DEPARTMENT OF PATHOLOGY AND LABORATORY MEDICINE
2013-2014 ANNUAL REPORT

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DEPARTMENT OF PATHOLOGY AND LABORATORY MEDICINE
FACULTY AND TRAINEE ROSTER
2013-2014

Chair

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

Vice Chair

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

Associate Chair for Administration

Susan P. Evers, M.P.H. (Joined October 2013)
Nancy H. Nye (Retired December 2013)

Distinguished Professors

Dwight A. Bellinger, D.V.M., Ph.D. (Fred C. and Lelia B. Owen Distinguished Professor)
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.
Thomas W. Bouldin, M.D.
Debra A. Budwit, M.D.
Frank C. Church, Ph.D.
William B. Coleman, Ph.D.
Marila Cordeiro-Stone, 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.
Margaret L. Gulley, M.D.
Catherine A. Hammett-Stabler, Ph.D.
H. Michael Jones, M.D.
Kathleen A. Kaiser-Rogers, Ph.D.
David G. Kaufman, M.D., PhD.
William K. Kaufmann, Ph.D.
Hyung-Suk Kim, Ph.D.
Susan J. Maygarden, M.D.
Volker R. Nickeleit, M.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.
Joan M. Taylor, Ph.D.
Michael D. Topal, Ph.D.
Karen E. Weck-Taylor, M.D.
Bernard E. Weissman, Ph.D.
John T. Woosley, M.D., Ph.D.

Associate Professors
Jessica K. Booker, Ph.D.
Arlene S. Bridges, Ph.D. (Separated March 2014)
Brian C. Cooley, Ph.D.
Georgette A. Dent, M.D.
Megan J. DiFurio, M.D. (Separated August 2013)
David A. Eberhard, M.D., Ph.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, MD (Promoted May 2014)
Masao Kakoki, 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.
Melissa B. Miller, Ph.D.
Leigh B. Thorne, M.D.
Cyrus Vaziri, Ph.D
Julia W. Whitaker, D.V.M. (Promoted July 2013)
David C. Williams, Jr., M.D., Ph.D. (Joined July 2013)
Monte S. Willis, M.D., Ph.D.
Alisa S. Wolberg, Ph.D.
Hong Xiao, M.D.
Maimoona B. Zariwala, Ph.D.

Assistant Professors
J. Todd Auman, Ph.D. (Joined October 2013)
Claudia M. Brady, M.H.S.
George Fedoriw, M.D.
Adil Hussein Gasim, M.D.
Oleg V. Gorkun, Ph.D. (Separated April 2014)
Kevin E. Greene, M.D.
Johann D. Hertel, M.D.
Nichole L. Korpi-Steiner, Ph.D.

Feng Li, Ph.D. (Joined March 2014)
Jiandong Liu, Ph.D.
Stephanie P. Mathews, M.D.
Marshall A. Mazepa, M.D. (Joined July 2013)
Vincent J. Moylan, Jr., M.S.
Siobhan M. O'Connor, M.D.
Yara A. Park, M.D.
Nirali M. Patel, M.D. (Joined July 2013)
Li Qian, Ph.D.
Jay S. Raval, M.D.
Marian A. Rollins-Raval, M.D., M.P.H. (Joined September 2013)
Lori R. Scanga, M.D., Ph.D.
Dennis A. Simpson, Ph.D.
Roger W. Stone, M.D. (Separated January 2014)
Dimitri G. Trembath, M.D., Ph.D.
Julia W. Whitaker, M.S., D.V.M.
Scott E. Williams, Ph.D.
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.

Clinical Faculty (Medical Examiners)
Sandra C. Bishop-Freeman, Ph.D.
Justin O. Brower, Ph.D.
Craig Nelson, M.D. (Joined January 2014)
Clay A. Nichols, M.D. (Separated June 2014)
Deborah L. Radisch, M.D.
Lauren Scott, M.D. (Joined July 2013)
Samuel D. Simmons, M.D. (Separated April 2014)
Susan E. Venuti, M.D. (Joined January 2014)
Ruth E. Winecker, Ph.D.

Faculty Emeritus
Stuart A. Bentley, M.D.
John D. Butts, M.D.
John F. Chapman, Dr.P.H.
Myra L.Collins, M.D., 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.
James R. Pick, D.V.M.
Marjorie S. Read, Ph.D.
Kinuko I. Suzuki, M.D.

Emeritus Vice Chair for Administration
Nancy H. Nye

Jointly Appointed Faculty
Diane Armao, M.D. (Radiology)
Gregory Bianchi, M.D. (Surgery)
Nizar Chahin, M.D. (Neurology)
Claire M. Doerschuk, M.D. (Medicine)
Ronald J. Falk, M.D. (Medicine)
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)
Darrel W. Stafford, Ph.D. (Biology)
James A. Swenberg, D.V.M., Ph.D. (Environmental Sciences and Engineering)
Melissa Troester, Ph.D. (Epidemiology)
Young E. Whang, M.D., Ph.D. (Medicine)
Elizabeth Wilson, Ph.D. (Pediatrics)
Daniel Zedek, M.D. (Dermatology)

Adjunct Faculty
Araba N. Afenyi-Annan, M.D.
William A. Ahrens, M.D. (Carolina Pathology Group; Separated February 2014)
Peter M. Banks, M.D. (Ventana-Roche Corporation)
Jared G. Block, M.D. (Joined September 2013)
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)
Paul Chastain, Ph.D (Joined July 2013)
Cherie H. Dunphy, M.D. (Laboratory Corporation of America)
Jeffrey Everitt, D.V.M. (GlaxoSmithKline)

Thomas H. Fischer, Ph.D.
Dana M. Fowlkes, M.D., Ph.D. (Green Spring Technology)
Kim R. Geisinger, M.D. (Piedmont Pathology Group)
M. David Goodman, M.D. (Joined January 2014)
Oleg Gorkun, Ph.D. (Joined May 2014)
Delores J. Grant, Ph.D. (North Carolina Central University)
Christopher W. Gregory, Ph.D. (Voyager Pharmaceutical)
Heike Hunt, M.D. (Baystate Medical Center)
John P. Hunt, M.D. (Baystate Medical Center)
Wendell D. Jones, Ph.D. (Expression Analysis/Quintiles)
Scott Kilpatrick, M.D. (Forsyth Medical Center)
Suzanne L. Kirby, M.D., Ph.D.
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, Ph.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)
Keith V. Nance, M.D. (Rex Hospital)
Thomas M. O'Connell, Ph.D. (LipoScience)
William R. Oliver, M.D. (East Carolina University)
Richard S. Paules, Ph.D. (NIEHS)
Ashley G. Rivenbark, Ph.D. (American Journal Experts, Oxford Science Editing, ASIP)
Dennis W. Ross, M.D., Ph.D. (Forsyth Medical Center, Retired)
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. (Tohuku University, Sendai, Japan)
Paul A. Wade, Ph.D. (NIEHS)
Ruth F. Walters, M.D. (Laboratory Corporation of America)
Carol J. Weida, M.D. (Joined September 2013)
Douglas C. Wolf, Ph.D., D.V.M. (EPA)

Clinical Fellows
Kevin A. Alby, Ph.D. (Microbiology)
Rachel Cianciolo, D.V.M. (Nephropathology)
Kristy R. Crooks, Ph.D. (Clinical Molecular Genetics)
Teri Sue Giles, M.D. (Cytopathology)
Melissa A. Hayden, Ph.D. (Cytogenetics)
Daniel Kenan, M.D. (Nephropathology)
Brian Klazynski, M.D. (Surgical Pathology)
Denise M. Milhorn, Ph.D. (Clinical Chemistry)
Hanan F. Mohammad, Ph.D. (Clinical Chemistry)
Stacey S. O'Neill, M.D., Ph.D. (Hematopathology)
Jeremy J. Parris, M.D. (Hematopathology)
Ersie Pougare (Surgical Pathology)

Anthony N. Tran, Dr.Ph., M.P.H. (Microbiology)
Amanda L. Treece, M.D. (Molecular Genetic Pathology)
Eric T. Weimer, Ph.D. (Immunology)

Co-Chief Residents
Shannon A. Covey, M.D. (PGY IV) Co-Chief Resident
Daniel L. Duncan, M.D. (PGY IV) Co-Chief Resident
Brooke S. Rambally, M.D. (PGY IV) Co-Chief Resident
Sara E. Wobker, M.D., M.P.H. (PGY IV) Co-Chief Resident

Residents
Christine E. Bookout, M.D. (PGY III)
Calire H. Edgerly, M.D. (PGY II)
Jonathan M. Hollyfield, M.D. (PGY II)
Julie A. Hull, M.D. (PGY II)
Kimberly E. Janssen, M.D. (PGY III)
Lindsey E. Matthews, M.D, MPH. (PGY II)
Nathan D. Montgomery, M.D., Ph.D. (PGY III)
Alexis R. Peedin, M.D. (PGY II)
Avani A. Pendse, M.D., Ph.D. (PGY III)
Spencer L. Rusin, M.D. (PGY III)
Bart B. Singer, M.D. (PGY II)
Hugh T. Stoddard, M.D. (PGY I)

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

Postdoctoral Research Fellows
Xue Bai, Ph.D. – Dr. Joan Taylor
Rui Cao, Ph.D. – Dr. Mehmet Kesimer (Separated February 2014)
Milton Carpenter, Ph.D. – Dr. Mehmet Kesimer (Joined November 2013)
Michelle Casad, Ph.D. – Dr. Joan Taylor (Separated July 2013)
Zhaokang Cheng, Ph.D. – Dr. Joan Taylor
Yanzhe Gao, Ph.D. – Dr. Cyrus Vaziri (Joined April 2014)
Richa Gupta, Ph.D. – Dr. Mehmet Kesimer (Joined May 2014)
Yukako Kayashima, Ph.D. – Dr. Nobuyo Maeda
Marlon Lawrence, Ph.D. – Dr. Oliver Smithies
Yuanli Li, Ph.D. – Dr. Mehmet Kesimer
Kota Matsuki, Ph.D. – Dr. Nobuyo Maeda
Georgia Radicioni, Ph.D. – Dr. Mehmet Kesimer
Chantelle Rein-Smith, Ph.D. – Dr. Frank Church (Separated June 2014)
Yuliy Rozenberg, Ph.D. – Dr. Christopher Mack
John Sheridan, Ph.D. – Dr. Mehmet Kesimer (Separated March 2014)
Hua Su, Ph.D. – Dr. Charles Jennette (Separated July 2014)
Mark Vitucci, Ph.D. – Dr. Ryan Miller (Separated July 2014)
Ninad Walavalker, Ph.D. – Dr. David Williams (Separated February 2014)

Patrick Weiser, Ph.D. – Dr. Richard Tidwell (Joined December 2013)
Yang Yang, Ph.D. – Dr. Cyrus Vaziri

Graduate Students

Sabri Abdelwahab – Dr. Mehmet Kesimer
Maria M. Aleman – Dr. Alisa Wolberg (Graduated May 2014)
James R. Byrnes – Dr. Alisa Wolberg
Rachel Dee – Dr. Joan Taylor
Dinuka M. DeSilva – Dr. Young Whang (Graduated May 2014)
Nicole D. Fleming – Dr. Jiandong Liu
Ashley M. Fuller – Dr. Melissa Troester
Julia E. Geddings – Dr. Nigel Mackman
Britta E. Jones – Dr. Ronald Falk
Kaitlin C. Lenhart – Dr. Joan Taylor (Graduated May 2014)
Pamela Lockyer – Dr. Xinchun Pi
Lantz C. Mackey – Dr. Jonathon Homeister (Graduated August 2014)
Kevin D. Mangum - Dr. Christopher Mack
Robert S. McNeill – Dr. Ryan Miller
Justine N. Moore – Dr. Claire Doershuk
Adam D. Pfefferle – Dr. Charles Perou
Amanda L. Rinkenbaugh – Dr. Albert Baldwin
Leander Sinanan – Dr. David Williams
Kristine M. Wadosky – Dr. Monte Willis (Graduated May 2014)
Bethany L. Walton – Dr. Alisa Wolberg
Laura M. Weise-Cross – Dr. Christopher Mack

RESEARCH AND SCHOLARLY ACCOMPLISHMENTS

Over the past year an excellent record of achievement in research has resulted in approximately 290 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.

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 tumor 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. Dr. Auman's other research effort is focused on investigating the role of pharmacogenomic DNA variants on response to chemotherapeutic agents in cancer patients. Dr. Auman is working with the UNCSeq clinical trial, which is 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, he plans 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.

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

Dr. Bagnell is the Director of the Microscopy Services Laboratory (MSL) which is a core facility of the University of North Carolina at Chapel Hill. The MSL provides light microscopy and electron microscopy services to UNC researchers and UNC Hospitals. Dr. Bagnell's top priorities for the coming year include finding a solution to the mass storage and transfer of imaging files and determining a funding mechanism for acquisition of an additional transmission electron microscope.

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

Dr. Bellinger's research interests remain in the area of hematology and cardiovascular disease. Swine models have been used for studying atherosclerosis for many years in this laboratory. A colony of familiar hypercholesterolemic pigs is maintained to study the role of hyperlipidemia on atherosclerosis, wound healing and renal disease. Grant funds continue for the maintenance of the hemophilia A and B and von Willebrand disease dogs at the FOBRL as a National Resource. Recently dogs with deficiency in factor VII and dogs with Glanzmann's thromboblasthenia have

been added to the colony. The dogs continue to be an effective model to test various gene therapies and other strategies to correct these inherited bleeding disorders. Studies using this model have resulted in human trials.

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, current efforts are focused on the validation of a panel of genes involved in hereditary cancer syndromes. Dr. Booker is involved in two major research efforts employing whole exome sequencing. NCGENES 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.

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, nerve biopsy service, and ophthalmic pathology.

DEBRA A. BUDWIT, M.D.

Dr. Debra Budwit's principle responsibilities are to provide clinical diagnostic services and teaching in surgical pathology and cytopathology. In this capacity, she also serves as an educator of pathology residents and fellows in training, to assist them as they develop and hone their diagnostic skills as future patient care providers. In addition to daily microscopic sign out sessions with residents, she also gives approximately four or more formal lectures per year to pathology trainees. She plans to continue in these endeavors.

FRANK C. CHURCH, Ph.D.

Dr. Frank Church divides his research effort between basic science and educational science. In the basic science research area, Dr. Church investigates proteases and their inhibitors in human biology and in various disease processes, focused in the arena of hemostasis-thrombosis, vascular biology and cancer biology. For more than 25 years they have 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 using mouse models of vascular and tissue injury (saphenous vein thrombosis and IVC stasis models, and cutaneous wound healing model) to understand the link between senescence ($p16^{INK4a}$), aging, wound healing, and venous thrombosis. They are characterizing the Tidwell Library of di-cationic compounds ("pentaminidine-like") for potential therapeutic anticoagulant activities. In the educational science research area, Dr. Church is involved in 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. Brian Cooley has 4 primary research efforts that he will be pursuing in the coming year: (1) develop novel applications of thrombosis and hemostasis models for understanding many aspects of thrombogenesis, from cancer-associated thrombosis to development of thromboemboli and their sequelae (R21 proposal submitted – PI: Cooley); (2) investigate the upstream enzymatic/signaling pathways and/or mechanotransduction of endothelial-to-mesenchymal transition in the context of vein graft stenosis (R01 proposal submitted – PI: Cooley); (3) expand the use of the MHI Surgical Models Core Lab for enhancing the research efforts of MHI investigators; and (4) develop and implement new surgical models in the MHI Core Lab for applications in other research, such as cancer, pharmacology, organ transplantation, and others, to enhance the research efforts of other departmental investigators at UNC, as well as outside institutions.

MARILA CORDIERO-STONE, Ph.D.

Marila Cordeiro-Stone's research activity at this time is focused on completing manuscripts describing studies performed by past trainees and submitting them for publications in peer-reviewed journals. During the coming year, the last of her current phased-retirement contract, will be dedicated to the orderly transfer of research equipment and reagents under her control to other investigators or core facilities, attending to administrative requirements from the Environment, Health, and Safety Department, and reviewing all records under storage, in order to identify those that can be discarded from those that must be kept by the department/university beyond my full retirement date. In the administrative arena, she will be transferring her position as Director of Graduate Studies for the Curriculum in Toxicology and responsibilities with the MPS in Toxicology degree to other faculty members.

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 to study the impact of social networking on the professional development and specialty choices of medical students.

LESLIE G. DODD, M.D.

Dr. Dodd's research interests are in the cytopathology and surgical pathology of neoplasms of bone and soft tissue.

DAVID A. EBERHARD, M.D., Ph.D.

Dr. Eberhard directs the Pre-Clinical Genomic Pathology Core in the LCCC, supporting the UNCseq Next-Generation Sequencing (NGS) Cancer Genomics program. In the past 2.5 years, Dr. Eberhard has built a lab comprised of 6 people (and still growing) that provides automated medium-throughput sample processing and analysis capabilities for massively parallel DNA and RNA sequencing, Nanostring gene expression and Sequenom mass-spectometry genotyping to UNC cancer researchers. Their ongoing UNCseq efforts have enrolled over 1000 patients for cancer genomic analysis to date. In the coming year they will work together with UNC Pathology to develop and implement translational cancer NGS capabilities and to develop research questions that capitalize on their UNCseq tumor mutation findings; to complete and publish collaborative projects on digital analysis of neovascularization in tumors, and on integration of digital histomorphology analysis and genomic data in tumors; and to address tumor genomic heterogeneity by analyzing enriched fractions of cellular subtypes isolated from FFPE tumor samples.

ROSANN A. FARBER, Ph.D.

Dr. Farber's interests are in Cancer Genetics and the Molecular Diagnosis of hereditary disorders. Her research focus has been on cancers associated with Lynch syndrome, which is a genetic predisposition to colorectal carcinoma, endometrial cancer, and several other less common types of tumors. Lynch syndrome cancers result from germline defects in genes coding for mismatch-repair (MMR) proteins; the hallmark of these MMR-deficient tumors is instability of simple-sequence repeats, known as microsatellites. Although Lynch syndrome is rare, up to 15% of sporadic tumors of the same types exhibit microsatellite instability as the result of somatic inactivation of the *MLH1* MMR protein by promoter methylation. In the area of diagnostics, her focus has also been on fragile X syndrome, which is an inherited disorder resulting from large expansions of a trinucleotide repeat. She is Director of the UNC American Board of Medical

Genetics Postdoctoral Training Programs and Associate Chair of the Department of Genetics for Academic Affairs.

GEORGE D. FEDORIW, M.D.

Dr. Fedoriw serves as the Director of Hematopathology and the Hematopathology Fellowship Program. 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 is working to characterize the distribution of lymphoma subtypes in Malawi. Dr. Fedoriw also actively provides research support for collaborators in the UNC Lineberger Comprehensive Cancer Center and the School of Pharmacy.

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

Research involving laboratory animals is critical to the overall research enterprise at UNC-Chapel Hill, accounting for 33% of our overall federal funding, 50% of funding in the School of Medicine. 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 150 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. In 2014, AAALAC will visit UNC to evaluate the animal care program. 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 UNC Disease Mechanisms Molecular and Cellular Pathology Program (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. The UNC residents attend 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. Fletcher is one of the providers of this didactic teaching. In addition, Dr. Fletcher co-chairs the Southeastern location of the International Mock Board Exam Coalition for the ACLAM board exam, which is offered to laboratory animal veterinarians at 10 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 62 laboratory animal veterinarians who took the mock exam in the Southeastern location in May 2014. 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. The Fletcher laboratory studies the mechanisms by which tissue factor activation mediates coagulation and thrombosis. Dr. Fletcher is also currently collaborating with Dr. Julia Whitaker, the Collaborative Cross, and the Mouse Behavioral Phenotyping Core in studies investigating rodent housing, environmental enrichment, and animal behavior.

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

Dr. Funkhouser's research goals are to identify new molecular prognostic and predictive variables in human solid neoplasms and in human solid organ allografts. He continues to collaborate with Dr. Weissman on studies of the role of BRG1 and BRM loss-of-fumction in lung carcinoma pathogenesis. He continues to collaborate with Dr. Egan on studies of the morphologic changes in ventilated rat lung following ischemia. He continues to collaborate with Dr. Olshan in Epidemiology on the Carolina Head and Neck Cancer (CHANCE) studies. He collaborates with Dr. Hayes in Medical Oncology regarding measurement of diagnostic reproducibility in lung carcinomas, and contributes to the UNC molecular-morphology correlation projects on lung and ENT carcinomas. He collaborates with Dr. Fine in Biostatistics on development of a web-based survey tool for measurement of diagnostic reproducibility.

PETER H. GILLIGAN, Ph.D.

Dr. Peter Gilligan's research evaluating the role of *Mycobacterium abscessus* in CF patients continues. In conjunction with Charles Esther Jr in Pediatric Pulmonology, they are performing an assessment of the epidemiology of 100 *Mycobacterium abscessus* isolates for which whole genome sequencing has been determined. They are working on improving the MALDI-TOF Mass Spectroscopy data bases for the identification of organisms detected during a large microbiome study of respiratory secretions in CF patients with chronic lung infections. They have also attempted to improve our capability for identifying *Mycobacterium abscessus* from CF respiratory cultures using MALDI-TOF mass spectroscopy. They also did a cost analysis showing large savings in organism identification costs with MALDI-TOF mass spectroscopy. They will soon begin a study determining the epidemiology of *Clostridium difficile* in their Bone Marrow Transplant Unit in conjunction with Infection Prevention colleagues with a potential long term goal of reducing infection rates in that unit.

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

Dr. Godfrey will continue to provide collaborative pathology evaluations for colleagues in the Medical School faculty, particularly members of the Lineberger Comprehensive Cancer Center. Recent and continuing projects include morphologic evaluations of: (1) pig models of atherosclerosis and Type II diabetes (Nichols), (2) Brg 1 mutant mice (Bultman), (3) dog models of hemophilia (Nichols), (4) mouse models of tuberculosis (Braunstein), and the (5) Chirper mouse mutation (Tarantino). She will assist in characterization of new mouse models through the interactions with the National Gnotobiotic Rodent Resource (B Sartor), the Mutant Mouse Regional Resource Center (MMRRC) at UNC (Magnuson), and the Collaborative Cross (Pardo Manuel de Villena). In support of our DLAM residency program, she assisted Dr. Allison

Rogala in completion of her studies of the Collaborative Cross line CC011/Unc that exhibits spontaneous colitis syndrome.

KEVIN G. GREENE, M.D.

Dr. Greene's research is focused on diseases of the gastrointestinal tract, liver, gallbladder, pancreas, and bile ducts. He is involved in multiple ongoing projects. Dr. Greene is a co-investigator in a clinical trial studying PET/MRI as a predictor of response to preoperative chemoradiation in patients with resectable rectal cancers. The purpose of the trial is to determine if PET/MRI can identify a subset of rectal cancer patients who can be treated with chemoradiation alone, sparing them from morbid surgical resections. They will perform the pathologic evaluation of all resections performed on patients enrolled in the study and will co-author the manuscript. Dr. Greene recently presented data collected during a retrospective review of the effectiveness of universal screening for Lynch Syndrome on colon cancer resections at UNC. He intends to publish the results during the upcoming year. Dr. Greene is also collaborating with his colleagues in Gastroenterology to study serrated polyps of the colon and rectum to further their understanding of these lesions.

PAMELA A. GROBEN, M.D.

