIE P. MATHEWS, M.D.

The majority of Dr. Mathews' work is in the Division of Hematopathology and entails comprehensive interpretation of hematopoietic and lymphoid tissue, incorporating morphologic, immunophenotypic, flow cytometric, cytogenetic, and molecular data. She also provides interpretation of serum and urine electrophoresis and immunofixation studies and serves as Director of the high volume Analytical Hematology Laboratory within McLendon Clinical Laboratories. In addition to having teaching responsibilities with pathology residents and the Hematopathology fellow during daily sign-out activities, Dr. Mathews participates in didactic lecture series for the residency and fellowship programs, and has recently taken on the role of Hematopathology fellowship Director. She is involved in medical student education as a small group lab instructor, previously during the MS2 Hematology/Oncology block and now as part of the MS1 hematology TEC curriculum. In keeping with her focus on clinical work and education, she recently accepted a position on the American Society of Clinical Pathology PRISE committee. Her research is primarily case-based with ongoing projects including the evaluation of EMA immunohistochemistry in the identification of erythroid precursors in bone marrow and correlation of red blood cell MCV with automated morphology flagging. She is also involved in a clinical study of prognostic factors in mantle cell lymphoma with Dr. Steven Park. In the past, she collaborated with Dr. Kashuba in the UNC School of Pharmacy on a project evaluating drug transporters in mucosal tissue and their implications for drug disposition in HIV prevention. In summary, Dr. Mathews' focus is primarily clinical with an emphasis on education and clinically valuable research projects.

SUSAN J. MAYGARDEN, M.D.

Dr. Maygarden works with the GU oncology group at UNC on several translational projects. She provides IHC interpretation for a Phase II clinical trial of novel therapeutic approaches for the treatment of bladder cancer, by assessing RB and P16 immunostaining of samples of tumors potentially eligible for the trial. Her other scholarly interests include screening for breast and

lung cancer, and works with an interdisciplinary UNC team to create a registry for lung cancer screening patients.

MARSHALL MAZEPA, M.D.

As recommendations from Carolina Value are implemented, we anticipate the potential to expand the UNC Healthcare's Blood Donation by merging with the Rex blood donation center. As we anticipate a larger role for the UNCH Blood Donation Center, Dr. Mazepa is actively expanding the reach of the center to the UNC student population. Dr. Mazepa's biology course on blood donation will take place in the Fall of 2016. Dr. Mazepa is also a co-faculty mentor for the formal platelet donation club with undergraduate student leadership. Dr. Mazepa also continues to expand his clinical work and teaching in the Special Coagulation Lab as the dedicated elective for the Pathology and Lab Medicine Residents is planned to begin in Winter 2016. Dr. Mazepa's clinical work and clinical research continues to grow in the arena of TTP. His TTP clinic continues to grow, offering long-term follow up for this relapsing condition. This is important for studying what many see as one major new concern in TTP: long-term morbidity and mortality. He is the co-founder of the USTMA research consortium, a group of 12 institutions committed to conducting clinical trials in TTP and establishing a registry and biorepository for future translational research. UNC opened the phase 3 study of caplicizumab for treatment of TTP in March 2016. Importantly, this is the first study to be conducted by the USTMA consortium. The second study the USTMA consortium is opening is a prospective registry and biobank for patients with TTP in remission. Funding has been obtained for 2 years of collection of registry data and specimens to be stored in a biorepository for the consortium. The study is currently open at Ohio State University and UNC, and will be opening at the remaining sites this summer. Dr. Mazepa anticipates that the registry is best suited to collecting data on predicting and preventing relapses (as opposed to optimizing acute therapy). Thus, the first 6-12 months of data collection will be utilized as preliminary data to plan a multicenter study of the effect of preventive (maintenance) immunosuppression in TTP, hopefully backed by NIH funding. Finally, Dr. Mazepa is collaborating with another UNC faculty member to develop a sequencing-based biomarker of TTP disease burden with the goal of establishing this as a predictive and/or prognostic biomarker in TTP.

GAYLE C. MCGHEE

Gayle McGhee's responsibilities for this year will include provision of gross organs for all of the organ blocks in the Medical School sequence, Graduate Courses, First Year Dental Pathology and various other one-time requests such as the provision of lungs and heart for anti-smoking lectures in local High Schools. The work is being made more complicated this year by the necessity to rearrange our library of gross organs in the recently renovated Autopsy Suite. Unfortunately, the available space has been rearranged and compressed making this into a difficult project. Collection maintenance is an ongoing process which involves discarding old, damaged specimens and consultation with Mr. Moylan and others to replace organ sets and enhance our collection. Another major component of her work is the scanning of microscope slides for use in Virtual Microscopy. To some extent this is a hands-on process which requires knowledge and experience in the use of the Aperio system and includes the ability to trouble shoot common problems. Scanning is done for teaching and in house research needs at no cost. In addition they scan for non-departmental faculty as a fee for service. The proceeds are used to support the yearly contract for service and upgrades for the Aperio slide-scanner. Additionally

Ms. McGhee helps in the organization of various teaching blocks by acquisition of teaching material and more importantly-by helping to organize and enter material for the Medical School on-line examination system. In the absence of Dr. Reisner she serves as a delegate to the CC2 Course Directors meeting and help to prepare surveys as needed by Dr. Reisner for his role on that committee. For the coming year Ms. McGhee plans on helping implement changes that are required to make Pathology teaching an excellent experience for the students they teach. She wants to provide more help toward lectures and lab preparation.

C. RYAN MILLER, M.D., Ph.D.

Dr. Miller's current activities are focused on translational research involving comparative genomics and proteomics analyses of gliomas from both humans and genetically-engineered mice (GEM). The main goals of this work are (i) to define the impact of cellular origin on the genomics of malignant glioma progression; (ii) to define the impact of cellular origin and oncogenic mutations on the kinomes of malignant gliomas; (iii) to define the impact of aging on the genomics and proteomics of malignant glioma progression, (iv) to define the transcription factor repertoire that mediates oncogenic mutation-induced de-differentiation of astrocytes into glioblastoma stem cells (GSC); (v) to define the role of PIK3CA mutations in gliomagenesis and targeted drug sensitivity, and (vi) to determine molecular signatures of human GBM after targeted drug therapies in order to develop molecular diagnostics for personalized therapy.

MELISSA B. MILLER, Ph.D.

Dr. Melissa Miller's major interests reside in the use of molecular technology to improve clinical infectious disease testing and, further, to use these technologies to explore the epidemiology of viral infections and antimicrobial resistance in bacterial infections. She is employing and comparing a variety of molecular technologies, including microarrays, sequencing and mass spectrometry, in the clinical diagnosis and epidemiology of infectious diseases. Further, Dr. Miller has developed an interest in the clinical and economic outcomes associated with the implementation of molecular infectious disease diagnostics. She continues to investigate and publish on the molecular epidemiology of MRSA, respiratory viral infections and mycobacterial infections.

STEPHANIE A. MONTGOMERY, Ph.D., D.V.M.

Dr. Montgomery provides collaborative pathology support on animal models and pre-clinical studies. As lead veterinary pathologist, she offer investigators a sophisticated understanding of how the models of experimental disease that they are studying recapitulate natural disease by providing a description of the types, progression, and severity of histopathologic changes, allowing researchers to accept or refute various aspects of their animal models. Dr. Montgomery educates investigators across disciplines on animal models, serving as a resource of anatomical and physiological differences between humans and animals, including age-related and strain (breed)-specific changes. As the Director of the LCCC Animal Histopathology Core, she has developed extensive immunohistochemistry and immunofluorescence assays for animal tissues that provide investigators with sophisticated tissue analysis that replicates the diagnostic tests performed in a clinical setting. Future plans include expanding the rodent clinical pathology services offered through this core. As issues arise, she has become involved in investigations of how current laboratory animal practices impact research studies being conducted on campus. In the largest of these projects, she is leading a study with the UNC Animal Studies Core to

determine the effect that *Corynebacterium bovis* (a commonly encountered bacteria in research vivaria) has on xenotransplant tumor take rate and growth in various immunocompromised mouse strains.

VINCENT J. MOYLAN, JR., M.S., P.A. (ASCP)

Vincent Moylan's main role in our department is to serve as instructor for our pathology residents when they rotate onto the autopsy service. He is also involved in several research projects that are affiliated with the UNC Lineberger Comprehensive Cancer Center. The first being the *LCCC Tumor Donation Program*. This is a rapid autopsy program headed up by Drs. Lisa Carey and Leigh Thorne. This research program involves breast cancer patients that have previously consented to autopsy upon their death. The second project is also a rapid autopsy program, similar to the above mentioned cancer study, except the study participants have metastatic melanoma. The program is headed up by Dr. Stergos Moschos. In addition, he will also be involved in a new research study that is just in the beginning stages and involves Alzheimer's disease participants. He continues to work closely with Dr. Nickeleit and the Nephropathology division handling all of the medical kidney specimens, and assisting the surgical PAs by processing and photographing select explant cases (cardiac, hepatic, lungs). He looks forward to his continuing work with Drs. Hadler, Reisner, and Aylsworth and other medical student teaching projects as they become available.

JUDITH NIELSEN, D.V.M.

In the research arena, Dr. Nielsen looks forward to continued collaboration with investigators at UNC in areas of infectious disease and neoplasia. She is currently mentoring three Veterinary Residents in DLAM with research projects. The first project evaluating the potential benefits of a new form of double decker caging to house rats has been completed and a publication describing this study is being submitted to *Journal of the American Association of Laboratory Animal Science*. A second resident research project, examining the ability to predict pinworm infection in mice by PCR of dust from IVC rack exhaust air is being written, also for publication in *JAALAS*, and an abstract has been submitted for presentation at the November 2016 national meeting of AALAS in Charlotte, NC. A third study, examining the ability to detect mouse subclinical infection with *Pasteurella pneumotropica*, *Helicobacter spp*, and Mouse Norovirus (MNV) in exhaust air dust from individually ventilated caging is near completion and an abstract of this study has also been submitted for presentation at the November 2016 AALAS meeting. Dr. Nielsen continues to explore and evaluate means of most efficiently and cost effectively monitoring the health status of our animal populations at UNC, with hopes that our studies will result in further reports and publications within the laboratory animal community. Dr. Nielsen has also continued her collaboration studying the pathogenesis of *Cryptococcus neoformans* in a mouse model with Dr. Kirsten Nielsen, who is now an Associate Professor in the Department of Microbiology in the School of Medicine at the University of Minnesota. This research resulted in a publication in the *Journal of Immunology* this winter and another paper in preparation for submission. She looks forward to continuing her leadership role in the Division of Laboratory Animal Medicine and the university in the support of Animal Welfare and Research.

VOLKER R. NICKELEIT, M.D.

The research activities of Dr. Nickeleit focus on different aspects of renal allograft pathology. (1) Adjunct assays (in particular electron microscopy and C4d staining) for the diagnosis of cellular

and antibody mediated rejection in kidney transplants are under investigation with additional focus on C4d in glomerular basement membrane remodeling. Dr. Nিকেleit is the chair (together with P. Randhawa from Pittsburgh) of the Banff-Working Group on T-cell mediated renal allograft rejection aiming at (re)defining features of cell-mediated rejection in the modern era of enhanced antibody/DSA testing. (2) A new and exciting line of investigation focuses on non-invasive diagnostic strategies to establish a diagnosis of polyomavirus nephropathy without an (invasive) biopsy (in close cooperation with H.K. Singh, MD). In pilot analyses negative staining electron microscopy on voided urine samples and the detection of three-dimensional polyomavirus clusters, termed Haufen, has proven to be a robust diagnostic method with negative and positive predictive values of greater than 90%. Extended prospective studies are currently conducted in order to validate the initial findings further. These efforts are in part funded by extramural support from Astellas Pharmaceuticals. In addition a mouse animal model of polyomavirus nephropathy is being characterized. Dr Nিকেleit and his team succeeded in mimicking polyomavirus induced tubular injury typical for human disease in a mouse model and could identify urinary Haufen in diseased mice. Further studies including gene expression profiling in mouse PVN and human PVN are currently conducted. Recently polyoma-BK-virus has also been associated with oncogenesis. Drs. Nিকেleit and Kenan are further characterizing the role of BK-virus in neoplastic growth using deep gene DNA and RNA sequencing strategies; the efforts have already resulted in one major publication in the Journal of Pathology.

SIOBHAN M. O'CONNOR, M.D.

Dr. O'Connor is in the writing phase of a project with Johnny Hollyfield evaluating whether a panel of four immunostains can distinguish serous carcinoma of the ovary with transitional cell morphology from malignant Brenner tumor. A case report of squamous cell carcinoma of the nipple with Avani Pendse was published online in Case Reports in Pathology. She is working with gyn clinicians on "Molecular and Metabolic Differences of Treatment Responders versus Non-responders in a Phase 0 Clinical Trial of Metformin in Endometrial Cancer," which was accepted as an abstract for ASCO. Other collaborative projects include "Using Novel in situ Hybridization Techniques to Detect Hep C Virus in Placentas," "Biomarkers of High Grade Cervical Dysplasia," "Diagnostic Endometrial Sampling After Ablation Therapy," "Washing of the Abdominopelvic Cavity During Myomectomy," and "Factors Associated with Recurrence Risk in Women with Endometrial Carcinoma." In addition, she is on a committee to support an NIH F31 fellowship application for an epidemiology PhD student comparing hrHPV tests using two different cervical self-sampling methods among sex workers in Mombasa, Kenya. She will continue her collaboration with the breast and gyn clinicians. She also plans to assist with additional Breast Spore projects.

YARA A. PARK, M.D.

Dr. Park's research focuses on thrombotic thrombocytopenia purpura (TTP), specifically the causes and exacerbating factors. Currently, she is investigating possible biomarkers in the initial presentation of TTP as well as in exacerbations during treatment. She is also conducting a nation-wide survey of practice patterns in TTP and distribution of TTP cases around the country.

NIRALI M. PATEL, M.D.

Clinically, Dr. Patel oversees somatic mutation testing using massively parallel sequencing within the UNC Molecular Genetics Laboratory. In addition to the Solid Tumor Panel, she

directed the launch of the Myeloid Mutation Panel (for AML, MDS, and MPN indications) in April 2015. Over the coming year, she will be developing an expanded somatic mutation sequencing panel for use in the clinical molecular laboratory. This is a translational project based on her role as a molecular pathologist for the UNCseq project, where she interprets data and oversees clinical confirmations to enable enrollment of patients into clinical trials.

ANDRE PHELAN, P.A.

Andre Phelan's primary activities include clinical instruction of gross pathology to the UNC pathology residents first through fourth year. Duties also include gross dissection and dictation of pertinent findings on surgical pathology specimens, assisting in intra-operative consultations through frozen section procedures, collecting samples for tissue procurement foundation, presenting gross conferences to pathology residents and performing ancillary duties such as specimen photography and radiography.

LI QIAN, Ph.D.

The goal of Dr. Qian's research is to understand the molecular basis of direct cardiac reprogramming and apply this knowledge to improve efficiency and clinical applicability of cellular reprogramming in heart disease. She has pioneered the system in which direct cardiac reprogramming could be rigorously studied and implemented, and demonstrated that endogenous cardiac fibroblasts can be reprogrammed into cardiomyocyte-like cells in their native environment. Her lab continues their recent work on direct cardiac reprogramming by delving into the molecular mechanisms that drive this fascinating process. Their plan for the coming year is to get their first R01 funded, one or more postdoctoral fellowships funded, and publish 2-3 research articles.

KATHLEEN W. RAO, Ph.D.

Dr. Rao's clinical and translational research is focused in the area of cancer cytogenetics. The UNC Clinical Cytogenetics Laboratory participates in two cancer cooperative groups (Alliance/CALGB and Children's Oncology Group) and Dr. Rao is active in peer review and/or leadership roles in both groups. As Chair of the COG Cytogenetics committee, Dr. Rao hosted a 1.5 day Cytogenetics Workshop in St. Louis, MO for over 200 Cytogeneticists from the US, Canada, Australia, New Zealand, and Great Britain (April 24-25, 2015). During the past year, the Cytogenetics Laboratory validated several new assays for paraffin embedded tissues. Plans for the coming year include adding additional FISH and microarray assays to the Cancer Cytogenetics clinical testing menu and aggressively pursuing the Laboratory's interest in identifying targetable genetic abnormalities in our UNC HealthCare cancer patient population.

JAY S. RAVAL, M.D.

Dr. Raval has been very active this semester. He spends his clinical service time in the areas of therapeutic apheresis (Medical Director), hematopoietic progenitor cell laboratory (Associate Medicine Director), transfusion medicine, blood banking, immunohematology, and platelet/plasma donor center. Dr. Raval's research continues to cover multiple areas in transfusion medicine. He continues to involve many individuals in his clinical and research activities; the backgrounds of these personnel are diverse and range from high school students to housestaff to faculty members (both here at UNC as well as from other institutions). Recently, he was awarded a \$50,000 NCTraCS-DTMI dual-institution CTSA to study the impact of RBC

rejuvenation on sickle cell disease patients receiving chronic transfusion therapy. Additionally, he is working closely with RTI International to characterize metabolomic markers of TTP disease activity, which will likely result in additional grant funding. Dr. Raval's involvement with AABB and ASFA continue to increase, and he contributes consistently to the missions of these organizations. With the increasing clinical volumes in transfusion medicine, therapeutic apheresis, and HPC transplantation here at UNC, due in part to expansion of the UNC Health System, clinical and research activities will also continue to increase. The upcoming year looks to be a very productive one for Dr. Raval and his colleagues.

MARIAN ROLLINS-RAVAL, M.D.

Over the past six months, Dr. Rollins-Raval has been attending on service in Hematopathology and Coagulation. In addition, as Director of the Special Coagulation Laboratory she is overseeing an understaffed area that is struggling consistently to staff the section, not to mention complete validations of new testing, including Chromogenic Factor VIII testing. Dr. Rollins-Raval has also coordinated with Bayer, Inc. to participate in two of their field studies for testing new recombinant Factor VIII drugs. In Flow Cytometry, at the behest of clinical colleagues, Dr. Rollins-Raval undertook the challenge for the lab to become a Children's Oncology Group Accredited Laboratory for the monitoring of minimal residual disease in B-lymphoblastic leukemia, the anticipated deadline has been extended by the COG, but the staffing in the Flow Cytometry Laboratory has not allowed for completion of this project. In addition to teaching while on Hematopathology Service, she also teaches a formal Coagulation Sign-Out to be experienced by DPLM residents during the Hematopathology rotation, fellows in Hematopathology and Transfusion Medicine throughout the whole year, both adult and pediatric Hematology/Oncology fellows when on service with her, and, potentially in the future, medical students. She has also hosted several elective rotations with Hematology/Oncology fellows in Coagulation. Given a little more time for research these past few months she has been able to complete several projects, including two published articles and a book chapter, and she is actively pursuing several projects (primarily in Coagulation) in the areas of ADAMTS13, HIT, and Factor VIII testing.

EIZABURO SASATOMI, M.D., Ph.D.

Dr. Sasatomi has recently developed a panel of immunohistochemical stains (smooth muscle actin, CD34, and glutamine synthetase) and a scoring system that will facilitate diagnosis and recognition of chemotherapy-associated sinusoidal injury (CSI), since the features of CSI can be difficult to recognize by pathologists who are not familiar with this entity and are not experts in the hepatobiliary system. Dr. Sasatomi has recently submitted a manuscript titled "Chemotherapy-induced Sinusoidal Injury (CSI) Score: A Novel Histologic Assessment of Chemotherapy-related Hepatic Sinusoidal Injury in Patients with Colorectal Liver Metastasis," for publication in BMC Cancer. Dr. Sasatomi is planning additional studies to assess the diagnostic utility of the same panel of immunohistochemical stains for the qualitative and/or quantitative assessment of hepatic sinusoidal injury in other clinical conditions such as Budd-Chiari syndrome, portal vein thrombosis, steatohepatitis, and ischemic/re-perfusion injury after liver transplantation.

LORI R. SCANGA, M.D., Ph.D.

Dr. Scanga has the following active research projects in the areas of cytology and surgical pathology, and supervises five research projects with pathology trainees. Project 1: Correlation of rapid on-site evaluation with final diagnosis in the evaluation of renal lesions, faculty advisor of Christine Bookhout (PGY4). This manuscript has been accepted for publication, is in proof status, and will be published in the first half of 2016. Project 2: Consultation in gynecologic pathology at an academic pathology department: concordance in diagnosis, quality measures, and effect on patient management, faculty advisor of Avani Pendse (PGY5). This project has an active IRB and is in the status of data collection, with a goal to submit an abstract to either USCAP or SGO in 2017. Project 3: The cytologic interpretation of Papanicolaou smears when HPV reflex testing is concomitantly requested, faculty advisor of Avani Pendse. This project has a current IRB submission, and an abstract has been submitted to the 2016 ASC Annual Scientific Meeting. Project 4: PREFER Trial: Preserving Fertility Choice in Early Cervical Cancer, faculty advisor of Avani Pendse and in collaboration with Dr. Boggess. The first trial patient underwent surgery on 5/23/2016. Drs. Scanga and Pendse are coordinating the pathology methods and specimens for this clinical trial. Project 5: Case report of a previously unreported co-occurrence of BRAF and EGFR mutations in micropapillary lung carcinoma, faculty advisor of Claire Edgerly (PGY 3) and in collaboration with Dr. Nirali Patel. Project 6: MDSC Clinical Trial: Myeloid-Derived Suppressor Cells in Head and Neck Cancer (MDSC clinical trial), in collaboration with Dr. Zdanski, Dr. Shores, and Dr. Serody. This research is currently in the stage of data review and manuscript preparation, with a goal for subsequent publication. Project 7: New Mexico HPV Pap registry (NMHPVPR) P16 adjudication study pathologist. This research is in the stage of data collection, with a goal for subsequent publication.

JOHN L. SCHMITZ, Ph.D.

Dr. Schmitz has continued collaboration with investigators from Duke University to assess the impact of HLA matching on lung transplant outcome. Initial data analysis has been completed and Dr. Schmitz is reviewing. As no significant impact of HLA mismatching was found, the next analyses will assess the influence of HLA epitope mismatch load on outcome. Dr. Schmitz will be conducting an analysis of de novo donor specific HLA antibody incidence in the UNC solid organ transplant populations at UNC to assess the impact of epitope mismatch load as a predictor and as a guide the frequency of post-transplant HLA antibody monitoring. The HLA laboratory received accreditation of NGS-based HLA typing and is currently one of 5 laboratories in the country that has achieved this. Dr. Schmitz is continuing collaboration with Dr. Falk's laboratory to assess the impact of regulatory B-cells on relapse risk in ANCA associated vasculitis patients treated with B-cell depleting antibodies. Dr. Schmitz's laboratory will begin performing a more specific regulatory B-cell phenotyping analysis on patients in the spring. Finally, Dr. Schmitz has received a contract with Becton Dickinson for conducting a clinical trial of their new flow cytometer for CD4 T-cell counts.

Dr. Schmitz is conducting several vendor sponsored clinical trials of a new diagnostics. He is evaluating a new clinical flow cytometer for Becton Dickinson in a 3 site clinical trial to generate data for FDA submission. In the Immunology laboratory Dr. Schmitz is conducting a study of a new automated platform for Rapid Plasma Reagin (RPR) testing. The laboratory is also preparing to evaluate a new T. pallidum chemiluminescent screening assay with the aim of modeling the clinical and financial impact of switching from the standard to reverse screening

algorithm for the laboratory diagnosis of Syphilis. The Immunology laboratory will also be evaluating the Thermofisher ImmunoCAP based MPO and PR3 ANCA assays in comparison to the current predicate assays. In the HLA laboratory, studies continue on the application of next generation sequencing for HLA typing. Dr. Schmitz will also be assessing the impact on short term outcomes of renal transplant recipients of donor specific HLA antibodies (DSA) detected by the sensitive Luminex based assay currently employed by the laboratory. This information will also be used to assess and modify, as necessary, current testing algorithms for DSAs.

STEVEN T. SHIPLEY, D.V.M.

Dr. Shipley's primary mission is divided between clinical service, teaching, and research. Clinical service plans/goals for the coming year include creating efficiency in delivery of clinical veterinary care (particularly to off-campus locations) through coordination and consolidation of duties with veterinary faculty and residents. Teaching goals include continuing to be actively involved in day to day mentoring and ongoing didactic instruction of Laboratory Animal Medicine residents at UNC as well as RTLAMTP Didactic lectures. Research goals include completing animal experiments in currently funded research and initiation of data analysis. Dr. Shipley also plans to actively reach out to UNC faculty for collaborative research opportunities in specific areas of strength/interest – large animal models, infectious disease, and immunology.

HARSHARAN K. SINGH, M.D.

Dr. Singh's clinical responsibilities have been devoted to renal pathology which has also been a major focus of her research with a minor research component in cytopathology. As Associate Director in the Division of Nephropathology, Dr. Singh assumed additional administrative responsibilities including assisting the Director with oversight of all clerical and laboratory staff, management of the nephropathology histology and immunohistochemistry laboratory, laboratory quality control issues, and the development of new diagnostic assays. As Director of Electron Microscopy services, she oversees quality control issues as related to EM and maintains oversight of all technical staff in this area. Approximately 75% of Dr Singh's time is devoted to clinical and teaching responsibilities in Nephropathology with the remaining time devoted to clinical/translational research in renal pathology with a focus in transplantation and teaching in the medical and dental schools as well as in the Pathobiology and Translational Science graduate program. Dr. Singh is a translational physician-scientist whose practice and clinical research interests are in polyomavirus infection in the setting of renal and other solid organ transplantation. She is also interested in the application of electron microscopy and ultrastructural pathology in the setting of renal transplantation. A number of projects in both human subjects and in animal models are underway in the area of Polyomavirus Nephropathy including: (i) multicenter study with Children's Hospitals of Philadelphia and Cincinnati involving children post-bone marrow transplantation and evaluating Polyomavirus infections and the application of the urine PV-Haufen test to diagnose Polyomavirus Nephropathy in this subset of patients. (ii) Dr. Singh is chairing the Banff working group for Electron Microscopy to evaluate glomerular basement membrane double contours, including Cg1A lesions and the presence of severe peritubular capillary basement membrane multi-lamination as features of chronic rejection and to develop and validate a standardized, reproducible diagnostic approach. The potential reversibility or progression of these lesions also remains undetermined and will be studied. (iii) Proof-of-concept studies in an animal model of PVN [developed at UNC]. (iv)

Finalizing data of a 5-year prospective study funded by Astellas Pharma evaluating patients with PVN with protocol biopsy data at time of PVN resolution.

SCOTT V. SMITH, M.D.

Dr. Smith is Associate Director of Surgical Pathology and Director of Pediatric Pathology for UNC Hospitals. Dr. Smith's clinical activities are focused in surgical pathology with broad emphasis in pediatric, ENT, cardiac, pulmonary, gastrointestinal, genitourinary, prostate, pancreaticobiliary, endocrine, cardiovascular, and bone and soft tissue pathology. An integral part of these endeavors is the instruction of the pathology residents and fellows to facilitate their professional development. His teaching activities are substantial within the medical center including ongoing lecture series within the Schools of Medicine, Dentistry, and Public Health. Dr. Smith works in collaborative research with Dr. Julie Blatt and Dr. Ian Davis in Pediatric Hematology Oncology.

OLIVER SMITHIES, D.Phil.

For over more than 25 years, much of Dr. Smithies research has been focused on identifying genetic factors that control blood pressure. Recently, he shifted emphasis towards understanding factors that cause proteinuria associated with pregnancy (pre-eclampsia) or diabetes. Dr. Smithies is currently in the final stages of submitting a paper to PNAS describing findings that dietary nicotinamide rectifies many of the maternal and fetal problems that develop in two mouse models of pre-eclampsia. A second, currently unfunded, research area concerns the way that the kidney glomerulus discriminates between large proteins, which do not cross the glomerular barrier, from small proteins, which do. He is currently in the final stages of submitting a paper to PNAS describing this work, which leads to the conclusion that proteinuria is determined by size-dependent permeation into the GBM together with saturable reabsorption of filtered molecules; the slit diaphragm is critical for the structural integrity of the glomerulus, but not for its size selectivity.

JOAN M. TAYLOR, Ph.D.

The long-term goal of Dr. Taylor's research is to identify signaling mechanisms that contribute to normal and pathophysiological cell growth in muscle (smooth, cardiac and skeletal). They are interested in studying cardiac and vascular development as well as mechanisms involved in heart failure, hypertension, and muscle degenerative diseases. The current directions of the Taylor lab are to characterize components of the integrin signaling cascade in these specialized cell types and to target disruption of these regulatory molecules *in vivo* in an effort to determine their precise role in cardiovascular growth and disease. They also seek to design therapeutics to target relevant pathways to treat hypertension and excessive myocyte death following myocardial infarction.

LEIGH B. THORNE, M.D.

Dr. Thorne's research activities continue with the Tissue Procurement Facility, specifically focusing on the quality assurance of research tissues collected. She also collaborates on two rapid autopsy programs (breast and melanoma). Dr. Thorne provides review and quality assurance of breast cancer tissues used in the Carolina Breast Cancer Study. Dr Thorne's clinical duties continue in molecular genetic pathology and the autopsy service. Dr. Thorne has also taken over as director of muscle pathology. With new hospitals coming into the UNC Healthcare

umbrella, in the upcoming year the UNCH Autopsy Service will be providing a more centralized system for the performance of autopsies among the different hospitals. She will also continue to assist the Decedent Care staff in improving this still newly developed area.