Dr. Groben collaborates with Dr. Nancy Thomas in Dermatology in studies focused on DNA methylation profiles of melanoma and other melanocytic lesions. BRAF mutations in melanoma are also an area of study. Dr. Groben reviews slides and selects appropriate tissues for study. She also performs laser capture microdissection to isolate small samples for study. This research is ongoing, and she will continue to be involved, but to a lesser extent next year.

MARGARET L. GULLEY, M.D.

Dr. Margaret L. Gulley's research is aimed at (1) understanding the molecular basis of Epstein-Barr virus (EBV)-related malignancy, and (2) developing novel laboratory tests to help manage affected patients. In the past year there has been substantial progress towards these goals. They devised a gene expression profiling system, including microRNA expression, and showed that EBV and associated human gene products could be measured both in formalin fixed paraffin embedded tissue and in plasma and serum. Refined protocols are now being applied to large number of specimens and controls to assess clinical performance. In a related study, enhanced formalin fixation procedures are being explored to improve DNA and RNA quality in histopathology laboratories. Work on The Cancer Genome Atlas (TCGA) led to new discoveries about cancer-related human and viral gene variants and gene expression profiles in two types of cancer—head and neck cancer associated with human papillomavirus, and gastric adenocarcnoma associated with Epstein-Barr virus and with helicobacter pylori bacterial infection. The discoveries are now being mined for clinically actionable tumor markers and drugable biochemical pathways in order to devise novel genomic assays that can be validated for possible use in clinical trials and ultimately in routine patient care. This work is accelerated thanks to support from university and hospital leaders who provided next generation sequencing instruments and associated resources. They spent over a year testing the equipment and refining protocols for its use. This effort culminated in the first massive parallel sequencing assay to be

implemented in North Carolina. In January 2014 the Solid Tumor Panel was implemented clinically in order to sequence 175 amplicons from 26 cancer genes in paraffin embedded tumor specimens. Raw data is analyzed to confirm gene variants and to interpret and report the variants that serve as tumor markers or as potential targets for therapy. In work of a more general nature, Dr. Gulley teams with TraCS and Lineberger Comprehensive Cancer Center leaders to improve laboratory services for campus investigators and to support clinical trials. This work enhances clinical applicability of basic science discoveries made locally, reinforcing the important role of pathologists in advancing medical practice using modern laboratory tools. In the coming year, they will continue to develop and refine standard operating procedures, including quality assurance measures, to gather the evidence required to bring new laboratory assays into the clinical realm. They continue to maximize productivity of local clinical investigators (faculty, med students, residents and fellows) by making tissue/lab/pathologist resources available for team science. Trainees are involved in most of their projects to prepare them to practice laboratory medicine and to help them become competent and to feel confident in directing lab services and assay validation projects. The Pathology Residency Program was enhanced this year by not only improving their month-long Molecular Diagnostics and Cytogenetics Course but also by adding a month-long rotation whereby residents gain practical experience delivering molecular pathology services. Newly devised milestones help assure that each trainee acquires the skills and experience required for modern pathology practice. Twelve continuing education lectures delivered at ASCP conferences promote lifelong learning by practitioners who trained in prior years.

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 Dental School's admissions committee.

CATHERINE A. HAMMETT-STABLER, Ph.D.

Dr. Hammett-Stabler's focus is in the improvement of clinical laboratory services and patient safety: She is currently engaged in three initiatives toward the development of practice guidelines. Two of these relate to the laboratory support of pain management and addiction programs (one evidence-based, the other consensus based), while the third related to the provision of clinical toxicology services in general. She is collaborating with Francis Ligler and Glenn Walker of the UNC/NCSU Biomedical Engineering Department in the development of a new immunoassay device.

TRACY M. HEENAN, D.V.M.

The Office of Animal Care and Use, directed by Tracy Heenan will continue to provide 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 Office of Animal Care and Use (OACU) guiding principles. With escalating compliance-related responsibilities, such as increased investigator-managed animal facilities as well as offsite facilities, it will most likely be necessary to add an additional T/C Coordinator position in the next five years. OACU, like everyone on campus, has had to plan for budgetary cuts. The office has made monumental strides in reducing the amount of paper as well as the associated costs by moving to an electronic review process. The office continues to find new ways to eliminate the voluminous paper copies of meeting information. Members review applications and the 1000 plus page semi-annual facility report electronically. The office has fully implemented the position responsible for Grant Application/IACUC Application congruency. IACUC applications are being compared with grant applications and faculty training is ongoing. This will be a process requiring cooperation and buy-in from research faculty. During the next several years the office will continue to educate and advise 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's clinical activities include breast and cytopathology. He is currently involved in multiple quality control and quality assurance initiatives and research involving cytopathology primarily focusing on anal and cervical exfoliative cytology.

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

The research of Dr. Jonathon Homeister has two major goals. The first is to utilize leukocyte lineage-specific trangenis gene expression and leukocyte lineange-specific gene targeting in murine experimental models to investigate α(1,3)-fucosyltransgerase (FUT) gene function in the development of atherosclerotic cardiovascular disease. They are using these mice and other mice and other mice made deficient in FUT-IV and FUT-VII in all tissues to define a role for selectin adhesion molecules and their fucosylated ligands in the development and progression of atherosclerosis. These mouse strains will be used to continue their studies that define the selectin-dependent contributin of several leukocyte lineages to the atherosclerotic disease process, as well as to homostasis 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 coagulatuin 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 also 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 focuses 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), with the goal of translating new knowledge into therapeutic and prognostic advances for patients with ANCA disease.

H. MICHAEL JONES, M.D.

Dr. Jones is a permanent, part-time staff attending pathologist on the autopsy service and also serves as a resource pathologist for the TPL (Translational Pathology Laboratory), providing interpretation of pathologic/histologic materials generated from investigational studies of multiple origins as required. The plan is to continue this in the coming year.

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 Cytogentics 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 two such patients were reported at the March 2014 American College of Medical Genetics meeting. Additionally, posters describing the clinical utility of chromosome microarray analysis in acute lymphocytic leukemia, and the use of whole exome sequencing and chromosome microarray analysis to identify copy number variants were presented at this meeting. Dr. Kaiser-Rogers is also currently a serving as a member on the CAP Cytogenetic Resource Committee and Co-chairing the ACMG Salary Survey Work Group.

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

Dr. Kakoki's current research aims at finding mechanisms for the phenotype in mice having genetically graded levels of the candidate genes (*Bdrkb1/Bdkrb2, Tgfb1, Edn1, Prl, Elmo1*) conferring susceptibility/resistance to diabetic complications. This year, in collaboration with Drs. Hathaway, Gasim, Jennette, and Smithies, Dr. Kakoki found that the genetic insufficiency of *Tgfb1* abolishes most features of diabetic nephropathy, not only glomerulosclerosis and albuminuria, but also polyuria and glucosuria, without changing plasma glucose or insulin levels. In addition, he found that the podocyte-specific overexpression of *Tgfb1* increases glomerulosclerosis, but not urine volume, albuminuria or glucosuria in the *Tgfb1* hypomorph, and that the proximal tubule-specific overexpression of *Tgfb1* increases urine volume, albuminuria and glucosuria, but not glomerulosclerosis in the *Tgfb1* hypomorph (manuscript in preparation). These results suggest that although diabetic albuminuria has been considered to be a marker for diabetic nephropathy, it is manifestation of the overexpression of *Tgfb1* in proximal tubules, and does not reflect the activity of *Tgfb1* in the glomerulus, which contributes to renal excretory dysfunction. In the next year, Dr. Kakoki will focus on finding mechanisms why overexpression of *Elmo1* exacerbates diabetic nephropathy and cardiopathy, both of which we have already noted in the *Elmo1* hypermorph.

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

Dr. David 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 extended DNA fibers from as few as 5 cells. He also shown that we can recover circulating tumor cells from mice bearing transplanted human breast cancers and that we can detect excess DNA damage in these cells if the mice were treated with chemotherapeutic drugs. Because these methods originally were time consuming 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 much shorter turn-around time. This latter work is being done in collaboration with Dr. Steven Soper from the Department of Biomedical Engineering. A further elaboration of this process being developed is an effort to separate tumor cell subtypes in heterogeneous cancers and evaluating these subtypes separately. They have already shown that two tumor subtypes can be separated by this approach. This work is currently supported by an NC TraCS grant and applications for UCRF, NIH, and DOD grants have been submitted. He is also doing a translational research study to try to find a histochemical 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 use 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 in the gene expression study. This study was supported by an NC TraCS grant.

WILLIAM K. KAUFMANN, Ph.D.

Dr. Kaufmann's research is currently focused on two projects, one to determine the mechanisms of enhanced UV-clastogenesis in melanoma cell lines expressing oncogenic BRAF, the other to apply duplex deep-sequencing to quantify UV-induced mutations in human melanocytes. He is submitting grant applications to pursue his studies of BRAF mutation and melanomagenesis.

APRIL E. KEMPER, M.H.S.

April Kemper's efforts continue to focus on one-on-one resident teaching, training in the surgical pathology laboratory, and training of the Duke Pathologists' Assistant students. The residents this year were excellent and she really enjoyed teaching them. She is especially proud when she sees the residents progressing through their training, developing their own style of grossing and appreciating her teaching efforts.

MEHMET KESIMER, Ph.D.

Dr. Kesimer's research group is still growing along with his grants portfolio. Together with a group of lung investigators, he is recently involved in an important FDA/NIH grant and formed the "UNC Center for Tobacco Regulatory Science and Lung Health." During the coming year he will continue to look for funds for his new ideas especially in the area of extracellular vesicles and their role in lungs innate defense and remodeling.

HYUNG-SUK KIM, Ph.D.

Dr. Kim studies genetic effect on complex diseases, animal models for cardiovascular diseases had been generated by gene targeting techniques. Resulting animals had shown the genetic factors to be key role in the control of blood pressure with the renin-angiotensin-aldosterone system tested. To understand homeostatic response to the genetic change, molecular phenotyping procedures had been developed by gene expression study using high-throughput real time RT-PCR method. His results shown in recent publishes, showed its power for recognizing subtle phenotypic changes in animals even with minimal genetic differences. Using this powerful technique, currently Dr. Kim, as a core director of gene expression core facility, has been collaborating with many researchers in many fields, such as cardiovascular diseases with Drs. Smithies and Maeda group, kidney problems with Drs. Arendshorst, Coffman (Duke Univ.), Williams (Temple Univ.), Luther (Vanderbilt Univ.), and Sharma (UCSD), heart failure with Dr. Meissnoer, and neurological disease with Dr. O'Connor (UCSD). His plans are more development in procedures of molecular and physiological phenotypes for characterization of animal models and continuation of collaboration.

NICHOLE L. KORPI-STEINER, Ph.D.

Dr. Korpi-Steiner's research is focused on the utilization and quality assurance of clinical point-of-care and laboratory tests. Her recent efforts have included the evaluation of point-of-care qualitative urinary hCG pregnancy test susceptibility to high-dose hook interference from intact human chorionic gonadotropin (hCG) and hCG beta-core fragment using simulation modeling. This study was performed in collaboration with NIH investigators whom provided hCG concentrations observed in early natural pregnancy from the prospective NIEHS Early Pregnancy Study. In addition, she is involved in 2 ongoing studies using 8 different hemoglobin (Hb) A1c assays across 4 academic medical centers. The first Hb A1c study examines the use of assay performance characteristics and quality control practices to estimate Hb A1c result reliability. The second Hb A1c study assesses Hb A1c assay analytical precision in the presence of Hb AA, Hb AS or Hb AC and impact on least significant change for patient Hb A1c values. Dr. Korpi-Steiner's goals for the upcoming year are to publish findings from the studies mentioned above as well as to develop and lead additional scholarly clinical research studies. A pilot study is ongoing to evaluate UNC Hospitals glucose meter disinfection practice using fluorescence gel dye spot indicator. Preliminary findings will be used to determine if intervention programs are needed for glucose meter users and whether intervention programs promote improvement in glucose meter cleaning practices. Additionally, she is leading a case report investigation of false-negative point-of-care hCG results in collaboration with investigators from UMass Health Alliance, MA.

RUTH A. LININGER, M.D.

Dr. Ruth Lininger provides subspecialty surgical pathology clinical diagnostic services 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 health care in a tertiary care setting. Her research interests are largely clinical, functioning as a pathologist in collaborative studies, primarily in gynecologic and breast cancer research. She is also researching the scientific basis of integrative medical therapies, especially those related to cancer treatment and treatment of viral and antibiotic resistant infectious diseases. She also 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 also participates in the business and fiscal aspects of surgical pathology billing and coding, as well as surgical pathology scheduling.

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. Dr. Liu's plan

for the coming year is to publish two peer-reviewed articles, apply for NIH R01 grant, 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.

Dr. Maeda's laboratory is interested in the genetics and molecular pathology of atherosclerosis, a complex multi-factorial vascular disease and the major cause of death and disabilities in modern societies. They have generated apolipoprotein E-deficient mice that develop spontaneous and human-like atherosclerotic plaques. With this mouse model, they have explored whether and how other factors modify plaque development. Their current focus is on the genetic risk factors that influence plaque development at the different vascular locations of apoE-deficient mice. Using quantitative trait loci (QTL) mapping, they have identified several loci determining the plaque size in the aortic arch that are completely independent of QTLs that determine plaque size at the aortic root. Interestingly, one of the two significant QTL peaks on chromosome 1 determining the plaque size in the aortic arch overlaps with a QTL determining the shape of aortic arch, suggesting a possible interaction between atherosclerosis and the vascular geometry. The QTL on chromosome 2 contains multiple genes that have known roles in clearance of apoptotic cells, suggesting that the strain differences in these genes may be influencing inflammatory response in early atherogenesis. However, why this QTL affects plaque development at the aortic arch but not aortic root remains to be elucidated. In the coming years, they will aim to identify how specific genomic variations in these loci influence susceptibility to plaque development at some locations of blood vessels but not other locations.

TRACIE L. MASSEY, B.S., P.A.

Tracie Massey's primary responsibility is triaging and banking specimens for the Tissue Procurement Facility. She has increased the amount of specimens banked from about 20% to 60-80%. Her goal is to have 95-98% of the cases consented 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 July 1, 2014, Tracie has agreed to cover 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. Tracie has also agreed to cover the frozen section bench for 2 rotations (one month) to cover maternity leave scheduling problems. Tracie covers the frozen section bench to allow the resident on service to be trained for renal biopsies and for the RISE exam.

STEPHANIE P. MATHEWS, M.D.

Dr. Mathews' research interests are case-based and translational studies in clinical hematology and analytical hematology. Current studies include the use of EMA immunohistochemistry to identify and evaluate erythroid precursors in the bone marrow and how an automated digital cell morphology analyzer can be incorporated in to hematopathology workflow. She has also collaborated with Dr. Angela Kashuba in UNC's School of Pharmacy on a project evaluating drug transporters in mucosal tissue and their implications for drug disposition in HIV prevention.

SUSAN J. MAYGARDEN, M.D.

Dr. Maygarden conducts clinical research in kidney and thyroid fine needle aspiration efficacy, and has recently become a collaborator on a grant on lung cancer screening. She took over as program director for the Anatomic and Clinical Pathology Residency Program in July, 2013. Plans for the coming year include transitioning the residency program to the Next Accreditation System.

MARSHALL A. MAZEPA, M.D.

Dr. Mazepa's primary clinical duties are with the Transfusion Medicine Services, where he supervises Pathology Residents in the care of patients receiving apheresis therapy and the UNC blood bank. He also is the director of the UNCH Blood Donation Center, which recently added collection of large-volume apheresis plasma for use trauma and plasma exchange therapies at UNCH. He plans to continue to expand blood donation capabilities, including the introduction of PAS (platelet additive solution) platelets in the coming year as one of a select number of centers offing for this component nation-wide. He also plans to join Dr. Rollins-Raval in expanding the coagulation laboratory signout and teaching for students, residents and fellows both in Pathology, Pediatrics and Internal Medicine in the coming year. Lastly, he started a UNC TTP clinic, housed in the UNCH hematology clinic for the long-term care and outcomes research in patients with TTP. Dr. Mazepa's work in hemostasis research continues to focus in platelet activation states. His funded project with the UNC hemophilia dog colony will continue through the coming year. He will also expand his work to human subjects referred for bleeding symptoms and is collaborating with the UNC Genetics department (Dr. Jonathan Berg) to perform whole-exome sequencing (WES) with the purpose of asking (1) whether WES is a logical and cost-effective replacement for screening functional assays of coagulation and (2) are there genes associated with failure to achieve platelets with high activation states (coated platelets) that tell us about the mechanism of this activation state and bleeding phenotype? His primary mentors for translational research are Dr. Raj Kasthuri and Dr. Nigel Key. Finally, his

work in TTP is continually expanding. He plans to open a sponsored clinical trial for a novel complement inhibiting MoAb this summer. He is collaborating with Dr. Evan Sadler to bring a novel ADAMTS13 assay to UNC for use in a Phase 2 study of low-dose Rituximab in TTP. He has submitted a concept for initiation of an Investigator-Initiated Phase 2, Multi-center trial of Ixazomib, a novel oral proteasome inhibitor in TTP, which would be the first study of its kind. In doing so, he is also planning to form and lead a multi-center TTP consortium for prospective studies in TTP. He is also collaborating with his colleagues in UNC TMS to form a national TTP registry (pilot funding submissions in progress), with a pilot period in the coming 12 months and national roll-out thereafter. He has submitted a grant to study plasma microparticles as a novel biomarker in TTP and is planning to submit a pilot grant with the TMS group to NC TraCS in response to an RFA to use metabolomics for biomarker discovery in conjunction with RTI. His primary mentorship in clinical research in TTP is Dr. Spero Cataland at Ohio State University.

GAYLE C. McGHEE

Gayle McGhee's responsibilities for this year will include provision of gross organs for all of the organ blocks in the 2nd year 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.
Provision of gross specimens is a multistep process as follows;

- Selection of appropriate organ specimens with the assistance of Drs. Hadler, Reisner, and other faculty
- Careful examination of specimens and washing for overnight
- Draining specimens and arraying on appropriate display trays with supplies of towels, gloves 7 etc.
- Moving specimens to the various teaching rooms and placing them out on desks/tables
- After use specimens are returned, inspected and replaced in new formalin
- 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 we 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, she 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 serve 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 we 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 analysis of astrocytomas from both humans and genetically-engineered mice (GEM). The main goals of this work are to (1) define the impact of cellular origin on the genomics of malignant astrocytoma progression, (2) define the impact of aging on the genomics of malignant astrocytoma progression, (3) define the role of PIK3CA mutations in gliomagenesis and PI3K inhibitor sensitivity, and (4) determine molecular signatures of human GBM after vorinostat therapy.

MELISSA B. MILLER, Ph.D.

Dr. 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. She continues to investigate and publish on the molecular epidemiology of MRSA and heteroresistant VISA, respiratory viral infections and mycobacterial infections. Dr. Miller's laboratory serves as the core laboratory for the molecular characterization of MRSA isolated from cystic fibrosis patients in two collaborative multi-center studies with Dr. Muhlebach in the Department of Pediatrics.

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

Vincent Moylan's main role in the 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 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 a second 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, Mr. Moylan will also be involved in a new research study that is just in the beginning stages and involves Alzheimer's disease participants. Also, he continues to work closely with Dr. Nickeleit and the Nephropathology department handling all of the medical kidney specimens, and assisting the surgical PA's by processing and photographing select explant cases (cardiac, hepatic, lungs). He looks forward to my continuing work with Drs. Hadler, Reisner, and Aylsworth and other medical student teaching projects as they become available.

JUDITH N. NIELSEN, D.V.M.

In the research arena, Dr. Nielsen continues collaborating with investigators at UNC on their research programs, such as Penny Anders of the Blossom Damania laboratory, members of the

Bill Goldman laboratory, and others. Her initial work with the Valerie Ashby laboratory in Chemistry has resulted in generation of an R21 grant application recently submitted to NIH. She is mentoring a Veterinary Resident in DLAM and am guiding her research project evaluating the potential benefits of a new form of double decker caging to house rats. In addition, she continues to explore and evaluate means of most efficiently and cost effectively monitoring the health status of their animal populations at UNC, with hopes that their studies will result in 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, School of Medicine at the University of Minnesota. This research has resulted in publications in Eukaryotic Cell, and a publication in PLoS Pathogens that was recognized by the Faculty of 1000, Biology. Dr. Nielsen 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. Having completed the 2013 ULEAD University Leadership Education & Development Program, she has continued to grow and learn new leadership skills and has gained a better perspective on the broad range of endeavors undertaken at UNC.

VOLKER R. NICKELEIT, M.D.

Dr. Nickeleit's research activities 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 and liver transplants are under investigation. Dr. Nickeleit 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 major research effort addresses polyomavirus infections in kidney allograft recipients. Dr. Nickeleit is the chair of the Banff-Working Group on polyomavirus nephropathy aiming at defining diagnostic guidelines. 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 Dr. Singh). 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 extra-mural support from Astellas Pharmaceuticals. In addition a mouse animal model of polyomavirus nephropathy is being characterized. Dr Nickeleit 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 are conducted to validate the mouse model (in part supported by Astellas Pharmaceuticals).

SIOBHAN M. O'CONNOR, M.D.

Dr. Siobhan O'Connor is in the process of submitting Hormone Receptor and HER2/neu Expression in Multifocal/Multicentric Breast Carcinoma. She is also working with Avani Pendse on a case report of squamous cell carcinoma of the nipple. She is collaborating with a breast radiologist on 3 projects reviewing radiology/pathology correlation of unusual breast

carcinomas and with gyn clinicians on several projects including "Metformin Use and Clinical Outcomes in Diabetic Patients," "Using Novel in situ Hybridization Techniques to Detect Hep C Virus in Placentas," "Biomarkers of High Grade Cervical Dysplasia," and "Factors Associated with Recurrence Risk in Women with Endometrial Carcinoma." Siobhan plans to continue her collaboration with breast and gyn clinicians. She also plans to assist with additional Breast Spore projects and use the resources for her own research projects.

YARA A. PARK, M.D.

Dr. Park's research focuses on thrombotic thrombocytopenic 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.

Dr. Patel provides anatomic and molecular pathology support for the UNCseq (LCCC1108) project, which identifies clinically actionable somatic mutations in cancer patients using massively parallel sequencing. She is also directing the implementation of next-generation sequencing for somatic mutations within the clinical molecular genetics lab through the launch of a solid tumor mutation panel in early 2014 and planned implementation of a myeloid mutation panel later this year.

LI QIAN, Ph.D.

Dr. Qian's research focuses on developing novel therapeutic approaches for cardiovascular disease, with a particular emphasis on cellular reprogramming technology. Their goal is to further understand the basic mechanisms underlying cardiac differentiation and maturation and apply them to improve the efficiency and clinical applicability of reprogramming. My plan for the coming year is to publish two more peer-reviewed articles, apply for NIH R01, participate in departmental and MHI seminars/activities and continue serving on various committees.

KATHLEEN W. RAO, Ph.D.