RICHARD R. TIDWELL, Ph.D.

Dr. Tidwell will continue research on the R01 subcontract with the University of Washington (co-principal investigator on the grant). During the first three years of this grant Dr. Tidwell's laboratory synthesized over 450 molecules and screened them for activity against the trypanosome responsible for human African trypanosomiasis (HAT). A number of these molecules have demonstrated all the positive attributes needed to predict success against the neurological form of HAT including the ability to cross the blood brain barrier. One compound was found to be curative in both acute and chronic mouse models of HAT. The compound was resynthesized during the past year and is scheduled for more testing during the coming year. Two manuscripts detailing the Phase 2 and 3 clinical trials of parafuramidine against early-stage HAT were submitted and published during the past year. These trials were among the first to be carried out under FDA regulations in Africa. A third paper was published on the new compounds synthesized and tested under the current NIH grant. In addition, a provisional patent was filed based on the most promising class of compounds covered in the current NIH grant (Tidwell, RR and Patrick, DA. Compounds for *Treatment of Trypanosomes and Neurological Pathogens and Uses Thereof*, filed January 21, 2016).

DIMITRI G. TREMBATH, M.D., Ph.D.

Dr. Trembath maintains a busy clinical service, signing out general surgical pathology the GI Smalls and GI Large benches. Dr. Trembath is Director of the Division of Neuropathology at UNC, and in conjunction with Dr. Tom Bouldin, is responsible for covering the surgical neuropathology service. These duties include teaching residents, covering frozen sections for both services, and signing out the in-house and outside cases assigned to that bench. In conjunction with Dr. Bouldin, Dr. Trembath is also responsible for covering the ophthalmologic pathology service. Dr. Trembath is also responsible for the muscle service (since 2015), in conjunction with Dr. Leigh Thorne. In terms of research, Dr. Trembath is involved in several collaborative efforts. With Dr. Stergios Moschos of Hematology-Oncology, Dr. Trembath is analyzing melanoma brain metastasis to discover genes involved in the metastatic process as well as genes important for prognosis and response to therapy. Dr. Trembath is also involved in a similar effort researching breast cancer brain metastases with Dr. Carey Anders. With Dr. Hae Won Shin of the UNC Neurology department, Dr. Trembath is collaborating in validating new MRI modalities for identifying seizure foci. Most recently, Dr. Trembath has begun collaborating with Dr. Shehzad Sheik of the UNC Department of Medicine to look at microRNAs involved in the pathogenesis of inflammatory bowel disease.

CYRUS VAZIRI, Ph.D.

Dr. Vaziri's current research is focused on understanding molecular mechanisms of genome maintenance as it pertains to cancer etiology and cancer therapy. His major goals are to publish results of ongoing research projects in high quality journals in order to maintain existing grants and to provide additional funding opportunities. Another goal is to broaden the scope of his research by identifying new avenues for future research and initiating new projects that will provide vehicles for extramural funding. To this end, trans-disciplinary studies are ongoing with

several colleagues at UNC including Dr. Ken Pearce (School of Pharmacy), Dr. Buddy Weissman (Pathology), Dr. Ben Major (LCCC), and Dr. Yuri Fedoriw (Pathology). A collaborative drug discovery project with School of Pharmacy colleagues has already resulted in a funded R01. Dr. Vaziri hopes that this is one of many trans-disciplinary collaborations that will help procure future funding.

KAREN E. WECK, M.D.

The goals of the research of Dr. Karen Weck are to translate novel molecular genomic tests for clinical diagnostic and prognostic testing and to investigate the clinical utility of novel molecular genetic testing. Major areas of focus in the past year include somatic mutation testing in a variety of tumor types to identify response or resistance to specific pathway inhibitors and support of broad-scale next-generation human exome sequencing efforts to identify mutations in genetic diseases and cancer. Dr. Weck is Co-Principal Investigator on a NHGRI U01 grant called North Carolina Genomic Evaluation by Next-generation Exome Sequencing (NCGENES). The overall goals of the UNC NCGENES project are to evaluate the use of whole exome sequencing (WES) as a diagnostic tool in selected clinical conditions with a likely genetic etiology, evaluate the use and impact of incidental sequence information, develop a clinically-oriented structure for interpretation, storage, and reporting of WES data, and implement WES in traditionally underserved populations throughout North Carolina. Significant efforts in the past year have been made to support the UNCSeq cancer project, supported by the University Cancer Research Fund. The goals of UNCSeq are to identify potentially medically actionable somatic mutations in UNC patients with cancer through massively parallel sequencing of ~250 genes in druggable pathways. The goals of Dr. Weck's research in the next year are to continue efforts to utilize next generation sequencing for clinical care at UNC in the areas of cancer and genetic disease.

ERIC T. WEIMER, Ph.D.

The flow cytometry laboratory has finished validation of CD45RA/RO enumeration. The flow cytometry lab continues its validation of minimal residue disease (MRD) for the Children's Oncology Group studies. The Immunology lab validated a new Phadia 250 instrument to increase throughput for allergy testing and validating a new liquid handler Thunderbolt for automation of Quantiferon Gold and other manual ELISAs. The HLA laboratory validated an updated next-generation sequencing assay for HLA which will reduce HLA typing ambiguity and reduce overall turn-around-time for patient HLA typing. In the coming year, the molecular immunology lab is validating assays including a genetic panel for immune deficiencies and a real-time PCR assay for T-cell receptor excision circle (TREC) and kappa receptor excision circle (KREC) enumeration for immune reconstitution surveillance. A research study examining the potential of HLA typing from cell-free DNA to better identify transplant rejection prior to the need for biopsy (funded by a Junior Faculty Development Award). Additional ongoing projects include resolution and submission of newly identified HLA alleles for official naming and inclusion in the IMGT/HLA database. Dr. Weimer's paper detailing the clinical implementation of NGS for HLA typing was accepted in Journal of Molecular Diagnostics and he has submitted two additional manuscripts with collaborators for publication. This experience has led to the request for an Editorial about clinical implementation of NGS for HLA typing

BERNARD E. WEISSMAN, Ph.D.

Dr. Weissman's laboratory will continue to work on identifying the mechanisms that drive SCCOHT development. They will also continue studies on the interaction between the SWI/SNF complex and KEAP1/NRF2 signaling during adenocarcinoma of the lung development. Finally, they have developed a novel genetically engineered mouse model (*LSL-Nrf2^{E79Q}*) to dissect the role of NFE2L2 (NRF2) activation in the development of human squamous cell carcinomas. These studies represent a continuing effort with long-time collaborators in the Lung Cancer/COPD working group. Dr. Weissman's major goals this coming year are to obtain at least one additional grant and to publish the initial characterization of the *LSL-Nrf2^{E79Q}* mouse, as well as the first study on the mechanism by which SMARCA4 inactivation initiates SCCOHT development.

JULIA W. WHITAKER, M.S., D.V.M.

Dr. Whitaker works in the Division of Laboratory Animal Medicine (DLAM) which provides support for research involving the use of animals by providing clinical care and surgical support. Research funding to UNC totaled \$792 million in the past year, with approximately \$594 million total NIH funding and an estimated one-third of this total supports research projects involving animal subjects in some phase of the research activity. UNC has maintained accreditation for the entire campus with the Association for the Assessment and Accreditation of Laboratory Animal Care, International (AAALAC International) since 1989. Federal regulations, as well as AAALAC requirements for accreditation, require adequate veterinary care for all research animals. In order for animals to be used for research at all at UNC, there must be veterinarians to evaluate their health and well-being. In August 2014, the UNC Animal Care Program was reviewed, and all animal facilities were reviewed by AAALAC International site visitors and UNC received full accreditation. In Sept 2015, Dr. Whitaker became Associate Director of Research Administration and works closely with the Institutional Animal Care and Use Committee (IACUC), serving as the alternate voting member for the Attending Veterinarian/DLAM Director in his absence. She has also joined the DLAM Advisory Committee, the DLAM Project Planning group, and the Enrichment Committee. As part of her duties within DLAM, Dr. Whitaker consulted with principal investigators and graduate students on animal care and use protocols. As part of her focus on aquatic animal medicine, she did most of the IACUC training for handling and use of the aquatic animal species. Since currently there is no one in the IACUC office with aquatic animal experience, she does most of the IACUC training in this area. UNC has a certified residency training program in laboratory animal medicine. ACLAM requires supervision by an ACLAM-boarded veterinarian for the didactic training of residents. In 2011, ACLAM approved the regional Research Triangle Laboratory Animal Training Program (RT LAMP), which is made up of partnering organizations who all participate in the training of the RT LAMP residents. The participating organizations are UNC, Duke, NCSU, Glaxo Smith Kline and NIEHS. The UNC residents attend the RT LAMP seminar held once a week for 2-4 hours, and the organizations share and rotate the teaching responsibilities of the course. As one of the 5 laboratory animal veterinarians in DLAM at UNC, Dr. Whitaker is one of the providers of this didactic teaching. Since Sept of 2009, Dr. Whitaker has Co-chaired the Southeastern location of the International Mock Board Exam Coalition for the ACLAM board exam, which is offered to laboratory animal veterinarians at 12 sites in the US and 4 internationally for those who are taking the ACLAM board specialty exam. It is given as part of the North Carolina Association of Laboratory Animal Medicine Workshop in

Laboratory Animal Medicine. There were 56 laboratory animal veterinarians who took the mock exam in the Southeastern location in May 2016. While the exam site is the Southeast region, this meeting is a national meeting and registrants come from across the US to attend the workshop and take the mock exam.

DAVID C. WILLIAMS, M.D., Ph.D.

Dr. David Williams maintains both an NIH-funded research laboratory and clinical service responsibilities in hematopathology. His laboratory is currently funded to study the dynamic interaction between methylcytosine binding domain proteins and DNA for which he has successfully completed most of the aims. Over the next year he will focus on publishing manuscripts and submitting a competitive renewal. This renewal will build on a new collaboration with Hong Wang at NC State to use single molecule fluorescence to follow DNA binding by the MBD proteins. More recently, David has published a manuscript describing an intrinsically disordered region of the MBD2 protein critical to the formation of the NuRD complex and will be resubmitting an R01 grant application to further characterize how this region stably binds the NuRD complex. To pursue this work, he has developed a collaboration with Joel Mackay at the University of Sydney. In addition, he has established collaborative efforts with Marcey Waters and was awarded internal Lineberger Comprehensive Cancer Center developmental grant to develop a cell penetrating peptide that disrupts methylation-dependent gene silencing. They are collecting preliminary data and plan to submit for an R01 in the Fall. Dr. Williams maintains an active collaboration with Brian Strahl and Stephen Frye to characterize bivalent readers of chromatin. He is currently a co-investigator on a competitive renewal with Stephen Frye which scored well and is likely to be funded. Finally, he has become an active member of the hematopathology service and will continue to expand his role both in teaching the residents and in clinical service.

SCOTT E. WILLIAMS, Ph.D.

Dr. Scott William's laboratory is interested in how stratified epithelia are built and maintained, in the context of development and cancer. They study a broad array of epithelial tissues including the skin epidermis, oral epithelia (collaborations involve Antonio Amelio, UNC Dentistry), and neuronal epithelia (collaborations involve Timothy Gershon, UNC Neurology). They study how cell polarity is established in these tissues, how it regulates cell-cell adhesions and asymmetric cell divisions, and how it becomes altered in squamous cell carcinomas. Other research interests include the genetic basis of epithelial-derived cleft lip and palate syndromes and identification and characterization of stem cells of the oral epithelia.

MONTE S. WILLIS, M.D., Ph.D.

Dr. Willis is Vice Chair of Academic Affairs in the Department of Pathology and Laboratory Medicine, Director of the UNC Campus Health Services Laboratory, Director of UNC Hospitals sweat testing laboratory, and Assistant Director of the UNC Hospitals core (clinical chemistry) laboratories. He is also an independent Principal Investigator in the McAllister Heart Institute directing a translational research program investigating the role of ubiquitin ligases (MuRF1, MuRF2, MuRF3) in metabolism, autophagy, and protein synthesis [Project 1: MuRF1 regulation of nuclear transcription factors (PPARalpha and Thyroid Receptoralpha) in stretch mediated cardiac hypertrophy and atrophy; Project 2: MuRF2 and MuRF3 regulation of PPAR isoforms in diabetic cardiomyopathy by non-

canonical ubiquitination in vivo; Project 3: Role of MuRF1 in calpain-1 mediated heart failure in vivo]. His laboratory also investigates the role of protein misfolding, autophagy, and proteotoxicity in the pathophysiology of heart failure [Project 4: The role of the human Bag3+ mutation (P209L) in mediating cardiac-specific heart failure; Project 5: Interactions between human cardiac myosin binding protein-C (cMyBP-C) truncation mutations and muscle-specific ubiquitin ligases in heart failure]. The laboratory also creates therapeutic interventions for heart failure using peptide-mediated inhibition of signal transduction [Project 6: Inhibiting cardiomyocyte cell death and fibroblast collagen synthesis in myocardial infarction via peptide inhibition of MK2]. The dynamic and interactive mentoring of post-doctoral fellows, graduate students, clinical residents, and visiting scientists are the creative focus of Dr. Willis' research and discovery program. The startup company CardioEphEx, LLC (<https://www.facebook.com/cardioephex?fref=photo>) was recently founded by Dr. Willis and his colleague Dr. Jitka Virag (East Carolina University) to develop therapies focusing on the cardiac Ephrin systems in ischemic heart disease and fibrosis. In the coming year, collaborative efforts with industry and international collaborators via the Leducq collaborative (<http://www.fondationleducq.org/nivel2.aspx?idsec=1195>) will continue and focus on generating the pre-clinical data needed to apply for FDA approval use in human studies for cardiac applications.

ALISA S. WOLBERG, Ph.D.

The major goals of Dr. Alisa Wolberg's research are to examine cellular, biochemical, and biophysical mechanisms that modulate procoagulant activity and fibrin formation during hemostasis and thrombosis. Dr. Wolberg's group has made substantial progress towards these goals. They have used in vitro and in vivo models of thrombosis and thrombolysis to examine how plasma hypercoagulability and vessel injury promote thrombus formation. Their studies suggest pathogenic roles for cell-derived microvesicles in thrombosis and cancer, correlate vascular injury with thrombus formation and stability, and have revealed newly-recognized pathways that regulate arterial and venous thrombosis. They have recently revealed a newly-recognized role for transglutaminase factor XIII in determining venous thrombus composition and size, and characterized the operant biochemical mechanisms. Their findings suggest novel approaches to reduce venous thrombosis risk. Future plans are to delineate the role of transglutaminase activity in determining venous thrombus size and stability and identify novel molecules to inhibit factor XIII function.

JOHN T. WOOSLEY, M.D., Ph.D.

Dr. Woosley's primary research effort is in GI and liver pathology. Over the last 20 years he has been a co-investigator on a continuum of research projects with Robert Sandler, M.D. The general thrust of these projects has involved the defining of environmental risk factors for adenomatous polyps and colorectal cancer and the identification of biomarkers as guides to more effective screening and prevention. The biology of colorectal cancer provides unique opportunities for etiologic research. Because colorectal cancer arises from an ordered series of pathologic precursor lesions, it is important to determine where potential environmental risk factors operate in the cancer sequence. Dr. Woosley also has a very active collaboration with Richard Semelka, M.D., Department of Radiology that has resulted in multiple publications that have expanded the radiopathologic knowledge base. Dr. Woosley is very actively involved in

collaborative research projects with Dr. Evan Dellon and Dr. Ramon Bataller, Division of Digestive Diseases, Department of Internal Medicine, UNC School of medicine. The collaboration with Dr. Dellon focuses on the basic pathophysiology of Eosinophilic esophagitis. The collaboration with Dr. Bataller focuses on the pathogenesis, prognosis, and treatment strategies for alcoholic steatohepatitis. Dr. Woosley is also actively involved in medical student and pathology resident training, but plays no active role in pathology graduate student training.

HONG XIAO, M.D.

Dr. Xiao's research efforts are focused on elucidating the pathogenic mechanism of immune-mediated vascular damage with emphasis on antineutrophil cytoplasmic autoantibody (ANCA) induced glomerulonephritis and small vessel vasculitis (ANCA disease). Her current approaches consist of (i) Identifying specific epitopes that are targeted by pathogenic anti-MPO IgG. Recombinant mouse/human MPO chimeric molecules have created and the pathogenic epitopes are being mapped using the chimeric molecules. (ii) Strain-based genetic analysis for genetic loci, trying to identify candidate genes and their protein products that modulate the diseases severity in experimental MPO-ANCA disease, which might be new markers for disease activity and potential targets for novel therapeutic strategy in humans. (iii) Investigating the involvement of receptors on neutrophil such as FcR, C5R, and kinin receptors in pathogenesis of ANCA disease and testing therapeutic interventions with inhibitors in ANCA disease model. (iv) Using animal model to dissect the mechanism of anti-MPO induced extravascular inflammation and tissue injury such as granuloma.

YANG YANG, Ph.D.

Oncogene-induced checkpoint signaling leads to growth arrest and permanent cell cycle exit (often termed Oncogene-Induced Senescence or OIS) which likely represents a barrier to malignant progression. However, oncogene-expressing cells do progress to malignancy and therefore pre-neoplastic cells must evade OIS. Rad18 regulates several pathways of DNA damage tolerance and DNA repair and is known to respond to several forms of DNA damage that are reportedly induced by oncogenes including replication stalling, DNA DSB, and ROS-induced oxidative lesions. Dr. Yang's project is to determine the potential contribution of Rad18 to tolerance of oncogenic stresses. Dr. Yang plans to publish one or two papers in the coming year.

MAIMOONA B. ZARIWALA, Ph.D.

Dr. Zariwala's research includes (i) Deciphering possible genetic causes of primary ciliary dyskinesia (PCD), and idiopathic bronchiectasis, and she continues to provide research genetics results to the consortium, and UNC patients and families. (ii) Identifying large deletions/duplications and decipher breakpoints to develop PCR-based assays and elucidate functional consequences of splice-site mutations. (iii) Large-scale mutation profiling for known PCD-associated genes to help (a) determine the denominator for the mutations in the unselected PCD cohort, (b) assist with the genotype-phenotype correlations, (c) provide negative samples which will be helpful resource for the novel discoveries, and (d) continue to build well-characterized cohorts for possible clinical trials. (iv) Continue to provide consultation and ongoing support to the Molecular Pathology Lab for expansion of clinical genetics test panel for PCD. Dr. Zariwala's laboratory has made significant progress towards each of these goals in the

last year. The work to decipher fraction of PCD patients harboring mutations in the known 30 gene panel has been completed in over 100 subjects and *DNAH5* continues to emerge as a top gene harboring mutations (~20% of all PCD). Few large deletions or duplications were known for PCD and Dr. Zariwala has identified over 10 patients harboring these large rearrangements. Work to decipher the breakpoint is ongoing. Whole exome sequenced data for over 50 “idiopathic Bronchiectasis” families has been received and is being analyzed. Additionally, 60 unrelated cases of PCD that are negative for mutations in the known PCD genes are currently being exome sequenced for the possible new discoveries. Further analysis is ongoing for the 2 families harboring *SPAG1* mutations but not fitting the ciliary phenotype. Expansion of the clinical test panel for PCD in the Molecular Pathology Lab is very close to being complete. Additional work with Molecular Pathology Lab on patients with the Cri du chat syndrome that have a deletion of *DNAH5* from one allele is underway to decipher if a second mutation is present in these patients that have an overlapping PCD phenotype. The work continues to represent significant steps forward in the studies of genetically heterogeneous disorders in humans.

QING ZHANG, Ph.D.

Dr. Zhang’s research focuses on understanding how hypoxia signaling/prolyl hydroxylase pathways contribute to breast cancer and renal cell carcinoma. Their ultimate goal is to develop selective strategies to target key signaling pathway in hypoxia signaling involved in cancer. Dr. Zhang’s plan for the coming year is to publish at least 2-3 peer-reviewed research articles. His lab has two papers published at *EMBO Journal* and *Mol Cell Oncol* last year. Currently, Dr. Zhang has another paper in revision for *Dev Cell* and two more papers in preparation. Dr. Zhang will also be actively submitting research grant applications, participating in departmental and Lineberger Cancer Center seminar/symposium events, and will continue to serve on committees for graduate students.

TEACHING

HOWARD M. REISNER, Ph.D.

MEDICAL: The TEC 1 integrated curriculum which spans the first three semesters of undergraduate medical education is taught in a completely integrated format. The curriculum integrates preclinical science (such as biochemistry, histology, cell biology, physiology and genetics) previously taught in the first year with the pathophysiology/pathology previously taught in the second year. The curriculum remains organ system based with the blocks being taught in a similar order. The initial block (Principles of Medicine, POM) and the second block (Immunology-Host Defense) serve a somewhat introductory role. An introductory lecture of 100 minutes on mechanisms of pathology was given by Dr. Jennette and two two-hour small group sessions covering the histopathology of cellular response to injury (including a short quiz) was included in the POM block. A small group session on inflammation and an overview lecture on mechanisms of immunopathology were included in the Immunology block. In addition an introductory lecture on neoplasia has been integrated into the Hematology (3rd) block. The teaching of systemic pathology in the subsequent organ system blocks is organized similar to the prior curriculum. Because of the shorter available time more use is being made of “free-standing” teaching modules for use independently by students. The use of virtual microscopy in several of the blocks (POM, Immunology, Pulmonary, Renal) continues to be much improved by working with Leica-Biosystems to provide an off-site service and upgraded performance.

Dr. Reisner has aided in preparation of teaching material with the assistance of Ms. McGhee and they have concentrated on making virtual microscopy slides easily available as part of the syllabi. As “Coil” for Pathology, Dr. Reisner works closely with the surgical pathology faculty who are responsible for teaching in each system block and also with faculty from other Departments (such as Cell Biology) to help in the provision of virtual microscopy for histology. Student acceptance has increased with the much improved Leica-Biosystems based server system and a far greater interest in histopathology was noted to be present during laboratory sessions. Laboratories continue to be staffed predominantly by staffed by both residents and M.D. faculty. The examination format has been somewhat modified to fit the integrated TEC 1 examination paradigm. Many small group sessions include a short quiz done in lab to help reinforce major points in the lecture and laboratory.

DENTAL: First Year Dental School Teaching: Pathology 127: Dr. Reisner (Course Director) revised the previous lecture-based format replacing most formal lectures with a prerecorded introduction followed by a brief-individually based on-line quiz. Dr. Reisner was available during the time devoted to individual student review and for an additional 15 minutes to provide guidance and answer questions. Following the quiz either histology review sessions or in some cases short case based sessions were provided followed by group quizzes. Several of the sessions did maintain the prior lecture based format for comparison. In addition a single joint general/dental pathology session was done in collaboration with Dr. Padilla. For the 2017 semester all lectures will be provided using prerecorded material. Student comments regarding the new format were extremely positive and represented a significant improvement. Two open book examinations were also included to encourage students to review the material.

Second Year Dental School Teaching (Pathology 214): The course is currently a series of eleven lectures designed to cover most areas of systemic pathology by invited Pathology Clinical

Faculty with Dr. Reisner filling in where necessary. Because of this format, the variability between sessions continues to diminish. The lack of a laboratory de-emphasizes histopathology and the use of fixed organ material. Lectures are now much more standardized and apropos the needs of the Dental students. Current efforts are focused on converting this format to the use of prerecorded lectures because of very poor student attendance at lectures

PATHOBIOLOGY AND TRANSLATIONAL SCIENCE GRADUATE PROGRAM

JONATHON W. HOMEISTER, M.D., Ph.D., DIRECTOR OF GRADUATE STUDIES

CYRUS VAZIRI, Ph.D., ASSOCIATE DIRECTOR OF GRADUATE STUDIES

Summary of Programmatic Activities, and Graduate Student Accomplishments and Activities

The graduate program Director, Jonathon W. Homeister, M.D., Ph.D., and Associate Director, Cyrus Vaziri, Ph.D., have held these positions since August of 2012.

The graduate student body individually and collectively accumulated a number of significant accomplishments during the past year. Two students successfully completed the Ph.D. program (Britta Jones and Amanda Rinkenbaugh). With these graduates, the Pathobiology and Translational Science graduate program has produced 188 total graduates and 139 Ph.D. graduates since 1954. Britta is in a Post-doctoral Fellowship at UNC-CH in the UNC Kidney Center, Division of Nephrology. Amanda has accepted a Post-doctoral position at MD Anderson Cancer Center in Houston, TX.

The Biological and Biomedical Sciences Program recruited another excellent class of graduate students, many of whom were interested in the Pathobiology and Translational Science graduate program. During Summer 2015, Fall 2015, and Spring 2016, nine faculty members associated with the Pathobiology and Translational Science graduate program hosted sixteen laboratory rotation experiences for fourteen individual students. This is about twice the number of laboratory rotations than the previous year. Zachary Opheim matriculated into our program from the BBSP in June of 2016, and will work with Dr. Joan Taylor. Another BBSP student, Michael Henderson, who previously earned his Master Degree in Toxicology and was on leave from that program to work at the NIEHS, chose to return to graduate school in August for his PhD degree. Michael joined our program and will be working with Dr. Nigel Key. As of July 1, 2016, the Pathobiology and Translational Science graduate program has a total of 15 students (14 from the BBSP and one from the M.D.-Ph.D. Program)

In 2015-16, graduate students from the program contributed authorship to over 15 publications in peer-reviewed journals as well as numerous published abstracts, many with a graduate student as first author, and several with multiple graduate students as co-authors. In addition, many graduate students were recognized for their research excellence with awards. At the 2015 Pathobiology and Translational Science Annual Research Symposium, Jamie Byrnes and Nicole Fleming received awards for outstanding presentations by a graduate student. Rachel Dee received the Trainee's Choice Award from her colleagues. Jamie Byrnes received an award for the Best Oral Presentation at the 2016 Gordon Research Seminar on Hemostasis. Sabri Abdelwahab received a Minority Trainee Development Scholarship from the American Thoracic Society at their international conference in May 2016. Robbie McNeill received a 2016 UNC Translational Medicine Symposium Poster Award. Haley Vaseghi received a First Place Oral

Presentation at the 2016 RTP Drug Metabolism Discussion Group Winter Symposium. Last, Jamie Byrnes received the 2016 Katherine Pryzwansky Young Investigator Award from the Department of Pathology and Laboratory Medicine.

Research support for students in Pathobiology and Translational Science was provided by a number of sources other than their mentor's grants. Several students received support from NIH training grants or the NSF. Ashley Fuller, Haley Vaseghi, and Sravya Kattula were both supported by the Integrative Vascular Biology NIH Training Program, and Britta Jones was supported by the North Carolina Kidney Foundation NIH Training Grant. James Byrnes and Nicole Fleming were supported by NSF Pre-doctoral Fellowships. Kevin Mangum and Rachel Dee were supported by Predoctoral Fellowships from the American Heart Association. In addition, several students were supported by funds from the Department of Pathology and Laboratory Medicine. During 2015-2016, Robbie McNeill, and James Byrnes received support as Robert H. Wagner Scholars in Pathobiology and Translational Science. Qiang Zhu received a Bill Sykes Scholarship, and Haley Vaseghi received partial support as a Bill Sykes Scholar, to supplement her American Heart Association fellowship.

The involvement of Pathobiology and Translational Science students and faculty in the Certificate Program in Translational Medicine remains strong, although financial support is no longer offered to the students. Seven Pathobiology and Translational Science Ph.D. students including, Sabri Abdelwahab, James Byrnes, Nichole Fleming, Britta Jones, and Robbie McNeill were fellows participating in the Program in Translational Medicine. The involvement of Pathobiology and Translational Science students in the relatively new Certificate Program in Cardiovascular Science is growing. This year three of our Ph.D. students, Rachel Dee, Qian Zhu, and Nicole Fleming, were fellows in the program.

During the last year, the Graduate Student Seminar Series, which began in Fall of 2001, continued to showcase the excellent research of the graduate trainees. The Spring 2016 Seminar Series featured presentations by 12 Pathobiology and Translational Science Ph.D. students. Beyond our Tuesday seminar series, graduate students from our program participated in numerous other research symposia on campus. Graduate students were also featured in a Pathology Grand Rounds session in Spring 2016. Kevin Mangum (from Dr. Mack's laboratory) gave a presentation entitled "*Transcriptional regulation of the smooth muscle-specific, hypertension-associated gene, GRAF3,*" and Jamie Byrnes (from Dr. Wolberg's laboratory) gave a presentation entitled "*Biochemistry of coagulation Factor XIII in venous thrombosis.*" These series provides valuable opportunities for students, faculty, and staff to learn more about graduate student research ongoing in the department. The Marc J. Mass, Ph.D., Memorial Distinguished Lecture Committee hosted Susan Slaughaupt, Ph.D., from Harvard University on Friday, April 29, 2016, for a talk entitled "*Treating mRNA splicing disorders using splice modulator compounds.*"

In the summer of 2015, the graduate students selected Dr. Christopher Mack, Ph.D. the 2015 recipient of the ***Joe W. Grisham Award for Excellence in Graduate Student Teaching***. The award was presented to Dr. Mack in September 2015 at the evening reception after the Annual Research Symposium, held at the University's Rizzo Conference Center. In other activities, the graduate students have continued to have regular outings to local restaurants and events for

informal discussions related to the graduate program and their research, as well as fun social interaction.