Dr. Rao's current clinical and translational research activities are 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. During the past year, the Cytogenetics Laboratory validated two new assays using a high resolution SNP microarray for acute lymphoblastic leukemia and for uveal melanoma and has presented findings on clinical utility and new observations from these studies at two national meetings (Dr. Melissa Hayden, former Cytogenetics Fellow). The Laboratory is currently engaged in cataloging the cytogenetically visible rearrangements that involve genes that are or may be amenable to targeted treatment in various liquid and solid tumors and producing a tool that can be used at the microscope to identify these targetable abnormalities. Dr. Kristy Crooks (Cytogenetics Fellow) will be presenting this work at the American Cytogenetics Conference in May. 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 actively worked with his colleagues in Transfusion Medicine, at UNC Hospitals, and the University to further knowledge in a variety of areas. Within the division, several projects are underway which characterize TTP patients and their disease. Additionally, other areas of transfusion research are underway, including RBC storage solution development with collaborators at Duke University. Several projects re: transfusion safety, apheresis procedures, and hematopoietic progenitor cell collection have been embarked upon with clinicians at the hospital, and these have led or will imminently lead to additional publications and future projects. Lastly, grant proposals for research into developing synthetic RBCs with Dr. Joseph DeSimone here in the Chemistry Department have been submitted. It has been a pleasure for Dr. Raval to teach the DPLM housestaff; their enthusiasm and work ethic have made the educational mission of the department exciting. The improvements in the Clinical Pathology/Laboratory Medicine housestaff presentations at their weekly conference are impressive and continue to help develop and hone the presentation skills of the residents and fellows. Lastly, the clinical service itself continues to be a source of great interest and satisfaction. With the volume, variety, and complexity of apheresis, immunohematology, blood bank, and stem cell cases that present to UNC Hospitals, along with the excellent technologists, nurses, and staff members that strive for optimal patient care, Transfusion Medicine Services continues to increase its volume as well as patient and consulting clinician satisfaction.

MARIAN ROLLINS-RAVAL, M.D.

Clinically, in addition to Hematopathology sign-out, Dr. Rollins-Raval's areas of interest are coagulation and flow cytometry. In Hematopathology, she has helped to bring up 5 new immunohistochemical stains useful for their sign-out. In coagulation, they have started to pathologist review and interpretation for both the activated protein C and lupus anticoagulant panels not previously performed. While in the flow cytometry laboratory, she has been working closely with the team to improve the current hematopoietic panels offered. Her research focuses on clarifying diagnostic dilemmas or challenges in the area of Hematopathology, particularly using immunophenotyping, either by paraffin immunohistochemistry or by flow cytometry. She also looks forward to working with the excellent Benign Hematology/Internal Medicine Clinicians to research ways of improving testing in the clinical Coagulation Laboratory. She has several goals for the coming year include providing a structure to coagulation education at UNC. In addition, they will be continuing to refine the testing menu in special coagulation and possibly bringing in house some tests that are currently send-outs, formulating new panels (with the help of the benign hematologists) which will be coupled with pathologist reviewed interpretations. In flow cytometry, they are continuing to develop new and improved tube combinations for the Hematopathology Service. They are also working to provide pathologist interpretations for several tests, including paroxysmal nocturnal hemoglobinuria and neutrophil oxidative burst assays.

HOWARD M. REISNER, Ph.D.

Dr. Reisner enjoys teaching and the preparation of course related material. The ability to design and execute a course on one's own (such as the Dental General Pathology and the Undergraduate Mechanisms of Disease Class) allows for creativity, some degree of authority along with the responsibility. One is likely to deserve the student comments one receives (and his have continued to be been quite good). Dr. Reisner is heavily engaged in the design of the Pathology elements in the new TEC1 curriculum and has played an active role in decisions about the new evaluation system

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

Dr. Scanga's clinical activities in anatomic pathology include both surgical pathology and cytopathology service. Her primary areas of clinical service are cytology and gynecological surgical pathology. Dr. Scanga has multiple areas of active research. She has a current IRB to study the use of cytology procedures in the diagnosis of renal lesions. She recently published a manuscript from this research in *Cancer Cytopathology*. Dr. Scanga is continuing to study this data set and will submit an abstract to a national meeting followed by a second paper this year. Dr. Scanga has also established multiple research collaborations with the UNC Otolaryngology/Head and Neck Surgery department. She is collaborating with Dr. Zdanski, Dr. Shores, and Dr. Serody to study Myeloid-Derived Suppressor Cells in Head and Neck Cancer (MDSC clinical trial). This research was presented as an abstract at the ASCO 2013 Annual Meeting in Chicago, and is currently in the stage of manuscript preparation. Dr. Scanga is active in teaching medical students, residents, and fellows. Dr. Scanga is the Pathology Course Director of MEDI 244 Reproductive Medicine since 2012. This role includes planning the schedule, developing and organizing pathology course material on the Sakai site, teaching lectures and small groups, and writing and selecting examination questions. This role is ongoing and Dr. Scanga will continue to serve as the pathology course director for this class next year. In addition, Dr. Scanga is designated as the Pathology Content Expert for the new Translational Education at Carolina (TEC) medical school curriculum beginning in the fall of 2014.

JOHN L. SCHMITZ, Ph.D.

Dr. Schmitz' laboratory is continuing studies of the incidence and characteristics of donor specific antibodies that develop after receipt of a solid organ transplant. His laboratory has contributed to two posters summarizing the incidence of angiotensin receptor antibodies renal transplant recipients and C1q binding antibodies in liver transplant recipients that have been accepted for the upcoming World Transplant Congress in July 2014. His laboratory will continue these studies with accrual of additional subjects over the next year. In concert with these descriptive studies, Dr. Schmitz' laboratory is piloting a modification to the flow cytometric HLA antibody screening test to allow detection of IgM HLA antibodies in addition to IgG antibodies and will then assess clinical outcomes associated with this enhanced screening method. Dr. Eric Weimer, post-doctoral fellow in the laboratory is developing a next generation sequencing assay for HLA typing. This approach is expected to significantly impact the HLA laboratory by promising greater efficiency for HLA typing at a reduced cost. In concert with this effort, Dr. Weimer is in dicussions with Illumina, the MiSeq vendor to evaluation panel of

primer to detect mutations associated with primary immune deficiencies. The Hospital Laboratories currently spend >$100,000 per year on this testing being done at referral centers. Developing this capacity in house offers the potential for significant cost savings and enhanced patient care by reducing turn around times for genetic testing results. Dr. Schmitz' CFAR Immunology Core laboratory activities have been highlighted by its participation in a large multicenter study of 4th generation HIV testing which entailed testing of over 10,000 samples. Data is currently being analyzed for this study which will be one of the largest studies of the ability of 4th generation testing to detect acute HIV infection.

DENNIS A. SIMPSON, Ph.D.

Dr. Simpson's current research has linked oncogenic BRAF expression to clastogenesis and sensitivity to UVB exposure. This is an important finding in the understanding of how nevi progress to melanoma. This research has also uncovered a link between oncogenic BRAF expression and down regulation of members of the SWI/SNIF complex possibly explaining the UVB hypersensitivity. In addition to this work there is a project to extend a next generation sequencing protocol published by Schmitt et al 2012 to exome capture. This will allow detection of ultraviolet radiation induced mutations in unselected populations of cells.

HARSHARAN K. SINGH, M. D.

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 major contribution exemplifying her professional commitment is to be seen in her research that culminated in the characterization and development of a novel, non-invasive, diagnostic test (Urine PV-Haufen test) to diagnose a major infectious complication post kidney transplantation known as Polyomavirus Nephropathy. This new diagnostic technique developed in collaboration with colleagues at UNC avoids invasive biopsy procedures, and could potentially have profound implications for the care of kidney allograft recipients' worldwide. The clinical impact of this novel discovery is now being confirmed in a prospective study with funding from Astellas Pharma, US Inc. The transplant research group in the Division of Nephropathology at UNC (headed by Dr. Nickeleit) has developed a mouse model of Polyomavirus Nephropathy. Dr. Singh is heavily involved in animal studies using their mouse model in evaluating the specific conditions under which PV-Haufen develop and are shed into the urine (proof of concept studies). Dr. Singh and her colleagues are also spearheading a multi-center study in children post-bone marrow transplantation evaluating Polyomavirus infections and the application of the urine PV-Haufen test to diagnose Polyomavirus Nephropathy in this subset of patients. These research activities allow Dr. Singh to combine and integrate the diverse areas of her expertise in electron microscopy, cytopathology and renal pathology. Dr. Nickeleit and Dr. Singh (UNC) are the lead investigators with 9 centers participating from the US, Canada, and Europe in developing an International Consensus Classification of Polyomavirus Nephropathy which is nearing completion.

SCOTT V. SMITH, M.D.

Dr. Smith is the 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, bone and soft tissue pathology. An integral part of these endeavors is the instruction of 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.

Over the past 20 years Dr. Smithies' research has been focused on identifying genetic factors that control blood pressure. Recently, its emphasis has shifted towards understanding factors that cause some pregnant women to develop pre-eclampsia, which is characterized by hypertension and proteinuria. He has been approaching this goal by using mouse models of preeclampsia and searching factors that influence the pathological processes. The work has already led to a potential trial of a novel, safe and inexpensive dietary supplement that may enable mothers with pre-eclampsia to avoid or delay the need to have early delivery of their babies. Pre-eclampsia accounts for about 20,000 premature births in the United States each year. A second research area that is occupying his attention concerns the way that the kidney glomerulus discriminates between large proteins, which do not cross the glomerular barrier, from small proteins, which do. To facilitate this study, Dr. Smithies has developed a simple method for making stable, oligomeric gold nano-particles. These oligoclusters have hydrodynamic radii similar to most of proteins in plasma and are therefore useful as tracers for studies of the biological fate of macromolecules with controlled sizes and charges. These and other gold nano-particles will be used in assessing kidney functions in vivo in the coming year.

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.

LEIGH B. THORNE, M.D.

Dr. Thorne's research activities continue with the Tissue Procurement Facility, most 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. 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 the collaboration with the Genomics Institute of Novartis Research Foundation (GNF). This collaboration has allowed the Tidwell led Consortium for Parasitic Drug Development (CPDD) to access to a library of over 300,000 small molecules to screen and optimize for development as treatments for late stage human African trypanosomiasis (HAT). An NIH R01 entitled "Drug Discovery for Human African Trypanosomiasis," in collaboration with the University of Washington was submitted to the NIH and received a priority score of 1%. The funding began June 4, 2013. We continue our collaboration with Bayer Animal Health and GALVmed to jointly research new drugs to treat animal diseases. Finally we are in the early stage of writing a book entitled "US Encounter with Tropical Disease." The book will detail how infectious diseases have impacted the United States throughout its history. Dr. Tidwell will begin phased retirement on July 1, 2014. The phased retirement will last through June 30, 2017.

MICHAEL D. TOPAL, Ph.D.

Dr. Topal's research focuses on genomic instability, DNA damage, and proteins that cleave and rearrange DNA sequence. His present work is focused on a gene evolution study of the herpes virus h-CMV. Dr. Topal has significant experience in genomic instability and DNA enzymology and with the technologies used for genomic research. He has been Assistant Dean for Core Technologies at UNC SOM since 2008. The focus of Dr. Topal's efforts is to strengthen the research infrastructure within UNC and the UNC School of Medicine and to make this infrastructure more available to a wide range of researchers. Towards his end, Dr. Topal chairs committees involved in developing HR policy concerning core directors and staff, working to consolidate core facilities on campus and provide centralized management of the facilities, and working to implement parts of the SOM Strategic Plan dealing with core facilities.

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

Dr. Trembath maintains a busy clinical service, signing out general surgical pathology, covering the GI Smalls and GI Large benches. Dr. Trembath, in conjunction with Drs. Tom Bouldin, Ryan Miller, and Debra Budwit, 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.s Bouldin and Dr. John Wright of Ophthalmology, Dr. Trembath is also responsible for covering the ophthalmologic pathology service. Dr. Trembath has an increasingly busy consult service, reviewing neuropathology cases from outside hospitals and pathology groups. In terms of research, Dr. Trembath is involved in several collaborative efforts. With Dr. Stergios Moschos of Hematology-Oncology, Dr. Trembath is developing genetic signatures for melanoma brain

metastasis to determine genes involved in the metastatic process as well as genes important for prognosis and response to therapy. In collaboration with Drs. James Crowley and Patrick Sullivan of the Department of Genetics, Dr. Trembath is analyzing a mouse model of tardive dyskinesia to understand how the drug haloperidol produces this condition. New collaborations have also developed with Dr. Adam Zanation of the UNC Otolaryngology Service to investigate the role of HPV in Schneiderian papillomas and with Dr. Jen Jen Yeh of the UNC investigating pancreas tumor biology. With Dr. Hae Won Shin of the UNC Neurology department, Dr. Trembath is collaborating in validating new MRI modalities for identifying seizure foci. Finally, Dr. Trembath is collaborating with Dr. David Eberhard and the team of UNCseq studying mutations associated with the development of meningiomas.

CYRUS VAZIRI, Ph.D.

Dr. Vaziri's 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 identify novel areas for future research and to initiate new projects that will provide vehicles for extramural funding. To this end, trans-disciplinary studies are ongoing with several colleagues at UNC including Dr. Bill Janzen (School of Pharmacy), Dr. Buddy Weissman (Pathology), Dr. Ben Major (LCCC), Dr. Yuri Fedrowi (Pathology). A collaborative drug discovery project with Dr. Janzen has already resulted in a funded R01. We hope this is one of many trans-disciplinary collaborations that will lead to successful grant applications.

KAREN E. WECK-TAYLOR, M.D.

The goals of the research of Dr. Karen Weck are to translate novel molecular tests into a CLIA-certified laboratory setting for clinical diagnostic and prognostic testing and to investigate the clinical utility of novel molecular 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. In addition, in the past year UNC Clinical Molecular Genetics Laboratory has developed several new clinical genomic assays for use in patient care, including validation of next generation sequencing technology to detect a panel of somatic mutations in tumors for use in patient care. The goals of Dr. Weck's research in the next year are to validate next generation sequencing technology for a panel of inherited cancer syndromes in the clinical molecular genetics laboratory in a CLIA-certified, CAP-accredited environment

for use in patient care and to continue work on the UNCSeq and NCGenes projects to utilize next generation sequencing for clinical care at UNC in the areas of cancer and genetic disease.

BERNARD E. WEISSMAN, Ph.D.

Dr. Weissman's research focuses upon the role of aberrant chromatin remodeling in disease development. Specifically, his laboratory has concentrated upon loss of activity of the SWI/SNF chromatin remodeling complex in the development of 2 deadly cancers- non-small lung carcinoma, a common adult malignancy and malignant rhabdoid tumor, a rare pediatric cancer. Previous studies from Dr. Weissman's laboratory have shown that inactivation of individual components of the complex alter gene expression through changes in chromatin organization and through altering the composition of the complex. Furthermore, the loss of SWI/SNF complex may induce epigenetic instability in cancer cells leading to gene silencing via a mechanism independent of DNA methylation. We have also shown that the SWI/SNF complex plays a direct role in regulating the KEAP1/NURF2 pathway, uncovering a new mechanism for its role in lung cancer development. During the next year, Dr. Weissman will continue to focus on dissecting on how the loss of SWI/SNF complex activity fuels the development of these specific cancers and the development of specific reagents to treat the subset of cancers with mutations in these genes. He will submit multiple applications for extramural support of these studies.

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

Clinical Research: Dr. Whinna will continue collaborative research efforts in Transfusion Medicine and Clinical Coagulation, focusing especially on clinical testing for new oral anticoagulant agents. Translational Research: Dr. Whinna has started research collaborations with several Biomedical Engineering faculty members, including Dr. Richard Superfine, to develop new miniaturized clinical testing platforms. Basic Research: Dr. Whinna continues using his mouse models for hemostasis/thrombosis to investigate basic mechanisms of hemostasis.

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

Dr. Whitaker continues to provide veterinary clinical care for the research animals on campus and to supervise the Surgical and Clinical areas of Veterinary Services as her primary function. The clinical case load has stabilized in the past year, but additional functions have been added to Veterinary Services, and she supervises this area as Associate Director of Veterinary Services. She continues to pursue research on the effect of caging environment on mouse reproduction and behavior, in collaboration with Dr. Sheryl Moy in the Department of Psychiatry and she is writing a publication from a 2012-2013 study. In addition, she and Dr. Moy, along with Dr. Craig Fletcher, have started a new project with additional collaboration with Dr. Pardo-Manuel studying the effect of caging environment in Diversity Outbred mice. She mentored a laboratory animal resident this year in a project in collaboration with Dr. Garner at Stanford University investigating the effect of oxidative stress on mouse dermatitis and evaluating 2 novel treatments for mouse dermatitis. Her interest and specialty training in aquatic animal medicine will continue to be used to support the aquatic research species on campus. She will continue to be involved in teaching and training of laboratory animal residents in the Research Triangle area

through the Research Triangle Laboratory Animal Training Program seminar, and through individual teaching of the UNC laboratory animal residents. She will continue to co-chair the Southeastern location of the International Mock Board Exam Coalition for the ACLAM board exam.

DAVID C. WILLIAMS, M.D.

Dr. David Williams maintains both an NIH funded research laboratory and clinical service responsibilities in hematopathology. Over the past year he successfully moved his laboratory from Virginia Commonwealth University to the University of North Carolina. During this transition he has published two senior author papers and started to develop new collaborations with faculty at UNC. 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 first two aims. Over the next year he will focus on finishing studies proposed for the second aim and beginning the third aim in preparation for competitive renewal in three years. In addition he has established collaborative efforts with Nate Hathaway and Stephen Frye of the Center for Integrative Chemical Biology and Drug Discovery to develop molecular inhibitors of MBD2-NuRD complex formation – a potential therapeutic target for cancer and β-hemoglobinopathies. Over the next year he plans to expand those collaborations, collect preliminary data and submit grant applications for additional funding. 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.

Since arriving at UNC in April, 2013, Dr. Scott Williams has been working to establish and expand a research program focused on epithelial development and differentiation, with a particular emphasis on how the orientation of cell divisions in epithelial stem cells affects tissue architecture. To this end he has hosted four first-year BBSP rotation students, two of whom have joined the lab for their thesis work in March and May, 2014. Kendall Lough's research will focus on the assembly of the apical protein complex that promotes asymmetric cell divisions in the epidermis through confocal and super-resolution imaging; the identification of new proteins involved in spindle orientation; and the role that centrosomes play in mitotic spindle positioning. Kevin Byrd's research will focus on characterizing stem cells in the oral epithelia; determining the role that spindle orientation proteins play in tongue, oral mucosa, and palatal epithelia development and oral cancers; and establishing genetic models for studying the epithelial contribution to cleft palate syndromes. In the past year he has published two first-authored papers (one review and one research paper). The research study was initiated while a post-doc at The Rockefeller University but was completed here at UNC, and has one of his students listed as second author. His goals for the summer and fall are to concentrate on parlaying the new projects they have developed into successful grant applications. These include an NIH R01 in the NIDCR (Dental and Craniofacial Research), an American Cancer Society Research Scholar grant, and to also apply for a K08 award for Kevin Byrd. Dr. Williams has applied for funding for Kendall through the GMB training grant and they plan to apply for an NSF fellowship this fall.

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

Dr. Willis is director of the Campus Health Services Laboratory, director of UNC Hospitals sweat testing laboratory and assistant director of the UNC Hospitals core (clinical chemistry) laboratories. Dr. Willis' research program studies 1) the role of muscle specific ubiquitin ligases (MuRF1, MuRF2, and MuRF3) in regulating metabolism in the pathophysiology of heart failure; 2) the role of protein of ubiquitin ligases in maintaining protein quality control in the context of protein misfolding, proteotoxicity, and autiophagy; and 3) testing novel peptides therapies in pre-clinical trials to reduce cardiomyocyte cell death and fibrosis in myocardial infarction. 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 long-term goals of the program include identifying therapies that can be developed beyond pre-clinical studies to human studies of ischemic heart disease and heart failure. 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 Alisa Wolberg, PhD 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 both goals during this year. 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. 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.

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 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 1) 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. 2) 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. 3) Investigating the involvement of receptors on neutrophil such as FcrR, C5R and kinin receptors in pathogenesis of ANCA disease and testing therapeutic interventions with inhibitors in ANCA disease model. 4) Using animal model to dissect the mechanism of anti-MPO induced extravascular inflammation and tissue injury such as granuloma.

MAIMOONA B. ZARIWALA, Ph.D.

The major goals of Dr. Zariwala's research are: (**1**) Decipher possible genetic causes of Primary ciliary dyskinesia, and idiopathic bronchiectasis by using candidate gene testing, or exome sequencing using next generation sequencing technologies to identify know or novel genes and continue to provide research genetics results to the patients and families, (**2**) Continue to expand research genetic test panel that will help improve the CLIA approved clinical genetic test for Primary Ciliary Dyskinesia, and (**3**) to Provide consultation and ongoing support to the Molecular Pathology Lab for clinical genetics test panel for Primary Ciliary Dyskinesia. Dr. Zariwala's laboratory has made significant progress towards each of these goals in the last year. The works on *RSPH4A* mutation profiling, identification of *DNAH5* mutation in association with large deletion of Chr 5 in patient with Cri du Chat syndrome, and on genetic heterogeneity in Amish cohort has been published. Ongoing collaboration and consortium bring additional DNA samples. Whole exome sequencing efforts in collaboration with the investigators from the Seattle Genomic Sequencing Center, Yale Center for Mendelian Genomics, Harvard University and Germany are continued. These efforts yielded many novel genes (*SPAG1, LRRC6, ZMYND10, C21orf59, CCDC65, ARMC4, DYX1C1* for classic PCD and *RSPH1* for milder form of PCD) that were published recently. In addition, mutations in *RAG1*, *OFD1*, *RPGR* in cases presenting with bronchiectasis and few other symptoms have been identified. Further, mutation profiling of the recently identified cilia biogenesis gene *CCNO*, and additional analysis of exome sequencing data is underway to identify genetic etiologies. Additionally, next generation sequencing based research genetic test panel to interrogate 28 of the 30 known genes for PCD is being validated that when successful will help with early diagnosis and intervention to improve clinical outcome. This test has a potential to be translated into the CLIA lab as well. These studies will also represent a significant step forward in the application of new approaches to 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. His plan for the coming year is to publish at least 2-3 peer-reviewed research articles. His lab has one paper in press at *Genes & Development* and another paper in revision for *Cell Reports*. He is planning to apply for some new investigator awards/grants such as V foundation. In the mean time, Dr. Zhang will apply for some breast cancer foundation/kidney cancer foundation grants. He will also be actively participating in departmental and lineberger cancer center seminar/symposium events and will continue to serve on committees for graduate students.

PROGRAMS AND SERVICES

TEACHING
HOWARD M. REISNER, Ph.D.