RESIDENCY TRAINING PROGRAM IN PATHOLOGY

SUSAN MAYGARDEN M.D., DIRECTOR

The Department of Pathology & Laboratory Medicine currently sponsors a residency training program in Anatomic Pathology (AP) and Clinical Pathology (CP). Our program is fully accredited by the American Council on Graduate Medical Education (ACGME); a complete description of our program, curriculum and current trainees is available on the departmental web site: <https://www.med.unc.edu/pathology/residency>.

The educational goals and philosophy of the residency program are:

1. Provide a flexible, broad-based training program for physicians that includes training in anatomic, clinical, and experimental pathology.
2. Encourage trainees to participate in research.
3. Provide an educational experience sufficient to ensure that all residents develop skill levels expected of a new practitioner in the six ACGME-defined competencies (patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism and systems-based practice).

We offer a four-year combined AP and CP residency with ample opportunities for research and post-residency fellowship training in a wide range of subspecialty areas in Pathology. The first three years of our program are focused on core training in AP and CP. The curriculum is organized to blend AP and CP core rotations within each of the first three years of training. The fourth year of training permits the trainee great flexibility – there are 5 months of elective rotations in AP, CP, or pathology research, so that the resident can concentrate on his/her particular interests. Overall there are 7.5 months of elective rotations interspersed throughout the four-year training program. All residents in our training program are provided with an individual study carrel, microscope, and computer fully loaded with appropriate software, connected to the internet and fully supported by the UNC Hospitals' ISD staff.

For the academic year July 1, 2015, through June 30, 2016, we had a total of 17 residents (15 AP/CP residents plus 2 AP-only residents). The two AP-only residents came about because of an increase in program complement granted in September 2014 to allow additional tracks in our program (AP-only, CP-only, or a research track). The first individual recruited for this extra position is an anatomic pathology only resident who joined our program on January 1, 2015. Our second AP-only resident is a former AP/CP resident who transitioned to an AP-only position also in January, 2015.

The 5 graduating residents completed the program on June 30, 2016. All have gone on to fellowship programs: 1 in cytopathology at UNC, 1 in surgical pathology at UNC, 1 in transfusion medicine at UNC, 1 in forensic pathology at UNC (Office of the Chief Medical Examiner of North Carolina), and 1 in breast pathology at Stanford. The program successfully matched 4 residents in March 2016 to form the incoming 2016 class. The program received approximately 415 applicants.

The leadership of the residency program remained stable in 2014-15. Dr. Susan Maygarden is the residency program director, Dr. Herb Whinna is the associate director, and Ms. Elizabeth McDonald is the program coordinator.

SUBSPECIALTY FELLOWSHIP TRAINING PROGRAM

CLINICAL CHEMISTRY FELLOWSHIP 2015-2016

Nichole Korpi-Steiner, Ph.D., Director

Ronald R. Henriquez, Ph.D., Fellow 2014-2016

(<http://www.pathology.unc.edu/fellowship/clinchem.htm>)

Begun in 1972, this postdoctoral training program has a rich history of producing leaders within the field of Clinical Chemistry. Following two-years of intensive training in both the analytical and clinical aspects of clinical chemistry, fellows are prepared to enter laboratory medicine in clinical service, educational, or research roles. In 2016, the UNC Clinical Chemistry Fellowship Program was inspected by the Commission on Accreditation in Clinical Chemistry (ComACC) and received successful reaccreditation of this fellowship training program through 2021.

Dr. Ronald R. Henriquez successfully passed the NRCC and part A of the ABCC examinations prior to completing his training in 2016. Dr. Henriquez presented several posters at the 2015 AACC annual meeting in Atlanta, *Comparison of Two Methods for Monitoring Compliance and Thoroughness of Glucose Meter Disinfection Practices* and *Evaluation of Hemoglobin A1c Immunoassay and Capillary Electrophoresis Methods*, with receipt of a best abstract award in patient safety from the Critical and Point-of-Care Testing Division.

CLINICAL MICROBIOLOGY FELLOWSHIP 2015-2016

PETER H. GILLIGAN, Ph.D., DIRECTOR

(<https://www.med.unc.edu/pathology/residency/fellowships/clinical-microbiology>)

The Department of Pathology and Laboratory Medicine and UNC Hospitals sponsors the Clinical Microbiology Training Fellowship, which is a two-year training program accredited by the Committee on Post-doctoral Education Programs of the American College of Microbiology. The Clinical Microbiology Fellowship is directed by Peter H. Gilligan, Ph.D. The major objective of this program is to train individuals to direct clinical and public-health-microbiology laboratories. The fellows' training includes five areas: (i) Technical training to become proficient at performing and interpreting the laboratory procedures offered in the clinical microbiology laboratory; (ii) Administrative training in the various aspects of laboratory management and administration, including budgeting, personnel, quality control, protocol preparation, safety regulations, and CLIA and OSHA requirements; (iii) Clinical training enabling the trainee to interface effectively with infectious-disease clinicians; (iv) Research in clinical microbiology; and (v) A four week external rotation at the State Laboratory of Public Health. On July 21, 2016, RongPong Plongla completed a highly successful fellowship in this program. Dr. Plongla joined our program in July 2014 from the Faculty of Medicine Chulalongkorn University, Bangkok, Thailand. He had recently completed a Masters of Medical Science degree from the University of Uppsala in Sweden. His fellowship training was supported by a grant to Dr. Plongla from the Thai government. Dr. Plongla had a highly productive fellowship. He has three papers published in refereed journals with another in preparation and 5 published abstracts. He taught medical students in the classroom and did significant clinical

training of residents and fellows in the clinical microbiology laboratories. He played a significant role in laboratory consolidation leading validation studies at both Hillsborough and High Point Hospitals. At Hillsborough he validated reflex urine cultures and rapid RSV/Flu PCR. At High Point, he validated the blood culture methodology. Dr. Plongla successfully passed the American Board of Medical Microbiology Examination (which had a 50% passing rate in 2016) and has returned to Faculty of Medicine Chulalongkorn University, Bangkok, Thailand.

In July 2016, Cara Levinson joined our training program. Dr Levinson has a PhD from the University of Albany. She did her doctoral level work at the Wadsworth Center which is the New York State Public Health Laboratory.

CLINICAL MOLECULAR GENETICS FELLOWSHIP

JESSICA K. BOOKER, Ph.D., DIRECTOR

Natasha Strande, Ph.D., FELLOW, 2015-2017

(<http://www.med.unc.edu/pathology/residency/fellowships/clinical-molecular-genetics-fellowship>)

The Department of Pathology and Laboratory Medicine and UNC Hospitals sponsors a Clinical Molecular Genetics fellowship, which is a one- or two-year training program in laboratory aspects of clinical molecular genetics. The program is accredited by the American Board of Medical Genetics and Genomics. The Molecular Diagnostic Laboratory at UNC Hospitals provides experience with tests including cystic fibrosis, fragile X mental retardation, hemochromatosis, factor V Leiden and prothrombin, α 1-antitrypsin deficiency, MCAD deficiency, connexin 26 and 30 mutations, Prader-Willi and Angelman syndromes, primary ciliary dyskinesia, EBV and BK viral loads, hereditary cancers, acquired mutations in cancer, chromosomal breakpoints in leukemias, pharmacogenetics, and monitoring of bone marrow transplants with polymorphic microsatellite markers. State-of-the-art technologies and instrumentation are used in all of these tests. The clinical aspects of the training program are complemented by a strong research foundation. The Clinical Molecular Genetics Fellowship is directed by Jessica Booker, Ph.D. There was one fellow in the training program in 2015-2016, and one from 2016-2017.

MOLECULAR GENETIC PATHOLOGY FELLOWSHIP

MARGARET L. GULLEY, M.D., DIRECTOR

(<http://www.med.unc.edu/olioli/residency/fellowships/mgp>)

The Molecular Genetics Laboratory performs assays on DNA and RNA to help in diagnosis, monitoring, and treatment of infectious disease, cancer, and heritable conditions. A test menu and description of each clinical service is found on our website:

<http://www.unccmedicalcenter.org/unccmc/professional-education-services/mclendon-clinical-laboratories/directory/molecular-pathology-and-genetics/>

Newly implemented are the Heritable Cancer Predisposition Panel for *BRCA1/2* gene sequencing. On the horizon are DNA sequencing panels for renal disease, cystic fibrosis, and primary ciliary dyskinesia, and a circulating cell free DNA panel to monitor cancer burden. All of these new tests rely on massively parallel sequencing technology to identify relevant gene variants. A pathologist's interpretation of the findings is reported to the patient's medical record.

Our clinical and academic mission is to advance healthcare using modern molecular technologies. Our training programs educate physicians, medical students, post-doctoral fellows, genetic counseling students, and clinical laboratory scientists. Our fellowship training program in Molecular Genetic Pathology was the first in the nation to educate a board-certified physician in this subspecialty. We offer a month-long course in Molecular Diagnostics and Cytogenetics targeted at pathology residents and open to other interested medical professionals. Our aim is to train science professionals to become competent and confident in using molecular technologies in clinical research and practice. Further information on our clinical, educational, and research work is found at: <http://www.med.unc.edu/pathology/faculty/biosketch-of-dr-margaret-gulley>

Increasingly clinicians use results of molecular tests for diagnosis and for patient management. We rely on solid evidence demonstrating that each test adds value for disease classification or for improving patient outcome. We thank UNC Hospitals, the TraCS Institute, the University Cancer Research Fund, and the Department of Pathology and Laboratory Medicine for making available the resources to implement many advanced molecular tests. We are well prepared to implement molecular technologies and to validate novel genomic assays. In many cases we can provide services at a lower cost and with greater consultation support than if testing were done at alternative laboratory facilities. Learn more about assay design and implementation in a document entitled "Validating assays for use in clinical trials" at <http://www.uncmedicalcenter.org/uncmc/professional-education-services/mclendon-clinical-laboratories/directory/molecular-pathology-and-genetics/>

Major Equipment in the clinical molecular genetics lab: Illumina MiSeq and NextSeq sequencers, Life Technologies Ion Torrent PGM sequencer, Roche LightCycler 2.0 and 480 real-time PCR instruments, Abbott m2000, Roche MagnaPure extractor and MagnaLyser, Perkin Elmer Janus Robotic Pipettor; Qiagen EZ1, Qiacube, and QiaSymphony extractors; Applied Biosystems / ThermoFisher QuantStudio Dx, 9700, 9800, 7500, and 7900 PCR instruments; two ABI Veriti thermocyclers, Idaho Technologies LightScanner, three ABI 3130xl and two ABI 3500 capillary gel electrophoresis instruments, Biotage Pyromark MD pyrosequencer, Affymetrix array scanner, RoboSep cell separator, and UVP gel documentation system.

Faculty include: Margaret L. Gulley M.D., Karen Weck M.D., Bill Funkhouser M.D. Ph.D., Leigh Thorne M.D., Jessica Booker Ph.D., Nirali Patel M.D., and Rosann Farber Ph.D. Fellows are Nathan Montgomery M.D. Ph.D. and Tasha Strande Ph.D. Our excellent staff includes six medical technologists, three research scientists, our supervisor and administrative director, and an office support assistant.

COAGULATION FELLOWSHIP

The Coagulation Fellowship did not have a Fellow assigned this year.

CYTOGENETICS FELLOWSHIP

KATHLEEN W. RAO, Ph.D., DIRECTOR and KATHLEEN KAISER-ROGERS, CO-DIRECTOR, Ph.D.

(<https://www.med.unc.edu/pathology/residency/fellowships/clinical-cytogenetics-fellowship>)

The McLendon Clinical Laboratories of UNC Hospitals and the Department of Pathology and Laboratory Medicine sponsor a fully accredited training program in Clinical Cytogenetics, which

leads to eligibility for certification by the American Board of Medical Genetics and Genomics (ABMGG). The usual training period is two years. Upon successful completion of the program and ABMGG Certification, the fellow will be qualified to direct a clinical Cytogenetics laboratory. The Cytogenetics Fellowship Program is part of a comprehensive ABMG training program that includes Medical Genetics Residents, Clinical Molecular Fellows, Clinical Biochemical Fellows, and Molecular Genetic Pathology Fellows. All trainees and faculty involved in these programs participate regularly in multiple clinical and educational conferences, and Fellows have opportunities to teach in Medical Student and Resident courses. The UNC Cytogenetics laboratory is a full service laboratory, processing over 4000 specimens on which more than 6500 tests are performed annually for both constitutional and oncology diagnostics. Sample types include CVS, amniocentesis, products of conception, peripheral blood, bone marrow, lymph nodes, solid tumors, tissue biopsies, and paraffin sections. Fellows are trained in result interpretation and in a variety of techniques, including tissue culture, chromosome banding and analysis, FISH, and high resolution SNP microarray. The UNC Cytogenetics Laboratory is an approved Children's Oncology Group Laboratory and Cancer and Leukemia Group B Laboratory and actively participates in both of these national cancer cooperative groups. The Clinical Cytogenetics Fellowship was directed by Kathleen W. Rao, Ph.D until March of 2016 and is currently directed by Kathleen Kaiser-Rogers, Ph.D. The ABMGG has recently decided to merge the Cytogenetics and Molecular Genetics Fellowships into a single Laboratory Genetics and Genomics (LGG) Fellowship as of July 1, 2017. This LGG Fellowship will be jointly directed by Kathleen Kaiser-Rogers and Jessica Booker, Ph.D.

CYTOPATHOLOGY FELLOWSHIP

LESLIE DODD, M.D., DIRECTOR

(<https://www.med.unc.edu/pathology/residency/fellowships/cytopathology>)

The Cytopathology Fellowship Program admits two trainees per year. The program has a highly competitive admissions policy and consistently attracts very well qualified candidates. All trainees in recent history have passed their qualifying examination (Cytopathology Board); we have a 100% pass rate. Trainees have a variety of learning experiences including cytopathology rotations, two months of elective time, and one required month of surgical pathology and conference review. This curriculum exceeds Board requirements for trainee engagement, progression to independent practice, and interdisciplinary learning.

The Cytopathology program has transitioned its evaluation process to comply with the "NAS" requirements stipulated by the ACGME. We have cytopathology-specific milestones the PEC will be using to evaluate trainee' progress. We have expanded our evaluation process to include more "360" evaluators in different departments (Radiology, Interventional Pulmonology, Gastroenterology). A fairly new addition to the curriculum is an option for trainees to attend an off-site comprehensive cytopathology course. To date, all fellows have reported this was an extremely positive experience. The curriculum has also added short rotations in the prep lab and the screening lab for fellows.

FORENSIC PATHOLOGY FELLOWSHIP

DEBORAH L. RADISCH, M.D., MPH, DIRECTOR

(<https://www.med.unc.edu/pathology/residency/fellowships/forensic-pathology>)

The North Carolina Office of the Chief Medical Examiner (OCME) in conjunction with the Department of Pathology and Laboratory Medicine and UNC Hospitals, offers a one-year fellowship in forensic pathology. The program is accredited by the Accreditation Council for Graduate Medical Education (ACGME) and is under the direction of the Chief Medical Examiner of the State of North Carolina. The trainee in forensic pathology performs approximately 250 forensic autopsies during the course of the one-year fellowship. Consultations in subspecialty areas, including neuropathology, pediatric pathology, forensic odontology, and forensic radiology are available within the Department of Pathology and Laboratory Medicine and the School of Dentistry. Ancillary laboratory studies, including post-mortem toxicology, clinical chemistry, microbiology, and special histology are provided by the in-house toxicology laboratory and WakeMed Pathology Laboratories. Forensic anthropology, crime lab technology, and other training experiences are also provided at designated sites, including North Carolina State University and the NC Crime Lab. The forensic pathology fellowship is directed by Deborah L. Radisch, MD, MPH. One fellow is currently undertaking the training program (2016-2017).

HEMATOPATHOLOGY FELLOWSHIP 2015-2016

STEPHANIE MATHEWS, M.D., DIRECTOR

(<https://www.med.unc.edu/pathology/residency/fellowships/hematopathology>)

The Department of Pathology and Laboratory Medicine (McLendon Clinical Laboratories) and the UNC Hospital sponsors a broadly based, one-year training program in hematopathology. The program is directed by full-time hematopathologists and is fully accredited by the ACGME. We have been highly successful in attracting high-quality applicants with a broad range of backgrounds, interests, and career goals. Our Fellowship is organized in such a way as to provide appropriate training in all areas of hematopathology, while also providing flexibility to address personal needs, interests, and objectives of the individual fellows. Trainees gain experience in the management and medical supervision of a high volume hematology laboratory, the evaluation of peripheral blood smears, bone marrow, and lymph node biopsies, coagulation testing, and hemoglobinopathy diagnosis. The Hematopathology Fellows have been very active in scholarly activities with resultant journal publications. The fellowship was able to recruit Nathan Montgomery, a former UNC resident, and Daniel Duncan, a former UNC resident and molecular fellow. Both were a tremendous asset to the work in our division, and functioned seamlessly within our team.

NEPHROPATHOLOGY FELLOWSHIP 2015-2016

VOLKER NICKELEIT, M.D., DIRECTOR

Francois Gougeon, M.D., Fellow

Alexi Mikhailov M.D., Fellow

(<https://www.med.unc.edu/pathology/residency/fellowships/nephropathology-fellowship>)

The Department of Pathology and Laboratory Medicine sponsors a one- to two-year fellowship in renal pathology in the Division of Nephropathology. Up to two fellows (from the US or foreign nationals) are accepted into the program. The fellows are directly involved in the diagnostic evaluation of over 1900 renal biopsies/nephrectomies (both native and transplant

cases) examined annually. All fellows are integrative members of the nephropathology team and receive intensive training. They prepare cases for sign out by the faculty using all standard techniques (light microscopy, immunofluorescence microscopy, immunohistochemistry, and electron microscopy). The fellows' responsibilities include the organization of clinico-pathologic and biopsy review conferences for medical faculty and housestaff, and teaching renal pathology to medical students, residents, and fellows. Teaching conferences and continuous education series offered by the nephrology and transplant divisions at UNC provide additional ample learning opportunities. Although emphasis is placed on the development of diagnostic skills, fellows are expected to carry out clinico-pathological and/or basic research projects and to present their data at national meetings, such as the ASN or USCAP (funding provided by the UNC Division of Nephropathology). Research projects focus on the pathogenesis of glomerulonephritides, allograft rejection, and polyomavirus infections. All state-of-the-art facilities (including gene sequencing) are available. Appropriate research studies are financially supported by the division. Clinico-pathological studies are facilitated by the Glomerular Disease Collaborative Network, which is a well-established network of over 200 nephrologists participating in clinical data collection. The division of nephropathology and the fellowship training program is directed by V. Nickleit, M.D. (www.uncnephropathology.org).

SURGICAL PATHOLOGY FELLOWSHIP/INSTRUCTORSHIP

WILLIAM K. FUNKHOUSER, M.D., Ph.D., DIRECTOR

Lauren Allen, MD, FELLOW/INSTRUCTOR (2015-16)

Spencer Rusin, MD, FELLOW/INSTRUCTOR (2015-16)

(<https://www.med.unc.edu/pathology/residency/fellowships/surgical-pathology-fellowship>)

The Department of Pathology and Laboratory Medicine sponsors a one-year fellowship/instructorship in diagnostic Surgical Pathology. The training program focuses on workup, diagnosis, and reporting of surgical pathology cases, with correlative exposure to cytopathology, immunohistochemistry, cytogenetics, electron microscopy, and molecular genetic pathology. The training year is divided into two equal parts. Each 6-month block has three components: 4 months are spent working up/diagnosing/dictating cases during rotations on 8 organ-specific benches and the frozen section room, 1 month is spent diagnosing/dictating outside cases, with presentation of a subset of these cases at 5 weekly multi-disciplinary conferences, and 1 month is spent on elective time for project completion/writing/submission. The difference between the Fall and Spring blocks is that the Fellow's work is checked and signed out by credentialed faculty in the Fall, whereas the Fellow is credentialed by the hospital during the Fall and given independent sign-out responsibilities as a faculty Instructor in the Spring. We have received uniformly good feedback on this training format from our Fellows/Instructors as they have competed for, and been hired as, independent practicing Pathologists in the academic or private practice workforce.

TRANSFUSION MEDICINE FELLOWSHIP

YARA A. PARK, M.D., DIRECTOR

The Department of Pathology and Laboratory Medicine and McLendon Clinical Laboratories of UNC Hospitals sponsor a comprehensive one-year fellowship program in Blood Banking/Transfusion Medicine that is fully accredited by the Accreditation Council of Graduate Medical Education (ACGME). The training program provides didactic and practical training in advanced immunohematology, therapeutic and donor apheresis, blood component donation, testing, preparation and storage, clinical coagulation, histocompatibility, hematopoietic progenitor cell collections and processing, and clinical support for an academic tertiary care hospital. Supported clinical programs include transplant programs in marrow/stem cells, liver, heart, lung and kidney; a Level I trauma program; and a neonatal intensive care unit.

PATHOLOGY AND LABORATORY MEDICINE GRAND ROUNDS – 2015-2016

GRAND ROUNDS ORGANIZING COMMITTEE: YURI FEDORIW, M.D., Chair

Members: Monte S. Willis, M.D., Ph.D., M.B.A. and Cyrus Vaziri, Ph.D.

(<https://www.med.unc.edu/pathology/coming-events/pathology-laboratory-medicine-grand-rounds>)

The Department of Pathology and Laboratory Medicine Grand Rounds seminar series continued to be well attended during the academic year 2015-2016. This weekly series provided a venue to disseminate clinically relevant translational and clinical research to promote the interaction and collaboration between the Department of Pathology and Laboratory Medicine faculty, residents, postdoctoral fellows, graduate students, and clinical fellows, and other members of the UNC academic community at-large. This is also the venue where we feature faculty academic accomplishments that serves as part of promotion and post-tenure reviews, and as a forum for announcements and discussion of items of interest and importance to faculty and trainees.

Yuri Fedoriw (Chair), Cyrus Vaziri, and Monte Willis comprised the Grand Rounds Committee for this academic year. The 2015-2016 Grand Rounds included talks intended to highlight and encourage the clinical and research collaborations of our Department of Pathology and Laboratory Medicine faculty. Some Grand Rounds (with CME credits) were delivered by two individuals paired by clinical and laboratory interests. Some pairs had ongoing collaborations, and others had complementary expertise and perspectives on related topics. The committee strived to assure a range of experimental, clinical, and surgical pathology, and included scientific reviews of pertinent areas in clinical medicine, translational research, and/or basic science.

The following list of 2015-2016 presenters, their affiliations and topics demonstrate that both internal and external speakers are sought.

Category 1 CME credit is offered for seminar participation. We provide an opportunity for the speakers to have their presentation formally evaluated, as required of all CME activities. Written comments and questions concerning the quality of the presentations are requested. Prior to each Grand Rounds seminar, refreshments are provided. This encourages a collegial atmosphere, and it also provides an opportunity for the attendees to visit and discuss science, medicine, and research.

FALL

SPEAKER/AFFILIATION

08/27/2015

Mehmet Kesimer, Ph.D.
Associate Professor, Department of Pathology and Laboratory Medicine
Marsico Lung Institute
The University of North Carolina at Chapel Hill
“Airway mucins to mucus: From innate defense to pathogenesis”

09/03/2015

Scott E. Williams, Ph.D.
Assistant Professor, Department of Pathology and Laboratory Medicine
UNC Lineberger Comprehensive Cancer Center
The University of North Carolina at Chapel Hill

“More than just cell division: Why mitotic spindle orientation matters”

- 09/10/2015 Nichole Korpi-Steiner, Ph.D., DABCC
Assistant Professor, Department of Pathology and Laboratory Medicine
The University of North Carolina at Chapel Hill
“Human chorionic gonadotropin testing: Assessing risk for patient care and safety”
- 09/17/2015 Qing Zhang, Ph.D.
Assistant Professor, Department of Pathology and Laboratory Medicine
UNC Lineberger Comprehensive Cancer Center
The University of North Carolina at Chapel Hill
“Study of EglN2 prolyl hydroxylase and oxygen sensing pathway in cancer”
- 09/24/2015 Catherine A. Hammett-Stabler, Ph.D., DABCC, FACB
Professor, Department of Pathology and Laboratory Medicine
Director of Core Laboratory, McLendon Clinical Laboratories
The University of North Carolina at Chapel Hill
“The FDA, LDTs, and YOU: Implications beyond MCL”
- 10/01/2015 Eizaburo Sasatomi, M.D., Ph.D.
Associate Professor, Department of Pathology and Laboratory Medicine
and Anatomic Pathology
The University of North Carolina at Chapel Hill
“Early hepatocellular carcinoma”
- 10/15/2015 George Fedoriw, M.D.
Associate Professor, Pathology and Laboratory Medicine
Director of Hematopathology
The University of North Carolina at Chapel Hill
“Clinical, immunophenotypic, and genomic characterization of lymphoproliferative disorders in Sub-Saharan Africa”
- 10/22/2015 Stephanie A. Montgomery, D.V.M., Ph.D.
Assistant Professor, Department of Laboratory Medicine
The University of North Carolina at Chapel Hill
“A comparative pathology approach to animal studies”
- 11/05/2015 Timothy R. Gershon, M.D., Ph.D.
Associate Professor, Department of Neurology
UNC Lineberger Comprehensive Cancer Center
UNC Neuroscience Center
The University of North Carolina at Chapel Hill
“Microcephaly syndromes identify novel targets for brain tumor therapy”

- 11/12/2015 Christopher P. Mack, Ph.D.
Associate Professor, Department of Pathology and Laboratory Medicine
The University of North Carolina at Chapel Hill
“Genomic and genetic insights into smooth muscle cell-specific gene expression”
- 11/19/2015 Yolanda Sanchez, Ph.D.
Associate Professor of Pharmacology and Toxicology
The Audrey and Theodor Geisel School of Medicine at Dartmouth
Associate Director for Basic Sciences, Norris Cotton Cancer Center
“Synthetic lethality: An old friend with a new job - Finding the Achilles heel of cancer”
- 12/03/2015 Marian Rollins-Raval, M.D., M.P.H.
Clinical Assistant Professor, Div of Hematopathology and Coagulation
Department of Pathology and Laboratory Medicine
The University of North Carolina at Chapel Hill
“Heparin-induced thrombocytopenia: STILL a clinicopathological diagnosis”
Raj Kasthuri, M.D.
Associate Professor, Division of Hematology and Oncology
Department of Medicine
The University of North Carolina at Chapel Hill
“Heparin-induced thrombocytopenia: STILL a clinicopathological diagnosis”
- 12/10/2015 Craig Fletcher, D.V.M., Ph.D.
Associate Professor, Department of Pathology and Laboratory Medicine
Director, Division of Laboratory Animal Medicine
Assistant Dean for Animal Research Resources
The University of North Carolina at Chapel Hill
“Platelet Factor-4 (PF-4): Bridging platelets and the immune system”
- 2/17/2015 Kenneth H. Pearce, Ph.D.
Center for Integrative Chemical Biology and Drug Discovery
Division of Chemical Biology and Medicinal Chemistry
UNC Eshelman School of Pharmacy
“Journeys in lead discovery and characterization from the CICBDD: Examples and future prospects”
- SPRING** **SPEAKER/AFFILIATION**
- 01/28/2016 Monte S. Willis, M.D., Ph.D.
Associate Professor and Vice Chair of Academic Affairs
Department of Pathology and Laboratory Medicine

The University of North Carolina at Chapel Hill
“Proteotoxicity, p38 signaling, and heart failure: Alzheimer’s Disease of the heart?”