MEDICAL:
Second Year Medical School Involvement: Pathology content provided by our department is incorporated into 10 of the 11 blocks which comprise the second year curriculum. (Please note that this will change for the 2014-2015 academic year with the institution of a new Medical School Curriculum)The blocks are predominantly organ system based. However, two blocks, an introductory "Tools" block and a Clinical Medicine Cases Block, serve special functions to be discussed. The only organ system in which the department does not play a strong role is the Musculoskeletal/Dermatology block which supplies its own expertise from Dermatology. However, we support the block in providing virtual scanned images for use. Each organ system block is represented by a member of this department serving on a "block committee". Several committees are chaired by departmental faculty members including the Tools Block (Reisner) and Integrated Clinical Case blocks (Hadler). Each block attempts to integrate pathology and abnormal physiology/medicine into a single course with a single syllabus (all presented on-line). Different blocks have taken somewhat different approaches but, in general, independent pathology lectures remain relatively intact and are usually broken into small units. The tendency for "independent" pathology laboratory sessions to be used in several of the blocks (including respiratory, GI, endocrine, female reproductive, and renal/urinary) has continued and receives excellent student comments. This year medical residents have worked along with Pathology Faculty and Residents in several of these laboratory sessions. These "mini-pathology" lab sessions are most successful when presented before the more medical sections of the laboratory (when such exist) and are designed to complement other material presented. The availability of laboratory staff that participate in multiple blocks (particularly Dr. Hadler) allows students to get to know our faculty members across several organ system blocks and student attendance in laboratories continues to be excellent. In addition, an introduction to Pathology as a medical career has been added and several of our junior faculty have been used this as an opportunity to meet students. Twelve video podcasts presenting overviews of introductory laboratory material continue to be used in the first block and were noted as helpful by students. The availability of gross organ specimens in the much improved facilities of Bondurant Hall proved to be an extremely positive development in laboratory/small group sessions and the department is pleased that such specimens were available for and heavily used this academic year. Although not perfect in it's implementation AIMS based quizzes have been used in the tool block and will be modified and expanded next year.

The Tools Block (Block 1) includes the entire Introduction to Pathology (General Pathology) sequence and has been accompanied by a substantial increase in hours available to this department. The Clinical Case Block was founded by Dr. Clark of this department and continues to provide a series of integrated cases in which pathology and clinical laboratory medicine play an important role.

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. All blocks used computer based virtual microscopy rather than glass slides and microscopes to present histopathological material and the availability of the Aperio scanner with 40X capabilities has allowed the extension of VM technology to the area of hematopathology. Images are provided online via a specialized image server which also serves as the repository for image files. Student acceptance continues to be excellent and a far greater interest in histopathology was noted to be present during laboratory sessions. The Aperio viewer (Imagescope) continues to be preferred by students to a virtual slide viewer used in histology. However, Dr Reisner has now modified all laboratory sessions to allow Virtual Microscopy using Macs and Linux based computers. In addition a new outsourced server system has been tested for presenting VM and will be implemented in the 2014-2015 academic year.

General Pathology Sequence (in Block I): The course was initially designed by Dr. Scott Smith and consisted of eight lecture sessions covering general pathology and five laboratory sessions using virtual microscopy and gross organ demonstrations. Laboratories were staffed by both Ph.D. and M.D. faculty so as to afford students the opportunity to meet both research and clinical faculty. Virtual microscopy images were presented using the image server. It is believed that these changes provided a more coherent introduction to aspects of pathology necessary for an understanding of subsequent material. The examination format (revised last year to have a "practical component") was again somewhat modified to fit the integrated second year examination paradigm. Each laboratory session included a short quiz done in lab to help reinforce major points in the lecture and laboratory. These will be somewhat modified for next year in response to student comments.

DENTAL:

First Year Dental School Teaching: Pathology 127: Dr. Reisner (Course Director) provided a series of nine one hour lectures which cover all essential aspects of general pathology. Because much of this material is not reviewed in subsequent courses in systemic medical and dental pathology, a good deal of attention to details and use of the textbook (Rubin's Essentials of Pathology 6th Edition) was encouraged. All lecture material was presented as PowerPoints which are made available to students before the lecture. There are seven laboratories covering general aspects of histopathology which are supervised by Drs. Hadler (who comments on gross organ pathology) and Reisner and the expanded use of introductory laboratory "podcasts" has proven both useful and popular. This has been made easier by incorporating access into the Sakai system. Two multiple choice exams were used as evaluation tools along with short "extra credit" exercises expanded this year to a surprising degree of enthusiasm. Although grading such short answer material is very time consuming it is repaid by student interest. In general, course comments and ratings have continued to be excellent.

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 we continue to reduce the variability between sessions. 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. Given the availability of virtual

microscopy short self-directed laboratory modules may also be included in the future. One sample podcast (in pulmonary pathology) has been produced for testing purposes.

*Several of our newer faculty including Drs. Fedoriw, Homeister, and Ryan Miller took an active role which will continue next year as a result of enthusiastic student comments. Note that Dr. Reisner played a somewhat more limited role in the fall of 2013 as he was on medical leave for a portion of the course.

MOLECULAR AND CELLULAR PATHOLOGY GRADUATE PROGRAM

JONATHON W. HOMEISTER, M.D., Ph.D., DIRECTOR OF GRADUATE STUDIES
CYRUS VAZIRI, Ph.D., ASSOCIATE DIRECTOR OF GRADUATE STUDIES
Summary of Graduate Student Accomplishments and Activities
Molecular and Cellular Pathology Ph.D. Program

The administrative leadership of the Molecular and Cellular Pathology Graduate Program last changed in August of 2012, at which time the current Director, Jonathon W. Homeister, M.D., Ph.D., and Associate Director, Cyrus Vaziri, Ph.D., assumed these positions. The graduate student body individually and collectively has accumulated a number of significant accomplishments during the past year. Five students successfully completed the Ph.D. program (Maria Aleman, Dinuka De Silva, Kaitlin Lenhart, Lantz Mackey, and Kristine Wadosky). With these graduates, the Molecular and Cellular Pathology Graduate Program has produced 181 total graduates and 133 Ph.D. graduates since 1954. Maria, Dinuka, and Kristine will continue their professional development through academic postdoctoral research. Lantz will do post-doctoral research training at the NIEHS in the Research Triangle Park. Kaitlin is currently a Research Associate in the Department of Pathology and Laboratory Medicine. The Biological and Biomedical Sciences Program (BBSP) recruited another excellent class of graduate students, many of whom were interested in the Molecular and Cellular Pathology Graduate Program. During Summer 2013, Fall 2013, and Spring 2014, faculty members associated with the Molecular and Cellular Pathology Ph.D. Program hosted 26 laboratory rotation experiences for 20 individual students (among 14 faculty laboratories). This is over twice as many laboratory rotations, twice as many students, and nearly twice the number of faculty labs involved in rotations compared to last year. This increase partly reflects the increased number of opportunities to host students among our new faculty laboratories established during the previous two years. As a result of these rotations Sabri Abdelwahab, Rachel Dee, Nicole Fleming, and Justine Moore matriculated into our program from the BBSP in June of 2014. Sabri will work with Dr. Mehmet Kesimer, Rachel will work with Dr. Joan Taylor, Nicole will work with Dr. Jiandong Liu, and Justine will work with Dr. Claire Doerschuk. As of July 1, 2014, the Molecular and Cellular Pathology graduate program has a total of 16 students (14 from the BBSP and two from the M.D.-Ph.D. Program).

Since the beginning of 2013, graduate students contributed authorship to over 43 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 2013 Molecular and Cellular Pathology Annual Research Symposium (September 2013), Bethany

Walton and Amanda Rinkenbaugh received awards for outstanding presentations by a graduate student. Maria Aleman received the Trainee's Choice Award from her colleagues. Bethany and Maria each also received an Abstract Achievement Award at the 55th Annual Meeting of the American Society of Hematology, and Maria received a 2014 Graduate Education Advancement Board IMPACT Award for her research project entitled "*Fighting Blood Clots More Effectively*." Lantz Mackey and Nicole Fleming received FASEB MARC Student Travel Awards from the *American Society for Investigative Pathology* to attend Experimental Biology 2014. Robbie McNeill received a UNC Lineberger Scientific Retreat Best Clinical/Translational Poster Award. Julia Geddings received several research awards including the Carl Storm Underrepresented Minority Fellowship, the Gertrude B. Elion Mentored Medical Student Research Award, the John B. Graham Medical Student Research Society Poster Presentation Award, and the Katherine Pryzwansky Young Investigator Award.

Research support for students in Molecular and Cellular Pathology was provided by a number of sources. Many students received support from training grants. Lantz Mackey, Laura Weise-Cross, and Bethany Walton were supported by the Integrative Vascular Biology NIH Training Program and Britta Jones was supported by the North Carolina Kidney Foundation NIH Training Grant. Two students were supported by extramural predoctoral fellowships from the American Heart Association, or the NIH. Kristine Wadosky was supported by her predoctoral fellowship from the American Heart Association, and Maria Aleman was supported by her predoctoral fellowship from the NHLBI. Dinuka De Silva was supported by the Linberger Comprehensive Cancer Center Trust, and Kaitlin Lenhart received a Dissertation Completion Fellowship from the UNC Graduate School. In addition, two students were supported by funds from the Department of Pathology and Laboratory Medicine. During 2013-2014, Amanda Rinkenbaugh and Robbie McNeill received continuing support as Robert H. Wagner Scholars in Molecular and Cellular Pathology.

The involvement of Molecular and Cellular Pathology students and faculty in the Certificate Program in Translational Medicine remains strong, although financial support is no longer offered to the students. Five Molecular and Cellular Pathology Ph.D. students including Amanda Rinkenbaugh, Bethany Walton, Britta Jones, Kim Bird, and Robbie McNeill were fellows participating in the Program in Translational Medicine.

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 2014 Seminar Series featured presentations by 11 Molecular and Cellular Pathology 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 2014. Julia Geddings (from Dr. Nigel Mackman's laboratory) gave a presentation entitled "*The Role of Tumor Microparticles in Cancer-Associated Thrombosis*," and Bethany Walton (from Dr. Alisa Wolberg's laboratory) gave a presentation entitled "*The contribution of Red Blood Cells to Coagulation*." This series provides a valuable opportunity 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 planned to host Charles E. Murry, M.D., Ph.D., from Washington University on Thursday January 30th for a

talk entitled "*Regenerating the Heart*." However, the event was cancelled due to weather and was rescheduled for the Fall of 2014.

In the summer of 2013, the graduate students selected Dr. Joan Taylor as the 2013 recipient of the *Joe W. Grisham Award for Excellence in Graduate Student Teaching*. The award was presented in September 2013 at the home of Dr. J. Charles Jennette during the annual Open House for the Molecular and Cellular Pathology graduate students, and the department faculty. 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 J. MAYGARDEN M.D., DIRECTOR

The Department of Pathology and 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 six months of elective rotations in AP, CP or Pathology research, so that the resident can concentrate on his/her particular interests. Overall there are eight 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, 2013, through June 30, 2014, we had a total of 16 residents, 4 residents/year in our 4 year program. The 4 graduating residents completed the program on June 30, 2014. All have gone on to fellowship programs: 1 in cytopathology at UNC, 1 in surgical pathology at UNC, 1 in molecular pathology at UNC, 1 in Hematopathology at New York Hospital, Cornell-Weill School of Medicine. The program successfully matched 4 residents in March, 2014 to form the incoming 2014 class. The program received 343 applicants, 158 of

whom were from US medical schools. 57 applicants were invited to interview, 49 were interviewed, and 46 were ranked.

A major focus of the residency program was the transition to the Next Accreditation System (NAS), which was implemented July 1, 2014. During 2013-14 the program formed a Clinical Competency Committee, the members of which are Dr. Herb Whinna (chair), Dr. Scott Smith, Dr. Siobhan O'Connor, and Dr. Jay Raval. Dr. Susan Maygarden and Ms. Elizabeth McDonald are non-voting members. The CCC will perform their first set of semi-annual assessments in the fall of 2014. Related to NAS, the curriculum and policies documents were updated, all program materials migrated from paper copies to a sharepoint website, rotation documents were updated for all rotations. Since our program holds an AGCME status of continuing full accreditation, the site visit that had been originally scheduled in October, 2013 has been transitioned in NAS to 2017. At that time the core program and all of the subspecialty fellowship programs in pathology will be reviewed.

The inaugural Thomas W. Bouldin lectureship was held January 8 and 9, 2014. Dr. Arie Perry, chief of Neuropathology from the University of California at San Francisco was the first Boulin lecturer. Dr. Perry was chosen by the residents to honor the namesake of this lectureship, Dr. Bouldin, our former residency director and long time neuropathologist.

The leadership of the residency program remained stable in 2013-14. 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 2012-13
CATHERINE A. HAMMETT-STABLER, Ph.D., DIRECTOR
DENISE M. MILHORN, Ph.D., FELLOW, 2012-2014
https://www.med.unc.edu/pathology/residency/fellowships/clinical-chemistry-fellowship

Begun in 1972, this COMACC-accredited 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. Maj Denise Milhorn, PhD (Deputy Director, Medical Research Materiel Command, FT Detrick, MD.) joined the program in August 2012 following deployment to the Field Assistance of Science and Technology Team in Kandahar, Afghanistan. She has contributed to multiple manuscripts and is presenting at AACC in July. The program had a record 92 applications for the position beginning July 1, 2013. Dr. Hanan F. Mohammad from the ComACC accredited-doctoral program at Cleveland State University was selected to become the program's 29th trainee. The Clinical Chemistry Fellowship is directed by Dr. Catherine Hammett-Stabler.

CLINICAL MICROBIOLOGY FELLOWSHIP
PETER H. GILLIGAN, Ph.D., DIRECTOR
KEVIN A. ALBY, Ph.D., FELLOW, 2013-2014

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 America 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: (1) Technical training to become proficient at performing and interpreting the laboratory procedures offered in the clinical microbiology laboratory; (2) 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; (3) Clinical training enabling the trainee to interface effectively with infectious-disease clinicians; (4) Research in clinical microbiology; and (5) A three week external rotation at the State Laboratory of Public Health. On June 21, 2013, Kevin Alby PhD completed a highly successful fellowship in this program. He played a major role in establishing Mass Spectroscopy as the standard technique in our laboratory for identifying bacterial and yeast. He also developed new methods for detecting multi-drug resistant organisms. He published 2 book chapters, one first author publication, and has two additional first author publications submitted. He also has six published abstracts. He will begin a position as the Associate Director of the Microbiology Laboratory at the Hospital of the University of Pennsylvania and as an Assistant Professor of Pathology and Laboratory Medicine at the University of Pennsylvania School of Medicine on July 1, 2013.

CLINICAL MOLECULAR GENETICS FELLOWSHIP
JESSICA K. BOOKER, Ph.D., DIRECTOR
IAN KING, Ph.D., FELLOW, 2014-2016

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 dynskinesia, EBV, CMV, 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 Dr. Jessica Booker. There was one fellow in the training program in 2013-2014, and one from 2014-2015.

MOLECULAR GENETIC PATHOLOGY FELLOWSHIP
MARGARET L. GULLEY, M.D., DIRECTOR
AMY TREECE, M.D., FELLOW, 2013-2014
https://www.med.unc.edu/pathology/residency/fellowships/mgp

The Department of Pathology and Laboratory Medicine and University of North Carolina Hospitals sponsors a one-year fellowship in Molecular Genetic Pathology. Trainees gain a working knowledge of molecular procedures including DNA sequencing (including massive parallel (next generation) sequencing, Sanger, and pyrosequencing), protein truncation test, DNA amplification (PCR), tissue macrodissection and other cell enrichment procedures, Southern blot, in situ hybridization/FISH, and array technologies including gene expression profiling and single nucleotide polymorphism (SNP) chips. These advanced technologies are applied in a wide spectrum of clinical settings including oncology, heritable disease, infectious disease, HLA-typing, identification, and pharmacogenetics. The fellow learns to analyze and interpret molecular data from clinical cases and to compose concise, informative reports that incorporate correlative clinical, histopathologic, immunophenotypic, and cytogenetic findings. The fellow learns to design and carry out research aimed at understanding the molecular basis of disease and translating fundamental discoveries into improved patient care. Ethical issues, quality assurance, and lab administration are discussed as they relate to clinical practice. UNC has the longest track record of board certifications among all ACGME-accredited molecular genetic pathology training programs in the nation. The program is directed by Margaret L. Gulley, MD with support from many faculty and staff. More information about this fellowship program can be found at https://www.med.unc.edu/pathology/residency/fellowships/mgp.

COAGULATION FELLOWSHIP

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

CYTOGENETICS FELLOWSHIP
KATHLEEN W. RAO, Ph.D., DIRECTOR
MELISSA A. HAYDEN, Ph.D., FELLOW
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 (ABMG). The usual training period is two years. Upon successful completion of the program and ABMG 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 6000 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 is directed by Dr. Kathleen W. Rao.

CYTOPATHOLOGY FELLOWSHIP
LESLIE DODD, M.D., DIRECTOR

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 a one required month of Surgical pathology and Conference review. This curriculum exceeds Board requirements for trainee engagement, progression to independent practice and interdisciplinary learning.

In anticipation of transition to the "NAS" requirements as stipulated by the ACGME, the program has adopted a formal infrastructure of a "Progressive Evaluation of Competency" committee. This committee is chaired by Dr. Siobhan O'Conner and is tasked with evaluating current trainees under a new paradigm ("milestones") for the current academic year.

FORENSIC PATHOLOGY FELLOWSHIP
DEBORAH L. RADISCH, M.D., M.P.H., DIRECTOR

The 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 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 completed the training program in 2012-2013.

HEMATOPATHOLOGY FELLOWSHIP
GEORGE FEDORIW, M.D., DIRECTOR
JEREMY PARRIS, M.D. and STACEY O'NEILL, M.D., FELLOWS, 2013-2014

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 Jeremy Parris from East Carolina University and Stacey O'Neill, 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
VOLKER NICKELEIT, M.D., DIRECTOR
AKANKSHA GUPTA, M.D., and LINA ESPINOSA, M.D., FELLOWS

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 may be 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). Part of the fellows' responsibility is to organize clinico-pathologic and biopsy review conferences for medical faculty and housestaff, and to teach 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. Research projects focus on the pathogenesis of glomerulonephritides, allograft rejection and polyomavirus infections. All state-of-the-art facilities (including laser microdissection) are available in the department. Appropriate research studies are funded by intramural support. 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 Dr. V. Nickeleit and additional information on this opportunitycasn be found at www.uncnephropathology.org.

SURGICAL PATHOLOGY FELLOWSHIP/INSTRUCTORSHIP
WILLIAM K. FUNKHOUSER, M.D., Ph.D., DIRECTOR
ERSIE POUAGARE, MD, FELLOW/INSTRUCTOR (2013-14)
BRIAN KLAZYNSKI, MD, FELLOW/INSTRUCTOR (2013-14)

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 7 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. Ongoing projects include the epidemiology and pathogenesis of thrombotic thrombocytopenic purpura (TTP) and the use of apheresis in lung transplant rejection. There was not a fellow for the academic year of 2013-2014.

PATHOLOGY AND LABORATORY MEDICINE GRAND ROUNDS - 2013-14

Grand Rounds Organizing Committee: Monte S. Willis, M.D., Ph.D., Chair
Members: David G. Kaufman, M.D., Ph.D. and J. Charles Jennette, M.D.

The Department of Pathology and Laboratory Medicine Grand Rounds seminar series continued to be well attended during the academic year 2013-14. 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 & 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 accomplisments 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.

To accommodate speaker and audience needs, Grand Rounds follows a flexible format. The presenters may choose a traditional format in which there is a single presenter; or when appropriate, as when integrating basic and clinical research or two or more disciplines, some choose to share the time with a collaborator or trainee. Presentations are usually 45 minutes, followed by a question-and-answer session. The committee strives to assure a range of experimental, clinical and surgical pathology subjects are appropriated and evenly covered. The topics are dependent upon speaker availability and while many presentations are usually related to the presenter's research interests, some include scientific reviews of pertinent areas in clinical medicine, translational research, and/or basic science. The following list of 2013-14 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 2013 DATE	SPEAKER/AFFILIATION	TITLE
09/12/2013	William B. Coleman, PhD Professor, Pathology and Laboratory Medicine, The University of North Carolina at Chapel Hill	"Targeting the Breast Cancer Epigenome"
10/03/2013	Nirali M. Patel, MD Assistant Professor, Pathology and Laboratory Medicine and Lineberger Cancer Center The University of North Carolina at Chapel Hill	"Next Generation Sequencing in Cancer: The UNCseq Process
10/10/2013	Nancy DeMore, MD., FACS Professor of Surgery, Department of Medicine The University of North Carolina at Chapel Hillie	"Development of Novel Angiogenesis Inhibitors"

10/24/2013	Teresa K. Tarrant, MD Assistant Professor, Departments of Medicine and Thurston Arthritis Research Center, Lineberger Cancer Ctr The University of North Carolina at Chapel Hill	'Regulators of G protein signaling affect innane immune responses in inflammortary arthritis"
10/31/2013	Cyrus Vaziri, PhD Associate Professor, Pathology and Laboratory Medicine The University of North Carolina at Chapel Hill	"Rad18-Mediated Ubiquitin Signaling, Genome Maintenance and Cancer"
11/07/2013	Victoria Bae-Jump, MD., PhD Associate Professor, Division of Gynecologic Oncology The University of North Carolina at Chapel Hill	"The Metabolic Effects of Obesity and Gynecologic Cancers"
11/14/2013	Rosalind A. Coleman, MD Professor, Department of Nutrition and Pediatrics The University of North Carolina at Chapel Hill	"Muscle Fuel Switching and Systemic Glucose Homeostasis"
11/21/2013	Xiaoling Li, PhD Principal Investigator, Laboratory of Signal Transduction National Institute of Environmental Health Sciences, RTP	"SIRT1 in metabolism and disease"
12/12/3013	P. Kay Lund, PhD Professor, Nutrition and Pediatrics Sarah Graham Kenan Professor of Cell & Molecular Physiology The University of North Carolina at Chapel Hill	"Intestinal stem cells in injury, regeneration and obesity: Novel roles for the insulin and insulin-like growth factor receptors"
12/19/2013	Siobhan M. O'Connor, MD Assistant Professor, Pathology and Laboratory Medicine The University of North Carolina at Chapel Hill	"Update on Molecular Targets in Ovarian Cancer"
SPRING 2014 DATE		
1/09/2014	Arie Perry, MD Professor of Pathology and of Neurological Surgery Director of Neuropathology University of California, San Francisco	"New glioma biomarkers in Neuro-Oncology"
1/16/2014	Yuri Fedoriw, MD Assistant Professor, Pathology and Laboratory Medicine Directory of Hematopathology The University of North Carolina at Chapel Hill	"Dysregulated B-cells Here and Abroad"
2/06/2014	Thomas J. Lawton, MD	"Lobular Neoplasia: Current Concepts

	CEO, Pacific Breast Pathology Medicial Corporation Seattle, WA	and Controversies"
2/20/2014	Doug Cyr, PhD Professor, Department of Cell Biology and Physiology UNC Cystic Fibrosis/Pulmonary Research Center The University of North Carolina at Chapel Hill	"Protein Quality Control in Cystic Fibrosis"
2/27/2014	Scott Bultman, PhD Assistant Professor, Department of Genetics The University of North Carolina at Chapel Hill	"Gut microbiota in colonic homeostasis and cancer prevention"
3/13/2014	Lori Scanga, MD., PhD Assistant Professor, Department of Pathology and Laboratory Medicine The University of North Carolina at Chapel Hill	"Utility of Fine Needle Aspiration and Core Biopsy with Touch Preparation in the Diagnosis of Renal Lesions"
3/20/2014	Susan Maygarden, MD Professor, Department of Pathology and Laboratory Medicine, Program Director, Anatomic and Clinical Pathology Residency, The University of North Carolina at Chapel Hill	"Graduate Medical Education in Pathology: Past, Present, and Future"
3/27/2014	Kevin G. Greene, MD Assistant Professor, Department of Pathology and Laboratory Medicine, The University of North Carolina At Chapel Hill	"Universal Screening of Colon Cancer Resections for Lynch Syndrome"
4/3/2014	***Residents & Fellows Research Day*** Avani Pendse, MD., PhD – Resident Physician	"Search for occult micrometastases in histologically negative lymph nodes from distantrecurrent endometrial cancer: a wild goose chase"
	Daniel J. Kenan, MD., PhD – Nephropatholoy Fellow	"High Grade Urothelial Carcinoma With Integrated BK Polyomavirus Arising In a Renal Allograft"
4/10/2014	Claire M. Doerschuk, MD Professor, Medicine and Pathology and Laboratory Medicine, Center for Airways Disease The University of North Carolina At Chapel Hill	"The Inflammatory Response in Pneumonia and Acute Lung Injury"
4/17/2014	***Graduate Student Research Day*** Julia Geddings, BS Department of Pathology and Laboratory Medicine	"The role of Tumor microparticles in cancer-associated thrombosis"
	Bethany Walton, BS Department of Pathology and Laboratory Medicine	"The Contribution of Red Blood Cells to Coagulation"

4/24/2014	Susan Fiscus, PhD Professor, Microbiology & Immunology The University of North Carolina at Chapel Hill	"From the Bench to Public Policy – The Odyssey of HPTN 052"
5/8/2014	David C.Williams, Jr., MD., PhD. Associate Professor, Department of Pathology and Laboratory Medicine The University of North Carolina at Chapel Hill	"Sliding and hopping along DNA: The dynamic distribution of methyl-cytosine binding domain proteins on DNA"
5/15/2014	Kathleen M. Caron, PhD Assistant Dean for Research, School of Medicine Professor and Chair, Cell Biology & Physiology The University of North Carolina at Chapel Hill	"Dosage During Development: Mouse Models to Pharmacology"
5/22/2014	Aimen Farraj, PhD., DABT. Research Biologist US Environmental Protection Agency Research Triangle Park, North Carolina	"Unraveling the Acute Mechanisms that Underlie Increased Cardiovascular Risk to Short-term Spikes in Air Pollution"
5/29/2014	Qing Zhang, PhD Assistant Professor, Pathology and Laboratory Medicine Lineberger Comprehensive Cancer Center The University of North Carolina at Chapel Hill	"Study of EglN2 and Oxygen Sensing Pathway in Breast Cancer"
6/5/2014	Marshall Mazepa, MD. Assistant Professor, Pathology and Laboratory Medicine Director, Blood Donation Ctr., UNC Blood Bank and Transfusion Medicine Service, The University of North Carolina at Chapel Hill	"Platelet Procoagulant Activity in Disorders of Hemostasis"
6/12/2014	Marila Cordeiro-Stone, PhD Research Professor, Pathology and Laboratory Medicine The University of North Carolina at Chapel Hill	"How Does the Intra-S DNA Damage Checkpoint Protect the Integrity of the Genome?"

CLINICAL SERVICES

BACKGROUND McLENDON CLINCAL 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 health care 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. For FY 13-14, the laboratory contributed 76 million dollars to UNC Hospital's operating margin.

The largest laboratory wide initiatives involved the upgrade of our SOFT LIS as well as our participation in the transition of the HIS to Epic. We have also completed planning and started the implementation phase for the opening of the Hillsborough Hospital. We will support a full service Clinical Laboratory at that site. All of the Clinical Laboratories are now using Sharepoint as the document control system for policies and procedures which gives us the capability of electronic review and signatures. Our test volumes continue to increase as does the complexity of our patient population. The laboratory is heavily involved in Lean and Six Sigma projects to ensure that we are making the best use of our space and our personnel resources. One of our current Six Sigma projects is to begin evaluating lab test utilization to assure that the right test is ordered and the right clinical information is available.

SURGICAL PATHOLOGY (Histology/Special Procedures Labs)
WILLIAM K. FUNKHOUSER, Jr., M.D., Ph.D., DIRECTOR

UNC Surgical Pathology generates diagnoses on UNCH specimens, on specimens to be reviewed because of patient referral to UNC hospitals, and on outside expert consultation specimens. In 2012, 28,800 cases were diagnosed, including 2700 outside cases, a stable year-over-year faculty caseload. The DPLM now trains 16 AP/CP residents. Gross room training of these residents is performed by the gross room Pathologists' Assistants. Cases route to 7 Surgical Pathology benches (not including Derm or Neuropath) benches (Breast, Benign Ob/Gyn, Gyn Onc, GI/Liver biopsies, GI/Liver resections, GU/Bone/ST, and ENT/Thor/Vasc). Junior residents gross all cases, preview resections, and sign out all cases real-time. Senior residents independently diagnose/dictate all cases, and gross 2 cases/day. Junior and senior residents also rotate through the Frozen Section room. SP Fellows independently diagnose/dictate all of their cases in the Fall, and serve as credentialed Instructors with independent sign-out responsibility in the Spring. Organ-specific lectures are presented by faculty, fellows, and residents in didactic and unknown formats. Fellows or Chief Residents rotate through a Conferences/Consult service during which they staff 5 of the multi-disciplinary conferences each week. Overall, these approaches are designed to offer graded responsibility, with the opportunity to become skilled at grossing, frozen section diagnosis, permanent section diagnosis, reporting, and teaching.

New faculty members joined us in 2012, including sign-out faculty (Drs. Hertel and Dodd). Dr. Hertel signs out the Cytopathology, Breast, and GI/Liver resection benches. Dr. Dodd signs out the Cytopathology, GU, and ENT benches.

The UNCH Histology laboratory is commensurately busy. We are fortunate that the Laboratory is well-led by Ms. Deloney, and that it is well-managed by Ms. Crook. This laboratory and its upstream accessioning personnel are critical to an efficient, error-free service. Block volume increases have been met with increased productivity, Lean analysis, improved instrumentation, and budget approval for seamless barcoding of specimens from accessioning to case sign-out. Error records are returned to the Histology laboratory for management follow-up and quality monitoring. Challenges for 2013 are to automatically measure block volumes, case TATs, and error rates, and to correlate these data with staffing type and levels, in order to define optimal technical staffing.

Overall, continuing increases in workload have been met by continuing increases in effort, ingenuity, and efficiency. 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
SUSAN J. MAYGARDEN, M.D., DIRECTOR

The Cytopathology Division changed Directorship in 2013. Our overall laboratory service volume remains relatively stable with the exception of a decline in Pap smear cases that follows an overall national trend due to changing screening paradigms. The decline in Gyn cases has been offset by 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 2013 the Chief technologist position transferred from Ms. Jennifer Cayless to Ms. DeAngelis Carroll-Baldwin. This led to a vacant cytopathologist position which was quickly filled with Ms. Christine Thompson. Our prep area is staffed by two temporary employees. During 2013 there was some difficulty with one of the positions but currently it is staffed by a capable individual. Current staffing levels for cytotechnologists and technical staff are satisfactory. The Cytopathology fellowship training program lost one of the two fellows in the midpoint of the academic year (December 2013). The fellow resigned her position citing “personal” issues but assured us it did not reflect poorly on the program. Her resignation led to an increased workload on the remaining fellow and faculty who staffed the remaining academic year. This represented a very heavy burden on faculty who were required to perform multiple “on site” evaluations in addition to the normally heavy workload. The remaining fellow (Dr. Terri Sue Giles) performed well under pressure and graduated the program in June 2013. She has also passed her Cytopathology Board examination.

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 2013 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. In 2013, a total of 130 autopsies were performed and 110 in the 2013-14 fiscal year. We currently have six faculty participating in the autopsy service in addition to the full time autopsy Pathologist's Assistant and two part-time autopsy technicians. In the last year we have expanded our services to include other UNC Healthcare System affiliates and now provide autopsy services for seven other hospitals in the state.

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). Eleven research (rapid) autopsies were performed in the last fiscal year between the two programs. We also provide tissues for research on an as needed basis for UNC investigators.

The Decedent Care program was officially begun January 2012. The mission 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 Cathy Holleman, Administrative Director of McLendon Labs and Sheila Deloney, Assistant Administrative Director in Anatomic Pathology. Currently Decedent Care is staffed by three individuals providing services to our clinicians and patient families seven days a week. In 2013, Decedent Care processed over 1000 deaths and coordinated 150 cremations/disposals. DCS also assists in coordinating the autopsies performed, as well as in handling of unclaimed bodies.

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 with description of each clinical service is found on our website: http://labs.unchealthcare.org/directory/molecular_pathology/index_html. Newly implemented is the Solid Tumor Mutation Panel that uses massively parallel sequencing technology to amplify 175 hotspot segments of 26 cancer genes. The assay is amenable to formalin fixed tissue or fine needle aspirate as long as dissected areas contain >20% neoplastic cells. A pathologist's interpretation of significant findings within the 21,000 bases of sequenced DNA is reported to the patient's medical record. Underway is validation work for next generation sequencing of

genes related to 1. myeloid neoplasms, 2. gastric cancer, 3. heritable cancer genes, 4. primary ciliary dyskinesia, and 5. hearing loss.

An important component of our clinical and academic mission to advance healthcare using modern molecular technologies. Our training programs educate physicians, medical students, post-doctoral fellows, genetic counseling students, and clinical laboratory science students. 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. Further information on our clinical, educational and research work is found at: http://www.med.unc.edu/pathology/faculty/biosketch-of-dr-margaret-gulley.

Molecular pathology is growing rapidly as clinicians increasingly use molecular tools for diagnosis and management. Increasingly we are using panels of genomic tests that simultaneously detect or analyze multiple DNA or RNA targets at once, aimed at identifying a profile or a rare event that predicts disease status or 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 advanced molecular tests and to validate multiple novel and informative assays. Learn more about translational assay design in a document entitled "Validating assays for use in clinical trials" at http://labs.unchealthcare.org/directory/molecular_pathology/index_html.

Major Equipment in the clinical molecular genetics lab: Illumina MiSeq and Life Technologies Ion Torrent PGM sequencers, 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 9700, 9800, 7500, and 7900 PCR instruments; two ABI Veriti thermocyclers, Idaho Technologies LightScanner, three ABI 3130xl capillary gel electrophoresis instruments, Biotage Pyromark MD pyrosequencer, Agilent array scanner, Affymetrix array scanner, RoboSep cell separator, and UVP gel documentation system.

Faculty are: Margaret L. Gulley MD, Karen Weck MD, Bill Funkhouser MD PhD, Leigh Thorne MD, Jessica Booker PhD, Nirali Patel MD, and Rosann Farber PhD. Fellows include Daniel Duncan MD and Ian King PhD. Our excellent staff includes six medical technologists, three research scientists, our supervisor and administrative director, and an office support assistant.

TRANSFUSION MEDICINE, APHERESIS, TRANSPLANT SERVICES

TRANSFUSION MEDICINE (Blood Bank, Platelet Donor Program, Apheresis)

YARA A. PARK, M.D., DIRECTOR

The Transfusion Medicine Service (TMS) had a steady workload and transfused 39,000 products in the last year. TMS prepared for the Epic conversion and although the computer system did not change for the blood bank, the interface with Epic was built, tested, and validated. Additionally, TMS, in conjunction with the Emergency Department (ED), established a secure, monitored refrigerator for emergency use red blood cells for use during traumas or massively bleeding patients in the ED. This allowed ED providers to have almost immediate access to

blood products when needed and reduced the wastage of blood units that were being sent to the ED for every trauma.

Therapeutic apheresis continued to see an increase in the patient census. The unit for the first time, performed extracorporeal photopheresis on pediatric patients, some of which weighed less than 15 kilograms. The unit is preparing for an expansion which will increase the clinic treatment bays from five to nine. With the EPIC conversion, the apheresis unit went from paper charting and ordering to completely electronic.

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. In August 2013, the BDC began collection apheresis plasma as well. The BDC has a Green Belt Project planned to recruit and retain donors who can donate more than one unit of platelets at a time.

CLINICAL MICROBIOLOGY, IMMUNOLOGY LABORATORIES
PETER H. GILLIGAN, Ph.D., DIRECTOR

The Clinical Microbiology/Immunology Laboratory has continued to expand its test menu and test volumes through the addition of new assays and new instrumentation. We have been able to enhance service to our clinicians and patients while maintaining our training mission. A major focus of the CMIL was preparing, training and implementation of EPIC. That effort continues abated into fiscal year 2015. We also consolidated all of our Standard Operating Proceures in the SharePoint system.

Microbiology

The Microbiology lab has instituted several new initiatives within the last year; the most important of which was the continued validation of the MALDI-ToF mass spectrometer. We have completed validation of rapidly growing mycobacterium and *Mycobacterium tuberculosis*. Our work in implementing the mass spec was the subject of a WRAL new story as well as presentation at national meetings as well as several stories in the popular and technical press.

The laboratory was asked to develop a contingency plan to develop protocols for patients suspected of having Ebola. Dr Miller has led that effort and has done an excellent job of interacting with infection control and the State Public Health Laboratory to assure that we are prepared to manage specimens from potential Ebola patients.

Because of continuing supply problems with the acquisition of BacTAlert blood culture bottles, we were forced to implement a new blood culture system BacTec. This required validation of the system in our laboratory, a re-write of our blood culture protocol, assistance in training both nurses and phlebotomists in the use of this new system, and updating of the McLendon Laboratories website.

Molecular Microbiology

A major initiative in the Molecular Microbiology section is the assessment of the impact of implementation of new molecular tests. Outcome measures include test utilization, hospital costs

and patient outcomes (length of stay, mortality, appropriate therapy, etc.). During FY14, we performed an outcome analysis for the implementation of the rapid molecular test performed on positive blood cultures with *Streptococcus* and *Enterococcus* which showed patients with vancomycin-resistant *Enterococcus* bacteremia received appropriate therapy ~40 hours faster when the rapid molecular method was used. Patients with bacteremia due to viridans group *Streptococcus* also had a significantly reduced time to appropriate antibiotic. This study indicates that it may be prudent to expand rapid molecular identification from positive blood cultures to more organisms.

Two other outcome studies are planned and funded for next fiscal year – impact of the multiplex respiratory viral panel on pediatric clinical care and the impact of the multiplex gastrointestinal pathogen panel on detection of infections, cost, public health, and healthcare-associated infections. The multiplex gastrointestinal pathogen panel was implemented at the beginning of FY14.

Since the Microbiology laboratory changed blood culture bottles and instrumentation, we performed verification studies on the downstream molecular tests offered on positive blood culture bottles – BC-GP (Gram positive organism detection) and *Candida* PNA-FISH prior to the implementation of the new system. Due to the critical nature of the blood culture bottle shortage that led to this conversion, these verifications studies had to be performed quickly. Two new tests were evaluated and implemented in FY14 – *Trichomonas* NAAT and HPV NAAT. The implementation of *Trichomonas* NAAT should allow us to detect more infections than our previous method, and the implementation of HPV testing lessens the time to result compared to sending out the testing. Three additional tests had modifications that were re-verified and implemented – rapid influenza PCR, hepatitis C genotyping and the gastrointestinal pathogen panel. Also, CMV viral load testing was re-verified with the purpose of transitioning the testing from Molecular Genetics. This will allow for improved clinical and academic collaboration with our infectious disease colleagues who meet daily in Microbiology. Several CMV-based studies looking at clinical impact and testing algorithms are being developed. The Molecular Microbiology section is constantly evolving to keep pace with new technologies and emerging viruses (including MERS Co-V, Ebola and EV-D68). During FY14, we developed and verified the technical performance of a MERS-CoV real-time RT-PCR assay should it be needed for a rapid diagnosis in collaboration with our public health partners. We continue to keep track of national and international viral outbreaks and adjust our test menu and reporting algorithms appropriately. We are generally able to have a laboratory plan in place within 1-2 weeks.

Immunology

During the past year, the Immunology Laboratory enhanced clinical services by implementing new equipment, new assays and converting an existing assay to an automated format. A new instrument (Diasorin Liaison XL) was validated and replaced the existing Diasorin Liaison instrument. This replacement was carried out due to recurring instrumentation and assay control problems. The Liaison XL offers random access capability along with simpler maintenance providing a more efficient testing system for Toxoplasma, CMV, HSV, Lyme, Rubella, EBV and VZV serologic testing. The manual extractable nuclear autoantibody test (ENA multiparameter) was replaced with an automated version (Phadia 250) enhancing test efficiency and reducing the risk for clerical error via electronic interfacing for result reporting. The laboratory also

implemented HTLV-I/II antibody testing using a newly FDA approved ELISA thus eliminating this assay from the referral testing menu. Additionally, the laboratory validated a new Hepatitis A immune status assay that replaced the current assay on the Abbott Architect.

The Immunology Laboratory completed a major update to all of the assay specific webpages on the McLendon Laboratories Website. Each page has been enhanced with the addition of more detailed assay specific information and interpretive notes. The QC monitoring program for the laboratory has been enhanced by tabulation of monthly testing volumes and positive rates along with development of optimized external quality control serum pools for most assays, the results of which are also monitored in an ongoing fashion to identify changes in test performance.

A number of new assays were originally slated to be implemented but were delayed due to start-up of EPIC. The validation testing for these assays was started during this past year however. Included in this group of tests are the quantiFERON-TB Gold In-Tube test, anti-smooth muscle antibody, Beta 2 glycoprotein and the Aspergillus galactomannan test. The projected 2014 referral cost of these assays was over $140,000. Thus, the upcoming implementation of these assays will have a significant impact on the current referral testing budget . Several evaluations of alternative vendors for ANA and ANCA IFA slides were carried out with the goal of introducing an automated IFA slide reader system in the next fiscal year. These studies are also ongoing. Finally, the competency assessment program for CPA technologists that perform immunology testing was improved including a full retraining of CPA staff on all relevant tests.

The Clinical Microbiology/Immunology Laboratory continued their training of Clinical Laboratory Science students at both the BS and MS levels. Training was also provided for clinical Pathology residents and fellows in both Medical Microbiology and Medical Laboratory Immunology. The lab also continued daily rounds with the Infectious Disease service and directors attend a variety of clinical conferences on a weekly basis such as Adult and Pediatric Infectious Disease Management Conferences. We also hosted a medical microbiologist from Greece, Dr Theofano Panagea. Dr Panagea came here to learn the state-of-the art for the laboratory diagnosis of chronic lung infections in cystic fibrosis patients. She spent considerable time learning the applications of both MALDI-ToF mass spectroscopy and 16s rRNA sequencing to organism identification.

PHLEBOTOMY SERVICES
PETER H. GILLIGAN, Ph.D., DIRECTOR

The bulk of the 2014 fiscal year was spent planning for the EPIC system go-live in April, 2014. During the months of February and March we spent significant effort orchestrating training for our staff. From day one of go-live through the first seven weeks we faced extremely large obstacles for the inpatient population. Our inpatient staff had the responsibility of trouble shooting the problems regarding the placement of orders for phlebotomy collections vs. floor collections. Training nurses and physicians how to order testing for inpatient collections consumed significant time and effort on the part of the phlebotomy staff. Outpatient services had just as many challenges in the beginning. However, the enormity of the challenges in the outpatient forum was not fully realized until June. It was often difficult for the phlebotomy staff to determine the tests needed because many outpatient orders did not have the date the test was

required entered. The clinics are just now recognizing that standardizing the ordering process will better assure that they get the testing that they want. Since the EPIC go-live date, data reports we use for quality assurance have not been available. Therefore, we can only say that outpatient collections by Phlebotomy Services have trended downward due to the movement of some clinics off site. Inpatient collections remain stable. Despite the stress and additional work placed on our staff by EPIC, we remain in Tier 2 for employee satisfaction according to the Employee Satisfaction Survey dated June 2014.

The Press-Ganey score measuring patient satisfaction with the "courtesy of the person drawing blood" was 89.5 on a scale to 100. However, because of problems with EPIC which have resulted in many patients having to endure multiple blood collections, we are concerned that these scores will drop significantly. This has been on ongoing problem since the EPIC go-live date which has been difficult to address since we can only provide input for the needed behavior changes.

The phlebotomy staff was trained in collecting blood cultures for the new blood culture system-BacTec.

CORE LABORATORY (Chem/UA/Coag/Hem/Tox/Endo)
CATHERINE A. HAMMETT-STABLER, Ph.D., DIRECTOR

The Core Laboratory services include coagulation, clinical chemistry, hematology, urinalysis, and referral testing. The Laboratory receives ~5000 samples daily and performs >5 million tests annually. The Laboratory's service areas continue to seek improvements to improve patient care and safety for staff and patients. Specimen processing and the stat areas were renovated to meet workflow needs. Laboratory has met reagent recalls and shortages by developing/adapting alternate methods using the 5600's open channels to minimize disruption to patient care for several immunoassay-based tests (cocaine, phenobarbital, haptoglobin, and microalbumin) and subsequently re-establishing testing when the shortages were relieved. Assays introduced into service include amikacin, itraconazole, ST2, CA19-9, plasma free hemoglobin, anti-beta2glycoprotien IgG and IgM, chromogenic Factor VIII, and intact PTH (fully automated to supplement intraoperative), The laboratory has worked with the Male Infertility Clinic to provide sperm counts on-site and is in the early stages of assuming the Maternal Screening and Alpha Fetoprotein Laboratory. In addition, the laboratory has developed a protocol for specimen management and testing of patients under investigation for Ebola and other emerging viruses. Overall, the Core Laboratory engaged in approximately 200 hours of Epic training in preparation for the implementation in April and several super-users assisted in the Rex transition.

Quality performance initiatives for the year included an update of competency assessment, further expanding Bio-Rad Unity into non-traditional quality management uses, and transition of procedures from the original SharePoint site into the new. The laboratory participated in a field trial of the Unity Risk Calculator Software, a program designed to assist in the identification of instrument malfunctions via QC rule violations. Special chemistry conducted a workflow analysis including streamlining of various processes, the implementation of a Tecan pipetting station, and interfacing of most of the LC/MSMS work stations. This effort has significantly reduced turn-around times and the potential for errors, increased productivity, in addition to

minimizing repetitive stress injuries.

The MT1 Advisory Board has continued to broaden educational opportunities for staff across all shifts. Scot Pearson was named special chemistry supervisor. Eric Stanford, evening supervisor, completed his requirements towards his master's in public health. Four supervisors have earned LEAN-Six Sigma green belts, one technologist has earned their purple belt, the associate director and senior fellow, along with 14 technologists, earned yellow belts, and three technologists earned their blue belts. Lean projects have focused on the referral testing review process. George Nicolopoulos was selected to receive this year's Care Award.

Lastly, Core Laboratory staff and directors are actively working through professional organizations (AACC and ASCLS) with respect to several critical pending regulatory issues, including the FDA's proposed *Notification and Medical Device Reporting for Laboratory Developed Tests (LDTs)* and the *Guidance for In vitro Companion Diagnostic Devices*.

HEMATOPATHOLOGY
GEORGE D. FEDORIW, M.D., DIRECTOR

The volume and complexity of cases has continued to increase in the Division and we now have two diagnostic services running in parallel. 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 consult cases sent for expert review. We continue to work closely with the flow cytometry lab, and have added several new panels. Incorporation of these data, along with cutting-edge testing from the Cytogenetic and Molecular Laboratories, provides a comprehensive diagnostic interpretation for our patients. The Division of Hematopathology now also supports a biopsy clinic in the North Carolina Cancer Hospital, which streamlines sample acquisition, processing, and communication with the clinical teams. Our faculty now consists of five board certified hematopathologists with a wide range of clinical, administrative and research responsibilities.