- 02/04/2016 Jason C. Mills, M.D., Ph.D.
Associate Professor, Departments of Medicine
Co-Director, Digestive Disease Center
Pathology & Immunology, and Developmental Biology
Washington University School of Medicine
“Metaplasia: Pearls and perils of reserve stem cells and reverse differentiation”
- 02/11/2016 Richard D. Lopez, M.D.
Associate Professor, Division of Cellular Therapy/Bone Marrow Transplantation
Duke University
“Innate anti-tumor and anti-viral immunity of $\gamma\delta$ -T cells: Biological and pre-clinical models for the adoptive immunotherapy of malignant and infectious diseases”
- 02/28/2016 Steven I. Park, M.D.
Associate Professor, Department of Medicine
Director of Lymphoma Program
UNC Lineberger Comprehensive Cancer Center
The University of North Carolina at Chapel Hill
“Myc-overexpression in lymphoma”
- 03/03/2016 Nikolay Dokholyan, Ph.D.
Michael Hooker Distinguished Professor of Biochemistry and Biophysics
The University of North Carolina at Chapel Hill
“From etiology to therapeutics of Lou Gehrig’s disease”
- 03/10/2016 Jiaoti Huang, M.D., Ph.D.
Professor and Chair of Pathology
Duke University School of Medicine
“Neuroendocrine Differentiation of Prostate Cancer”
- 03/17/2016 Kevin D. Mangum, Graduate Student Research Day Program in Pathobiology and Translational Science
Department of Pathology and Laboratory Medicine
The University of North Carolina at Chapel Hill
“Transcriptional regulation of the smooth muscle-specific, hypertension-associated gene, GRAF3”
James R. Byrnes, Graduate Student Research Day Program in Pathobiology and Translational Science

Department of Pathology and Laboratory Medicine
The University of North Carolina at Chapel Hill
“Biochemistry of coagulation Factor XIII in venous thrombosis”

- 03/24/2016 Bobbie S. Pritt, M.D., Thomas W. Bouldin Lecture
Director of Clinical Parasitology
Department of Laboratory Medicine and Pathology
The Mayo Clinic
“Worms you won’t find in your garden”
- 03/31/2016 Marshall A. Mazepa, M.D.
Assistant Professor, Department of Pathology and Laboratory Medicine
The University of North Carolina at Chapel Hill
“Can we bring precision medicine to thrombotic thrombocytopenia purpura (TTP)? Treating for more than just a normal platelet count”
- 04/07/2016 Diane M. Armao, M.D.
Research Instructor, Department of Pathology and Laboratory Medicine
The University of North Carolina at Chapel Hill
“How the pathological examination of giant axonal neuropathy is informing therapy development: The revolving glass door of bench to bedside”
Steven J. Gray, Ph.D.
Assistant Professor, Department of Ophthalmology
UNC Gene Therapy Center
The University of North Carolina at Chapel Hill
“How the pathological examination of giant axonal neuropathy is informing therapy development: The revolving glass door of bench to bedside”
- 04/14/2016 Arti Pandya, M.D., M.B.A.
Associate Professor of Pediatrics and Genetics
Division Chief, Genetics and Metabolism
The University of North Carolina at Chapel Hill
“Impact of next generation sequencing on diagnosis of hearing loss”
- 04/21/2016 R. Balfour Sartor, M.D.
Midgette Distinguished Professor of Medicine, Microbiology and Immunology, The University of North Carolina at Chapel Hill
“Regulation of intestinal inflammation versus homeostasis by immune responses to resident intestinal bacteria”
- 04/29/2016 Susan A. Slaugenhaupt, Ph.D., Marc J. Mass, Ph.D. Memorial Lecture
Professor of Neurology
Scientific Director, Massachusetts General Research Institute
Center for Human Genetic Research

Harvard Medical School
“Treating mRNA splicing disorders using splice modulator compounds”

05/12/2016

Pablo Ariel, Ph.D.
Director, Microscopy Services Laboratory
Department of Pathology and Laboratory Medicine
The University of North Carolina at Chapel Hill
“Answering biological questions with light-sheet microscopy”

05/19/2016

Avani Pendse, M.D., Ph.D., Resident & Fellows Research Day
Cytopathology Fellow, Department of Pathology and Laboratory Medicine
The University of North Carolina at Chapel Hill
“Concomitant request for Human Papillomavirus (HPV) reflex testing introduces a positive bias on the morphologic interpretation of Thin Prep pap tests”
Sixto M. Leal Jr., M.D., Ph.D., Resident & Fellows Research Day
PGY-2 Resident, Department of Pathology and Laboratory Medicine
The University of North Carolina at Chapel Hill
“Novel insights into the pathogenic potential of the human microbiome”
Nathan D. Montgomery, M.D., Ph.D., Resident & Fellows Research Day
Hematopathology Fellow, Department of Pathology and Laboratory Medicine
The University of North Carolina at Chapel Hill
“Karyotypic abnormalities associated with Epstein-Barr virus status in classical”

05/26/2016

Timothy C. Hallstrom, Ph.D.
Assistant Professor, Department of Pediatrics
Division of Blood and Marrow Transplantation
University of Minnesota
“Cell fate control by integrated E2F, FOXO, and AKT signaling in retinal progenitor cells and retinoblastoma”

06/16/2016

Maimoona Zariwala, Ph.D.
Research Assistant Professor, Department of Pathology and Laboratory Medicine
The University of North Carolina at Chapel Hill
“Current status of Genetic of Primary Ciliary Dyskinesia”

06/23/2016

Joshua Zeidner, MD
Assistant Professor, Department of Medicine
UNC Lineberger Comprehensive Cancer Center
The University of North Carolina at Chapel Hill
“AML in 2016: Moving beyond a one size fits all approach”

CLINICAL SERVICES

BACKGROUND McLENDON CLINICAL LABORATORIES

HERBERT C. WHINNA, M.D., Ph.D., DIRECTOR

McLendon Clinical Laboratories provides laboratory and pathology services to physicians in support of excellent patient care at UNC Hospital. Each laboratory section maintains fiscal accountability for revenue generated and expense required to provide clinical test results. The revenue contribution from the laboratory has continued to grow, despite the difficult financial climate facing healthcare as a whole. The directors of each laboratory, working closely with the assistant administrative directors, develop short and long range plans to assure that the laboratories are supporting the testing needs of the hospital, while continuing to provide the medical staff with cutting edge technologies. The laboratory contributed \$77.9 million dollars to UNC Hospital's operating margin for FY 17. McLendon Laboratories focused the past year on four major initiatives: EPIC Beaker implementation (addressed in the LIS section), development of an internal testing laboratory for the UNC Health Care System, Carolina Value consultative review, and laboratory system-wide integration, and accreditation inspections.

The Carolina Value review and Beaker implementation interfaced at different times to drive change within the McLendon Laboratories and healthcare system. As part of the Carolina Value Laboratory Non-labor Solution team, the McLendon Laboratories was identified as the primary internal reference testing laboratory for the UNCHCS. Beaker test builds enabled accessioning logic to be developed that routed tests available at McLendon Laboratories to be identified and prepared for shipment in affiliate hospitals. Carolina Value assisted in implementing a state-wide courier system. Expected annual savings for the UNCHCS are estimated at \$1.5 million. Additional budget resources including FTE's were added to the FY17 budget to support this initiative.

As part of the UNCHCS growth, McLendon Laboratories provided added additional laboratory services at the Chatham Park Medical Office Building in Pittsboro, completed transition of Chatham Hospital Laboratory to UNC management, and supported transition of the Hayworth Cancer Center Laboratory to the UNC Medical Center. Hillsborough Hospital Laboratory testing volumes have exceeded expected growth at 145% above projections for FY 16. Additional staffing was added at this facility to support the growth and expand phlebotomy services.

The Carolina Value initiative facilitated a review of all laboratories' internal operations for optimizing workflow and validating staffing levels. While the review is nearing completion in December, recommendations to date have resulted in the addition of two FTE's in Microbiology and positive feedback of efficiency of operations within the Core Laboratory. A goal of this review is implementation of uniform metrics within the healthcare system. This standardization has been supported by implementation of instrumentation standardization committees, standardization of system-wide contracts, and establishment of a UNCHCS senior executive officer and laboratory leadership roundtable to identify and coordinate laboratory programs that mutually benefit UNCHCS affiliates.

SURGICAL PATHOLOGY DIVISION, 2015-2016

WILLIAM K. FUNKHOUSER, M.D., Ph.D., DIRECTOR

KEVIN G. GREENE, M.D., DIRECTOR OF HISTOLOGY LABORATORY

UNC Surgical Pathology generates diagnoses on UNCH specimens, on specimens obtained from UNC Health Care affiliate hospitals, on specimens to be reviewed because of patient referral to UNC Hospitals, and on outside expert consultation specimens. In 2015, 33,000 cases were diagnosed, including 2740 outside cases, an 11% year-over-year increase. Inside cases are grossed by Pathologists' Assistants (PAs) and residents on Surgical Pathology rotations. We currently employ four PAs for gross room work and teaching, including one who rotates at the Hillsborough Hospital. The Department of Pathology and Laboratory Medicine now trains 16 AP/CP residents. Gross room training of these residents is performed by the gross room PAs. Junior residents gross all cases, and senior residents gross 2 cases/day to fill gaps in experience. Tissue cassettes containing patient specimens are fixed in formalin, then routed to the Histology Laboratory for processing, embedding, and slide preparation (cutting and staining). This Laboratory is well-led by Ms. Deloney, and is well-managed by Mr. Mortillo. Block volumes have increased along with case volumes, so UNCH will need to staff proportionate to demand for histology expertise to maintain an efficient, error-free service. A major change in record keeping occurred in April 2016, when laboratory personnel and pathologists began to use a new lab software program, Epic Beaker. This software should allow us to use barcoding to identify and track specimens from accessioning to grossing to histology to signout, and also to automatically track block volume trends, case TATs, and error rates.

Glass slides are routed to 8 Surgical Pathology benches (not including Derm or Neuropath) including, Breast, Benign Ob/Gyn, Gyn Onc, GI/Liver biopsies (2), GI/Liver resections, GU/Bone/ST, and ENT/Thor/Vasc. Each bench is staffed either by a solo faculty pathologist, a faculty-resident pair, or a faculty-fellow pair. With Epic Beaker, retrieval of clinical and radiographic data can be done in a paperless fashion, and reports can be dictated using either voice recognition or outside transcriptionists. Junior and senior residents work regularly with, and model on the habits of, faculty pathologists to generate accurate diagnoses, thoroughly reported, in a timely fashion. Service cases supplement the educational mission: organ-specific lectures are presented by faculty, fellows, and residents in didactic and unknown formats. As well, fellows and senior residents rotate through a Conferences/Consults service, during which they staff a multi-disciplinary conference each day (5 per week, of 12 recurring multidisciplinary conferences), while concurrently reviewing and reporting 10 outside cases per day. Major goals of the residency training program are stepwise assignment of responsibilities to build confidence and competence, and regular feedback and mentoring to allow identification of preference of particular organ system pathology and future independent practice environment.

Overall, continuing increases in laboratory workload have been met by continuing increases in effort, ingenuity, and efficiency. It is hoped that the new electronic medical record can be configured to improve workflow efficiency at technical and professional levels. It is hoped that UNCH will choose to staff the Histology Laboratory proportionate to block volumes. The management and leadership skills of Dr. Whinna, the Director of the McLendon Clinical Laboratories, and of Dr. Jennette, Chair of the Department of Pathology and Laboratory Medicine, are perceived as critical to the improvements and successes described above.

CYTOPATHOLOGY

LESLIE DODD, M.D., DIRECTOR

The Cytopathology Division changed Directorship in 2013. Our overall laboratory service volume is increasing steadily. While the volume of Pap tests has declined in previous years following an overall national trend due to changing screening paradigms, 2016 saw a 10% increase in Pap test volumes from the previous year. In addition, there has been a steady increase in fine needle aspiration cases. This includes a dramatic increase in the number of endoscopic bronchogenic ultrasound (EBUS) guided cases. The latter increase is due to the recent hire of a fellowship-trained pulmonologist with endoscopic expertise. The addition of this individual has led to an increased demand for on-site evaluation services for both our cytotechnologists and trainees (fellows), but offers additional learning material and potential opportunities for collaboration on scholarly projects. In addition, 2014 brought us an additional gastrointestinal interventionist, increasing our presence in the GI interventional suite.

Staffing of the Cytopathology Laboratory remains relatively stable. Due to our overall increase in FNA volumes, we have been filling our cytotechnologist open positions with individuals with prior experience in interpreting FNA. Overall, the cytotechnologists are spending more time with rapid on-site evaluations (ROSE) than conventional screening. The evolving role of the cytotechnologists was initially considered unwelcome, but the staff appears to have accepted that this is their fate.

The Cytopathology Fellowship training program remains very successful. The 2015-2016 fellows both passed their ACGME Boards in Cytopathology. One fellow is training in another fellowship but expects to take a job in an academic practice at the end of the year. The second fellow is employed in a private practice group locally. Our current fellows are progressing appropriately and we expect them to be able to practice independently at the end of the training period.

The Division of Cytopathology has also increased its academic presence through publications and presentations, both regionally and nationally. Dr. Maygarden was invited to speak at the North Carolina Society of Pathologists and Dr. Dodd gives a workshop at the American Society of Cytopathology each year. In addition, Dr. Dodd was appointed to the College of American Pathologists Cytopathology Committee in 2015. Dr Hertel presented a Cytopathology/Molecular Pathology study for Duke Pathology Grand Rounds in August 2105. In 2015-2016 the Cytopathology faculty co-authored two abstracts with residents for the USCAP meeting. There were at least four manuscripts submitted and accepted for publication on cytopathology topics, authored by the faculty. The Division is also working on opportunities for junior faculty to publish and engage in other scholarly activities.

AUTOPSY PATHOLOGY & DECEDENT CARE SERVICES

LEIGH B. THORNE, M.D., DIRECTOR

The UNCH Autopsy Service continues to provide valuable information to clinicians and families of patients. We support UNC Healthcare System affiliates and also provide autopsy services for other hospitals in the state. In 2015, a total of 139 autopsies were performed and 117 in the 2015-

2016 fiscal year. We had five faculty participating in the autopsy service in addition to the full-time autopsy Pathologist Assistant and two part-time autopsy technicians.

In addition to our clinical mission, Dr. Thorne, Vincent Moylan PA, and Claudia Brady PA continue to participate in the breast and melanoma rapid autopsy programs, in collaboration with Dr. Lisa Carey (breast) and Dr. Stergios Moschos (melanoma). Eight rapid autopsies were performed in the last fiscal year for the breast cancer program and an additional research autopsy was performed on a cancer patient with tissue collected for the UNC Lineberger Comprehensive Cancer Center Tissue Procurement Facility, specifically at the request of the patient. We also provide tissues for research on an as needed basis for UNC investigators.

The mission of the Decedent Care program, which began in January 2012, is to improve not only the autopsy services provided to families of deceased patients but to improve the process from the time the patient passes to release of the body to the funeral home. The program is under the oversight of Dr. Leigh Thorne and Sheila Deloney, Assistant Administrative Director in Anatomic Pathology. Decedent Care is staffed by three individuals and a supervisor (position added in Fall 2016) providing services to our clinicians and patient families seven days a week. In 2015, Decedent Care processed 1150 deaths and coordinated and handled paperwork for 110 cremations/disposals. DCS also assists in coordinating the autopsies performed at UNCH and screens all deaths to ensure appropriate deferral to the Orange County Medical Examiner.

MOLECULAR PATHOLOGY

MARGARET L. GULLEY, M.D., DIRECTOR

The Molecular Genetics Laboratory performs assays on DNA and RNA to help in diagnosis, monitoring, and treatment of infectious disease, cancer, and heritable conditions. A test menu and description of each clinical service is found on our website:

<http://www.uncmedicalcenter.org/uncmcl/professional-education-services/mclendon-clinical-laboratories/directory/molecular-pathology-and-genetics/>

Newly implemented are the Heritable Cancer Predisposition Panel for *BRCA1/2* gene sequencing. On the horizon are DNA sequencing panels for renal disease, cystic fibrosis, and primary ciliary dyskinesia, and a circulating cell free DNA panel to monitor cancer burden. All of these new tests rely on massively parallel sequencing technology to identify relevant gene variants. A pathologist's interpretation of the findings is reported to the patient's medical record.

Our clinical and academic mission is to advance healthcare using modern molecular technologies. Our training programs educate physicians, medical students, post-doctoral fellows, genetic counseling students, and clinical laboratory scientists. Our fellowship training program in Molecular Genetic Pathology was the first in the nation to educate a board-certified physician in this subspecialty. We offer a month-long course in Molecular Diagnostics and Cytogenetics targeted at pathology residents and open to other interested medical professionals. Our aim is to train science professionals to become competent and confident in using molecular technologies in clinical research and practice. Further information on our clinical, educational, and research work is found at: <http://www.med.unc.edu/pathology/faculty/biosketch-of-dr-margaret-gulley>

Increasingly clinicians use results of molecular tests for diagnosis and for patient management.

We rely on solid evidence demonstrating that each test adds value for disease classification or for improving patient outcome. We thank UNC Hospitals, the TraCS Institute, the University Cancer Research Fund, and the Department of Pathology and Laboratory Medicine for making available the resources to implement many advanced molecular tests. We are well prepared to implement molecular technologies and to validate novel genomic assays. In many cases we can provide services at a lower cost and with greater consultation support than if testing were done at alternative laboratory facilities. Learn more about assay design and implementation in a document entitled "Validating assays for use in clinical trials" at <http://www.uncmedicalcenter.org/uncmc/professional-education-services/mclendon-clinical-laboratories/directory/molecular-pathology-and-genetics/>

Major Equipment in the clinical molecular genetics lab: Illumina MiSeq and NextSeq sequencers, Life Technologies Ion Torrent PGM sequencer, Roche LightCycler 2.0 and 480 real-time PCR instruments, Abbott m2000, Roche MagnaPure extractor and MagnaLyser, Perkin Elmer Janus Robotic Pipettor; Qiagen EZ1, Qiacube, and QiaSymphony extractors; Applied Biosystems / ThermoFisher QuantStudio Dx, 9700, 9800, 7500, and 7900 PCR instruments; two ABI Veriti thermocyclers, Idaho Technologies LightScanner, three ABI 3130xl and two ABI 3500 capillary gel electrophoresis instruments, Biotage Pyromark MD pyrosequencer, Affymetrix array scanner, RoboSep cell separator, and UVP gel documentation system.

Faculty include: Margaret L. Gulley M.D., Karen Weck M.D., Bill Funkhouser M.D. Ph.D., Leigh Thorne M.D., Jessica Booker Ph.D., Nirali Patel M.D., and Rosann Farber Ph.D. Fellows are Nathan Montgomery M.D. Ph.D. and Tasha Strande Ph.D. Our excellent staff includes six medical technologists, three research scientists, our supervisor and administrative director, and an office support assistant.

TRANSFUSION MEDICINE SERVICE

YARA A. PARK, M.D., DIRECTOR

The Transfusion Medicine Service (TMS) had a steady workload and transfused approximately 39,000 products in the last year. We began to supply platelet additive solution platelets as part of our inventory as these types of platelets are reported to have a lower incidence of transfusion reactions. TMS assisted with intensive training of employees for Hillsborough Hospital. With affiliated hospitals implementing the same computer system as UNC and sharing our database, the staff of TMS worked extensively with these hospitals to make the transition smooth. In early 2017, TMS will begin using a new automated immunohematology analyzer and validations and training began in late 2016.

Therapeutic apheresis continued to see an increase in the patient census. The unit completed an expansion which increased the clinic treatment bays from five to nine. This has allowed Apheresis to increase both collections for the Bone Marrow Transplant program as well as therapeutic procedures. In addition, the nurses have begun a quality improvement project to reduce central line infections in apheresis outpatients.

The Blood Donation Center (BDC) had maintained an outstanding collection rate of close to 2700 units of platelets per year. Multiple donor drives were done including hospital volunteers and intramural sports clubs. Faculty and staff from the BDC led an undergraduate service

learning class on blood donation. BDC also began testing donors for Zika virus in accordance with a new FDA requirement.

All parts of the lab were inspected and reaccredited by CAP and AABB this year.

CLINICAL MICROBIOLOGY, IMMUNOLOGY LABORATORIES

PETER H. GILLIGAN, Ph.D., DIRECTOR

The Clinical Microbiology and Immunology laboratories continue to support the mission of UNC Health Care by providing excellent patient care while also supporting the training mission of the UNC School of Medicine, the school of Clinical Laboratory Science and the Molecular Diagnostic Science program. In FY16, the CMI labs expanded our testing menus, adopted new instrumentation, supported research endeavors and underwent a conversion to a new laboratory information system. The implementation of this new system brought the opportunity to offer reference services for our 11 affiliates. Here are some of the endeavors that were undertaken in each of the laboratory areas.

Microbiology

As part of McLendon laboratories, the Microbiology laboratory implemented a new laboratory information system that was built from the ground up. It took many hours of staff time to help build the system and then subsequently test and retest all of the possible resulting scenarios. This exhaustive process was tackled by senior leadership in the laboratory, which left all of their daily duties to fall on the bench technologists, who assumed them without complaint. This accomplishment was the epitome of teamwork. The new system was implemented in April 2016 and went remarkably well for a conversion of this size and scale. The extensive preparation was evident. The conversion to a centralized computer system allowed our 8 affiliate hospitals to begin sending their reference testing to the McLendon laboratories. This impact was acutely felt by the Microbiology lab because we were tasked with doing all of the Microbiology work for our affiliate, High Point Regional hospital, a 350 bed hospital. The increase in workload and the complexity of this undertaking has taken maximum effort from the staff, supervisory team and laboratory directors. This is an ongoing process that is causing great change in the laboratory workflow and culture. As part of this transition, one of our microbiology fellows, Rong Pong Plongla lead validation studies as both High Point and Hillsborough Hospitals.

In addition to the new computer system, the laboratory was also tasked with implementing IQCP (Individualized Quality Control plans) as mandated by CMS for all of the tests that cannot utilize day of test QC. These plans are very detailed and took much of the laboratory Specialists' time to prepare. The lab also prepared for and underwent a CAP inspection with only 1 deficiency requiring response. In addition to these accomplishments, the lab has trained 2 post-doctoral fellows, multiple pathology residents, medical students and Clinical Laboratory Science students. We offer daily consultative and education services for three different infectious disease consult services. This year the laboratory added a clinical rotation in the processing area for the Wake Tech MLT program. Two members of the laboratory's technical staff have given lectures, presented papers and participated in workshops at national conferences.

Clinical Immunology Laboratory

John L. Schmitz, Ph.D., and Eric T. Weimer, Ph.D.

During the past year, the Clinical Immunology Laboratory (CIL) enhanced clinical services by implementing new equipment to improve laboratory workflow, reduce potential for manual errors and decrease turn-around-times. The CIL procured and validated a 2nd Phadia ImmunoCap250 instrument in order to accommodate a continually growing volume of allergen specific IgE requests and autoimmune testing (ENA, Ttg) from new affiliates. In addition, an instrument to automate the Quantiferon Gold In-tube TB screening test was validated. This was necessary due, as well, to greater than expected test volumes (originally projected at 2000 tests/year and now running at ~4200 tests/years). The CIL has reduced the turn-around-time for ANCA testing and experienced greater than expected test volumes from affiliates (33% increase over expected).

New assays validated and implemented in the last year include the use of bronchoalveolar lavage fluid for the Aspergillus galactomannan assay to address clinical demand for a more sensitive sample type for this test. The CIL implemented the IMMY Cryptococcal antigen lateral flow assay. This is a highly sensitive, rapid assay that has significantly less sample preparation requirements thus enhancing ease of use and reducing hands-on time for testing. The CIL has also implemented the Bio-Rad Geenius HIV-1/2 supplemental assay. This test is replacing the Bio-Rad Multispot HIV-1/2 assay for confirmation of HIV-1/2 positive screens. The test will be implemented in February 2017. Finally, due to affiliate requests, the CIL implemented an acute viral hepatitis panel (HAV-IgM, HBV-sAg and HBV-cIgM) to simplify ordering of this combination of tests.

Molecular Microbiology

In Molecular Microbiology, we have been investigating the impact of implementing a molecular gastrointestinal pathogen panel which we found reduced the time to positive result by 32h, reduced total number of tests ordered on patients (38% reduction), increased detection rate (2.4% vs. 13.6%) and identified more outbreaks (both within the hospital and in the community, which allowed for more rapid intervention). We are also expanding the pathogens tested in our rapid blood culture identification test to include staphylococci which should allow patients to receive targeted, more effective therapy quickly and more rapidly identify potential contaminants so that treatment is not continued unnecessarily. This should translate to more effective patient care, reduced antimicrobial exposure, and enhance the efforts of the antimicrobial stewardship team and the Code Sepsis initiative. We have previously published the success of this approach at UNC for enterococci and streptococci where a drastic decrease in time to appropriate antibiotic was measured. (3 hours vs. 3 days for VRE, 4h vs. 12h overall).

Additional initiatives:

- Development of a Zika virus PCR test as part of UNCH's readiness plan
- Ongoing study to investigate the impact of MALDI-TOF mass spectrometry for identification of staphylococci from blood cultures; more accurate reporting for coagulase negative

staphylococci allows for better determination of contamination vs. true infection and decreases unnecessary antimicrobial use

-Outcome study on the use of the respiratory viral panel in pediatrics: 25% of results caused a change in patient management, 25% confirmed patient management plan; we are working with pediatric ID to educate physicians on the appropriate use and interpretation of the test

-Validation and implementation of a more rapid respiratory viral panel this season; this will greatly improve provider satisfaction and has the potential to lower costs due to less testing, shorter length of stay and less time on isolation (we will do a study to measure)

-Analyzed workflow and performed additional studies to allow us to decrease turnaround time for batched testing (HIV, HCV) to improve physician satisfaction (at UNCMC and affiliates) and allow patients to receive new HCV drugs more quickly

-Expanded menu to include: primary HPV testing, norovirus PCR, and an improved rapid PCR for influenza and RSV

PHLEBOTOMY SERVICES (2015-2016)

PETER H. GILLIGAN, Ph.D., DIRECTOR

Phlebotomy Services budget had a 16.4% profit margin this year. The Press-Ganey mean score for the inpatient survey increased to 89.9% for the fiscal year ending June 30, 2016. It is continuing to increase due in part to pediatric initiatives put in place in April 2016. A dedicated team was assigned to Children's Hospital to create stability and increase familiarity of the patients and staff with the phlebotomy team. This has also received very positive feedback from Children's Hospital team members and administration.

The Beaker LIS was implemented on April 16, 2016. The changes for phlebotomy were the addition of the Rover mobile device and associated printers for inpatient and outpatient stations at UNCMC. The Inpatient workflow changed from hourly draws to a worklist that shows up to 6 hours of future orders. This was enabled to reduce redraws that were a source of patient and staff dissatisfaction in years past. The Rover application also enabled phlebotomists to see "Timed" and "Stat" draws on the mobile device which eliminated the need for a resource tech to remain in the lab at all times. The scanner process aims to reduce the number of misidentified patients and scanner use compliance will be followed as a metric. The blood culture contamination report was recreated and became available on 9/1/2016. The goal is to maintain a contamination rate below 2%. This metric will be followed and data available for the next annual report. Other reports are still being optimized and created. The inpatient staff joined the Code Sepsis team in June to collect expedited blood cultures.

Outpatient services struggled with implementation due to processes changing at GoLive, test build problems and ordering learning curve for providers. We have worked with key stake holders such as transplant to streamline and optimize the process. All staff members have been trained to release orders but a dedicated team was created to improve customer service and proficiency. Directorship of the Cancer Center draw station was turned over to Oncology in April 2016.

As part of the Carolina Value initiative, outpatient phlebotomists continue to cover offsite locations and personnel have been trained to support microbiology. The results of the Carolina Value review are expected to be completed by the end of 2016.

CORE LABORATORY (Chem/UA/Coag/Hem/Tox/Endo)

Catherine Hammet-Stabler, Ph.D., Director

The Core Laboratory services include clinical chemistry, coagulation, hematology, and urinalysis. The Laboratory receives ~5000 samples daily performing >5 million tests annually. The UNCH Core Laboratory team continues to lead quality care and improvement initiatives to improve patient care and safety for staff and patients.

- New instrument validations were performed and subsequently implemented in order to maintain high-quality Core Laboratory services, including: two Radiometer (ABL837 and ABL835) blood-gas analyzers and two osmometers (3250). Core Laboratory Leadership provided technical assistance to Chatham Hospital Lab in the validation of a new Ortho Vitros5600 chemistry/immunoassay analyzer. The icotest and clinitest tests were discontinued.
- A major endeavor in 2016 was the successful validation and implementation of the Beaker laboratory information system including auto-verification, and new configuration of the Ortho Instrument Manager/EnGen middleware platform.
- In alignment with Carolina Value, the Core Laboratory began service as an internal reference lab for UNC Healthcare affiliate hospitals which led to an increase in test utilization (>5000 tests April-June 2016) performed in the Core Laboratory and contributed to UNC Healthcare savings of ~\$67,000 since Beaker go-live (April-June 2016).
- Core Laboratory and ObGyn Leadership collaborated to develop and implement a new protocol using STAT urine pregnancy testing to assist patient workflow with clinical ultrasound procedures.
- Core Laboratory and Performance Improvement Leadership collaborated to test Computerized Physician Order Entry (CPOE) in the Leapfrog Annual Survey. UNC's team successfully received the highest possible score indicating "Fully Implemented."
- In 2016, the Centers for Medicare and Medicaid Services began enforcing Individualized Quality Control Plans (IQCP) as an alternate quality control option. Core Laboratory teams continue to lead the development of 2 IQCPs for Amnisure and fetal fibronectin testing which will support cost-containment, enhancement of quality practices, and compliance with new IQCP federal regulatory requirements.

In addition, the Core Laboratory continues to play a key role in the UNC School of Medicine mission to provide leadership and excellence in patient care and education. In 2016, three Medical Students (PATY417), one Clinical Chemistry Fellow, one Immunology Fellow, two Molecular Genetics and Clinical Cytogenetic Fellows, and sixteen Clinical Laboratory Science (CLS) students participated in Core Laboratory clinical rotations receiving education in lab testing and the practice of laboratory medicine.