SPECIAL COAGULATION LABORATORY
HERBERT C. WHINNA, M.D., Ph.D., DIRECTOR

The Special Coagulation Laboratory provides access to esoteric testing of hemostasis for both UNC and community physicians. This past year we have validated screening testing for Activated Protein C Resistance that will allow for broader sensitivity as well as reduced testing costs and validating Ristocetin Cofactor Activity to our new platelet aggregometer. The laboratory continues performing special studies testing for equipment 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; Department of Medicine where hematology and coagulation issues on patients seen by the Hem/Onc Consult Service are discussed.

CLINCIAL CYTOGENETICS
KATHLEEN W. RAO, Ph.D., DIRECTOR
KATHLEEN A. KAISER-ROGERS, Ph.D., CO-DIRECTOR

The caseload continued to increase in the Cytogenetics the laboratory through 2013-14 during which over 4000 samples were received and over 6000 tests performed, with increases seen in requests for both conventional karyotyping and FISH assays. The laboratory currently processes approximately 500 constitutional microarray cases annually. At the current time, the laboratory offers over 40 different interphase FISH assays, most of which are designed to diagnose or monitor specific genetic abnormalities associated with various cancers. The laboratory currently offers two 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 is required for non-small cell lung cancer patients to qualify for the drug crozotinib. Both assays use FISH technology on paraffin embedded tumor tissue. Overall the laboratory has seen a 70% increase in paraffin FISH testing in the past 2 years and has recently validated six paraffin FISH assays including tests for the following loci: BCL2, BCL6, EWSR1, MYC, SS18, and ETV6.

Several of our more interesting cytogenetic projects were reported in poster presentations at the 2014 American College of Medical Genetics Meeting in Nashville, Tennessee. Dr. Kathy Kaiser-Roger reported two cases with combined uniparental isodisomy and a supernumerary marker chromosome, Dr. Melissa Hayden reported on the clinical utility of chromosomal microarray analysis in acute lymphoblastic leukemia, and Dr. Kristy Crooks provided a comparison of whole exome sequencing and chromosome microarray analysis to identify copy number variants. Additionally Drs. Melissa Hayden and Kristy Crooks, in collaboration with Dr. Kathleen Rao, gave presentations at the 2014 American Cytogenetics Conference (ACC) on recurrent focal PAX3 gene deletions in uveal melanoma, and the construction of a reference database of cytogenetic abnormalities associated with immuno- and chemotherapeutics, and current clinical trials, respectively. Both Dr. Hayden (immediate past Cytogenetics Fellow) and Dr. Crooks (current Cytogenetics Fellow) won Student Travel Awards from the ACC for their platform presentations at the meeting. Dr. Kaiser-Rogers coauthored a paper describing the effects of PTEN deficiency on IGF1 and mTOR in Ewings Sarcoma in Cancer Research.

The Cytogenetics Laboratory continues to participate in the cancer cooperative groups (CALGB and COG). Dr. Rao continues her term as Chair of the COG Cytogenetics Committee and long-time member of the CALGB Cytogenetics Review Committee. Dr. Rao is also a member of the Board of Directors of the American College of Medical Genetics and Genomics (ACMG) and is currently serving a two year term as the Vice President for Laboratory Genetics for the ACMG. Dr. Kathy Kaiser-Rogers is currently serving as a member of the CAP/ACMG Cytogenetics Resource Committee, representing ACMG.

LABORATORY INFORMATION SERVICES
HERBERT C. WHINNA, M.D., Ph.D., DIRECTOR

Activities for Lab Information Services for this past fiscal year mostly revolved around implementation of the RCM e-Services system for Outreach billing and other services. This involved significant expansion of the SCC system to include SoftWeb for web based orders and results, SoftExpress for courier management and call tracking and SoftAR for billing. SoftReports was also added to enhance the appearance of patient reports. These systems went live on 6/30/2013 after an extensive building and testing period. Also this year, we saw the beginnings of the Epic implementation. We have been closely working with various teams on this project as well as giving up one LIS position to be a full-time Epic Core Team member. The coming year provides many challenges for LIS with the arrival of Epic and Meaningful Use Stage 2. We have already begun upgrading CoPath to their 2012 version in preparation for Epic/MU2, and are scheduled for go-live in August. Soon we will begin an upgrade to the SCC system to their MU2 compliant version. This is a significant upgrade that will go live on the same day as Epic here at UNCH. These projects, along with the many other changes required to systems and workflow, promise a year of tough challenges and tight timelines into 2014.

NEPHROPATHOLOGY LABORATORY
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 1,900 renal specimens (native & transplant biopsies and nephrectomies) from over 200 nephrologists throughout the state, region and the world are analyzed annually. During the 2013 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 additionally 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 diseases seen in renal allografts. The research activities are supported by extramural grants and are facilitated by an extensive database and archival system that currently includes data from approximately 40,000 renal specimens, 15,000 serum samples, and 1500 urine samples. Currently, two pathology post doctoral research associates from Columbia and India are being trained on how to manage and organize a nephropathology laboratory. The UNC nephropathology faculty is also heavily engaged in continuous education series enhancing the diagnostic skills of pathologists and nephrologists, such as short courses at the annual USCAP meetings, the Columbia Presbyterian post graduate course on nephropathology in New York, or the 'Nephropathologiekurs Volhard-Fahr' in Mannheim, Germany. The 7th edition of ‘Heptinstall’s Pathology of the Kidney’ is coming “…fresh off the press…” with heavy editorial input from the UNC nephropathology division. All efforts are coordinated with activities in the UNC Kidney Center and those 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

The Quality Management Group worked closely with their assigned laboratories to provide mock inspections to prepare their labs for the real CAP Inspection. CAP inspectors arrived on site in August. McLendon Laboratories had a very successful College of American Pathologists (CAP) inspection as a result of the planning and attention to detail from the QM Group. The laboratory had very few citations and received many complements from the inspectors. QM employees have been team leaders for several Lean and Six Sigma Projects. The group has added a brown belt and black belt to their ranks. One of the projects involved a complete redesign of the document control process with all laboratories converting their policies and procedures to Sharepoint. The group is also leading teams to assess laboratory test utilizations as well as a project to increase multi-unit platelet donations.

NEUROPATHOLOGY SERVICE AT UNC HOSPITALS
THOMAS W. BOULDIN, M.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 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.

OUTREACH LABORATORY SERVICES
HERBERT C. WHINNA, M.D., Ph.D., DIRECTOR

McLendon Laboratory's Outreach Service operates as the primary interface between the diagnostic testing services of the hospital laboratory and a variety of facilities located throughout North Carolina that require clinical laboratory testing. Some of these are physicians' offices, UNC hospital based clinics, UNC P&A clinics, UNCPN clinics, skilled nursing facilities, home health agencies, community hospitals, dialysis centers (transplant patients), and other community services. The service has grown to serve over 82 clients in the research triangle area. Support is provided primarily in the areas of diagnostics, assistance with regulatory compliance and maintenance of point of care competency, training and testing. Forty-three of the serviced providers perform some level of point of care testing (from waived to moderately complex) and four of the clinics are CAP accredited. Last year Outreach served over 105,000 patients ordering and processed over one-half million tests.

Outreach manages three off-site laboratories; Ambulatory Care Center, Carolina Point 2 and the Hillsborough Medical Office Building. The ACC laboratory supports the operating rooms by

providing rapid turn-around for parathyroid hormone testing. Both the CP2 and HMOB laboratories provide a moderately complex test menu including hematology, general chemistries and urinalysis. Also, the CP2 and HMOB sites also accept walk-in patients providing a much needed service for off-campus specimen collection.

Outreach has restructured staffing so that the off-site laboratories and processing section have a Lead Technologist available to directly support staff, answer questions and assist in customer service concerns. The Business Development and Account Liaison's role has expanded to include supporting those hospital based clinics that are continually to relocate off of 101 Manning Drive and into the surrounding community. The call center continues to operate M-F 7:30 am – 8 pm answering incoming calls, adding tests to previous orders and calling critical values for both the hospital and off-campus laboratories.

In the coming year, Outreach will be focusing on implementing a software package (Soft Express) capable of managing supply distribution, specimen tracking and customer concerns. The impact of EPIC could be substantial as a large number of the facilities and clinics off-campus that Outreach supports will be moving to an electronic order entry system allowing them to no longer need paper requisitions. With a common system in place many of the current procedures in the processing area will change and work-flow will be substantially reduced due to specimens arriving already registered, ordered, and barcoded.

TRANSPLANT LABORATORIES (HLA and Flow Cytometry)
JOHN L. SCHMITZ, Ph.D., DIRECTOR

The Histocompatibility (HLA) Laboratory implemented new services and process improvements to enhance overall laboratory operations and support of transplant patient care. Data has accrued over the past several years indicating a significant impact of HLA-DPB1 mismatching on hematopoietic stem cell transplant (HSCT) outcome. As such, the HLA laboratory implemented high resolution HLA-DPB1 typing by DNA sequencing. In addition, to typing this locus, mismatches between donors and recipients are further classified as permissive versus non-permissive to assist clinicians in ranking potential donors. In response to a request from Carolina Donor Services (CDS), the local organ procurement organization, the HLA laboratory is now cryopreserving serum and plasma samples from all local deceased donors. Samples will be archived and available to CDS for use in investigation of potential cases of donor transmitted infections.

Several process improvements were implemented in the past year to enhance efficiency and reduce turn around times for critical tests. The flow cytometric crossmatch assay, used as the final check of immunologic compatibility between solid organ transplant candidates and potential donors was modified by addition of a live/dead discriminating dye. This has allowed technologists to eliminate potential interference from dead/dying donor cells in the crossmatch assay. The laboratory collaborated with the HSCT clinical team to modify the HLA typing algorithms for patients and donors in order to simply workload in the laboratory and decrease the potential for unnecessary or missed typings on potential donors. This has resulted in a more streamlined workflow and enhanced efficiency in the laboratory.

The HLA Laboratory has continued its significant teaching responsibilities by hosting CLS students, Clinical Immunology, Allergy/Immunology and Nephrology Fellows.

The Flow Cytometry Laboratory has also implemented new service and process improvement that have positively impacted laboratory operations and patient care. The laboratory has validated a new assay to detect the presence of HLA-B*57:01 on patient cells. This antigen is a known susceptibility allele for increased risk of hypersensitivity to the anti-retroviral drug abacavir. HIV infected patients are screened for the presence of this antigen prior to use of this drug. This testing had been done via molecular HLA typing. The flow cytometric assay is less expensive and rapid allowing same day test resulting. The laboratory has also modified the panel of antibodies used to classify chronic hematologic malignancies. This change provides a more effective approach for the detection and classification of these malignancies.

Two process improvements in the flow cytometry laboratory have been completed. A Kaizan was conducted in the laboratory resulting in reorganization of laboratory space, and development of processes to more efficiently monitor supply levels. This process focused on two high volume tests, CD4 T cell and CD34 stem/progenitor cell enumeration. This has resulted in better workflow in the laboratory for these tests. A second process improvement involved a revision in the process of leukemia/lymphoma result review. Samples that have uncomplicated interpretations can be be forwarded directly to the hematopathologist without a second review by laboratory staff. Complicated cases will be subjected to a second rewiew prior to submission to hematopathology. Implementation of this change improves turn around time for a significant number of samples and eliminates unnecessary second review, increases efficiency in the laboratory.

The Flow Cytometry Laboratory continued its teaching activities with the hosting of CLS students, Pathology Residents, Laboratory Immunology, and Allergy/Immunology Clinical fellows completing rotations or receiving lectures.

HUMAN PROGENITOR CELL LABORATORY
YARA A. PARK, M.D., DIRECTOR

The Hematopoietic Progenitor Cell (HPC) Lab underwent a Kaizen event this year which optimized our current space as well as creating discrete work areas. With the work areas, multiple HPC products can be processed without the technologists crossing paths to reduce risk of cross-contamination. Additionally, an oxygen monitoring system was installed to ensure the safety of the staff while working with liquid nitrogen. The lab was inspected and re-accredited by CAP and AABB.

CORE AND SERVICE LABORATORIES

MICROSCOPY SERVICES LABORATORY
C. ROBERT BAGNELL, Jr., Ph.D., DIRECTOR

Microscopy Services Laboratory is a UNC core facility for electron 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 153 principal investigators from 29 departments and centers at UNC-CH, and other area institutions. The total number of active laboratory clients now stands at greater than 1000. In addition to its research roll, the laboratory serves as the primary electron microscope facility for ultrastructural clinical diagnosis for UNC Hospitals and for Dr. Charles Jennette's renal pathology referral service. The laboratory also serves as an alternate for UNC Hospitals clinical electron microscopy specimen preparation service and for Dr. Charles Jennette's renal pathology referral service. In the past 12 months the light microscope facilities logged 8,544 hours of use, electron microscope facilities logged 1,798 hours of use and the laboratory has performed 300 electron microscopy specimen preparations.

MSL taught the Light Microscopy, Pathology 464, course in the Spring 2014 semester. MSL added a live-cell imaging chamber to its Zeiss LSM 710 confocal system utilizing funds from the UCRF and the Department of Pathology and Laboratory Medicine. MSL continues to provide free image analysis software in the form of macros and plug-ins for the NIH ImageJ platform. In the year past, MSL has posted to it's web page a macro that is used to do preliminary image processing on intermolecular FRET images before utilizing the ImageJ Pix-FRET plugin for FRET analysis.

LASER CAPTURE MICRODISSECTION CORE FACILITY
C. ROBERT BAGNELL, Jr., Ph.D., DIRECTOR

This facility is part of the Microscopy Services Laboratory. LCM is a method for collecting very small regions of tissue or specific cells for use in "omic" analyses. The facility houses a Zeiss PALM LCM and an Arcturus PIX-Cell II LCM, a Leica CM 1850 cryostat, and a ventilation hood for staining and dehydration. Over the past 12 months, the LCM systems were utilized a total of 189.5 hours.

TRANSLATIONAL PATHOLOGY LABORATORY (TPL)
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.

No new major equipment was acquired in 2013. Due to rapidly increased demand on biomarker expression/co-expression analysis in individual cells as well as cellular morphometrics, and in order to reduce the analysis time from 22 h to 1-1.5 h per slide, we purchased two additional perpetual licenses of the Definiens Tissue Studio (total 4) and upgraded workstation hardware. During 2013 TPL provided 51,270 ($423,714) service units to 91 UNC investigators: the Lab pulled 1,221 diagnostic slides and FFPE blocks from the UNCH Surgical Pathology archives; provided 17,130 units of histology services (Cell and tissue processing, microtomy, special stains), 4,287 TMA cores and tissue scrolls, 2,250 H&E, 10,247 chromogenic and fluorescent IHC slides; developed new staining protocols for 87 antibodies and dual staining protocols for 32 antibody pairs; constructed 48 new TMA blocks. The Core's rapidly growing 35 TB image library (https://tpl-spectrum.med.unc.edu), containing 87,716 digital slides (77,386 scanned slides and 11,330 exported TMA spot GPEG images) belonging to 150 PI, is maintained by the IT professionals in the LCCC Bioinformatics Core; 21,201 slides were scanned in 2013. In 2013-14 TPL services were acknowledged in 47 published manuscripts and 12 abstracts and TPL staff were co-authors on 21 (45%) and 6 (50 %) of these respectively.

ANIMAL CLINICAL LABORATORY FACILITY
HYUNG-SUK KIM, Ph.D., DIRECTOR

The Major change was that a new Animal Blood Chemical Analyzer, VetScan VS2 Chemistry Analyzer was added for animal blood chemistry with VT350 analyzer. VetScan VS2 analyzer requires only 100ul whole blood (or plasma or serum) for many group tests, such as entire liver or kidney profiles. The Luminex MAGPIX system, using magnetic bead-based multi-analytes provides a complete solution for rapid, accurate biomarker quantitation in a variety of sample matrices, has been successfully operated during this fiscal year with more than 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 enable researchers to gain more information faster without compromising reliability. Furthermore, an automated microplate washer from BioTek Company can enhance 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 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

for long period from normal or abnormal values, discussion with us will help to interpret clinical results. More than thirty principal investigators from the UNC-CH campus use these services for their research.

GENE EXPRESSION FACILITY
HYUNG-SUK KIM, Ph.D., DIRECTOR

The facility provides services for gene expression studies using quantitative real time RT-PCR by ABI 7500 and 7300 Sequence Detection Systems and high throughput preparation of total RNA and genomic DNA by ABI Prism 6100. Currently more than 2,000 disease-related genes have been developed to detect their 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 of gene copy number, with a less than two-day turn-around time. This genotyping process can exclude many laborious procedures, such as preparation of genomic DNA, PCR, gel running, Southern blot analysis. Currently we are genotyping more than three thousand mice monthly. We can also provide a full service which includes all the steps necessary for designing and synthesizing Taqman probes and primers, preparing RNA samples, and quantitative analysis. Through full service, we are collaborating with many PIs for gene expression research. More than thirty principal investigators from ten different departments are currently using this research core facility.

DNA SYNTHESIZING FACILITY
HYUNG-SUK KIM, Ph.D., DIRECTOR

The facility serves more than 50 investigators from a variety of campus-wide departments 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 have been synthesized. The fluorescent oligonucleotide TaqMan probes with 5' fluorescein (6-FAM) and 3' quencher tetramethyl rhodamine (TAMRA) are successfully prepared for users of real time RT-PCR.

ADME MASS SPECTROMETRY CENTER
ARLENE S. BRIDGES, Ph.D., DIRECTOR
RICHARD R. TIDWELL, Ph.D., CHAIR, ADVISORY BOARD

The ADME Mass Spectrometry Center was a recharge facility that specialized in small-molecule analysis. Located on the UNC-Chapel Hill campus, the Center was open to all investigators, regardless of field of study or university affiliation. The goal of the Center was to assist scientists performing both classic and pioneering ADME-TOX experiments involved with drug discovery and development. The facility offered assistance and training in preclinical and clinical study design, sample preparation, bioanalytical techniques (method development, method validation, sample analysis), data interpretation, grant writing, and publication editing. The facility welcomed the opportunity to work with and train technicians, graduate students, and research fellows. The facility closed in the Spring of 2014.

SPECIAL HONORS AND AWARDS

CHRISTINA E. BOOKHOUT, M.D.

2014 William McLendon Clinical Pathology Conference Award

FRANK C. CHURCH, Ph.D.

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

DANIEL L. DUNCAN, M.D.

2014 Walter L. LaMar Residency Excellence Award

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

2014 Fred Dalldorf Medical Student Teaching Excellence Award

JIANDONG LIU, Ph.D.

2014 MHI/Cardiology 20K Award for Cardiovascular Research, UNC-Chapel Hill

STEPHANIE P. MATHEWS, M.D.

2014 Phillip Blatt Clinical Pathology Teaching Excellence Award

LI QIAN, Ph.D.

2014 MHI/Cardiology 20K Award for Cardiovascular Research, UNC-Chapel Hill
2014 Junior Faculty Development Award, UNC-Chapel Hill
2013-2017 Ellison New Scholar in Aging, The Ellison Medical Foundation

OLIVER SMITHIES, D. PHIL.

Honorary Doctorate, Cardiff University, July 18, 2013
Degree of Doctorate (Honoris Causa) D.Sc., KIIT University, Odisha, INDIA, Nov. 16, 2013
Faculty Service Award, UNC General Alumni Association, Chapel Hill, NC, Jan. 17, 2014
Paul Harris Fellow, The Rotary Foundation of Rotary International, June 4, 2014

JOAN M. TAYLOR, Ph.D.

Joe W. Grisham Award for Excellence in Graduate Student Teaching, 2013

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

2014 Fred Askin Anatomic Pathology Teaching Excellence Award

QING ZHANG, Ph.D.

2013 University Research Council Award, UNC-Chapel Hill
2014 Kimmel Scholar Award, Sidney Kimmel Foundation

ELECTED LEADERSHIP POSITIONS

WILLIAM B. COLEMAN, Ph.D.

Member, Council, The American Society for Investigative Pathology
Member, Finance Committee, Federation of American Societies for Experimental Biology
Publications Member, Committee, The American Society for Investigative Pathology
Member, Divisional Oversight Committee, The American Society for Investigative Pathology
Member, Membership Committee, The American Society for Investigative Pathology
Member, Education Committee, The American Society for Investigative Pathology
Member, North Carolina Congressional Liaison Committee, The Coalition for Life Sciences
Member, Medical Research Committee, Blue Faery: The Adrienne Wilson Liver Cancer Association

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

Executive Committee, North Carolina Association for Biomedical Research (NCABR) Committee
Board of Directors, North Carolina Association for Biomedical Research (NCABR) Committee

WILLIAM K. FUNKHOUSER, M.D.

Council, Association of Directors of Anatomic and Surgical Pathology

PETER H. GILLIGAN, Ph.D.

CPC American Society of Microbiology

CATHERINE A. HAMMETT-STABLER, Ph.D.

American Association of Clinical Chemistry, North Carolina Section, Executive Committee

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

Member, ASIP Programming Committee
Member, ASIP Meetings and Task Force Committee

HARVEY MICHAEL JONES, M.D.

Chair, Publications Committee, American Osler Society

WILLIAM K. KAUFMANN, Ph.D.

Member, Finance committee, Environmental Genomics and Mutagenesis Society

NICHOLE L. KORPI-STEINER, Ph.D.

AACC Critical and Point of Care Testing Division, Member-at-Large, 2013 - 2015
AACC North Carolina Local Section, House of Delegate Representative, 2013 - 2015
AACC North Carolina Local Section, Secretary, 2014 - Present

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

Member, National Cancer Institute, The Cancer Genome Atlas (TCGA), Glioblastoma Analysis Working Group (AWG)
Member, National Cancer Institute, The Cancer Genome Atlas (TCGA), Low Grade Glioma Disease Working Group (DWG)
Member, Scientific Advisory Committee, National Functional Genomics Center
Member, American Association of Neuropathologists Awards Committee
Member, Neuro-oncology Committee, NCI Alliance for Clinical Trials in Oncology
Co-Chair, Neuro-Pathology Committee, NCI Alliance for Clinical Trials in Oncology

MELISSA B. MILLER, Ph.D.

Governing Council, Pan American Society of Clinical Virology

VOLKER R. NICKELEIT, M.D.

BOD-Renal Pathology Society (Chair: Nominations and Awards Committee)
President, Renal Pathology Society

JUDITH N. NIELSEN, D.V.M.

President-Elect, North Carolina Academy of Laboratory Animal Medicine
Chair, AAMC Careers in Medicine (CiM) Advisory Committee
Chair, AAMC Electronic Residency Application Service (ERAS) Advisory Committee
Chair, American Society of Hematology (ASH) Awards Committee
Chair, American Society of Hematology (ASH) Committee on Promoting Diversity
Chair, Alliance for Academic Internal Medicine (AAIM*), ex officio member*

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 1/1/2012-12/31/2017. (One of 2 people from the US elected in an international election in which all (boarded) clinical cytogeneticists could vote, to represent the US on this governing committee)
Member, Board of Directors of the American College

Vice President for Laboratory Genetics, American College of Medical Genetics (2013-2015)
Chair, Children's Oncology Group Cytogenetics Committee

JOHN L. SCHMITZ, Ph.D.

Past President, Association of Medical Laboratory Immunologists

HARSHARAN K. SINGH, M.D.

Secretary, Renal Pathology Society

KAREN E. WECK-TAYLOR, M.D.

Association of Molecular Pathology Nominating Committee, Solid Tumors Subdivision (elected office)

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

Councilor, Society for Cardiovascular Pathology, March 3, 2013-present (3 year term).
International Society for Heart Research, North American Section, Cardiac Metabolism Special Interest Group Steering Committee. Elected Dec 2011. Term: 2012-2014.
Elected Chair-Elect/Chair of the Committee for Career Development, Women and Minorities (CCDWM), American Society of Investigative Pathology (ASIP), July 2011-June 2015 (4 year term total). Serves as full member on ASIP Council, Program, and Finance Committees in this capacity.
Secretary-Treasurer (Elected), Member/Steering Committee, Endocrinology & Metabolism Section, American Physiology Society, April 2011-April 2014.

ALISA S. WOLBERG, Ph.D.

Chair, International Society of Thrombosis and Haemostasis, Scientific Subcommittee on Factor XII and Fibrinogen

LEADERSHIP POSITIONS

JAMES TODD AUMAN, Ph.D.

Managed and coordinated the RNA sequencing efforts as part of UNC's participation in The Cancer Genome Atlas (TCGA) project. During this time frame this resulted in 2,274 RNA sequencing libraries made and 2,351 RNA libraries sequenced.

FRANK C. CHURCH, Ph.D.

Member, Strategic Priority Group 1
Member, Morehead-Cain Foundation, Central Selection Committee
Member, University Research Council Grants Review Panel
Member, 2nd year Course Directors Committee
Member, Medical School Admissions Committee
Member, Academy of Distinguished Teaching Scholars, UNC-CH
Fellow, Academy of Educators, UNC-CH School of Medicine
Member, Teaching Champions

GEORGETTE A. DENT, M.D.

Member, Association of American Medical Colleges (AAMC) Electronic Residency Application Service (ERAS) Advisory Committee
Member, Association of American Medical Colleges (AAMC) Careers in Medicine (CiM) Advisory Committee
Member, American Society of Hematology (ASH) Committee on Promoting Diversity
Member, American Society of Hematology (ASH) Awards Committee
Member, Alliance for Academic Internal Medicine (AAIM*), ex officio member*

GEORGE D. FEDORIW, M.D.

Member, Society for Hematopathology: Education committee
Member, ASCP PRISE committee

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

Member, American College of Laboratory Animal Medicine, Planning Committee

WILLIAM K. FUNKHOUSER, M.D.

Member, Expert Guidelines Panel, Colon Ca, CAP/AMP/ASCP
Member, Molecular Oncology Committee, CAP
Member, Nominating Committee, Pulmonary Pathology Society
Member, Mutant Mouse Regional Resource Center-UNC; Internal Advisory Committee

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

Member, Mouse Pathology Consortium within the American College of Veterinary Pathologists.
Member, National Gnotobiotic Rodent Resource Center, Advisory Board Member
Member, National Gnotobiotic Rodent Resource Center, Executive Committee

MARGARET L. GULLEY, M.D.

Member, Alliance for Clinical Trials in Oncology, Member, Translational Research Program Executive Committee
Member, Alliance for Clinical Trials in Oncology, Member, Sequencing Committee
Member, College of American Pathologists (CAP), Member, Personalized Healthcare Rapid Response Workgroup, Council on Government and Professional Affairs

CATHERINE A. HAMMETT-STABLER, Ph.D.

Member, CLSI Document Development Committee on Toxicology and Drug Testing in the Clinical Laboratory
Member, AACC Government Relations Committee
Member, NACB-AACC Evidence Based Laboratory Medicine Committee
Member, NACB Laboratory Medicine Practice Guideline Committee on Pain Management
Member, CLSI Document Development Committee on Toxicology and Drug Testing in the Clinical Laboratory
IATDMCT Symposia Chair, Scientific Committee for the 13th International Congress
Chair, Clinical and Laboratory Standards Institute Committee, Pain Management Support

TRACY M. HEENAN, D.V.M.

CPIA Council member, Certification of Professional IACUC, December Administrators (CPIA)
Chair, Recertification Committee, CCPIA
Ad hoc Consultant, Association for the Assessment and Accreditation for Laboratory Animal Care International (AAALAC)

J. CHARLES JENNETTE, M.D.

Member, College of American Pathologists (CAP) Renal Pathology Working Group
Co-Chair, 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, Organizing Committee for the 2015 World Congress of Nephrology, Cape Town, South Africa
Member, United States and Canadian Academy of Pathology Ambassador

KATHLEEN A. KAISER-ROGERS, Ph.D.

Member, College of American Pathologists Cytogenetics Resource committee
Co-Chair, American College of Medical Genetics Salary Survey Committee

DAVID G. KAUFMAN, M.D.

Member, Society of Toxicology: Scientific Liaison Committee

NICHOLE L. KORPI-STEINER, Ph.D.

Member, CLSI QMS11-A Nonconforming Event Management Working Group, 2013 – Present (appointed)
Member, AACC Society for Young Clinical Laboratorians (SYCL) Executive Committee, 2012 – 2017; (appointed)
Member, Professional Practices in Clinical Chemistry Organizing Committee (5 day course scheduled for Spring 2015), 2014 – Present (appointed)
Member, AACC SYCL Workshop Organizing Committee, 2013 – Present (appointed)
Member, SYCL360 Subcommittee, Chair, 2012 – Present
Member, SYCL Workshop committee, 2013 – Present

MARSHALL A. MAZEPA, M.D.

Chair and Member, HTRS Media Committee

VOLKER R. NICKELEIT, M.D.

Member, Organizing Committee: International Course on Native and Transplant Renal Biopsy Interpretation; June 2014, Ljubljana, Slovenia
Chair, Banff Working Group on Cellular Rejection and Borderline
Chair, Banff Working Group on Polyomavirus Nephropathy

YARA A. PARK, M.D.

Member, AABB, Annual Meeting Education Program Unit
Member, American Society for Clinical Pathology, Pathologist Recertification Individualized Self-Assessment Examination (PRISE) Committee
Member, AABB, Cellular Therapy Product Collection and Clinical Practices Subsection
Member, American Society for Apheresis, Annual Meeting Organizing Committee
Member, College of American Pathologists, Transfusion Medicine Resource Committee
Member, American Society for Apheresis, Applications Committee
Chair, American Society for Apheresis, Abstract Committee
Chair, American Society for Apheresis, HPC Donor Subcommittee, Clinical Applications Committee

NIRALI M. PATEL, M.D.

Member, American Medical Association – Delegate to Young Physician Section for College of American Pathologists

JAY S. RAVAL, M.D.

Member, American Society for Apheresis Clinical Applications Committee
Member, American Society for Apheresis Extracorporeal Photopheresis Subcommittee
Member, American Society for Apheresis Pediatric Subcommittee
Member, AABB Therapeutic Apheresis Subsection
Chair, AABB Cellular Therapy Adverse Event Reporting Initiative
Chair, Thrombotic Thrombocytopenic Purpura Registry Network
Chair, AABB Cellular Therapy Product Collection and Clinical Practices Subsection
Chair, American Society for Apheresis Education Committee
Chair, American Society for Apheresis Practitioner Subcommittee
Chair, American Society for Apheresis Webinar Subcommittee
Chair, American Society for Apheresis Journal Club Subcommittee
Chair, American Society for Apheresis Online Resources Subcommittee

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

CAP Inspector, The University of Florida, Gainesville, Florida, Jan 2014

JOHN L. SCHMITZ, Ph,D,

Member, ASHI Directors Affairs Committee
Member, AMLI Constitution and Bylaws Committee
Session Chair, AMLI Annual Meeting 2013. NK cell and Interactions with HLA Molecules. August 12, 2013.
Session Chair, School on Diagnostic Assessment of Immune Phenotyping and Function in Primary Immunodeficiencies (PIDs). Thursday, April 10, 2014. Baltimore, Maryland

HARSHARAN K. SINGH, M.D.

Member, International Meetings Organizing Committee, Renal Pathology Society

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

Member, Awards Committee AANP annual meeting June 2014
Alternate delegate, North Carolina to the CAP House of Delegates

KAREN E. WECK-TAYLOR, M.D.

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

JULIA W. 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 review.
Chair, North Carolina Academy of Laboratory Animal Medicine, Education Committee
Clinical and Laboratory Standards Institute (CLSI) Consensus Committee on Molecular Methods

MEMBER OF BOARD OF DIRECTORS OF NATIONAL/INTERNATIONAL ACCREDITATION AGENCY

JESSICA K. BOOKER, Ph.D.

Board of Directors, American Board of Medical Genetics

PETER H. GILLIGAN, Ph.D.

Chair, Professional Practice Committee, American Society for Microbiology

MARGARET L. GULLEY, M.D.

Member, Alliance for Clinical Trials in Oncology, Translational Research Program Executive Committee
Director, Alliance for Clinical Trials in Oncology, Molecular Reference Laboratories
Member, College of American Pathologists (CAP), Personalized Healthcare Rapid Response Workgroup, Council on Government and Professional Affairs

KATHLEEN A. KAISER-ROGERS, Ph.D.

Member, College of American Pathologists Cytogenetics Resource committee
Co-chair, American College of Medical Genetics Salary Survey Committee (Construction, distribution, and reporting of ACMG Salary Survey Data)
Member, Advisory Board of Directors for the Cytogenetics Array Group Copy Number Variant Database

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

Society for Neuro-oncology/World Federation of Neuro-oncology Session 9A
Preclinical therapeutics. November 24, 2013. San Francisco, CA.
Member, National Cancer Institute, The Cancer Genome Atlas (TCGA), Glioblastoma Analysis Working Group (AWG)
Member, National Cancer Institute, The Cancer Genome Atlas (TCGA), Low Grade Glioma Disease Working Group (DWG)
Member, Scientific Advisory Committee, National Functional Genomics Center
Member, American Association of Neuropathologists Awards Committee
Member, Neuro-oncology Committee, NCI Alliance for Clinical Trials in Oncology

MELISSA B. MILLER, Ph.D.

Member, ASM, Committee on Laboratory Practices
Member, ASM, Scherago-Rubin Award Nominating Committee
Member, AMP, Infectious Disease Leadership Committee
Member, AMP, Clinical Practices Committee
Member, PASCV, Council

Member, PASCV, Molecular Virology Workshop Planning Committee, co-chair
Session Chair, ASM, Scientific Symposium, Notes from the Bench, Advances in Clinical Microbiology

VOLKER R. NICKELEIT, M.D.

Chair, Banff- Group: Chair of Working Group / Task Force on "Polyomavirus Nephropathy Classification"
Chair, The American Society of Nephrology (ASN), Kidney Week 2013 'Reviewer Chair' (abstract review board): basic/experimental inflammation

YARA A. PARK, M.D.

Chair, American Society for Apheresis, Abstract Committee
Member, AABB, Annual Meeting Education Program Unit
Member, American Society for Clinical Pathology, Pathologist Recertification Individualized Self-Assessment Examination (PRISE) Committee
Member, AABB, Cellular Therapy Product Collection and Clinical Practices Subsection
Member, American Society for Apheresis, Annual Meeting Organizing Committee
Member, College of American Pathologists, Transfusion Medicine Resource Committee
Member, American Society for Apheresis, Applications Committee
Director/Moderator, AABB Annual Meeting, "Challenges in Therapeutic Apheresis: When a Patient Doesn't Follow the Rules", October 2013

NIRALI M. PATEL, M.D.

Chair, Association for Molecular Pathology, Membership Affairs Committee

JAY S. RAVAL, M.D.

Chair, Thrombotic Thrombocytopenic Purpura Registry Network
Hematology 2013: International Conference on Hematology and Blood Disorders Organizing Committtee
Member, AABB Therapeutic Apheresis Subsection
Member, AABB Cellular Therapy Product Collection and Clinical Practices Subsection
Member, American Society for Apheresis Clinical Applications Committee
Chair, American Society for Apheresis Education Committee Chair, American Society for Apheresis Practitioner Subcommittee Chair, American Society for Apheresis Webinar Subcommittee Chair, American Society for Apheresis Journal Club Subcommittee
Chair, American Society for Apheresis Online Resources Subcommittee

JOHN L. SCHMITZ, Ph.D.

Member, American Society for Histocompatibility and Immunogenetics Accreditation Review Board – Chair (Program Director)
Member, American Board of Medical Laboratory Immunology

Member, American College of Microbiology

HARSHARAN K. SINGH, M.D.

Session Chair, Moderator, Inflammation Session Proferred Papers, American Society of Nephrology, Atlanta, Georgia, November 6-10, 2013.

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

Vice President, Board of Directors, Myocarditis Foundation (myocarditisfoundation.org). January 1, 2013-December 31, 2014.

ALISA S. WOLBERG, Ph.D.

Member, American Society for Hematology (ASH) Scientific Subcommittee on Thrombosis and Vascular Biology
Member, American Heart Association (AHA) Arteriosclerosis, Thrombosis and Vascular Biology Spring Program Committee

MEMBER OF FDA, CDC OR COMPARABLE COMMITTEE

WILLIAM K. FUNKHOUSER, M.D.

Member, Immunology Devices Panel, FDA

MELISA B. MILLER, Ph.D.

Member, FDA, Microbiology Devices Panel
Member, Clinical and Laboratory Standards Institute, Antimicrobial Susceptibility

KATHLEEN W. RAO, Ph.D.

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

KAREN E. WECK-TAYLOR, M.D.

Member, 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 (R01 Study Section), March 2014
ad hoc External Grant Reviewer for the National Institutes of Health, Cancer Diagnostics and Treatment SBIR/STTR Study Section, March 2014
ad hoc External Grant Reviewer for Breakthrough Breast Cancer (London), March 2014
ad hoc External Grant Reviewer for the American Institute of Biological Sciences, March 2014
ad hoc External Grant Reviewer for the National Institutes of Health, Cancer Diagnostics and Treatment SBIR/STTR Study Section, March 2014
ad hoc External Grant Reviewer for the Research Grants Council of Hong Kong, Collaborative Research Fund, November 2013.
ad hoc External Grant Reviewer for the National Cancer Institute, National Institutes of Health, NCI-F Manpower and Training Study Section, October 2013
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-13-LCRP-CA), October 2013
ad hoc External Grant Reviewer for the Netherlands Organisation for Scientific Research, September 2013
ad hoc External Grant Reviewer for the National Cancer Institute, National Institutes of Health, Special Emphasis Panel (T32 Study Section), July 2013

MARILA CORDEIRO-STONE, Ph.D.

Member, NIH ZRG1 F05-D (21) Fellowship Cell Biology, Developmental Biology, and Bioengineering Special Emphasis Panel, March 2014

GEORGE D. FEDORIW, M.D.

Member, NIH/NCI clinical trials planning meeting, biomarkers subcommittee

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

Member, Biological and Genetic Research Committee

WILLIAM K. FUNKHOUSER, M.D.

Member, UNC TRACS Institute

MARGARET L. GULLEY, M.D.

Member, NCI The Cancer Genome Atlas (TGCA) Stomach-Esophagus Analysis Working Group, Leader of the Viral Pathogen Workgroup

NIH study section, Innovative Technologies for Cancer Biospecimen Science, Special Emphasis Panel (2014)

J. CHARLES JENNETTE, M.D.

Co-Chair, NIH Glomerular Disease Consortium CureGN Steering Committee
Pathology Co-Chair, NIH/NIDDK CureGN UMI

WILLIAM K. KAUFMANN, Ph.D.

Member, CSR, Cancer Etiology

HOWARD M. REISNER, Ph.D.

Member, ITRS Final Review panel Louisiana Board of Regents

JOHN L. SCHMITZ, Ph.D.

Reviewer, ZAI1 PTM-I S3, Collaborative Network for Clinical Research on Immune Tolerance. July 9, 2013

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

Study Section Reviewer, American Heart Association. Cardiac Biology BCT5. March 31, 2014.
Special Emphasis Panel, National Institutes of Health Internet Assisted Review (IAM) Panel Z014/05 ZRG1 CB-J (55). March 19 & 20, 2014.

BERNARD E. WEISSMAN, Ph.D.

Chair, NIH/CSR, Cancer Genetics

SERVICE AS EDITOR OR ON EDITORIAL BOARDS

WLLIAM B. COLEMAN, Ph.D

Associate Editor, PLoS ONE
Associate Editor, BMC Cancer
Editorial Board, Current Pathobiology Reports (S.S. Monga, Editor-in-Chief)
Editorial Board, Laboratory Investigation (G.P. Siegel, Editor-in-Chief)
Editorial Board, Archives of Pathology and Laboratory Medicine (P.T. Cagle, Editor-in-Chief)
Editorial Board, Experimental and Molecular Pathology (J.M. Cruse, Editor-in-Chief)
Editorial Board, The American Journal of Pathology (K.A. Roth, Editor-in-Chief)
Editorial Board, Clinica Chimica Acta (C.-W. Lam, Editor-in-Chief)

BRIAN C. COOLEY, Ph.D.

Editorial Board, Microsurgery
Editorial Board, Plastic and Aesthetic Research

FRANK C. CHURCH, Ph.D.

Editorial Board, Thrombosis

LESLIE G. DODD, M.D.

Editorial Board, Diagnostic Cytopathology
Editorial Board, Journal of the American society of Cytopathology

WILLIAM K. FUNKHOUSER, M.D.

Editorial Board, Am J Clin Path
Section Editor, Arch Path Lab Med
Milestone Editor, ASIP Pathways Newsletter

PETER H. GILLIGAN, Ph.D.

Associate Editor, MBio
Associate Editor, Clinical Microbiology Reviews
Associate Editro, Journal of Clinical Microbilogy

MARGARET L. GULLEY, M.D.

Editorial Board, American Journal of Surgical Pathology
Editorial Board, Diagnostic Molecular Pathology
Editorial Board, PLOS Currents: Evidence for Genomic Applications
Editorial Board, Applied Immunohistochemistry & Molecular Morphology

CATHERINE A. HAMMETT-STABLER, Ph.D.

Editor, Special issue on biobanking and biorepositories, Hammett-Stabler CA, Korpi-Steiner N. Introduction to special issue for biobanks and biorepositories. Clin Biochem. 2014;47:237-8. doi: 10.1016/j.clinbiochem.2014.01.007
Associate Editor, Clinical Biochemistry

TRACY M. HEENAN, D.V.M.

Associate Editor, Lab Animal Journal, Adequate Veterinary Care: A Researcher Training Manual. March, 2013.

JONATHON W. 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, Kidney Biopsy Advisory Board
Editorial Board, Journal of Rheumatology
Editorial Board, Laboratory Investigation
Editorial Board, Clinical Nephrology
Editorial Board, Patholigy Case Reviews

DAVID G. KAUFMAN, M.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

MEHMET KESIMER, Ph.D.

Editorial Board, Journal of Extracellular Vesicles
Editorial Board, Exosomes and Microvesicles

WILLIAM K. KAUFMANN, Ph.D.

Editorial Board, Environmental and Molecular Mutagenesis

NICHOLE L. KORPI-STEINER, Ph.D.

Guest Editor, Clinical Biochemistry, Special Issue for Biobanks and Biorepositories, 2013-2014

Section Editor, Clinical Chemistry ASCP Case Reports, 2014 – Present

CHRISTOPHER P. MACK

Editorial Board, Arteriosclerosis, Thrombosis and 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 R. NICKELEIT, M.D.

Editorial Board, Journal of Nephrology and Urology, Jacobs Publishers
Editorial Board, Austin Journal of Nephrology and Hypertension, Austin Publishing Group
Editorial Board, Journal of Multidisciplinary Pathology, ScienceScript LLC
Editorial Board, Annals of Clinical Cytology and Pathology
Editorial Board, Journal of Transplantation & Stem Cell Biology, Avens Publishing Group
Editorial Board, World Journal of Transplantation
Editorial Board, Kidney and Blood Pressure Research

JAY S. RAVAL, M.D.

Editorial Board, International Blood Research and Review
Editorial Board, The Journal of Extracorporeal Technology
Editorial Board, International Journal of Blood Transfusion and Immunohematology
Editorial Board, Journal of Blood Disorders and Transfusion

JOHN L. SCHMITZ, Ph.D.

Section Editor, Current Allergy and Asthma Reports.
Editorial Board, Clinical and Vaccine Immunology
Editorial Board, Journal of Immunologic Methods

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

Editorial Board, Journal of Neuropathology and Experimental Neurology

KAREN E. WECK-TAYLOR, M.D.

Associate Editor, Molecular Genetics and Pharmacogenomics

Editorial Board, Genetics in Medicine
Editorial Board, American Journal of Pathology
Editorial Board, Journal of Molecular Diagnostics Editorial
Editorial Board, Expert Review of Molecular Diagnostics

BERNARD E. WEISSMAN, Ph.D.

Editorial Board, Journal of Cellular Physiology
Editorial Board, Genetics Research International

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

Section Editor, Archives of Pathology & Laboratory Medicine, Clinical Effectiveness and Economics, September 1, 2012-present.
Editorial Board, Biological Markers and Guided Therapy, January 1, 2014-December 31, 2017.
Editorial Board, World Journal of Cardiology, January 01, 2014-December 31, 2017.
Editorial Board, Expert Opinion of Molecular Diagnostics. August 2013-present.
Editorial Board, Editorial Consultant, International Journal of Basic, Applied and Innovative Research, (March 30, 2012-Present).
Editorial Board, Cardiovascular System, Herbert Open Access Journals. Dec. 2012-present.
Editorial Board, American Journal of Physiology – Endocrine and Metabolism, July 1, 2012-present.
Editorial Board, Expert Opinion on Medical Diagnostics. March 1, 2012-July 2013.
Editorial Board, Cardiovascular Pathology. January 1, 2012-present (3 year term).
Editorial Board, Journal of Hypertension: Open Access. October 2011-present.
Editorial Board, American Journal of Pathology. July 2011-present (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.
Editorial Board, American Journal of Physiology – Heart and Circulatory Physiology, January 1, 2011-January 31, 2014.
Editorial Board, Skeletal Muscle, July 2010-March 2014.
Guest Editor, J Mol Cell Cardiol, Special Issue: Protein Quality Control, The Ubiquitin Proteasome System, and Autophagy. Spring 2014 Issue

ALISA S. WOLBERG, Ph.D.

Editorial Board, Arterioscl, Thromb, Vasc Biol
Editorial Board, Frontiers in Hematology, Frontiers in Medicine

INVITED LECTURES AT STATE/NATIONAL AND INTERNATIONAL MEETINGS

WILLIAM B. COLEMAN, Ph.D.

American Society for Investigative Pathology, Annual Meeting, April 2014, San Diego, CA
Oral Presentation: "Molecular signatures of triple-negative breast cancer."

BRIAN C. COOLEY, Ph.D.

Mouse Models of Cancer-Associated Thrombosis. International Society for Thrombosis and Hemostasis, Scientific and Standardization Committee, June 24, 2014; Milwaukee, WI

GEORGETTE A DENT, M.D.

"The Jaws are Closing on Unmatched Students: Engaging National and Local Perspective," Association of American Medical Colleges (AAMC), Annual Meeting, Philadelphia, PA, November 2, 2013

"Myxoid lesions of Soft Tissue: Big Diagnoses on Little Specimens" ASCP Webinar, October 17, 2013

DAVID A. EBERHARD, M.D., Ph.D.

"Clinical Reporting of NGS Data". ASCO-EORTC-NCI Markers in Cancer joint meeting, Brussels, Belgium, November 07-09 2013.

PETER H. GILLIGAN, Ph.D.