HEMATOPATHOLOGY 2015-2016

GEORGE FEDORIW, M.D., DIRECTOR

The volume and complexity of cases has continued to increase in the Division as the diagnostic services support growing clinical need. The primary Hematopathology service is responsible for all in-house peripheral blood, bone marrow, and tissue diagnostics, while the second service covers body fluid examination, referrals, and cases sent for expert consultation. The laboratory

also provides hemoglobin evaluations for the work-up of hemoglobinopathies and thalassemias. We continue to work closely with the flow cytometry lab, and have added several new diagnostic panels. Incorporation of these data, along with cutting-edge testing from the Cytogenetic and Molecular Laboratories, provides a comprehensive diagnostic report for our patients. The Division of Hematopathology also supports a biopsy clinic in the North Carolina Cancer Hospital, which streamlines sample acquisition, processing, and communication with the clinical teams. Our faculty consists of five board-certified hematopathologists with a wide range of clinical, administrative, teaching, and research responsibilities

SPECIAL COAGULATION LABORATORY 2015-2016

MARIAN ROLLINS-RAVAL M.D. MPH, DIRECTOR

The Special Coagulation Laboratory provides access to esoteric testing of hemostasis for both UNC and community physicians. We are actively pursuing validation of new tests, including chromogenic Factor VIII. The laboratory continues performing special studies testing for equipment and pharmaceutical companies generating additional revenue, as well as assisting colleagues with research projects. Faculty and staff also continue to regularly participate in the Friday Hematology Conference sponsored by the Division of Hematology & Oncology in the Department of Medicine where hematology and coagulation issues in patients seen by the Hem/Onc Consult Service are discussed.

CLINICAL CYTOGENETICS

KATHLEEN W. RAO, Ph.D., DIRECTOR

KATHLEEN A. KAISER-ROGERS, Ph.D., CO-DIRECTOR

The caseload continued to increase in the Cytogenetics Laboratory through 2015-2016 during which over 4100 samples were received and over 6600 tests performed, with increases seen in requests for both conventional karyotyping and FISH assays. The laboratory currently processes approximately 550 constitutional microarray cases annually. At present, the laboratory offers over 50 different interphase FISH assays, most of which are designed to diagnose or monitor specific genetic abnormalities associated with various cancers. The laboratory currently offers three FISH assays that are considered companion diagnostics for drugs that target specific molecular features in tumors. A positive result on the HER2 assay (amplification of the ERBB2 locus) is required for a breast cancer patient to qualify for the drug Herceptin, and a positive result for rearrangement of the ALK locus or the ROS1 locus is needed for non-small cell lung cancer patients to qualify for the drug crizotinib. All three assays use FISH technology on paraffin-embedded tumor tissue. Overall the laboratory has seen a 60% increase in paraffin FISH testing in the past 2 years.

The cytogenetics laboratory has recently validated a fast hybridization fluorescence in situ hybridization (FISH) assay to detect the recurring PML-RARA rearrangement associated with acute promyelocytic leukemia (APL) within several hours of sample receipt rather than 24 hours. This rapid turnaround is important because these patients can develop serious blood-clotting or bleeding problems and therefore need to be quickly diagnosed and placed on the appropriate therapy. The laboratory is also currently in the process of validating two different FISH assays to identify and characterize chromosome rearrangements involving the CRLF2 gene which are seen patients with high risk B-cell precursor acute lymphoblastic leukemia (BCP-ALL).

One of our interesting cytogenetic projects was reported at the 2016 American College of Medical Genetics Meeting in Tampa, Florida. Dr. Alexandra Arreola, our current Cytogenetics Fellow, reported a patient with a complex chromosome 9 rearrangement who presented with dysgerminoma with gonadoblastoma and multiple medullary renal cysts; Dr. Kaiser-Rogers was senior author on this presentation. Dr. Kaiser-Rogers was also a co-author on a poster presentation at the International Conference on Prenatal Diagnostic Therapy Meeting in Washington, DC involving a 22q11.2 deletion detected using the cell free DNA present in the maternal circulation. Dr. Rao and/or Dr. Kaiser-Rogers have also been involved in several additional projects that have now been published in the literature.

The Cytogenetics Laboratory continues to participate in the cancer cooperative groups (Alliance/CALGB and COG). Dr. Rao continued her term as Chair of the COG Cytogenetics Committee, she continued as a long-time member of the CALGB Cytogenetics Review Committee, and she continued in her second term as a member of the ISCN Committee (International System for Cytogenetic Nomenclature) until her death in March of 2016. In June of 2016 Dr. Kathleen Kaiser-Rogers was appointed Director of the Cytogenetics Laboratory. Dr. Kaiser-Rogers continues to serve as Vice Chair of the CAP/ACMG Cytogenetics Resource Committee and as the ACMG-CAP liaison for the ACMG Laboratory Quality Assurance Committee and the ACMG Cytogenetics Quality Assurance Subcommittee. She also continues to serve as Chair of the ACMG Salary Survey Work Group, which is responsible for overseeing the design, implementation, and interpretation of a biennial salary survey for medical geneticists boarded by the AMBGG. A 99 page report summarizing the results of the 2015 survey was published on the ACMG Web Page in June of 2016.

LABORATORY INFORMATION SERVICES

HERBERT C. WHINNA, M.D., Ph.D., DIRECTOR

2016 was the year of Epic's Beaker module implementation and the final switchover of LIS functions to ISD. McLendon Labs successfully went live with Epic Beaker in April, followed by High Point/Johnston Hospitals in May and Pardee/Caldwell Hospitals in June. Our last LIS employee has been working legacy application data transition to databases accessible to ISD Enterprise application Business Objects for data retrieval in the future with the goal of turning off support of the legacy LIS applications by end of calendar year 2016.

NEPHROPATHOLOGY LABORATORY 2015-2016

VOLKER R. NICKELEIT, M.D., DIRECTOR

The Division of Nephropathology in the Department of Pathology and Laboratory Medicine is one of few highly specialized centers in the U.S. that provides expert diagnostic evaluation of medical renal diseases and kidney transplant related disorders. More than 1900 renal specimens (native and transplant biopsies and nephrectomies) from over 200 nephrologists throughout the state, region, and the world are analyzed annually. During the 2015 calendar year, the Division evaluated close to 500 cases from UNC Hospitals, and the remainder from outside institutions. Over 90% of specimens are routinely evaluated not only by light microscopy at multiple levels of section with different stains, but also by immunofluorescence microscopy utilizing a panel of antibodies, electron microscopy, and occasionally by immunohistochemistry. Thus, the actual number of procedures that are performed on renal

specimens by far exceeds 6000 per year. The Division of Nephropathology is involved in clinical, translational, and basic research on renal diseases, especially glomerulonephritides and disorders seen in renal allografts. The research activities are supported by extramural grants and are facilitated by an extensive database and archival systems that include data from approximately 40,000 renal specimens, 15,000 serum samples, and 2,000 urine samples. Currently, two pathology post-doctoral fellows are being trained on how to manage, organize and run a nephropathology laboratory/service. The UNC nephropathology faculty are also heavily engaged in continuous education series enhancing the diagnostic skills of pathologists and nephrologists, such as special symposia organized at the Annual Kidney Week/ASN Meeting, the Columbia Presbyterian post graduate course on nephropathology in New York, the 'Nephropathologiekurs Volhard-Fahr' in Mannheim (Germany) or the annual 'Transplant Workshop' in Basel/Switzerland. The 7th edition of 'Heptinstall's Pathology of the Kidney' published in 2014 had heavy editorial input from the UNC nephropathology division. Efforts are coordinated with activities of the Glomerular Disease Collaborative Network (GDCN). The GDCN has been in operation for over two decades and is a consortium of academic and community nephrologists; it has the goal to enhance knowledge of renal diseases and treatment strategies.

QUALITY MANAGEMENT GROUP

HERBERT C. WHINNA, M.D., Ph.D., DIRECTOR

In advance of the Beaker implementation, the online Specimen Collection manual was revised to update ordering information for ~1000 lab tests. In addition, a new section for Internal Reference Testing was published on the website. New laboratory opened at 2016-Chatham Park Medical Office Building-currently pursuing CAP accreditation. Transfusion Medicine Services underwent successful AABB/CAP inspection receiving their re-accreditation October 2016. McLendon Labs underwent their biennial CAP inspection October 10-11, 2016. New medical directors approved for 2 laboratories: Dr. Dana Neutze for Family Medicine Lab and Dr. Nichole Korpi-Steiner for ACC Laboratory. Lean Six Sigma Project: Purple Belt Project involving multidisciplinary team from Labs, Nursing, and Respiratory Therapy for Point of Care Blood Gas Testing Quality Assurance.

NEUROPATHOLOGY SERVICE AT UNC HOSPITALS

DIMITRI G. TREMBATH, M.D., Ph.D., DIRECTOR

The clinical diagnostic services in neuropathology at UNC Hospitals include diagnostic surgical neuropathology, autopsy neuropathology, ophthalmic pathology, and the interpretation of peripheral nerve muscle biopsies. The volume and complexity of the neuropathology cases from the surgical service and autopsy service at UNC Hospitals provides a rich training experience in diagnostic neuropathology for the Department's 16 residents in anatomical and clinical pathology and two fellows in surgical pathology. Departmental faculty members regularly attend and are active participants in the neuropathology conferences at UNC Hospitals. These conferences include the monthly Neuropathology-Neuroradiology Conference and the Autopsy Service's weekly Brain Conference, as well as individual teaching conferences to members of the departments of Neurology, Neurosurgery, and Ophthalmology.

OUTREACH LABORATORY SERVICES

HERBERT C. WHINNA, M.D., Ph.D., DIRECTOR

The McLendon Laboratories continued to expand off-site outreach services the past year with the opening of the Chatham Park Medical Office Building Laboratory. This building is a collective initiative among the UNC Medical Center, Chatham Hospital, and UNC Physician network. The laboratory serves patients from these three client bases. McLendon Laboratories also partnered with the Hayworth Cancer Center and McCreary Cancer Center to provide laboratory services as these facilities transition to UNC management. Informal consultation is provided to McCreary Cancer Center on an as-needed basis. McLendon Laboratories provides a technical supervisor and quality management support to Hayworth Cancer Center.

Meredith Jones retired from the position as the Administrative Director of Outreach Services. Recruitment is underway for a replacement. The staff within the department continued with expansion of services to additional sites and support of clinics as Beaker processes were implemented. Key among service enhancements included incorporation of stat courier services for urine toxicology screen testing to support relocation of the Benign Adult Hematology Clinic to Carolina Pointe II and partnership between Phlebotomy Service and the Outreach Department to provide additional phlebotomy services to off-site hospital based clinics.

Hillsborough Hospital Laboratory surpassed growth expectations as new clinics and services migrated from the main campus to the Hillsborough Campus. An Assistant Administrative Director position was added to the organizational structure to provide higher level supervision on-site. Two experience employees transferred from main Transfusion Medicine Service to enhance TMS expertise on-site. Factor assays were added in Coagulation to support hemophilia joint replacements.

TRANSPLANT LABORATORIES (HLA and Flow Cytometry) 2015-2016

JOHN L. SCHMITZ, Ph.D., DIRECTOR

ERIC WEIMER, Ph.D., ASSOCIATE DIRECTOR

The Histocompatibility (HLA) Laboratory implemented enhanced services and process improvements to improve overall laboratory operations and support of patient care. The laboratory improved its Next Generation Sequencing based HLA typing method with the validation of a new testing process. The new process results in a significant reduction in hands on sample processing that contributes to the reduction in turn-around-time from 14 to 7 days for a complete high-resolution HLA typing result. This change also reduces the risk of manual pipetting error in this complex testing system. Finally, due to a redesign in the HLA-DR primers in the system, the ambiguity rate has been reduced from ~3% of loci typed to ~0.3% resulting in the need for less follow up testing, further reducing cost and turn-around-time.

The HLA Laboratory has also validated a real-time PCR HLA typing method for Celiac Disease (CD). This assay provides a rapid, 90 minute, method for determination of the presence of HLA-DQB1 and DQA1 alleles associated with increased risk for CD. Use of this assay will result in improved turn-around-times for this testing.

The laboratory also implemented a magnetic bead lymphocyte isolation system. Compared to the established Ficoll-Hypaque process, magnetic beads provide a more highly purified lymphocyte preparation for use in flow cytometric crossmatch at a minimal increase in cost. Improved lymphocyte purity impacts the sensitivity of the flow crossmatch in a positive fashion providing assurance of the most sensitive method for detection of donor specific antibody for assessment of immunologic compatibility between solid organ donors and recipients.

Finally, the HLA laboratory completed the validation and implementation of a new laboratory information system, Histotrac. This system has provided numerous improvements in laboratory processes allowing decreased turn-around time and risk reduction from manual test result recording and LIS reporting. The most impactful processes include instrumentation interfacing with Histotrac for elimination of manual data recording LIS data entry. Hematopoietic Cell Transplant (HCT) reports are now electronically generated from the Histotrac database instead of manually generated in MS Word documents. Multiplex bead array results are electronically recorded in Histotrac which interfaces with EPIC for result reporting. This has resulted in a significantly reduced error risk for the 100 analyte panels that are used for pre- and post-transplant HLA antibody testing.

The Flow Cytometry Laboratory has also implemented new services and process improvements during this fiscal year. The laboratory implemented an assay to enumerate naïve and memory T cells (CD45RA/RO). This assay is needed for the evaluation of pediatric patients being assessed for primary immune deficiencies and will accommodate the expected increase in these evaluations with implementation of state wide newborn screening for Severe Combined Immune Deficiency (SCID).

The Flow Cytometry Laboratory is working closely with the Hematopathology Service to improve testing activities related to Leukemia/Lymphoma diagnostics. To address the needs of this service, the laboratory has been able to increase staff size and validate new antibodies (CD22) as well as eliminate panels with limited utility (ZAP-70). The laboratory now achieves a 24 hour turn-around-time for Hematopathology samples.

The flow laboratory has completed validation of a B-cell acute lymphoblastic leukemia (B-ALL) minimal residual disease panel. This testing will offer an important new method for clinicians to assess the effectiveness of therapies for B-ALL and manage patients appropriately. The laboratory will be able to offer this assay for patients enrolled in clinical trials as well as non-trial patients.

Finally, a number of improvements to existing methods have been made that reduce cost, and ensure compliance with new regulatory requirements. The panels of antibodies used for monitoring cell depleting therapies (rituximab, thymoglobulin) were converted to fully FDA approved panels eliminating the laboratory developed test label and allowing daily quality control assessment. The laboratory has also verified limit of detection for the PNH, CD34, and fetal hemoglobin assays. In addition, the laboratory validated a change in red cell lysing agent for the CD34 stem/progenitor cell enumeration assay which has resulted in a decrease in the number of repeat tests needed.

Both the Flow Cytometry and HLA Laboratories contribute to the teaching mission of the School of Medicine by hosting of CLS students, Pathology Residents, Laboratory Immunology and Microbiology Fellows, Allergy/Immunology, and Pharmacy Clinical fellows/residents.

HEMATOPOIETIC PROGENITOR CELL (HPC) LABORATORY

YARA PARK, M.D., DIRECTOR

The Hematopoietic Progenitor Cell (HPC) Laboratory processed approximately 220 HPC products for transplant and transplanted over 180 patients during the past year. The lab was inspected and reaccredited by CAP and AABB. In addition, HPC is preparing for a FACT inspection in early 2017. As the Bone Marrow Transplant program grows, HPC is planning for an expansion in both processing areas from three processing bays up to five as well as an increase in liquid nitrogen storage of products. The expansion will include an integrated oxygen monitoring system to ensure staff safety.

CORE AND SERVICE LABORATORIES

MICROSCOPY SERVICES LABORATORY

C. ROBERT BAGNELL, Jr., Ph.D., DIRECTOR until December 2015

PABLO ARIEL, Ph.D., Director from January 2016

Microscopy Services Laboratory is a UNC core facility for electron microscopy and light microscopy. The laboratory is also the light microscopy core facility for the Lineberger Comprehensive Cancer Center. Additionally, it provides clinical electron microscopy services. During this reporting period the laboratory supported research by 121 principal investigators from many departments and centers at UNC-CH, as well as other area institutions. The total number of active laboratory clients now stands at greater than 1000.

In addition to its research role, the laboratory serves as the primary electron microscope facility for ultrastructural clinical diagnosis for Dr. Charles Jennette's renal pathology referral service. The laboratory also serves as an alternate for specimen preparation for electron microscopy for Dr. Charles Jennette's renal pathology referral service.

Robert Bagnell retired at the end of December 2015, after 30 years of exemplary service. Pablo Ariel, took over on January 1, 2016.

From July 2015 to June 2016, the light microscope facilities logged 6,685 hours of use, electron microscope facilities logged 1,554 hours of use and the laboratory performed 381 electron microscopy specimen preparations. During this period, Robert Bagnell co-authored two peer reviewed publications and Victoria Madden co-authored three peer-reviewed publications.

The MSL is in the midst of numerous equipment upgrades. First, a second transmission electron microscope with a high resolution camera was added to the lineup, thanks to funding from CFAC. Second, a prolonged live-cell imaging system has been significantly upgraded with funds from CFAC, Pathology and Dr. Ariel's startup funding, leading to significant improvements in sensitivity, spatial and temporal resolution. Third, MSL's application for a light-sheet microscope to the North Carolina Biotechnology Center was successful and delivery and installation of this state-of-the art technology will occur in November 2016. In addition to funds from NCBC, there were generous contributions from the College of Art and Sciences, CFAC, the Vice Chancellor for Research, the Department of Pathology and Laboratory Medicine and Dr. Ariel's startup funding.

We have worked with OIS to secure on-line mass image storage space, utilizing a server specifically for the Department of Pathology and Laboratory Medicine. This provides our clients with an easy way to transfer data from our microscopes to their laboratory.

The laboratory continues to provide access, at low-cost, to powerful commercial image processing and analysis software and to free image analysis software in the form of macros and plug-ins for the FIJI platform, and to assist clients in developing image processing algorithms.

Finally, the MSL has participated in education efforts by hosting a demonstration class for a First Year Seminar titled “Art and Technology”, taught by the Art Department.

TRANSLATIONAL PATHOLOGY LABORATORY (TPL) 2015-2016

C. RYAN MILLER, M.D., Ph.D., DIRECTOR

The Translational Pathology Laboratory continues to meet the needs of clinical, basic, and population scientists who require the analysis of human tumors. The Core provides a centralized resource for researchers, offering professional expertise, quality-controlled and validated procedures, digital pathology evaluation, and access to human archived specimens. Utilization of this Core, which is equipped with new-generation instrumentation, allows investigators to perform innovative clinical trials using molecular correlates and endpoints; to conduct research with large numbers of samples; and to perform qualitative and quantitative analysis of fresh, frozen and formalin-fixed, paraffin-embedded specimens using morphology-based assays of DNA, RNA, and proteins.

In 2016 TPL was awarded by the UNC SOM CFAC to acquire a new image analysis software from the Visiopharm and upgrade the infrastructure of the TPL’s mission critical web application for digital slide storage, data management and analysis.

During 2015-2016 TPL provided 74,840 (\$644,382) service units to 118 investigators (102-UNC and 16-non-UNC): the Lab pulled 2,840 diagnostic slides and FFPE blocks from the UNCH Surgical Pathology archives; provided 26,062 units of histology services (cell line and tissue processing, microtomy), 7,051 TMA cores and tissue scrolls; 3,278 H&E slides; 14,394 chromogenic and fluorescent IHC and ISH slides; developed new staining protocols for 65 new antibodies and 61-dual and 4-triple staining protocols; constructed 22 new TMA blocks; and 20,604 units of digital pathology services. The Core's rapidly growing 55 TB image library (<https://tpl-spectrum.med.unc.edu>), currently contains 126,816 digital images belonging to 254 PI, the server is maintained by the IT professionals in the LCCC Bioinformatics Core.

In 2015-16 TPL services were acknowledged in 47 published manuscripts and abstracts and TPL staff were co-authors on 13 (27%) of these.

THE ANIMAL CLINICAL LABORATORY FACILITY

HYUNG-SUK KIM, Ph.D., DIRECTOR

The facility performs blood chemistry tests, urinalysis, and hematological tests in animal samples, to characterize physiological and clinical phenotypes in animal models. For clinical tests, 44 different chemicals including general health tests, liver function tests, and kidney function tests are currently available with an automated chemical analyzer, Ortho-Clinical Diagnostics Johnson & Johnson’s VT350 (purchased in 2008), which can measure one test with 5-10 µl sample volume. For hematological tests, the animal blood counter (HESKA’s CBC Diff, Veterinary Hematology System) can measure WBC#, Lym%, Lym#, Mon%, Mon#, Gra%, Gra#, RBC#, HGB, HCT, MCV, MCH, MCHC, RDW, PLT, MPV, and 3 distribution curves of WBC, RBC, and PLT with 20µl whole blood sample. Since we have various data accumulated over a long period of time (including normal and abnormal values), discussion with facility staff helps in the interpretation of clinical results. More than thirty principal investigators from the UNC-CH campus use these services for their research.

The Luminex MAGPIX system, which uses magnetic bead-based multi-analyte analysis provides a complete solution for rapid and accurate biomarker quantitation in a variety of sample matrices, has been successfully operated during this fiscal year to support the research of >20 PIs. This affordable system can perform up to 50 tests simultaneously in a single reaction volume, greatly reducing sample input (10-20ul/sample), reagents, and labor while improving productivity. The MILLIPLEX magnetic bead-based multi-analyte panels from EMD Millipore Company (see below kits) enable researchers to rapidly produce data without compromising reliability. Furthermore, an automated microplate washer from BioTek Company enhances magnetic bead assays by complete plate biomagnetic separation during washing. We now offer multiplexed biomarker immunoassays for cytokine/chemokine detection, metabolism, toxicity, cancer biomarkers, and many other disease states.

THE GENE EXPRESSION FACILITY

HYUNG-SUK KIM, Ph.D., DIRECTOR

The facility provides services for gene expression based upon quantitative real-time RT-PCR using ABI7500 and ABI7300 Sequence Detection Systems and high throughput preparation of total RNA and genomic DNA by ABI Prism 6100. Currently more than 2,000 disease-related gene assays have been developed to detect expression levels in mice, human, and rat, including various house-keeping genes. In addition, a service for mouse genotyping analysis has been well established with a high throughput performance based on detecting differences in gene copy number, with a less than two-day turn-around time. This genotyping process eliminates the need for many laborious procedures, including preparation of genomic DNA, PCR, gel electrophoresis, and Southern blot analysis. Currently we are genotyping more >3000 mice monthly. The facility provides a full service which includes designing and synthesizing Taqman probes and primers, preparing RNA samples, and quantitative analysis. Through full service, we are collaborating with numerous PIs that require gene expression analysis for their research. More than thirty principal investigators from ten different departments are currently using this research core facility.

THE DNA SYNTHESIZING FACILITY

HYUNG-SUK KIM, Ph.D., DIRECTOR

The facility serves more than 50 investigators from a variety of departments campus-wide in its function of producing oligonucleotides for use in genetic research. Three DNA Synthesizers can produce ten oligonucleotides simultaneously. During this fiscal year, about three thousand oligonucleotides were synthesized. The fluorescent oligonucleotide TaqMan probes with 5' fluorescein (6-FAM) and 3' quencher tetramethyl rhodamine (TAMRA) were successfully prepared for users of real-time RT-PCR.

ANIMAL HISTOPATHOLOGY & LABORATORY MEDICINE

STEPHANIE A. MONTGOMERY, Ph.D., D.V.M., DIRECTOR

The Animal Histopathology Core (AHC) is a UNC Core Facility providing high quality, affordable histology support to the UNC biomedical research community. Major services include tissue embedding and sectioning (frozen and paraffin), routine and special stains, consultation on animal study design and tissue collection, immunohistochemistry (IHC), and immunofluorescence labeling. The AHC adds value to investigators through a convenient

campus location, customizable services, subsidized pricing, and access to a board-certified veterinary pathologist. The AHC also provides support to other UNC core facilities, particularly Translational Pathology Lab (TPL) and Animal Studies.

The AHC employs 3 FTEs and hosts several undergraduate work-study students. In FY2016, 116 investigators utilized AHC services (110 UNC, 6 external to UNC), a >25% increase from FY2015. AHC members were co-authors or acknowledged on 11 publications in FY2016. No core facility equipment was replaced or added in FY2016. In its first year of offering fully automated IHC and IF services designed for rodent tissues, AHC analyzed 3,808 slides for investigators. In September 2015, the AHC transitioned to electronic ordering and invoicing by utilizing UNC-based Infoporte technology. This system allows AHC users to remotely enter orders and upload documents pertaining to specimen requests. Implementation of digital record keeping also allowed AHC to institute electronic specimen tracking. Due to expanding services and usage, the AHC worked with the SOM Planning Office to secure additional laboratory space. In January 2016 the AHC began occupying 426 MacNider, a laboratory room adjacent to the main laboratory space in 432 MacNider. With the addition of 426 MacNider, the AHC now occupies 1075 sq. ft of laboratory space.

SPECIAL HONORS AND AWARDS

PABLO ARIEL, Ph.D

Presented a keynote lecture at the LaVision Biotech UltraMicroscope User Meeting in Munster, Germany on September 21, 2016

FRANK CHURCH, Ph.D.

Richard H. Whitehead Lecturer, School of Medicine (notified May, 2016)
Honorary Member of the Whitehead Society
Best Poster Presentation Award at 2015 SGEA/AAMC Conference (notified April, 2016)
Foundation Phase TEC Basic Science Course Award, Hematology-Oncology, Course Co-Director, UNC SOM (2015)

YURI FEDORIW, M.D.

Phil Blatt Clinical Pathology Teaching Excellence Award 2016

WILLIAM FUNKHOUSER, M.D., Ph.D.

Best Doctors in America, Best Doctor, Inc. 2015

MARGARET L. GULLEY, M.D.

Best Doctors in America, Best Doctors Inc. 2015

J. CHARLES JENNETTE, M.D.

Norma Berryhill Distinguished Lecturer 2015
Charles Kleeman Visiting Professorship in Nephrology, UCLA Health System
William Barriss McAllister Memorial Lecture, Yale School of Medicine, New Haven
Best Doctors in America, Best Doctors, Inc. 2015

NICOLE KORPI-STEINER, Ph.D.

Best Abstract Award in Patient Safety, American Association for Clinical Chemistry, Management Sciences and Patient Safety Division. 2015

CHRIS MACK, Ph.D.

Joe W. Grisham Award for Excellence in Graduate Student Teaching, UNC Department of Pathology 2015

C. RYAN MILLER, M.D., Ph.D

Neuro-oncology Top Reviewer Award, Society for Neuro-oncology 2015
Society for Neuro-oncology Best Oral Poster Presentation Award, 20th Annual Scientific Meeting, November 20, 2015

VOLKER NICKELEIT, M.D.

Best Doctors in America, Best Doctors Inc. 2015

JAY S. RAVAL, M.D.

Outstanding Services Rendered to the OMICS International Conferences Community, 3rd
International Conference on Hematology and Blood Disorders, Atlanta, GA 2015
NCTracCS-DTMI Dual-Institution Clinical and Translational Science Award
Who's Who in America, 69th and 70th editions

EIZABURO SASATOMI, M.D., Ph.D.

Fred Askin Anatomic Pathology Teaching Excellence Award 2016

JOHN L. SCHMITZ, Ph.D.

Appointed to the Board of Directors of the American Society for Histocompatibility and Immunogenetics 2015

SCOTT SMITH, M.D.

Fred Dalldorf Health Affairs (Medical Student) Teaching Excellence Award 2016

KAREN WECK, M.D.

Best Doctors in America, Best Doctors, Inc. 2015
Elected by peers as Chair of the CAP Molecular Pathology and Genomics cluster

ERIC T. WEIMER, Ph.D.

Junior Faculty Development Award

SCOTT WILLIAMS, Ph.D.

Selected as keynote speaker for the Triangle area Mitosis Symposium
CGIBD Pilot/Feasibility Award

MAIMOONA ZARIWALA, Ph.D.

Received "Founder's Award in recognition of leadership & outstanding contribution to the field of PCD research by "Primary Ciliary Dyskinesia Foundation, MN" that is a patient advocacy group.

QING ZHANG, Ph.D.

2016 Jon Shevell Young Scientist Travel Scholarship, Suan G. Komen Foundation
2015 The V Foundation Scholar Award
2015 DOD CDMRP Career Development Award
2015 Susan G. Komen Career Catalyst Award

LEADERSHIP POSITIONS

FRANK C. CHURCH, Ph.D.

Chair, Board of Directors, Med-Atlantic Affiliate of the American Heart Association

WILLIAM B. COLEMAN, Ph.D.

Council, The American Society for Investigative Pathology, July 2004-Present

President, The American Society for Investigative Pathology, July 2015-June 2016

Finance Committee

Membership Committee

Scientific Interest Group Oversight Committee

GEORGETTE A. DENT, M.D.

Member, Association of American Medical Colleges (AAMC) Careers in Medicine (CiM) Advisory Committee

Member, American Society of Hematology (ASH) Committee on Promoting Diversity

LESLIE G. DODD, MD

Member, ASC - Progressive Evaluation of Competency Committee

Member, CAP - Surgical Pathology Committee

Member, CAP - Cytopathology Committee

Member, ASC PEC Exam Committee

GEORGE FEDORIW, M.D.

Member, Society for Hematopathology, Education Committee

Member, ASCP Annual meeting hematology – course proposal review board

Member, ASCP Annual Meeting hematology – abstract review board

Member, College of American Pathologists: Hematology and clinical microscopy committee

Member, AIDS Clinical Trials Group: Kaposi Sarcoma central review

WILLIAM K. FUNKHOUSER, M.D.

Member, Nominating Committee, Pulmonary Pathology Society

Member, CAP/AMP/ASCO Expert Guidelines Panel, Colorectal Cancer

Member, CAP Molecular Oncology Committee

PETER GILLIGAN, Ph.D.

Chair Professional Practice Committee, American Society for Microbiology

MARGARET GULLEY, M.D.

The Cancer Genome Atlas (TCGA) project at the National Cancer Institute (NCI): Leader, Pathogen Committee, Mutation Signatures Working Group (2016-2017); Leader, Pathogen Committee, Pan-Gastrointestinal (Pan-GI) Working Group (2016-2017); Leader, Pathogen Committee, Esophageal Carcinoma (ESCA) Working Group (2014-2016)

CAP/ASCP/ASCO Guideline Committee for HER2 Testing in Gastroesophageal Carcinoma
Alliance for Clinical Trials in Oncology: Member, Translational Research Program Executive
Committee; Member, Sequencing Committee

CATHERINE HAMMETT-STABLER, Ph.D.

Member, AACC Government Relations Committee

Member, NACB-AACC Evidence Based Laboratory Medicine Committee

Member, NACB Laboratory Medicine Practice Guideline Committee on Pain Management

Chair, CLSI Document Development Committee on the Laboratory Support of Pain
Management Services

TRACY HEENAN, D.V.M.

Compliance Auditor NIH Office of Laboratory Animal Welfare (OLAW)

CPIA Council Member Certification of Professional IACUC Administrators (CPIA)

Recertification Committee Chair, CCPIA

Ad hoc consultant Association for the Assessment and Accreditation for Laboratory Animal Care
International (AAALAC)

JONATHON W. HOMEISTER, M.D., Ph.D.

Member, Program Committee, American Society for Investigative Pathology

Member, Meritorious Awards Committee, American Society for Investigative Pathology

J. CHARLES JENNETTE, M.D.

Member, American Society of Nephrology Glomerular Disease Advisory Group

Member, College of American Pathologists (CAP) Renal Pathology Working Group

Member, Glomerular Disease Advisory Group, American Society of Nephrology

Member, Advocacy Committee, Association of Pathology Chairs

Member, Practice and Management Committee, Association of Pathology Chairs

Member, EULAR/ACR Working Group on the Definition and Classification of Vasculitis

Member, International Society Nephrology Commission for Global Advancement of Nephrology

Member, International Society of Nephrology Committee on Renal Pathology

Member, United States and Canadian Academy of Pathology Ambassador

Member, NIH Glomerular Disease Consortium CureGN Pathology Committee

Member, Renal Pathology Society Nominating and Awards Committee

Chair, NIH/NIDDK CureGN UM1 Pathology Scoring Workgroup

KATHLEEN KAISER-ROGERS, Ph.D.

Member of the College of American Pathologists Cytogenetics Resource Committee

NICHOLE KORPI-STEINER, Ph.D.

Chair, AACC Society for Young Clinical Laboratorians (SYCL) Executive Committee 2016-
present

Moderator and speaker, American Association for Clinical Chemistry, "Expanding Point of Care
Testing in Healthcare Systems for Patient Centered Care," Philadelphia, PA 2016

STEPHANIE MATHEWS, M.D.

Society for Hematopathology Education Committee member

ASCP PRISE Committee member
ASCP RISE/FISHE Sub-committee member

MARSHALL MAZEPA, M.D.

Thrombosis and Hemostasis Societies of North America (THSNA) appointed Board Member and Chair of the Website Committee

C. RYAN MILLER, M.D., Ph.D.

Member, National Cancer Institute, The Cancer Genome Atlas (TCGA), Low Grade Glioma Working Group

Member, National Cancer Institute, The Cancer Genome Atlas (TCGA), Glioblastoma versus Low Grade Glioma Working Group

Member, Neuro-oncology Committee, NCI Alliance for Clinical Trials in Oncology

Member, Pathology Committee, NCI Alliance for Clinical Trials in Oncology

MELISSA B. MILLER, Ph.D.

Member, ASM, Committee on Laboratory Practices

Member, ASM Professional Practice Committee

Member, ASM, Clinical Awards Selection Committee

Member, PASCV, Public Relations Committee

Member, CLSI, <48 Revision Committee

Chair, ASM, Committee on Laboratory Practices

Chair, PASCV, Public Relations Committee

Chair, NIH, Antimicrobial Resistance Leadership Group, Diagnostics and Devices Subcommittee

Chair, ASM, Clinical Awards Selection Committee

Chair, AAM, Colloquium on Changing Diagnostic Paradigms for Microbiology (task force)

Molecular Virology Workshop, Daytona Beach, FL, Morning Moderator

STEPHANIE MONTGOMERY, Ph.D., D.V.M.

Co-Chair, RTP Rodent Pathology Course Planning Committee for 8th state-of-the-art biennial course, 2017; 2 year appointment

Member, American College of Veterinary Pathologist, Experimental Disease Committee, 3 year appointment

VOLKER NICKELEIT, M.D.

Member, Banff Working Group on Electron Microscopy in the Evaluation of Renal Transplant Biopsies

Chair, Banff Working Group on Cellular Rejection and Borderline Changes

Chair, Banff Working Group on Polyomavirus Nephropathy

YARA A. PARK, M.D.

AABB, Annual Meeting Education Program Unit, 2013-present

American Society for Apheresis, HPC Donor Subcommittee, 2009-present

Chair American Society for Apheresis, Clinical Applications Committee, 2016-present

Chair, College of American Pathologists, Transfusion Medicine Resource Committee, 2016-present
Session Chair, American Society for Apheresis Annual Meeting, Abstract Session 1, May 2016

NIRALI M. PATEL, M.D.

Member, AMA Young Physician Section
Delegate for the College of American Pathologists ClinGen Somatic Work Group
Chair, Membership Affairs Committee, Association for Molecular Pathology

LI QIAN, Ph.D.

Board of Directors International Chinese Stem Cell Foundation 2016
International Society of Stem Cell Research (ISSCR) Annual Meeting Abstract Review Committee
International Conference and Exhibition on Cardiology and Cardiovascular Scientific Committee Member
Weinstein Cardiovascular Research Conference, Session Chair “Stem Cell and Bioengineering” platform section

JAY S. RAVAL, M.D.

Member, ASFA Abstracts Committee
Member, ASFA Clinical Applications Committee
Member, ASFA Extracorporeal Photopheresis Subcommittee
Member, ASFA Pediatric Apheresis Subcommittee
Member, ASFA Rare Diseases Subcommittee
Member, AABB Therapeutic Apheresis Subsection
Member, AABB Pediatric Transfusion Medicine Subsection
Member, AABB Clinical Hemotherapy Subsection
Member, UNC SOM Academy of Educators
Member, ASFA Principles of Apheresis Technology Writing Group
Member, ASFA Research Committee
Member, ASFA Sickle Cell Disease Subcommittee
Member, AABB Annual Meeting Scientific Abstracts Review Committee
Member, ASFA Annual Meeting Education Program Organizing Committee
Member, ASFA Pediatric Apheresis Adverse Event Reporting Initiative
Member, ASFA Extracorporeal Photo[heresis International Practice Characterization Initiative
Chair, ASFA Pediatric Apheresis Guidance Document Initiative
Chair, AABB Cord Blood HPC Adverse Event Reporting Initiative
Chair, ASFA Severely ADAMTS13 Deficient TTP Registry
Chair, AABB Cellular Therapy Product Collection/Clinical Practice Subsection
Chair, ASFA Education Committee
Chair, ASFA Practitioner Subcommittee
Chair, ASFA Webinar Subcommittee
Chair, ASFA Journal Club Subcommittee
Chair, ASFA Online Resources Subcommittee
Chair, ASFA Hematologic CDiseases/TTP Subcommittee

Session Chair/Moderator, “Red Cell Exchange”, Breakfast with the Experts, Apheresis Review Session, American Society for Apheresis Annual Meeting, Palm Springs, CA, May 2015

Session Chair/Moderator, “Education Session: Basic Therapeutic Apheresis”, American Society for Apheresis Annual Meeting, Palm Springs, CA, May 2016

MARIAN A. ROLLINS-RAVAL, M.D.

Member, ASFA, Clinical Applications Committee

Member, ASFA, Coagulation Subcommittee

JOHN SCHMITZ, Ph.D.

Board of Directors, American Society for Histocompatibility and Immunogenetics

Program Planning Committee, American Society for Histocompatibility and Immunogenetics Annual Meeting, October 2015.

Vice Chair, Directors Affairs Committee, American Society for Histocompatibility and Immunogenetics

Member, Directors Training Review and Credentialing Committee⁴, American Society for Histocompatibility and Immunogenetics

Member, Accreditation Review Board American Society for Histocompatibility and Immunogenetics

Session Chair, American Society for Histocompatibility and Immunogenetics Annual Meeting, October 2015

HARSHARAN SINGH, M.D.

Member, Banff working group for T-cell mediated rejection The Banff Society for Transplantation, 2013-2018.

Member, Banff working group for Polyomavirus Nephropathy, The Banff Society for Transplantation, 2011-2016

Chair, Banff Electron Microscopy Working Group, The Banff Society for Transplantation, 2015-2020.

Session Chair: Renal Transplant Pathology Case Presentations. Indian Society of Renal and Transplant Pathology (ISRTP) Annual Meeting, July 10-12, 2015. Cochin, Kerala India.

OLIVER SMITHIES, D.Phil.

Advisory Board Member of Tohoku Forum for Creativity Thematic Program, Sendai, Japan.

Attended International Advisory Board Meeting November 28, 2015

JOAN M. TAYLOR, Ph.D.

American Society of Biochemistry and Molecular Biology Career Day – presenter, panelist April 2016

Weinstein Cardiovascular Development and Regeneration Conference – organizing committee, abstract reviewer June 2016

DIMITRI G. TREMBATH, M.D., Ph.D.

Member, Awards Committee Member American Association of Neuropathology

Member, Selection Committee for the American Medical Association (AMA) Foundation's 2015 Seed Grant Research Program
Altermante, College of American Pathologists House of Delegates
Representative House of Delegates, College of American Pathologists

KAREN WECK-TAYLOR, M.D.

Association of Molecular Pathology Nominating Committee, Solid Tumors Subdivision
CAP liaison to the American College of Medical Genetics and Genomics (ACMG)
Member council of scientific affairs (CSA), College of American Pathologists
Clinical and Laboratory Standards Institute (CLSI) Consensus Committee on Molecular Methods
Chair, Molecular Pathology and Genomics Cluster, College of American Pathologists
Chair, Biochemical and Molecular Genetics Resource Committee, College of American Pathologists
Chair, Pharmacogenetics Workgroup, College of American Pathologists

ERIC T. WEIMER, Ph.D.

Member, ASM: Laboratory Practice Committee
Session Chair/Moderator, ASHI: 41st Annual Meeting, September 29th, 2015, Savannah, GA
(New Genomic/Proteomic Assays session)

BERNARD WEISSMAN, Ph.D.

NCI Provocative Questions Workshop, November 17, 2015

JULIA WHITAKER, M.S., Ph.D.

Co-Chair for Southeast region – International Mock Board Exam Coalition for the American College of Laboratory Animal Medicine Board exam 2010-present
Education Committee – North Carolina Academy of Laboratory Animal Medicine 2013-present

DAVID C. WILLIAMS, JR., M.D.

Co-Chair of the Gene Regulation Special Interest Group, American Society of Investigative Pathology

MONTE WILLIS, M.D., Ph.D.

Member, Program Committee for Experimental Biology, American Society of Investigative Pathology, August 2007-present
Committee member, ASIP Committee for Career Development and Diversity (CDDD) July 2015-present
Co-Chair, Sugar, Sugar, awww, Honey, Honey...Pathophysiology of Diabetes, Obesity and Metabolic Complications, Monday, 4 April 2016. 2-5p.m. San Diego, CA
Co-Chair, Cell Injury Workshop: Proteotoxicity and Cell Injury Sunday, 3 April 2016 Experimental Biology 2016, San Diego, CA
Co-Chair, XVIth Annual Workshop on Graduate Education in Pathology: Integrating Clinical and Anatomic Pathology. Saturday, 2 April 2016 Experimental Biology 2016, San Diego, CA

ALISA S. WOLBERG, Ph.D.

Vice Chair 2016-2018 International society of Thrombosis and Haemostasis Governance Committee
Chair 2016-2018 American Heart Association Brinkhous Award Committee
Co-Chairman 2013-present International Society of Thrombosis and Haemostasis Scientific Subcommittee on Factor XIII and Fibrinogen
Member, International Society of Thrombosis and Haemostasis Membership and Communications Committee (2016-2018)
Member, American Society for Hematology (ASH) Scientific Affairs Committee (2016-2017)
Member, International Society of Thrombosis and Haemostasis Scientific Subcommittee on Animal Cellular and Molecular Models (2015-present)
Vice-Chair, American Heart Association (AHA) Arteriosclerosis, Thrombosis and Vascular Biology Brinkhous Award Committee (2014-2016)
Member, American Heart Association (AHA) Arteriosclerosis, Thrombosis and Vascular Biology: Spring Program Committee (2014-2016)
Women's Leadership Committee (2014-2016)
Abstract Committee Co-Chair and Planning Committee Member, Thrombosis & Hemostasis Summit of North America: 2016
Member, International Advisory Board, 2nd International Factor XIII Workshop, Hévíz, Hungary: 2016
Member, International Scientific Advisory Board, XXV ISTH Congress, Toronto, Canada: 2015
Member, American Society for Hematology (ASH) Scientific Subcommittee on Thrombosis and Vascular Biology (2012-2015)

MAIMOONA W. ZARIWALA, Ph.D.

Panelist for the American Thoracic Society (ATS) project committee working toward standardization of clinical criteria for primary ciliary dyskinesia.
Since May 2014: Expert Reviewer for the review article entitled "Primary Ciliary Dyskinesia" for **Orphanet** (www.orpha.net/) that is "the portal for rare disease and orphan drugs". Orpha number ORPHA244. First update May 2014
Expert Reviewer for the report entitled "Primary Ciliary Dyskinesia" for **Genetics Home Reference** (ghr.nlm.nih.gov) that is a guide to understanding genetic conditions which is a service of the U.S. National Library of Medicine. Last updated June 2, 2014. Currently working with them for another large update (July 2015).
Since Dec. 2007: Expert Reviewer for the report titled "Primary Ciliary Dyskinesia" for **NORD** (<http://www.rarediseases.org/rare-disease-information/>) that is a National Organization for Rare Disorders. Updated Nov. 26, 2008, May 31, 2012, June 4, 2012 and last updated in April 2015.

ELECTED LEADERSHIP POSITIONS

FRANK C. CHURCH, Ph.D.

Board of Directors, Mid-Atlantic Affiliate of the American Heart Association

WILLIAM B. COLEMAN, Ph.D.

President, The American Society for Investigative Pathology, July 2015-June 2016

CRAIG A. FLETCHER, D.V.M., Ph.D.

NCABR Executive Committee & Board of Directors 2013 – 2016

ACLAM (American College of Laboratory Animal Medicine) Planning Committee Chair 2013 – 2016

Lab Animal, Nature Publishing Group – Editorial Board 2015 – 2018

PETER GILLIGAN, Ph.D.

CPC – American Society for Microbiology

KATHLEEN KAISER ROGERS, Ph.D.

CAP-ACMG Liaison for the Laboratory Quality Assurance Committee

Chair, American College of Medical Genetics Salary Survey Work Group

Vice Chair, College of American Pathologists Cytogenetics Resource Committee

NICHOLE KORPI-STEINER, Ph.D.

Chair-Elect, AACC North Carolina Local Section, 2016 – Present

Member-at-Large, AACC Critical and Point of Care Testing Division 2016 – Present

MELISSA B. MILLER, Ph.D.

Pan American Society of Clinical Virology, Council

VOLKER NICKELEIT, M.D.

Renal Pathology Society (RPS) member of the BOD/BOA: advisor to the president

JUDITH NIELSEN, D.V.M.

North Carolina Academy of Laboratory Animal Medicine, President 11/1/2013 – 9/29/15; Past President 9/30/2015 – present; 2 year appointment)

NIRALI M. PATEL, M.D.

Board of Directors, Association for Molecular Pathology

KATHLEEN W. RAO, Ph.D.

International Standing committee on Human Cytogenetic Nomenclature (elected) member 1/1/2012 – 12/21/2017.

JAY S. RAVAL, M.D.

Board Member, AABB Cellular Therapies Section Executive Coordinating Committee

Board of Trustees, Americas Region, International Society of Apheresis

STEVEN T. SHIPLEY, DVM

American Society of Laboratory Animal Practitioners Board of Directors, Society Board of Directors and ASLAP Legislative & Regulatory Affairs Committee BOD Liaison, July 2015-July 2018

MONTE S. WILLIS, M.D., Ph.D.

Councilor, North American Section of the International Society for Heat Research (ISHR), Elected December 2014 to 6-year term (2015-2021).

Chair-Elect/Chair of the Education Committee, American Society of Investigative Pathology (ASIP), July 2014-June 2018 (Elected to a 4 year term total). This capacity includes service on ASIP Council and Program Committees.

Councilor, Society for Cardiovascular Pathology, March 3, 2013 – present (3 year term)

ALISA S. WOLBERG, Ph.D.

Council Member, International Society on Thrombosis and Haemostasis 2016-2022

Board of Counsellors, International Fibrinogen Research Society 2012-2018

Vice-Chair, Chair, Gordon Research Conference, Hemostasis 2016, 2018

Board of Directors, North American Society of Thrombosis and Hemostasis 2014-2017

MEMBER OF BOARD OF DIRECTORS OF NATIONAL/INTERNATIONAL ACCREDITATION AGENCY

JESSICA BOOKER, Ph.D.

Member of BOD of the American Board of Medical Genetics and Genomics

FRANK C. CHURCH, Ph.D.

Communications Committee, World Parkinson Coalition
Planning Committee, Moving Day NC Triangle

JOHN L. SCHMITZ, Ph.D.

American Society for Histocompatibility and Immunogenetics Accreditation Review Board

MEMBER OF FDA, CDC OR COMPARABLE COMMITTEE

WILLIAM K. FUNKHOUSER, M.D.

Member, Immunology Devices Panel, FDA

MARGARET L. GULLEY, M.D.

CAP/ASCP/ASCO HER2 Testing in Gastric Cancers Guideline Expert Panel Member

MELISSA B. MILLER, Ph.D.

FDA, Microbiology Devices Panel
Clinical and Laboratory Standards Institute, Antimicrobial Susceptibility Committee
NIH, Antimicrobial Resistance Leadership Group

KATHLEEN W. RAO, Ph.D.

Member, Children's Oncology Group, Infant Leukemia and T-cell ALL Committee
Committee Member, Cancer and Leukemia Group B (CALCG) Cytogenetics Review

KAREN WECK-TAYLOR, M.D.

Molecular and Clinical Genetics Devices Panel, FDA Medical Devices Advisory Committee

MEMBER OF NIH OR COMPARABLE STUDY SECTION

WILLIAM B. COLEMAN, Ph.D.

ad hoc External Grant Reviewer for the National Institutes of Health, Special Emphasis Panel (R21/R03 Study Section), March 2016

ad hoc External Grant Reviewer for the National Institutes of Health, Special Emphasis F09A-D Panel (F30/F31/F32 Study Section), March 2016

ad hoc External Grant Reviewer for the Oak Ridge Associated Universities, Florida Department of Health Biomedical Reviews, December 2015

ad hoc External Grant Reviewer for the National Institutes of Health, Cancer Diagnostics and Treatment SBIR/STTR Study Section, November 2015

ad hoc External Grant Reviewer for the Lung Cancer Research Program of the Department of Defense, Congressionally Directed Medical Research Program, Concept Award Study Section (W81XWH-15-LCRP-CA), October 2015

WILLIAM K. FUNKHOUSER, M.D.

Member, TRACS study section, UNC

MARGARET L. GULLEY, MD

NIH study section, Global Noncommunicable Diseases and Injury Across the Lifespan: Exploratory Research (R21), 2016

WILLIAM K. KAUFMANN, Ph.D.

NCI, Innovative Molecular Analysis Technologies 6/16-17-16

NOBUYO MAEDA, Ph.D.

NIH, F05D , Adhoc

MONTE S. WILLIS, M.D., Ph.D.

Study Section Reviewer, Florida Department of Health, Panel 1. Nov. 15-Dec. 15, 2015

Study Section Reviewer, American Heart Association. Cardia Biology BCT2. Oct. 10, 2015

Study Section Co-Chair, American Heart Association. Cardia Biology BCT3. April 15, 2016

Ad hoc Study Section Reviewer, University of Nebraska 2015 Food for Health Collaboration Initiative, January 2016

Reviewer, Billings Innovation Laboratory 2015-2016 Awards, Gilling's School of Global Public Health, January 2016

BERNARD E. WEISSMAN, Ph.D.

NCI, Program Project Review Panel October 15-16, 2015

DOD, Breast Cancer Breakthrough Awards (Chairperson) February 7-9, 2016

NCI, SPORE Review Panel June 15-16, 2016

ALISA S. WOLBERG, Ph.D.

adhoc NIH/NHLBI Hemostasis and Thrombosis

adhoc NIH ZRG1 VH-C (80) A

adhoc NIH/NHLB R03 ZHL1 CSR-R (M2)1

2015-pres AHA Thrombosis BSC2

QING ZHANG, Ph.D.

Florida Dept. of Health Bankhead-Coley Cancer Research Program 11//2015

SERVICE AS EDITOR OR ON EDITORIAL BOARDS

FRANK C. CHURCH, Ph.D.

Editor, Daily Parkinson eNewspaper, 2016 World Parkinson Congress
Editorial Board, Thrombosis

WILLIAM B. COLEMAN, Ph.D

Associate Editor, American Journal of Pathology (K.A. Roth, Editor-in-Chief), October 2014-Present

Associate Editor, PLoS ONE (D. Pattinson, Executive Editor), December 2011-Present

Associate Editor, BMC Cancer (M. Norton, Editor-in-Chief), February 2010-Present

Editorial Board, Current Pathobiology Reports (S.S. Monga, Editor-in-Chief), May 2012-Present

Editorial Board, Laboratory Investigation (G.P. Siegel, Editor-in-Chief), July 2007-Present

Editorial Board, Archives of Pathology and Laboratory Medicine (P.T. Cagle, Editor-in-Chief), April 2007-Present

Editorial Board, Experimental and Molecular Pathology (J.M. Cruse, Editor-in-Chief), January 2007-Present

Editorial Board, Clinica Chimica Acta (C.-W. Lam, Editor-in-Chief), August 2000-Present

BRIAN C. COOLEY, Ph.D.

Heart Research – Open Journal

Journal of Angiology & Vascular Surgery

Microsurgery

Plastic and Aesthetic Research

LESLIE G. DODD, M.D.

Editorial Board, Diagnostic Cytopathology

Editorial Board, Am J Clin Pathol (AJCP)

Editorial Board, Journal of Am Cytopath Soc (JASC)

WILLIAM K. FUNKHOUSER, M.D.

Editorial Board, Molecular Path Section Editor, Arch Path Lab Med

Milestones Editor, ASIP Pathways Newsletter

PETER GILLIGAN, Ph.D.

Associate Editor, Mbio

Associate Editor, Clinical Microbiology Reviews

Associate Editor, Journal of Clinical Microbiology

MARGARET GULLEY, M.D.

Editorial Board, Applied Immunohistochemistry & Molecular Morphology

Editorial Board, American Journal of Surgical Pathology

Editorial Board, PLOS Currents: Evidenceon Genomic Tests

CATHERINE HAMMETT-STABLER, Ph.D.

Associate Editor, Clinical Biochemistry

Editorial Board, Practical Laboratory Medicine

JONATHON HOMEISTER, M.D., Ph.D.

Editorial Board, Journal of Molecular and Cellular Cardiology
Editorial Board, Cardiovascular Pathology

J. CHARLES JENNETTE, M.D.

Editorial Board, Archives of Pathology and Laboratory Medicine
Editorial Board, American Journal of Kidney Disease
Editorial Board, Journal of Rheumatology
Editorial Board, Laboratory Investigation
Editorial Board, Clinical Nephrology
Editorial Board, AJSP: Reviews and Reports
Editorial Board, Pathology Case Reviews

DAVID G. KAUFMAN, M.D., Ph.D.

Editorial Board, Experimental and Molecular Pathology
Editorial Board, Frontiers of Biosciences
Editorial Board, Translational OncoGenomics
Editorial Board, Clinical Medicine: Pathology
Editorial Board, The Open Reproductive Science Journal

WILLIAM K. KAUFMANN, Ph.D.

Editorial Board, Environmental and Molecular Mutagenesis

MEHMET KESIMER, Ph.D.

Associate Editor, Tobacco Regulatory Science
Editorial Board, American Journal of Respiratory Cell and Molecular Biology (AJRCMB)

NICHOLE KORPI-STEINER, Ph.D.

Section Editor, Clinical Chemistry ASCP Case Report 2014-Present
SYCL Section Editor for Clinical Chemistry Journal, 2016-Present
National Academy of Clinical Biochemistry, Scientific Shorts, 2015-Present

CHRISTOPHER MACK, Ph.D.

Editorial Board, Arteriosclerosis
Editorial Board, Thrombosis
Editorial Board, Vascular Biology

C. RYAN MILLER, M.D., Ph.D.

Editorial Board, Brain Pathology
Editorial Board, Brain Research Bulletin

MELISSA B. MILLER, Ph.D.

Editorial Board, Journal of Clinical Microbiology (ASM Press)
Editorial Board, Diagnostic Microbiology and Infectious Disease (Elsevier)

VOLKER NICKELEIT, M.D.

Journal of Nephrology and Urology, Jacobs Publishers
Austin Journal of Nephrology and Hypertension, Austin Publishing Group
Journal of Multidisciplinary Pathology, ScienceScript LLC
Annals of Clinical Cytology and Pathology
Journal of Transplantation & Stem Cell Biology (JTSCB), Avens Publishing Group
World Journal of Transplantation
Kidney and Blood Pressure Research
Ultrastructural Pathology
Journal of Cellular and Molecular Pathology, SciTechnol
Journal of Modern Human Pathology (JHP), Nobel Research

YARA A PARK, M.D.

Editorial Board, Journal of Clinical Apheresis

JAY S. RAVAL, M.D.

Frontiers in Surgery: Reconstructive and Plastic Surgery
Transfusion and Apheresis Science
Therapeutic Apheresis and Dialysis
International Blood Research and Reviews
The Journal of ExtraCorporeal Technology
International Journal of Blood Transfusion and Immunohematology
Journal of Blood Disorders and Transfusion

JOHN SCHMITZ, Ph.D.

Clinical and Vaccine Immunology
Journal of Immunological Methods

HARSHARAN K. SINGH, M.D.

Ultrastructural Pathology
Journal of Nephrology and Urology
International Journal of Nephrology and Kidney Failure

DIMITRI G. TREMBATH, M.D., Ph.D.

Journal of Neuropathology and Experimental Neurology

KAREN WECK-TAYLOR, M.D.

Chair, Molecular Pathology and Genomics Cluster, College of American Pathologists
Chair, Biochemical and Molecular Genetics Resource Committee, College of American Pathologists
Chair, Pharmacogenetics Workgroup, College of American Pathologists

BERNARD E. WEISSMAN, Ph.D.

Journal of Cellular Physiology
Genetics Research International
Lung Cancer: Targets and Therapy

MONTE S. WILLIS, M.D., Ph.D.

Editorial Board, American Journal of Physiology – Endocrine and Metabolism, July 2, 2015-present

Editorial Board, Cardiovascular Pathology January 1, 2012-present (3 year term)

Editorial Board, American Journal of Pathology July 2011-present (2nd 3 year term)

Associate Editorial Board, American Journal of Cardiovascular Disease, March 2011-present

Editorial Board, Journal of Molecular and Cellular Cardiology January 1, 2011-present

Section Editor, Archives of Pathology & Laboratory Medicine, Clinical Effectiveness and Economics September 1, 2012-present

Editorial Board, Military Medical Research January 2016-present

Editorial board, American Journal of Physiology – Endocrine and Metabolism July 1, 2015-present

Editorial Board, Cardiovascular Pathology January 1, 2012-present (2nd 3 year term)

Editorial Board, American Journal of Pathology July 2011-present (2nd 3 year term)

Associate Editorial Board, American Journal of Cardiovascular Disease, March 2011-present

Editorial Board, Journal of Molecular and Cellular Cardiology January 1, 2011-present

ALISA S. WOLBERG, Ph.D.

Associate Editor, Frontiers in Medicine (Hematology Section) 2015-present

Associate Editor, Seminars in Thrombosis and Hemostasis 2015-present

Member, Editorial Board, Journal of Thrombosis and Haemostasis 2016-present

Member, Editorial Board, Arteriosclerosis, Thrombosis and Vascular Biology 2010-present

INVITED LECTURES AT STATE/NATIONAL AND INTERNATIONAL MEETINGS

SILVIO ANTONIAK, Ph.D.

Third Annual Patient, Family, Researcher meeting of the Myocarditis Foundation, Gaylord Hotel and Conference Center at National Harbor, Maryland, “Blood coagulation in Myocarditis” September 25-26, 2015

PABLO ARIEL, Ph.D.

Fourth Annual Conference of the Mid Atlantic Directors and Staff of Scientific Cores, Pittsburg, PA “Implementing an Ultramicroscope light-sheet system in a core facility” June 10, 2016

FRANK C. CHURCH, Ph.D.

K-12 Technologies Invigorating Learning in Medical Education Classrooms. Smith, K.W. and F.C. Church. Practice Session proposal. 8th Annual Conference on Higher Education Pedagogy, February 10-12, 2016, Blacksburg, VA

Experiential Learning Fueled by K-12 Techniques in a Medical Education Classroom. Smith, K.W. and F.C. Church. Transformation Workshop at Change MedEd2015, October 1-2, 2015, Chicago, IL.

WILLIAM B. COLEMAN, Ph.D.

Pathobiology for Investigators, Students, and Academicians – 2015 (PISA 2015), American Society for Investigative Pathology, October 2015, Baltimore, MD, Poster Presentation: “Presence of a p53 mutant gene expression signature associates with poor outcomes among breast cancers.” W.B. Coleman (Presenter), J.S. Parker, R. Sandhu, and C.K. Anders. Poster Presentation: “Expression of a p53 mutant gene expression signature associates with poor outcomes among ER+/PR+/Her2- breast cancers.” W.B. Coleman (Presenter), J.S. Parker, R. Sandhu, and C.K. Anders

Experimental Biology 2016, April 2016, San Diego CA, President’s Symposium: Molecular Pathogenesis of Triple-negative Breast Cancer – Implications for Prevention and Therapy. Symposium Organizer and Chair: W.B. Coleman.

Experimental Biology 2016, April 2016, San Diego CA, Breast Cancer Workshop: The Biology and Therapy of Breast Cancer Brain Metastasis. Workshop Organizer: W.B. Coleman.

GEORGE FEDORIW, M.D.

College of American Pathologists Annual Meeting, October 5th, 2015. Diagnostic Challenges in Low Grade B-cell Lymphomas.

American Society of Clinical Pathology: Practical and effective hematopathology. La Jolla, CA, May 2nd-5th, 2016.

- a. Basics of bone marrow evaluation I and II
- b. Cytologic evaluation of lymphoma
- c. Evaluation of the cytopenic patient
- d. Myelodysplastic syndromes and myelodysplastic/myeloproliferative overlap neoplasms
- e. WHO update of myeloid neoplasms
- f. Interactive case presentation

PETER GILLIGAN, Ph.D.

SEACM Williamsburg, VA November 2015

Challenges in Laboratory Testing for *Clostridium difficile* with Carey-Ann Burnham. American Association of Clinical Chemistry April 2016

VIRGINIA L. GODFREY, D.V.M, Ph.D.

American College Veterinary Pathology, Minneapolis, MN Neuropathology Mystery Case, October 18, 2015

NC Academy of Lab. Animal Medicine Workshop in L.A. Medicine, Raleigh NC The Laboratory Mouse, May 12, 2016

MARGARET GULLEY, M.D.

“Molecular Diagnosis” Pathology Update: State-of-the-Art Diagnostic Approaches to Surgical Pathology, 3 lectures in a continuing medical education course, American Society for Clinical Pathology, Las Vegas, July 30, 2015.

“Molecular Tools to Enhance Cancer Diagnosis and Management in Central America” International Showcase at the Assoc. for Molecular Pathology annual meeting, Austin, Nov 4, 2015

"Molecular Surgical Pathology for the Practicing Pathologist" 9 lectures in a continuing medical education course, American Society for Clinical Pathology, Miami, April 10-14, 2016

CATHERINE HAMMETT-STABLER, Ph.D.

Behind the Curtain: Laboratory Testing in Addiction. Urine Drug Testing in the Addiction. Co-faculty: Paul Martin. Addiction Medicine Conference. The Governor’s Institute of Substance Abuse. Asheville, NC April 22, 2015

TRACY HEENAN, D.V.M.

April 1, 2016, Public Responsibility in Medicine and Research IACUC Conference, Seattle, WA; Workshop C9: Program Review and Facility Inspections (Program Oversight Track)

April 2, 2016, Public Responsibility in Medicine and Research IACUC Conference, Seattle WA; Roundtable Facilitator – Compliance/Federal/Legal/Regulatory

JONATHON W. HOMEISTER, M.D., Ph.D.

“Integrating Clinical and Anatomic Pathology into Graduate Education at UNC,” XVIth Annual Workshop on Graduate Education in Pathology. American Society for Investigational Pathology at Experimental Biology 2016, San Diego, CA. April 2, 2016

J. CHARLES JENNETTE, M.D.

Visiting Professor: Division of Nephrology, Thomas Jefferson University Sidney Kimmel Medical College, “ANCA Glomerulonephritis Renal Biopsy Case Reviews” November 23, 2015

Keynote Lecture: Canada Vasculitis (CanVas) Research Symposium, “ANCA Associated Vasculitis 2015” October 8, 2015, Calgary, Canada

Invited Lectures (2), Columbia University Postgraduate Review Course: Renal Biopsy in Medical Diseases of the Kidney, "Rapidly Progressive Glomerulonephritis and ANCA" and "IgA Nephropathy and IgA Vasculitis" New York, NY, July 15, 2015

Norma Berryhill Distinguished Lecture, "Preparation and Serendipity as Keys to Academic Success: A Tale of Bedside to Bench and Back Again" Chapel Hill, NC, November 11, 2015

UNC Division of Rheumatology Grand Rounds, "Pathology, Classification and Diagnosis of Vasculitis" 10/30/15

Course Co-Director: ASN Kidney Week Pre-Course: Fundamentals of Renal Pathology, Lectures: "Anatomy, Histology and Pathologic Evaluation of the Kidney," "Crescentic Glomerulonephritis," and "Vasculitides" San Diego, November 3-4, 2015

Leiden Lupus Classification Meeting, "CureGN Pathology Classification and Scoring" Leiden, The Netherlands, May 10, 2016

Spring National Kidney Foundation Meeting, "ANCA Associated Vasculitis: Clinical Manifestations and Immunopathogenesis" Boston, April 30, 2016

30th Annual Meeting of the Glomerular Disease Collaborative Network (3 lectures), "Developments in the Past 30 Years that have Changed Management of Glomerular Diseases," "Kidney Disease Caused by Monoclonal Immunoglobulin," "Atypical Anti-GBM Disease" Chapel Hill, NC, April 16-17, 2016

Annual Sao Paulo Nephrology Course, "Vasculitis and the Kidney: Pathogenesis, Diagnosis and Classification" Paulista University, Sao Paulo, Brazil, April 13, 2016

Cadernos de Patologia Renal 2016 (2 lectures), "Vasculitis with Renal Impairment" and "Thrombotic Microangiopathy and the Kidney" Sao Paulo, Brazil, April 11-12, 2016

United States and Canadian Academy of Pathology Annual Meeting, Renal Pathology Evening Conference, "Thrombotic Microangiopathies" Seattle, WA, March 13, 2016

4th Annual Renal Pathology Workshop, Riyadh, Saudi Arabia, 2 talks, "Nephrotic Syndrome" and "Crescentic Glomerulonephritis" Riyadh, Saudi Arabia, February 25, 2016

William Barriss McAllister Memorial Lecture: Department of Pathology, Yale School of Medicine, "Clinicopathologic Classification, Diagnosis and Pathogenesis of Vasculitis" New Haven, February 18, 2016

Charles Kleeman Visiting Professor in Nephrology at UCLA: 6 grand rounds presentations at UCLA Medical Center, UC Irvine, Cedars-Sinai Medical Center, Harbor UCLA, Olive View Medical Center, and VA Greater Los Angeles Healthcare System, Los Angeles, June 27-29, 2016

MEHMET KESIMER, Ph.D.

Invited presenter: Frontiers in Glycan Analysis. Waters Corporation/The University of Georgia Complex Carbohydrate Research Center. March 16-17, 2016. Complex Carbohydrate Center, Athens, GA.

Organizer: American Thoracic Society "New strategies and Challenges in Lung Proteomics and Metabolomics" Workshop. February 4-5, 2016 National Jewish Health, Denver CO.

Session Leader: Progress in the proteomics field. "New strategies and Challenges in Lung Proteomics and Metabolomics" Workshop. February 4-5, 2016 National Jewish Health, Denver CO.

Invited Speaker: Quantitative Proteomics Analysis of Lung Secretions. "New strategies and Challenges in Lung Proteomics and Metabolomics" Workshop. February 4-5, 2016 National Jewish Health, Denver CO.

Invited speaker, “Gel forming mucins in response to infection and inflammation in normal and cystic fibrosis airways.” 29th Annual North American Cystic Fibrosis Conference (NACFC), workshop session ‘Mobilizing CF Mucus.’ Phoenix, Arizona. October 9, 2015

NICHOLE KORPI-STEINER, Ph.D.

Beckman Coulter, Inc., “Implementing IQCP: How one medical center succeeded,” National webinar, December 15, 2015.

American Association for Clinical Chemistry, “An IQCP development roadmap: One medical center’s journey toward implementation,” National webinar, November 5, 2015.

American Association for Clinical Chemistry, “One POCT request, 2 requests, 3 requests, 4,” Philadelphia, PA, 2016.

THOMAS T. LAWTON, M.D.

"Molecular Classification of Breast Cancer and Clinical Implications for Treatment"

"Management of High Risk Breast Lesions at Core Biopsy." XII Congreso Nacional de Mastologia. Monterrey, Mexico: August 19-22, 2015.

"Breast Imaging Keynote Speaker: Radiology—Pathology Challenges to Lobular Neoplasia and Radial Scars." Radiological Society of North America 100th Annual Meeting. Chicago, IL: November 29-December 4, 2015.

CHRISTOPHER MACK, Ph.D.

Am Society of Pharmacology and Expert Therapeutics Conference, San Diego, CA 4/5/16
“GPCR and RhoA signaling in hypertension”

C.RYAN MILLER, M.D., Ph.D.

Influence of PI3K and MAPK pathway mutations on response to mono and dual treatment with targeted kinase inhibitors. American Society for Investigative Pathology, San Diego, CA April 2-6, 2016

Cell of origin and initiating mutagens influence glioma pathogenesis. American Association of Neuropathologists, Baltimore, MD June 16-29, 2016

MELISSA B. MILLER, Ph.D.

Re-entering Anti-bacterial Drug Development Summit, Cambridge Health Institute, “Practical utilization of multiplex infectious disease tests and impact on patient care,” Boston, MA, November 18, 2015.

E.G. Scott Microbiology Symposium, 22nd Annual Meeting, Christiana Care Health System, “Multiplex detection of respiratory pathogens: benefits and challenges,” Newark, DE, September 29, 2015.

Interscience Conference on Antimicrobial Agents and Chemotherapy (international), 55th Annual Meeting, Workshop, “Introduction of MALDI-ToF Mass Spectrometry and VITEK MS,” San Diego, CA, September 17, 2015.

Southwestern Association of Clinical Microbiology, 34th Annual Meeting, “Challenging Cases iClinical Microbiology,” Shreveport, LA, September 16, 2015.

Memorial Healthcare System, Pathology Grand Rounds, “The changing paradigm of the laboratory diagnosis of gastroenteritis,” Hollywood, FL, August 11, 2015.

American Society for Microbiology, Microbe 2016, “The changing paradigm of the laboratory diagnosis of gastroenteritis,” Boston, MA, June 17, 2016.

Pan American Society for Clinical Virology, 23rd Annual Molecular Virology Workshop, “Respiratory panels: available panels, performance and pitfalls” Daytona Beach, FL, May 18, 2016.

American Society for Microbiology, Hot Topics Webinar Series, “Molecular multiplex testing: respiratory and gastrointestinal pathogens,” February 1, 2016.

VOLKER NICKELEIT, M.D.

Banff-CST Joint Scientific Meeting: “Update from Polyomavirus Working Group” October 2015, Vancouver

Banff-CST Joint Scientific Meeting: “Prospects for Modifying/Improving the Banff Criteria for Borderline and TCMR” October 2015, Vancouver

Society of Renal & Transplantation Pathology (ISRTP), 10th annual conference: “General aspects of rejection pathology” July 2015, Kochi

Society of Renal & Transplantation Pathology (ISRTP), 10th annual conference: “Infections in renal allografts” July 2015, Kochi

Glomerular-Disease Collaborative Network meeting (GDCN 30th annual conference): “Renal biopsy case discussions with pathologic and clinical correlations” April 2016, Chapel Hill, NC, USA Tubulo-interstitial Lesions in Renal allografts 6.27.16, Basel, Switzerland

De-Novo and Recurring Glomerulopathies in Renal allografts 6.29.16, Basel, Switzerland, Approaches to the evaluation of transplant biopsies: interactive forum four times during 4 day seminar

NIRALI PATEL, M.D.

Next Generation Clinical Sequencing: What Oncologists Need to Know from a Pathologist’s Perspective. Mountain Area Health Education Center: Advanced Laboratory Testing Across Cancer Types: Everything You Need to Know. Asheville, NC, October 2, 2015.

Next Generation Sequencing Technologies: Application and Challenges for Cancer Genomics. Association of Medical Laboratory Immunologists: 2015 Annual Meeting. New Orleans, LA, August 14, 2015.

JAY S. RAVAL, M.D.

Invited Lecturer, “Special Session - Updates in Acquired Thrombotic Thrombocytopenic Purpura: Disease Pathogenesis, Laboratory Monitoring, and Current Treatment Strategies”, International Conference on Hematology and Blood Disorders, Atlanta, GA, 11/2015

Invited Lecturer, “Round-table Discussion About Therapeutic Plasma Exchange in Thrombotic Thrombocytopenic Purpura”, International Conference on Hematology and Blood Disorders, Atlanta, GA, 11/2015

Invited Lecturer, North Carolina Association of Blood Bankers, Autumn Workshop, “Transfusion Associated Circulatory Overload Reactions Take My Breath Away,” Chapel Hill, NC, 9/2015

“Clinical Applications: Donor and Cellular Therapy”, Apheresis Review Session, American Society for Apheresis Annual Meeting, Palm Springs, CA, 5/2016

HARSHARAN SINGH, M.D.

The Role of Electron Microscopy in Renal Transplants. Indian Society of Renal and Transplant Pathology (ISRTP) Annual Meeting, July 10-15, 2015. Cochin, Kerala India.

Slide Seminar in Renal Transplant Pathology. Indian Society of Renal and Transplant Pathology (ISRTP) Annual Meeting, July 10-15, 2015. Cochin, Kerala India.

Invited Lecturer: Renal Biopsy Case Presentations – Annual Meeting of the Glomerular Disease Collaborative Network. Chapel Hill, NC April 16-17, 2016.

OLIVER SMITHIES, D.PHIL.

Nobel Lecture at 65th Lindau Nobel Laureate Meeting, Lindau, Germany, “Where do Ideas Come From?” June 27 – July 3, 2015

Interview for The Conversation, an online, evidence-based information source: “Nobel laureate: for inspiration, I take to the sky and fly with birds.” July 23, 2015

Interview by Ushma Neill, PhD., for Journal of Clinical Investigation. July 28, 2015

Lecture at CIDD/Neuroscience Center Investigator Forum, UNC. “Where do Ideas Come From?” Sept 8, 2015

Interview by Ernie Hood, MA, for “Radio in Vivo: Your Link to the Triangle Science Community” WCOM-FM Oct 29, 2015

Informal chat discussion with students from Tohoku University Graduate School of Pharmacy, Sendai Japan Nov 30, 2015

Conference talk with Brazilian students from the Federal University of Rio de Janeiro, Brazil December 22, 2015

Meet with President-elect Margaret M. LaMontague Spellings and Chancellor Carol L. Folt March 23, 2016

Keynote address at the Student Research Forum, University of Kansas Medical Center, Kansas City, Kansas. “Where do Ideas Come From?” March 31 – April 2, 2016

Presentation at Biomedical Engineering class at East Chapel Hill High School April 15, 2016

Presentation at the Genetics and Environmental Mutagenesis Society at NIH/NIEHS, Research Triangle Park, NC. “Where do Ideas Come From?” April 19, 2016

Seminar Speaker at Duke-NUS Graduate Medical School. “Where do Ideas Come From?” June 3, 2016

Keynote Address at Duke-NUS Graduation and Hooding Ceremony, Duke-NUS Graduate Medical School, Singapore June 4, 2016

KAREN WECK-TAYLOR, M.D.

Whole Exome Sequencing: Opening the floodgates,” Next Generation Dx Summit, Washington, DC, August 19-20, 2015

University of Pittsburgh Department of Pathology, March 28, 2016

DAVID C. WILLIAMS, M.D.

“Evolution and divergence of methyl-cytosine binding domain (MBD) proteins, potential therapeutic targets” Stanley Manne Children’s Research Institute, Northwestern University, Chicago, IL, Oct 7, 2015

MONTE S. WILLIS, M.D., Ph.D.

- AHA Scientific Sessions Annual Meeting. Interaction of Proteotoxicity and Autophagy in Cardiac Pathology. Session Title: Protein Degradation Pathways in Cardiomyopathy and Heart Failure. Orlando, FL, November 8, 2015.
- Department of Physiology, Pathology and Pathophysiology Seminar, Beijing Chaoyang Hospital, Capital Medical University, Beijing, People's Republic of China. Role of the Ubiquitin Ligase MuRF1 in Regulating Cardiac Metabolism and Autophagy *in vivo*. October 29, 2015.
- President Forum Seminar, Tianjin Medical University, Tianjin, People's Republic of China. Role of the muscle-specific ubiquitin ligase MuRF1 in regulating cardiac metabolism and susceptibility to heart failure. September 27, 2015.
- 2015 International Conference on Geriatric Medicine & The Tenth Anniversary Celebration of the Heart Institute. North China University of Science and Technology, International Academic Hall, Science Building, Tangshan City, Hebei Province, People's Republic of China. September 26, 2015.
- 2016 Postdoctoral Preparation Institute: Career Transitions. Advancing Biomedical Research Workforce Diversity. Talk entitled: Negotiating the Job Offer: 15 Things to Consider. Bethesda Marriott Hotel and Conference Center, Bethesda, MD. June 3, 2016
- Duke Molecular Physiology Institute Seminar. Talk entitled: "The metabolic impact of proteotoxicity and protein quality control alterations in various rodent models of diabetes and ageing?" May 31, 2016.
- Duke-NUS Signature Research Programme in Cardiovascular and Metabolic Disorders and the National Heart Center Singapore, Signature Seminar Series. Talk entitled: The of role of cardiac-specific ubiquitin ligases and proteotoxicity in heart failure. Singapore. April 12, 2016.
- Experimental Biology 2016 Symposium: Cytokine Signaling in the Heart. American Physiology Society sponsored symposium entitled "Thyroid Hormone Modulation of Cardiac Function and Remodeling: Bench to Bedside". Talk entitled: Posttranslational Regulation of thyroid hormone receptors during cardiac hypertrophy and remodeling. San Diego, CA. April 4, 2016
- Experimental Biology 2016 Symposium: Cytokine Signaling in the Heart. American Society of Investigative Pathology/Society of Cardiovascular Pathology sponsored talk entitled: The Role of Cardiac Innate Immunity in Cardiac Injury. San Diego, CA. April 3, 2016
- Cell Injury Workshop: Proteotoxicity and Cell Injury. Talk entitled: Proteotoxicity and Cell Injury. 3 April 2016
- Experimental Biology 2016, San Diego, CA.XVIth Annual Workshop on Graduate Education in Pathology: Integrating Clinical and Anatomic Pathology. Talk entitled: The evolving workforce issues in graduate education and pathology's unique position. Saturday, 2 April 2016
- Experimental Biology 2016, San Diego, CA.55th Society of Toxicology Annual Meeting Workshop: Breaking Bad: Cardiovascular Autophagy Gone Rogue: A Putative Mechanism of Toxicity and a Drug Target in Disease. Talk entitled: Clinical Perspective on Cardiovascular Autophagy. New Orleans, Louisiana. March 16, 2016.
- Auburn University, Dept. of Drug Discovery and Development, Harrison School of Pharmacy Seminar. Therapeutic Targeting of Metabolism and Proteotoxicity in Heart Failure: Two New Ideas. Auburn, AL, January 19, 2016.

ALISA S. WOLBERG, Ph.D.

American Society of Hematology, Orlando, FL Factor XIII and red blood cells in venous thrombosis, December 2015.

International Fibrinogen Workshop, Skukusa, S. Africa, The role of factor XIII in red blood cell retention and thrombosis June 2016

Duke UNC K12 Clinical Hematology Research Scholars Symposium Keynote Speaker, "Scientific Research: Life Lessons from the Bench," Durham, NC, May 16, 2016

Penn-CHOP Blood Center for Patient Care and Discovery, "Newly-recognized roles for fibrinogen and factor XIII in thrombosis," Philadelphia, PA, October 28, 2015

BloodCenter of Wisconsin, Blood Research Institute, "Newly-recognized roles for fibrinogen and factor XIII in thrombosis," Milwaukee, WI, September 15, 2015

DIRECTOR OF CONTINUING EDUCATION COURSES

JESSICA BOOKER, Ph.D.

“Schizophrenia risk from complex variation of complement component 4” Current Topics in Medical and Human Genetics Conference, 2/18/16

GEORGE FEDORIW, M.D.

Lineberger Protocol Office: 9/9/15 Intro to Hematopathology (1hr)

Adult Heme Onc: 7/24/15 Intro to Blood and Marrow Review (1hr)

Hematology/Oncology Inpatient Pharmacy: Introduction to Hematopathology 6/25/15, 9/28/15, 10/21/15

Hematology/Oncology Physician Extenders: Hematopathology: disease classification and diagnostic testing 6/24/15

CATHERINE A. HAMMETT-STABLER, Ph.D.

The FDA, LDTs, and You: Implications beyond MCL. Department of Pathology and Laboratory Medicine Grand Rounds, September, 24, 2015.

Demystifying the Appointments, Promotions, and Tenure Process. Department of Pathology and Laboratory Medicine faculty meeting, October, 29, 2015.

Review of Core Laboratory. McLendon Clinical Laboratories Quality Management Meeting, September 22, 2015.

Annual Review of Urine Drug Testing in Pain Management. Anesthesiology Fellows Conference, September 9, 2015.

NICHOLE KORPI-STEINER, Ph.D.

UNC Department of Pathology and Laboratory Medicine Grand Rounds, 09/10/15, Human chorionic gonadotropin testing: Assessing risk for patient care and safety

MCL, 07/16/15, Quality Control of the future: preparing labs for IQCP

SUSAN MAYGARDEN, M.D.

UNC Pathology continuing medical education program on pathology of the genitourinary track, 4/9/2016, 2 lectures each 30 minutes: “Update on grading of prostate cancer” and “Cribriform and papillary lesions of the prostate” Friday Center, Chapel Hill

VOLKER NICKELEIT, M.D.

Nephropathology laboratory staff CME, 9/21, 8.30-9.30: Pathology of common renal diseases visited at the multi headed scope.

Nephropathology laboratory staff CME, 10/21, 8.30-9.30: Tissue staining and processing artifacts visited at the multi headed scope.

Nephropathology laboratory staff CME, 2/10, 8.30-9.30: Pathology of common renal diseases visited at the multi headed scope.

Nephropathology laboratory staff CME, 4/13, 8.30-9.30: Tissue staining and processing artifacts visited at the multi headed scope.

YARA A PARK, M.D.

Director of (ACGME, COMACC) fellowship training program
Member, P & T Committee of UNCH

KATHLEEN W. RAO, Ph.D.

Training Director of Clinical Cytogenetics Fellowship Training Program ABMG

JAY S. RAVAL, M.D.

Lecturer, UNC Hospitals Apheresis Nursing Staff, “Therapeutic Plasma Exchange for Neurologic Diseases” 9/2015

Lecturer, UNC Hospitals HPC Laboratory Staff, “HPC Collections Using the Spectra Optia Apheresis System” 9/2015

Lecturer, UNC Hospitals Apheresis Nursing Staff, “Thrombotic thrombocytopenic purpura and therapeutic plasma exchange” 10/2015

Lecturer, UNC Hospitals TMS Laboratory Staff, “TACO reactions” 10/2015

JOHN L. SCHMITZ, Ph.D.

Neonatal thrombocytopenia can be caused by IgA anti-platelet antibodies in breast milk of immune thrombocytopenic mothers. Carolinas Red Cross HLA Lab, September 11, 2015.

Validation of Next Generation Sequencing for HLA typing. Carolinas Red Cross HLA Lab, November 13, 2015

Drug hypersensitivity and HLA-B57 screening by flow cytometry. Carolinas Red Cross HLA Lab, October 30, 2015

Red Cross CE Lecture – Virtual Crossmatching and Impact on Transplant Outcomes 2/29/2016

Red Cross CE Lecture – CAR T cells 5/27/16

Red Cross CE Lecture – HLA epitopes and use in transplantation 6/10/16

SCOTT V. SMITH, M.D.

ISUP Recommendations for Best Practice Application of Immunohistochemistry in Differential Diagnosis of Testicular Germ Cell Neoplasms, April 9, 2016

LEIGH B. THORNE, M.D.

NGS and Chimera analysis 2/9/16 Molecular journal club

KAREN E. WECK, M.D.

Current Topics in Medical and Human Genetics, December 17, 2015

Current Topics in Medical and Human Genetics, May 12, 2015

SERVICE ON UNC AND UNCH COMMITTEES

PABLO ARIEL, Ph.D.

Member, UNC Imaging Roundtable Group

JAMES TODD AUMAN, Ph.D.

Member, NC TraCS CTSA Translational Advancements Resource Committee
Member, LDBR Data Sharing Committee

JESSICA K. BOOKER, Ph.D.

Training Director of the ABMGG Clinical Molecular Genetics Fellowship

FRANK C. CHURCH, Ph.D.

Committee member of School of Medicine Admissions Committee
Member, TEC SOM Foundation Phase Curriculum Development Committee Member
“Teaching Champions” Medical Education Committee

WILLIAM B. COLEMAN, Ph.D.

Director, UNC Program in Translational Medicine
Pathobiology and Translational Science Ph.D. Program Executive Committee
Member, BBSP NCGC Admissions Committee

GEORGETTE A. DENT, M.D.

Member, Third and Fourth Year Course Directors Committee
Member, Student Progress Committee
Member, Translational Education at Carolina (TEC) Foundation Phase Committee
Member, TEC Application Phase Committee
Member, TEC Individualization Phase Committee

ROSANN A. FARBER, Ph.D.

Member, UNC APT Committee
Member, SOM Conflict of Interest Committee
Member, COI monitoring committees (Strahl, Albritton, Perou)
Member, Department of Genetics, Advisory Committee
Member, Department of Genetics, Search Committee
Member, Department of Genetics, Faculty Mentoring Committee

GEORGE FEDORIW, M.D.

Member, Hematology/oncology tissue procurement committee

CRAIG A. FLETCHER, D.V.M., Ph.D.

Member, A&T IACUC Committee
Member, Animal Program Master Planning, Executive Committee meetings/y
Member, UNC Search Committee for Assistant Dean, SOM Planning Office
Member, UNC Search Committee for Director of the Office of Industry Contracting

Member, UNC Search Committee for Facilities Engineering Director
Member, UNC Search Committee for Director for Research Division Financial Services
Dean Advisory Committee
Member, DLAM Advisory Committee
Member, DLAM/IACUC Subcommittee
Member, DLAM Leadership Committee
Member, DLAM Project Planning Committee
Member, Institutional Animal Care and Use Committee (IACUC)
Member, Institutional Biosafety Committee (IBC)
Member Office of Research (OoR) Large Group
Member, Wilson Hall Annex Committee
Member, UNC Facilities Planning Committee, member 2014-present
Member, UNC Facilities Work Group, member 2014-present
Member, UNC University Safety and Security Committee, member 2014-present

PETER GILLIGAN, Ph.D.

Member, UNC Parking and Transportation Committee
Member, UNC Faculty council
Member, MD-PhD Selection Committee

MARGARET GULLEY, M.D.

Member, UNC Clinical Genetics Advisory Group to Lineberger Cancer Center and University
Cancer Research Fund
Member, Executive Director's Advisory Group, UNCH McLendon Labs
Member, UNC Pathology Residency Education Committee; Director of Molecular Pathology

SUSAN C. HADLER, M.D., M.S.

Member, Medical School TEC Foundations Committee
Member, Dental School Curriculum Committee
Member, Dental School 1st Year Teaching Committee
Member, Medical School Survey Oversight Task Force
Member, Biomedical and Clinical Science Integration (Dental School)
Member, Medical School Step 1 Task Force
Member, Dental School Faculty Search Committee

CATHERINE HAMMETT-STABLER, Ph.D.

Member, Health Sciences Advisory Committee on Appointments and Promotions, 2014-present
Member, Faculty Affairs and Leadership Development Committee, 2015-present

TRACY HEENAN, D.V.M.

Member, DLAM Advisory Committee (appointed June 2004)
Member, IACUC Animal Concern Subcommittee
Member, IACUC
Member, Vice Chancellor for Research Senior Staff Member
Member, University's Sustainability Advisory Committee
Member Search Committee for Assistant Professor Veterinarian,

Member, Division of Laboratory Animal Medicine (DLAM)
Member, Vendor Request for Proposal DLAM Master Plan
Member, Vice Chancellor for Research (VCR) Compliance Task Force
Chair, IACUC/DLAM Leadership Committee
Founder and Co-Chair, Network of Laboratory Animal Coordinator Steering Committee

JONATHON HOMEISTER, M.D., Ph.D.

Director of Graduate Studies, Pathobiology and Translational Science Ph.D. Program
Pathobiology and Translational Science Ph.D. Program Executive Committee
Member, BBSP Executive Committee
Member, Department of Pathology and Laboratory Medicine Research Advisory Committee

J. CHARLES JENNETTE, M.D.

Member, UNC Health Care System Executive Council
Member, Dean's Advisory Committee of the UNC School of Medicine
Member, UNC Faculty Physicians Board
Member, Medical Staff Executive Committee
Member, UNC Faculty Physicians Payor Relations Committee
Member, NC TraCS Institute/CTSA Translational Science Advisory Board (TSAB)
Member, Carolina Value Labor Solution and Implementation Team
Member, Learning Environment and Patient Care Experience, UNC-HC Committee
Member, Clinical Chairs' Committee
Member, Chair Incentive Committee

DAVID G. KAUFMAN, M.D.

Chair, UNC, Radiation Safety Committee
Chair, SOM, Jefferson Pilot and Woods award Selection Committee

WILLIAM K. KAUFMANN, Ph.D.

Chair, Department of Pathology and Laboratory Medicine Research Advisory Committee

MEHMET KESIMER, Ph.D.

Member, UNC Committee on Scholarship Awards and Student Aid
Member, Prelim Exam Committee, department of Pathology and Internal Medicine

NICHOLE KORPI-STEINER, Ph.D.

Member, Standards and Accreditation Committee
Chair, UNC Hospitals Point of Care Testing Committee
Co-Chair, Clinical Pathology Resident/Fellow Conference
Blue Belt Sponsor, Lean Six Sigma Teams:
Purple belt team, Point of Care blood gas testing quality assurance, 2015 – Present
Green belt team, Outpatient phlebotomy patient satisfaction, 2015 – Present
Purple belt team, Phlebotomy inpatient collection quality assurance, 2015 – Present

CHRISTOPHER MACK, Ph.D.

Member, UNC McAlister Heart Institute Executive Committee
Member, IVB Training Grant Executive Committee
Chair, IVB Training Grant Selection Committee

NOBUYO MAEDA, Ph.D.

Department of Pathology and Laboratory Medicine Research Advisory Committee
DLAM Advisory Committee
DLAM Faculty Recruitment Committee

SUSAN MAYGARDEN, M.D.

Member, GMEC Committee
Member, CCC Committee for AP/CP Residency
Chair of Medicine Search Committee, UNC SOM
Chair of Surgery Search Committee, UNC SOM

C. RYAN MILLER, M.D., Ph.D.

Member, Lineberger Comprehensive Cancer Center Clinical Genomics
Member, Lineberger Comprehensive Cancer Center UNCseq Committee
Medical Scientist Training Program (MSTP) Admissions Committee
Biological and Biomedical Sciences Program (BBSP), Neurobiology, Cancer and Cell Biology (NCGC) Admissions Committee,
Graduate Program in Translational Medicine

MELISSA B. MILLER, Ph.D.

Anti-infective Subcommittee of the Pharmacy and Therapeutics Committee, UNC Health Care
Hospital Infection Control Committee, UNC Health Care
Anti-infective Subcommittee of the Pharmacy and Therapeutics Committee, UNC Health Care
School of Medicine, Associate Professor Appointments, Promotions and Tenure Committee
School of Medicine, Health Sciences Advisory Committee

JUDITH NIELSEN, D.V.M.

Member, IACUC
Member, IACUC Animal Concern Subcommittee
Member, Lab Animal Enrichment Committee (resigned Feb. 2016)
Member, LAC Steering Committee
Member, DLAM Leadership Committee
Member, DLAM Advisory Committee 2015-Jan 2016
LCCC Animal Studies Core Advisory Committee
IBC joined this committee in Feb. 2016- present

SIOBHAN O'CONNOR, M.D.

Resident Clinical Competency Committee
Cytopathology Fellow Clinical Competency Committee

LI QIAN, Ph.D.

Member, UNC MHI Executive Committee
Chair, Pathology Preliminary Examination Committee
Chair, Animal Core Directors, UNC Core Facility Advocacy Committee (CFAC)
Member, Search Committee for UNC CBP/MHI Faculty
Member, Search Committee for NSU/UNV Regenerative Medicine Faculty
Member, Graduate Program Education Committee, Dept. of Pathology and Lab Medicine
Member, Graduate Program Executive Committee, Dept. of Pathology and Lab Medicine
Member, UNC School of Medicine Assistant Professor Advisory Committee (APC)
Member, Research Advisory Committee (RAC), Dept. of Pathology and Lab Medicine
Member, UNC IVB/MHI Annual Symposium Organizing Committee
Member, Pathology Preliminary Examination Committee
Member, Pathology Departmental Retreat Organizing Committee
Co-Chair, UNC MHI Seminar Series Organizing Committee
Member, Faculty Speaker/Interviewer, BBSP Graduate Student Recruitment
Member, Faculty Judge, Annual University Research Day Scientific Sessions
Member, UNC Human Pluripotent Stem Cell Core Faculty Mentoring Committee

JAY S. RAVAL, M.D.

Member, Non-trauma Massive Transfusion Protocol Committee
Member, Faculty Information Technology Advisory Panel
Member, Sickle Cell Disease Patient Committee
Member, TMS/Transplant Service Laboratories QA Committee
Member, BMT/HPC Transplant QA/QI Committee
Member, Pulmonary Transplant Committee
Member, Living Donor Kidney Transplant Committee
Member, UNC Honor Council
Member, AP/CP Residency Program Clinical Competency Committee
Member, Benign Hematology QI/ME
Member, CP QI/M&M Committee
Co-Director, Clinical Pathology/Laboratory Medicine Housestaff Conference
Chair, Transfusion Medicine Fellowship Program Clinical Competency Committee

MARIAN ROLLINS-RAVAL, M.D., M.P.H.

Member, TMS/Immunology QI Committee
Member, Transplant Services QI Committee
Member, Benign Hematology QI/ME
Member, Hematopathology Director's Meeting
Member, Coagulation Director's Meeting
Member, Flow Cytometry QI/Development
Member, CP QI/M&M Committee
Member, Parker Hematology/Oncology Conference

JOHN SCHMITZ, Ph.D

Director, UNC Medical Laboratory Immunology Fellowship

SCOTT V. SMITH, M.D.

Member, AP/CP Clinical Competency Committee, UNC Pathology Residency Program

JOAN TAYLOR, Ph.D.

Department of Pathology and Laboratory Medicine Research Advisory Committee
McAllister Heart Institute, Executive Committee
McAllister Heart Institute, Leadership Committee
School of Medicine Conflict of Interest Committee
Internal review committee for Pew, Searle, Ellison, Rita Allen, and Packard scholars
Search Committee Member, Chair of Pharmacology
Primary Mentor & Committee Member, Li Qian, Dept. Pathology
Faculty Mentoring Committee Member, Jiandong Liu, Dept. Pathology
Faculty Mentoring Committee Member, Qing Zhang, Dept. Pathology
Faculty Mentoring Committee Member, Raluca Dimitru, Dept. Genetics
Faculty Mentoring Committee Member, Sean McLean, Dept. Surgery
Faculty Mentoring Committee Member, Jonathan Schissler, Dept. Pharmacology
Faculty Mentoring Committee Member, Michael Bressan, Dept. Cell Biology and Physiology
Faculty Mentoring Committee Member, Jimena Guidance, Dept. Cell Biology and Physiology
Faculty Mentoring Committee Member, Stephanie Montgomery, Dept. Pathology
Faculty Mentoring Committee Member, Pablo Ariel, Dept. Pathology
Member, Vice Chair for Research, Department of Pathology
Associate Director, McAllister Heart Institute

CYRUS VAZIRI, Ph.D.

Member, Department of Pathology and Laboratory Medicine Research Advisory Committee
Member, BBSP 'Pathogenesis' Graduate Admissions Committee
Member, Graduate Program in Molecular Pathology Executive Committee
Member, Graduate Program in Molecular Pathology Qualifying Exam Committee
Member, Curriculum in Toxicology Qualifying Exam Committee
Associate Director of Graduate Studies, Graduate Program in Molecular Pathology
Director of Graduate Admissions, Curriculum in Toxicology

KAREN WECK-TAYLOR, M.D.

Member, Department of Pathology and Laboratory Medicine Research Advisory Committee

BERNARD E. WEISSMAN, Ph.D.

Member, Executive Committee, Curriculum in Toxicology

HERBERT C. WHINNA, M.D., Ph.D.

Member, UNCCH POC Committee
Member, UNCH Transfusion Committee
Member, UNCH MSEC
Member, UNCH Credentials Committee
Member, Epic EPIC Committee

Member, Epic eLIP committee

JULIA WHITAKER, M.S., D.V.M.

Member, Institutional Animal Care and Use Committee (IACUC)

Member, DLAM Advisory Committee

Member, Enrichment Committee

Member, DLAM Project Planning Committee

DAVID C. WILLIAMS, M.D., Ph.D

Member of UNCSeq Molecular Tumor Board

Member, DPLM Research Advisory Committee

Member, BBSP NCGC-A Graduate Admissions Committee

ALISA S. WOLBERG, Ph.D.

Member, UNC Thrombosis and Hemostasis Program Seminar Series

Member, McAlister Health Institute Executive Committee

Internal Reviewer, UNC Department of Cell Biology & Physiology Program Review: 2016

Member, UNC Graduate School Education Impact Award Committee: 2014, 2015

Planning Committee Member, 8th Symposium on Hemostasis: Translational and Basic Science Discoveries, Chapel Hill, NC: May 14-17, 2016

QING ZHANG, Ph.D.

Member, Pathology Preliminary Exam Committee

DEPARTMENT FACULTY HANDBOOK

The Department of Pathology and Laboratory Medicine maintains the Faculty Handbook on the Departmental intranet. The Handbook is updated regularly as new information becomes available. The idea for this resource came from the faculty, who wished to have a centralized, easily accessible source of information on topics of interest for new and established faculty members. The Handbook provides our faculty members with detailed and up-to-date information on such topics as faculty appointments and promotion, purchasing, grant proposals, human resources, equipment available within the Department, core research services available within the University, and policies of the School of Medicine. The handbook also provides an introduction and overview of the process of faculty orientation. The Department of Pathology and Laboratory Medicine's Faculty Handbook is accessible to all faculty members through the Departmental intranet.

The screenshot shows a web browser window displaying the UNC School of Medicine website. The browser's address bar shows the URL <http://www.med.unc.edu/pathology/>. The page features the UNC School of Medicine logo and navigation links such as "directories", "maps & directions", "news", "make a gift", and "careers". The main content area is titled "Department of Pathology and Laboratory Medicine" and includes a banner image of medical professionals in a laboratory setting with the text "Clinical Services for Today's Patients. Education and Research for Tomorrow's Patients." Below the banner, a breadcrumb trail reads "you are here: home > handbook". The main heading is "DPLM Faculty Handbook", followed by a list of links: "Annual Teaching Summary Policy", "Compensation Plans", "Faculty Mentoring Program", "Faculty Orientation", "Grant Proposals", "Guidelines for Appointment, Reappointment & Promotion of Faculty in UNC School of Medicine", "Human Resources", "List of Mentors & Mentees for 2010-11", "Pathology Equipment Inventory (2010)", "Procedures & Criteria for Appointments, Reappointments, Promotions, & Awards of Tenure", "Purchasing", "Research Grant Review Policy", and "Core Research Facilities at UNC". A "Print this" link is located at the bottom right of the content area. The browser's status bar at the bottom indicates a zoom level of 100%.

DEPARTMENT WEBSITE

The Departmental website (<http://www.med.unc.edu/pathology>) was inaugurated in 1995 as a means of making potential applicants more aware of our graduate, postdoctoral, and residency training programs. Today, the website is a comprehensive, detail-rich resource for those seeking information about the educational, research, and clinical training programs of the Department. The website includes information on our graduate program in molecular and cellular pathology, our residency training program, our eleven clinical fellowship programs, the four research core service laboratories available to scientific investigators, a faculty directory with links to individual faculty-member biosketches, and a list of upcoming Departmental events. The website also provides an overview of the Department, including its history, recent annual reports, administrative directory, and photographic archive. The website is on a server maintained by the UNC School of Medicine. Dr. Thomas Bouldin is the webmaster and authors the webpages for the faculty and clinical training programs. Dr. Jonathon Homeister authors the webpages for the Pathobiology and Translational Science graduate program.

Welcome to UNC Pathology & Laboratory Medicine

Graduate Studies

Our **Graduate Program in Molecular and Cellular Pathology** provides a unique environment for predoctoral and postdoctoral training in experimental pathology. Nationally and internationally renowned investigators provide laboratory research opportunities that use multifaceted approaches and state-of-the-art techniques to explore the pathogenesis of a wide range of human diseases.

Research Core Laboratories

Research services for scientists are available in the **Translational Pathology Lab**, the **Animal Clinical Chemistry & Gene Expression Labs**, the **Microscopy Services Lab**, the **Oligonucleotide Synthesis Core Facility**, and the **Mass Spectrometry Core Facility**.

Departmental Information

Our **Faculty Directory** and **Administrative Directory** are online. Also available are an **overview** of the Department, recent **annual reports**, and a **photographic archive** of faculty members and trainees dating back to 1948.

Clinical Training Programs

Our **Residency Program** in anatomic and clinical pathology is an ACGME-accredited, four-year training program. We also offer **Fellowships** in clinical chemistry, clinical molecular genetics, clinical cytogenetics, cytopathology, forensic pathology, hematopathology, microbiology, molecular genetic pathology, nephropathology, surgical pathology, and transfusion medicine.

Clinical Laboratories

The **McLendon Clinical Laboratories** provide clinical services in anatomic pathology and laboratory medicine to UNC Hospitals. The **Labs' Manual** includes a directory, test information, forms and requisitions, antibiograms, and other information.

Seminar Series and Annual CME Course

Grand Rounds and the **Graduate Program's Seminar Series** will recommence in the fall semester. Our **Annual CME Course** in the spring will focus on topics in diagnostic pathology and laboratory medicine.

Contact

Department of Pathology and Laboratory Medicine
 Campus Box #7525, Brinkhous-Bullitt Building
 Chapel Hill, NC 27599-7525
 United States
 Phone: 919-966-4676
 Fax: 919-966-6718
 Webmaster: tbouldin@med.unc.edu

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PUBLICATIONS
Department of Pathology and Laboratory Medicine
School of Medicine
University of North Carolina at Chapel Hill
July 1, 2015 – June 30, 2016

SILVIO ANTONIAK, Ph.D.

Antoniak S, Tatsumi K, Hisada Y, Milner JJ, Neidich SD, Shaver CM, Pawlinski R, Beck MA, Bastarache JA, Mackman N. Tissue factor deficiency increases alveolar hemorrhage and death in influenza A infected mice. *J Thromb Haemost.* 2016;14:1238-1248.

Antoniak S, Mackman N. Tissue factor expression by the endothelium: Coagulation or inflammation? *Trends Cardiovasc Med.* 2016;26:304-305.

Mitchel JA, Antoniak S, Lee JH, Kim SH, McGill M, Kasahara DI, Randell SH, Israel E, Shore SA, Mackman N, Park JA. IL-13 augments compression stress-induced tissue factor expression in human airway epithelial cells. *Am J Respir Cell Mol Biol.* 2016;54:524-531.

Rautou PE, Tatsumi K, Antoniak S, Owens AP 3rd, Sparkenbaugh E, Holle LA, Wolberg AS, Kopec AK, Pawlinski R, Luyendyk JP, Mackman N. Hepatocyte tissue factor contributes to the hypercoagulable state in a mouse model of chronic liver injury. *J Hepatol.* 2015;64:53-59.

Owens AP 3rd, Edwards TL, Antoniak S, Geddings JE, Jahangir E, Wei WQ, Denny JC, Boulaftali Y, Bergmeier W, Daugherty A, Sampson UK, Mackman N. Platelet inhibitors reduce rupture in a mouse model of established abdominal aortic aneurysm. *Atheroscler Thromb Vasc Biol.* 2015;35:2035-2041.

AMES TODD AUMAN, Ph.D.

Campbell JD, Alexandrov A, Kim J, et al., Cancer Genome Atlas Research Network (J.T. Auman, member of Genome Characterization Center), Artyomov MN, Schreiber R, Govindan R, Meyerson M. Distinct patterns of somatic genome alterations in lung adenocarcinomas and squamous cell carcinomas. *Nature Genetics.* 2016;48:607-616.

Ceccarelli M, Barthel FP, Malta TM, et al., TCGA Research Network (J.T. Auman, member of Genome Characterization Center), Noushmehr H, Iavarone A, Verhaak RG. Molecular profiling reveals biologically discrete subsets and pathways of progression in diffuse glioma. *Cell.* 2016;164:550-563.

The Cancer Genome Atlas Research Network (J.T. Auman, member of Genome Characterization Center). Comprehensive molecular characterization of papillary renal-cell carcinoma. *New England Journal of Medicine.* 2016;374:135-145.

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Ciriello G, Gatza ML, Beck AH, et al., TCGA Research Network (J.T. Auman, member of Genome Characterization Center), Perou CM. Comprehensive molecular portraits of invasive lobular breast cancer. *Cell*. 2015;163:1506-1519.

JESSICA BOOKER, Ph.D.

Berg JS, Foreman AK, O'Daniel JM, Booker JK, Boshe L, Carey T, Crooks KR, Jensen BC, Juengst ET, Lee K, Nelson DK, Powell BC, Powell CM, Roche MI, Skrzynia C, Strande NT, Weck KE, Wilhelmsen KC, Evans JP. A semiquantitative metric for evaluating clinical actionability of incidental or secondary findings from genome-scale sequencing. *Genet Med* 2016;18:467-475.

Susswein LR, Marshall ML, Nusbaum R, Vogel Postula KJ, Weissman SM, Yackowski L, Vaccari EM, Bissonnette J, Booker JK, Cremona ML, Gibellini F, Murphy PD, Pineda-Alvarez DE, Pollevick GD, Xu Z, Richard G, Bale S, Klein RT, Hruska KS, Chung WK. Pathogenic and likely pathogenic variant prevalence among the first 10,000 patients referred for next-generation cancer panel testing. *Genet Med*. 2016;18:823-832.

Treece AL, Montgomery ND, Patel NM, Civalier CJ, Dodd LG, Gulley ML, Booker JK, Weck KE. FNA smears as a potential source of DNA for targeted next-generation sequencing of lung adenocarcinomas. *Cancer Cytopathol*. 2016;124:406-414.

Eichler FS, Li J, Guo Y, Caruso PA, Bjonnes AC, Pan J, Booker JK, Lane JM, Tare A, Vlasac I, Hakonarson H, Gusella JF, Zhang J, Keating BJ, Saxena R. CSF1R mosaicism in a family with hereditary diffuse leukoencephalopathy with spheroids. *Brain*. 2016;139:1666-1672.

FRANK C. CHURCH, Ph.D.

Cardenas JC, Rein-Smith CM, Church FC. Overview of blood coagulation and the pathophysiology of blood coagulation disorders. Reference Module in Biomedical Sciences, from *Encyclopedia of Cell Biology*, Volume 1, 2016, Pages 714-722.

Smith, K.W. and F.C. Church. Experiential learning fueled by K-12 techniques in a medical education classroom. In preparation.

Church, F.C., E. Stein, K.W. Smith, and K.O. Gilliland. Engaged learning experience in an honors undergraduate biology course. In preparation.

Hobbs, G.W., Gilliland, K., Foster, J., Belhorn, T., and F.C. Church. Sticking it to their colleagues: IM injections in a vaccination curriculum. "Really Good Stuff" Article in *Medical Education*. In preparation.

WILLIAM B. COLEMAN, Ph.D.

Sandhu R, Roll JD, Rivenbark AG, Coleman WB. Dysregulation of the epigenome in human breast cancer: Contributions of gene-specific DNA hypermethylation to breast cancer pathobiology and targeting the breast cancer methylome for improved therapy. *Am. J. Pathol*. 2015;185:282-292.

Coleman WB. Genomic catastrophe and neoplastic transformation. *Am. J. Pathol.* 2015;185:1846-1849.

BRIAN C. COOLEY, Ph.D.

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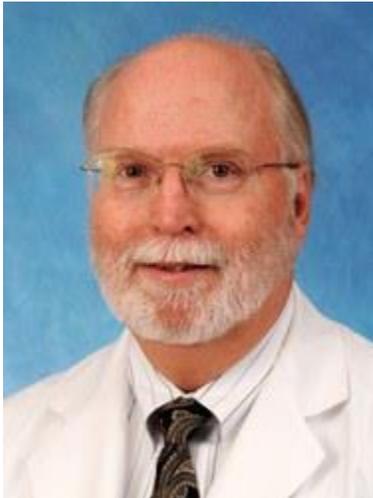
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DEPARTMENT DISTINCTIONS

Norma Berryhill Distinguished Lecture

The annual Norma Berryhill Distinguished Lecture was presented by J. Charles Jennette, MD, Kenneth M. Brinkhous Distinguished Professor and Chair of Pathology and Laboratory Medicine.



J. Charles Jennette, MD

The event was held Wednesday, November 11, 2015 at the Carolina Club. A reception was held following the lecture. New faculty were honored and welcomed at the event. Many University dignitaries and established members of the faculty were in attendance as well as Dr. Jennette's family.

The title of his presentation was "Preparation and Serendipity as Keys to Academic Success. A Tale of Bedside to Bench and Back Again". A video of his presentation is available at the following link <http://news.unhealthcare.org/som-vital-signs/2016/jan-14/2015-norma-berryhill-distinguished-lecture-video-available>.

The Norma Berryhill Distinguished Lectureship is given annually by a selected tenured or tenure track member of the faculty to honor their accomplishments which have added distinction to the Medical School. The convocation also serves to engender a sense of the Medical School community.

UNC Nobel laureates Oliver Smithies and Aziz Sancar present medals to UNC

Sancar, the 2015 winner of the Nobel Prize in Chemistry, donated his prize money to a Chapel Hill foundation. Smithies donated his monetary award to four universities, including UNC.

By Mark Derewicz

CHAPEL HILL, NC – “I don’t go to work every day; I go to *play* every day. And that’s my advice to students here today: find something you love so much that you can say – as I can say – I never did a day’s work in my life.”

That was the message of Oliver Smithies, DPhil, at a ceremony honoring him and fellow Nobel Prize laureate Aziz Sancar, MD, PhD, both of whom presented gold-plated bronze replica Nobel Prize medals to the University of North Carolina-Chapel Hill Wednesday at a Davis Library gathering of hundreds of colleagues, students, UNC staff, media, and community members.

Smithies, the Weatherspoon Eminent Distinguished Professor in the Department of Pathology and Laboratory Medicine, won the 2007 Nobel Prize in Medicine or Physiology for his pioneering work on gene targeting and knockout mice, techniques that gave researchers the ability to study diseases like never before.

In a short speech, Smithies, now 90, said, “I still find the day-to-day work – or I should say *play* – very enjoyable. I just did an experiment this morning and I expect to do another one this afternoon because I wasn’t quite satisfied with the one this morning; I should just say it didn’t work . . . but it was well done.”

In her introduction to both Nobel laureates, UNC-Chapel Hill Chancellor Carol L. Folt, said, “When you talk to both of them and see how joyful they are about the work they do, it confirms in our minds that we all do our work because we love it, and *that’s* a hallmark of a great educational place.”



Oliver Smithies, DPhil, UNC School of Medicine (photo by Jon Gardiner, UNC-Chapel Hill)

Then she shared little-known story about the time she asked them how they joined the UNC faculty: “Dr. Smithies said UNC recruited his wife Nobuyo Maeda, also a researcher in the department of pathology and laboratory medicine. He said, ‘I was the trailing spouse that UNC also hired.’”

Folt added, “And as Dr. Smithies told this story, I could see how happy Dr. Sancar was, and I asked him why. He said he was the person who led the search committee to hire Dr. Maeda and arrange to bring Dr. Smithies to UNC, as well. Then Dr. Sancar said, ‘So, I think I helped bring two Nobel Prize winners to UNC.’”

After winning the Nobel Prize in 2007, Smithies donated equal amounts of his monetary prize of approximately \$310,000 to his alma mater Balliol College in Oxford and the three places he spent his research career: the University of Toronto, the University of Wisconsin, and the University of North Carolina at Chapel Hill.

Sancar, the Sarah Graham Kenan Professor of Biochemistry and Biophysics, won the 2015 Nobel Prize in Chemistry for his work mapping the cellular mechanisms that underlie DNA repair, which occurs in all of us every day in response to damage caused by outside forces, such as ultraviolet radiation and other environmental factors.



Aziz Sancar, MD, PhD, UNC School of Medicine (Photo by Jon Gardiner, UNC-Chapel Hill)

“As opposed to Dr. Smithies, I’m not very good in the lab,” Sancar said at Wednesday’s event. “I’m not good with my hands. So, most of the work that won us the Nobel Prize was done by graduate students and postdocs, some of whom are here today. And I’m very grateful to them all.”

Sancar, who is from Turkey and has been a professor at UNC since 1982, also thanked his wife Gwen Sancar, PhD, herself a professor of biochemistry and biophysics, not only for her support but for being a critical research partner early in his career,

Sancar donated the entire \$310,000 prize award to the Aziz & Gwen Sancar Foundation of Chapel Hill. The couple bought a house on Franklin Street near downtown Chapel Hill several years ago as part of their foundation. The goal was to create a cultural center for international students and scholars close to campus, an idea that dates back to Sancar’s days as a foreign-born graduate student.

“The day I stepped off the airplane in Dallas, I essentially saw the need for such houses on college campuses and promised myself to eventually dedicate my resources to a project of this kind.”

The cultural center is named “Carolina Turk Evi,” and is owned by the Aziz & Gwen Sancar Foundation. The center provides graduate housing for Turkish researchers at UNC, as well as short-term guest services for Turkish visiting scholars. UNC currently hosts approximately 100 Turkish students and scholars. These individuals occasionally have difficulty adapting to American culture. One aim of Carolina Turk Evi is to facilitate their transition.

Another key aim of the foundation is to promote a cultural exchange between Turkey and the United States.

“I believe strongly that we are all more similar than we are different,” Sancar said. “If we take the time or have the opportunity to learn about one another – to promote friendship and understanding – then we won’t have as many conflicts in our personal lives or between nations.”

As part of the Nobel Prize ceremonies last December, Sancar was given a solid gold Nobel Prize medal and three replica medals. He donated the original medal to Turkey to be displayed at the mausoleum of Mustafa Kemal Ataturk, the founder of the Republic of Turkey and the country’s first president.

“I give credit to Ataturk for creating an educational system that would allow a kid from a small, rural place to receive a quality education, go to medical school, and pursue research at the highest level,” Sancar said. “I gave the medal to the mausoleum to honor this and to hopefully inspire the youth of Turkey who might wonder what they can accomplish in science if they work hard.”

In Memoriam

Sadly, this year we mourned the deaths of three members of the Department, Kathleen Rao, PhD, long-term Director of Cytogenetics; Marge Gulley, former influential administrative leader of the Department; and Burnice Taylor, mentor and friend to many residents in his role as diener.

Kathleen Rao, PhD, had her primary faculty appointment in Pediatrics, but she had a major role in teaching residents and serving patients through her exceptional accomplishments as the Director of the Cytogenetics Laboratory since 1984. In this role she mentored many fellows, residents, genetic counselors and others. She was an influential leader in many national and international societies. Because of her active involvements in medical student education, the Kathleen Rao Educational Scholarship was established several years ago to fund projects that focus on education improvements.

Margaret (Marge) Gulley, mother of current faculty member Margaret (Peggy) Gulley, and a cherished member and supporter of our Department, passed away on May 11 at age 96. Mrs. Gulley played important administrative roles in the Department from 1955-1990. After her retirement in 1990, The Margaret O. Gulley Award for Secretarial Excellence was established by her colleagues and friends to honor her remarkable contributions to the Department. She will be sorely missed but her legacy in the Department will live on through the Gulley Award for Secretarial and Administrative Excellence, her daughter, and the many of us who were touched by her.

Burnice Taylor was a beloved and respected member of the Department for half a century. To honor Burnice for his many years as a special member of the UNC Departmental team, and for his positive impact on the lives and careers of the countless pathologists he taught, the Burnice Taylor Fund for Excellence in Autopsy Pathology was established. To date generous gifts from 25 former residents have been made to the fund, which will be used to enhance and reward excellence in Autopsy Pathology by Residents.