IDSA Practice Guidelines: Instructive Cases and Application of New Technologies in the Diagnosis of Community Acquired Lower Respiratory Tract Infections. Infectious Disease Society of America. San Francisco, CA October 2013

Case Mysteries from Chapel Hill. Southern California Branch of the Amertican Society of Microbiology. San Diego, CA Oct 2013

Clinical Microbiology 2013 Update. Mountain AHEC, Asheville, NC Nov 2013

Utilizing New Technologies and Knowledge to Understand Chronic Lung Infection in CF: Microbiome, Multiplex PCR, MALDI-TOF Mass Spectroscopy, Sequencing SEACM Greenville, SC Nov 2013

Best Thought and Continuous Study: The Intersection of Clinical Care and Research and The Clinical Microbiology Quiz. American Society for Microbiology General Meeting. Boston MA May 2014

Best Thought and Continuous Study: The Intersection of Clinical Care and Research Wake Forest School of Medicine January 2014

MARGARET L. 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, Montreal, July 25, 2013.

"Genomics Services of the Alliance-Affiliated Molecular Reference Labs", Alliance for Clinical Trials in Oncology, Rosemont, Nov 8, 2013.

CATHERINE A. HAMMETT-STABLER, Ph.D.

Boot Camp Drug Testing in Pain and Addiction Management. Pain, Addiction, and the Law, Chapel Hill, NC. May 2, 2014

The Dark Side of CAMs – What Your Patients May Not Tell You. Anesthesiology Conference, April 15, 2014.

Drug Testing in the Addition Setting. Psychiatry Conference, October 4, 2013.

Drug Testing for Anesthesiologists. Anesthesiology Conference, October 2, 2013.

TRACY M. HEENAN, D.V.M.

Public Responsibility in Medicine and Research IACUC Conference:
Denver, CO; Presenter and Facilitator, Workshop A1: Creating Quantifiable and objective Indices of Animal Well-Being (Animal Well Being and the 3Rs Track)

Public Responsibility in Medicine and Research IACUC Conference:
Denver, CO; Presenter and Facilitator, Workshop D4: Educating the Public About Biomedical Research (Communication and Advocacy Track)

J. CHARLES JENNETTE, M.D.

Invited Lecture American Society of Nephrology Renal Week Postgraduate Education Course: Glomerulonephritis Update: "Pathology of Rapidly Progressive Glomerulonephritis", Atlanta, November 6, 2013.

Invited Lectures (4), American Society of Nephrology Renal Week Postgraduate Education Course: Basic Renal Pathology - from Bedside to Bench, "IgA Nephropathy," "Diabetic Glomerulosclerosis," "Crescentic Glomerulonephritis," and "Vasculitis," San Diego, Atlanta, November 5-6, 2013.

Invited Lecture: André Aisenstadt Clinical Day, “From Bright’s Disease to Personalized Therapy for Rapidly Progressive Glomerulonephritis (We Are Not There Yet)”, Jewish General Hospital, McGill University, Montreal, Canada, October 23, 2013

Kasperzak Memorial Lecture: “From Idiopathic Crescentic Glomerulonephritis to ANCA Glomerulonephritis: Scientific Serendipity”, Cleveland Clinic Nephrology Update, Cleveland, OH, October 11, 2013

Invited Lectures (2), Cleveland Clinic Nephrology Update, “Clinicopathologic Case Presentation”, “Renal Biopsy Case Presentations”, Cleveland, OH, October 10-12, 2013

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 17, 2013

Invited Lecture. Association of Pathology Chairs 2013 Annual Meeting, “Benchmarking Pathology Faculty Academic Productivity”, Boston, July 10, 2013

Visiting Professor: Nephrology Grand Rounds, “Pathogenesis of ANCA Disease”, Barnes-Jewish Hospital/Washington University, St. Louis, September 13, 2013

Visiting Professor: Pathology Grand Rounds “Systemic Vasculitis: Historical Perspective, Pathology, and Pathogenesis with an Emphasis on Historical Milestones, Small Vessel Vasculitis and ANCA,” Dept. Pathology and Laboratory Medicine, Emory University School of Medicine, Atlanta, November 18, 2013

KATHLEEN A. KAISER-ROGERS, Ph.D.

"Structural Chromosome Rearrangements" UNC-Greensboro Genetic Counseling students, January 30, 2014

Problem solving conference, UNC-Greensboro Genetic Counseling students, January 30, 2014

"Molecular Cytogenetics" UNC-Greensboro Genetic Counseling students, February 6, 2014

Problem solving conference, UNC-Greensboro Genetic Counseling students, February 6, 2014

MEHMET KESIMER, Ph.D.

Invited Symposium Chair, “Regulation of Mucus in CF lung Disease’. North American CF Conference, 22 October 2013, Salt Lake City, Utah.

Speaker, Cardiopulmonary study group meeting In: Tabaco Centers of Regulatory Science Meeting, April 28 2014, Bethesda MD.

Invited Speaker, European Cystic Fibrosis Conference. In Workshop 12, Mucus and Mucins in CF. Mucins are abnormally concentrated in CF respiratory secretions: role in disease pathogenesis. June 12, 2014, Gothenburg, Sweden.

Invited Symposium Speaker: International Society of Extracellular Vesicles Meeting. ISEV, Rotterdam, the Netherland, May 3 2014. (Could not attend, because the meeting partly overlapped with TCORS meeting)

NICHOLE L. KORPI-STEINER, Ph.D.

Potential effects of analytical and biological factors on HbA1c results. Annual Meeting American Association for Clinical Chemistry; Houston, TX. July 29, 2013.

CHRISTOPHER P. MACK, Ph.D.

Novel RhoA signaling mechanisms that control gene expression in smooth muscle
Georgia Regents University, Dept of Physiology 5/29/14

Nuclear RhoA Signaling a potential role in MRTF-dependent transcription
International MADS Box conference, Rochester, NY 7/12/13

NOBUYO N. MAEDA, Ph.D.

University of Minho, "Genetic risk factors for atherosclerosis at different vascular locations: looking through mouse genetics." Braga, Portugal, June 21, 2013

2013 Antonio Nathan Shock Center Conference on Aging, "Mitochondrial DNA Biogenisis in Stem/Progenitor Cells and Aging – Associated Metabolic Disorders." San Antonio, Oct 17-20, 2013
6th world Congress on Preventive and Regenerative Medicine, "Mitochondrial DNA Biogenisis in Stem/Progenitor Cells and Aging – Associated Metabolic Disorders." Bhubaneswar, India, Nov 14-16, 2013

SUSAN J. MAYGARDEN, M.D.

North Carolina Society of Pathologists state meeting, "Urinary Cytology and Ancillary Testing", Charlotte, NC, April 4, 2014

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

Preclinical models in brain tumor drug development: Value and limitations of cell lines and mouse models. World Federation of Neuro-oncology Educational Session. San Francisco, CA. November 21, 2013.

TCGA low grade glioma expression profiling. TCGA Low Grade Glioma Workshop. Houston, TX. October 10, 2013.

Genomic complexity of gliomas: Mapping its origins in mouse models to achieve precision medicine. University of Washington, Department of Neurological Surgery. Seattle, WA. February 19, 2014.

Genomic complexity of gliomas: Mapping its origins in mouse models to achieve precision medicine. Department of Pathology. St. Jude's Children's Research Hospital. Memphis, TN. February 21, 2014.

MELISSA B. MILLER, Ph.D.

American Society for Clinical Pathology, Webinar Series, "Laboratory Diagnosis of Viral Respiratory Infections," November 5, 2013.

Infectious Disease Society of America, ID Week, "Diagnosis of Infection in Transplant Recipients," Meet-the-Professor, October 5, 2013.

Infectious Disease Society of America, ID Week, "New IDSA Guideline: Laboratory Diagnosis of Infectious Diseases," Interactive Panelist, October 3, 2013.

Southwestern Association of Clinical Microbiology, 32nd Annual Meeting, "Challenging Cases in Clinical Microbiology," Dallas, TX, September 6, 2012.

Southwestern Association of Clinical Microbiology, 32nd Annual Meeting, "VITEK MS: Revolutionary technology that takes microbial identification from days to minutes," Dallas, TX, September 4, 2012.

Department of Pediatrics, Grand Rounds, "What's new in Clinical Microbiology," December 5, 2013.

School of Nursing, Continuing Education Program: Pediatric Sexual Assault Nurse Training, "STI Testing in Pediatrics," November 6, 2013.

Division of Infectious Diseases, Immunocompromised Host Service, "A review of laboratory services for the immunocompromised host," August 14, 2013.

Pan American Society for Clinical Virology, 29th Annual Clinical Virology Symposium, Corporate Workshop (Becton Dickinson), "The changing paradigm of the laboratory diagnosis of gastroenteritis," Daytona Beach, FL, April 28, 2014.

American Society for Microbiology, Molecular Webinar Series: Molecular Diagnosis of Infectious Diseases: Applications and Challenges, "Multiplex Gastrointestinal Pathogen Tests," March 4, 2014.

American Society for Microbiology, Molecular Webinar Series: Molecular Diagnosis of Infectious Diseases: Applications and Challenges, "Multiplex Respiratory Viral Tests," February 25, 2014.

VOLKER R. NICKELEIT, M.D.

International Course on Native and Transplant Renal Biopsy Interpretation: "Acute and chronic T-cell and antibody mediated rejection." June 2014, Ljubljana, Slovenia

International Course on Native and Transplant Renal Biopsy Interpretation: "How to render diagnoses of renal allograft biopsies: an algorithmic approach with critical review of the Banff 2013 classification system." June 2014, Ljubljana, Slovenia

Glomerular-Disease Collaborative Network meeting (GDCN 28th annual conference): "Updates in Membranous Nephropathy". April 2014, Chapel Hill, NC, USA

Glomerular-Disease Collaborative Network meeting (GDCN 28th annual conference): "Renal biopsy case discussions with pathologic and clinical correlations". April 2014, Chapel Hill, NC, USA

United States and Canadian Academy of Pathology (USCAP), 103rd annual meeting, joint companion meeting of The Renal Pathology Society and The Society for Ultrastructural Pathology: "Transplant Glomerulopathy". March 2014, San Diego, CA

Nephropathology Seminar (Nephropathologiekurs Volhard-Fahr), lecturer on: "Transplant-Pathology & Infections". Mannheim, Germany, annual course 2014.

16th Congress of the European Society for Organ Transplantation (ESOT): "Rejection revisited: is pathology still gold standard". September 2013, Vienna, Austria

12th Banff Conference on Allograft Pathology: "Thrombotic microangiopathy in the renal allograft". August 2013, Comandatuba-Bahia, Brazil

Session Chair, Renal Pathology Consensus Meeting: Updates on investigator initiated histological classification schemes on renal diseases. Atlanta, GA (USA), November 2013 (at ASN Renal Week 2013)

JUDITH N. NIELSEN, D.V.M.

NCALAM Laboratory Animal Medicine Workshop, Raleigh, NC. "Disaster Planning for the Laboratory Animal Veterinarian" (invited), May 15, 2014.

SIOBHAN M. O'CONNOR, M.D.

University Teaching Hospital, Lusaka, Zambia, 11/7/2013, "Essential information a pathologist can/should provide in the care of women with cervical and breast cancer"

YARA A. PARK, M.D.

Lecture to OB/Gyn Department, MFM Division, December 2013

KATHLEEN W. RAO, Ph.D.

Graduate Training in Clinical Cytogenetics; Banbury Summit III: Medical Genetics Triaining in the Genomics Era; Cold Spring Harbor, New York; February 24, 2014

The Convergence of Cytogenetics and Molecular Training; Banbury Summit III: Medical Genetics Triaining in the Genomics Era; Cold Spring Harbor, New York; February 25, 2014

JAY S. RAVAL, M.D.

American Society for Apheresis 2013 Annual Meeting, Breakfast with the Expert, "Apheresis in Hematological Disorders", Denver, CO

AABB 2013 Annual Meeting, The So-Cell Network, Roundtable Discussion for Cellular Therapy Professionals, "Cellular Therapy Product Infusion Related Adverse Events", Denver, CO

AABB 2013 Annual Meeting, Challenges in Therapeutic Apheresis Medicine: When a Patient Doesn't Follow the Rules, "Thrombotic Microangiopathies: Mimickers of Idiopathic Thrombotic Thrombocytopenic Purpura", Denver, CO

North Carolina Association of Blood Bankers, Spring Workshop, "An Overview of Non-Immunohematologic Transfusion Reactions," 4/2014

Division of Pediatric Critical Care, "Extracorporeal Photopheresis in Pediatric Patients," 5/7/2014 and 5/15/2014

Division of Pediatric Critical Care, "Tandem Extracorporeal Membrane Oxygeneration Plasma exchange," 2/2014

JOHN L. SCHMITZ, Ph.D.

ASM conference on undergraduate education. May 15, 2014. "Career Opportunities in Clinical Immunology and Microbiology". Danvers, MA.

European Federation of Immunogenetics. June 24, 2014. "The ASHI Laboratory Accreditation Process- current status and challenges. Stockholm, Sweden.

HARSHARAN K. SINGH, M.D.

Renal Pathology Society Companion Meeting – United States and Canadian Academy of Pathology Annual Meeting, San Diego, CA March 1-7, 2014: Urinary Haufen are Accurate Biomarkers of PVN – Proof of Concept Studies.

Renal Biopsy Case Presentations – GDCN Annual Meeting, Chapel Hill, NC April 12, 2014.

Renal Biopsy Case Presentation: Glomerulonephritis. International Course on Native and Transplant Renal Biopsy Interpretation. June 5-7, 2014, Ljubljana, Slovenia.

Renal Biopsy Case Presentation: Tubulointerstitial Disease. International Course on Native and Transplant Renal Biopsy Interpretation. June 5-7, 2014, Ljubljana, Slovenia.

Renal Biopsy Case Presentation: Transplant Pathology. International Course on Native and Transplant Renal Biopsy Interpretation June 5-7, 2014, Ljubljana, Slovenia.

OLIVER SMITHIES, D. PHIL.

Speaker, Plenary Presentation, International Society for Pharmaceutical Engineering, Durham, NC, "Where Do Ideas Come From?" Aug. 27, 2013

Seminar speaker, St. David's School, Raleigh, NC, "The Value of Keeping Curious, the Genius of Hard Work," Oct. 4, 2013

Speaker, Bressler Award for Simon John, NYC, NY, "Keeping an Eye on Simon" Oct. 11, 2013

Inaugural Lecturer, 6th World Congress on Preventive and Regenerative Medicine, KIIT Univ., Odisha, INDIA, Where Do Ideas Come From?" Nov. 14, 2013

Foundation Day Lecture, CSIR-Centre for Cellular and Molecular Biology, Hyderabad INDIA, "Where Do Ideas Come From?" Nov. 18, 2013

Speaker, Scientists with Stories, Morehead Planetarium, Chapel Hill NC, Jan. 16, 2014
Lecturer, The Echo Foundation, "Science for Humankind: Dr. Oliver Smithies," Charlotte NC, March 31 – April 1, 2014

Lecturer, Thomas Jefferson Scholar Lecture, NCSU, Raleigh NC, "On Being a Scientist for 60 Years," April 22, 2014

Lecturer, The Echo Foundation, "Science for Humankind: Dr. Oliver Smithies," Charlotte NC, March 31 – April 1, 2014

Speaker, Rotary Club luncheon, "Ethical Behavior," RTP Rotary, Raleigh NC, June 4, 2014

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

UNC Department of Pathology and Lab Medicine 2014 CME event 3/29/14: "GISTs and Other Mesenchymal Tumors of the Gastrointestinal Tract"

CYRUS VAZIRI, Ph.D.

Dept. of Biology, UNC Greensboro, NC (Title: "Integration of Trans-Lesion Synthesis with Checkpoint Signaling and Cell Cycle Progression") 2013

Mitchell Cancer Center, University of Alabama (Title: "Rad18-Mediated Ubiquitin Signaling, Genome Maintenance and Cancer") 2014

KAREN E. WECK-TAYLOR, M.D.

"Clinical Molecular Testing for Secondary Drug Resistance in Cancer," Next Generaton Dx Summit, Washington, DC, August 22, 2013.

BERNARD E. WEISSMAN, Ph.D.

Invited Speaker, Cancer Center, University of Virginia, Charlottesville, VA, November, 2013

Invited Speaker, Tumor Biology Program, Stanford University, Stanford, CA, January, 2014

Invited Speaker, LCCC Annual Symposium, UNC, Chapel Hill, NC, April 2014

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

Workshop in Laboratory Animal Medicine, "The Laboratory Fish", Raleigh, NC, May 16, 2014

DAVID C. WILLIAMS, M.D.

Presentation at Biophysic Program Seminar on 1/21/14 – "Structure and DNA binding dynamics of the methyl-cytosine binding domain (MBD) proteins"

Presentation at Pathology Department Grand Rounds on 5/8/14 - "Sliding and hopping along DNA: The dynamic distribution of methyl-cytosine binding domain proteins on DNA."

Presentation at Carolina Chromatin Consortium on 11/7/13 – "Targeting disruption of the NuRD chromatin remodeling complex, structure and dynamics of methyl-cytosine binding domains"

Presentation at Center for Integrative Chemical Biology and Drug Discovery on 11/15/13 – "Targeting disruption of the NuRD chromatin remodeling complex"

Presentation ar the Molecular Therapeutics Retreat, LCCC, on 11/20/13 -"Targeting disruption of the NuRD chromatin remodeling complex, structure and dynamics of methyl-cytosine binding domains"

SCOTT E. WILLIAMS, Ph.D.

International Society for Stem Cell Research Conference "Par3-Insc and G-alpha-i3 cooperate to promote oriented epidermal divisions". Vancouver, BC, Canada, June 18-21st, 2014.

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

Experimental Biology / ASIP Annual Meeting 2014. Committee on Career Development, Women, and Minority (CCDWM) symposium talk entitled: Negotiation Basics: A Practical Discussion on Getting What You Want, When You Want It. Sunday, April 27, 2014, 7-7:30 a.m.

Experimental Biology / American Society of Investigative Pathology Annual Meeting 2014. Talk entitled: Repairing "Misfolded" Proteins as a Therapy for Heart Failure. San Diego, CA. April 29, 2014.

Experimental Biology / American Physiological Society Annual Meeting 2014. Symposium: New Mechanisms of Heart Failure Based on Protein Misfolding. Talk entitled: Role of the ubiquitin proteasome system in heart failure. April 30, 2014.

American Heart Association Scientific Sessions 2013. Symposium titled: Dynamics of protein degradation machinery in cardiac function. Dallas, TX. Talk entitled: Proteasome-dependent regulation of cardiac signal transduction. November 18, 2013.

Myocarditis Foundation Satellite Meeting, 17th Annual Scientific Meeting of the Heart Failure Society of America. Peabody Convention Center, Orlando, FL. Talk entitled: Future of Myocarditis. Sept. 22, 2013.

University of Vermont, Otolaryngology Head & Neck Surgery Research Grand Rounds. Burlington, VT. Talk entitled: The Emerging Role of the Ubiquitin Proteasome System in Heart Failure and Ischemic Heart Disease. August 14, 2013.

University of Vermont, Department of Surgery Grand Rounds. Burlington, VT. Talk entitled: Mechanisms of Cardiac and Skeletal Atrophy in Cancer Cachexia. August 15, 2013.

ALISA S. WOLBERG, Ph.D.

XXIV Congress of the International Society on Thrombosis and Haemostasis, "Investigation fibrinolysis and fibrinolysis in health and disease." Amsterdam, June 2013

XXIV Congress of the International Society on Thrombosis and Haemostasis, :Determinants of Clot Stability." Amsterdam, June 2013

Thrombosis and Hemostasis Summit of North America (THSNA), "Overview of global assays: principle and practice." Chicago, IL, April 11, 2014

7th Symposium on Hemostasis: Old System, New Players, New Directions, "Fibrinogen and red blood cells in venous thrombosis." Chapel Hill, NC, May 17, 2014

Centre for Blood Research, "Fibrinogen, factor XIII and red blood cells in venous thrombosis: novel mechanisms, novel therapeutic targets?" Vancouver, BC, February 5, 2014

QING ZHANG, Ph.D.

University of Texas MD Anderson Cancer Center, Kidney Cancer Program, Houston, TX, February 2014

DIRECTOR OF CONTINUING EDUCATION COURSES

GEORGE FEDORIW, M.D.

Practical and Effective Hematopathology: ASCP Educational Course May 19-23, 2014.

WILLIAM K. FUNKHOUSER, M.D.

ASCP Educational Course, Mol Surg Path, May 5-7, 2014

J. CHARLES JENNETTE, M.D.

Course Co-Director, 28th Annual Meeting of the Glomerular Disease Collaborative Network, Chapel Hill, NC, April 12-13, 2014

Short Course Director, United States and Canadian Academy of Pathology Annual Meeting, "Pathology of Blood Vessels: Vasculitides, Vasculopathies and Coagulopathies", San Diego, CA, March 6, 2014

American Society of Nephrology Renal Week Postgraduate Education Course: Basic Renal Pathology - from Bedside to Bench, San Diego, Atlanta, November 5-6, 2013

Meeting Co-Organizer and Co-Director: Southeast Association of Pathology Chairs Annual Meeting, Asheville, NC, October 2-5, 2013

MELISSA B. MILLER, Ph.D.

Pan American Society for Clinical Virology, Molecular Virology Workshop, 21st Annual Workshop (full day), Daytona Beach, FL, April 26, 2014.

American Society for Microbiology, 114th General Meeting, Workshop (full day), Matrix assisted laser desorption ionization time-of-flight mass spectrometry in clinical microbiology, Boston, MA, May 17, 2014.

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

March 13, 2014 UNC Pathology and Laboratory Medicine Grand Rounds: Utility of Fine-Needle Aspiration and Core Biopsy with Touch Preparation in the Diagnosis of Renal Lesions.

SERVICE ON UNC AND UNCH COMMITTEES

JAMES TODD AUMAN, Ph.D.

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

C. ROBERT BAGNELL, Ph.D.

Member, Imaging Taskforce

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

Member, Institutional Biosafety Committee
Member, Institutional Animal Care and Use Committee

WILLIAM B. COLEMAN, Ph.D.

Member, BBSP Pathogenesis Admissions Committee

BRIAN C. COOLEY, Ph.D.

Member, Institutional Animal Care and Use Committee
Member, MHI Executive Committee

MARILA CORDEIRO-STONE, Ph.D.

Member, Executive Committee of the Curriculum in Toxicology
Member, Executive Committee of the Biological and Biomedical Science Program
Mentoring Committee(s), Department of Pathology and Lab Medicine
Member, Search Committee for Associate Dean for Graduate Education, School of Medicine,
Member, Search Committee, Associate Chair for Administration, Department of Pathology and Lab Medicine
Member, Ad-hoc Search Committee, Research Assistant Professor, Department of Pathology and Lab Medicine

GEORGETTE A. DENT, M.D.

Member, Education Committee
Member, First Year Course Directors Committee
Member, Second Year Course Directors Committee
Member, Third and Fourth Year Course Directors Committee
Member, Student Promotions Committee
Member, Curriculum Operations Committee
Member, Translational Education at Carolina (TEC) Foundation Phase Committee
Member, TEC Application Phase Committee

Chair, UNCH Infection Control Committee

DAVID A. EBERHARD, M.D., Ph.D.

Member, UNC Tissue Procurement Facility (TPF) External Advisory Committee
Member, UNC Heme-Onc Tissue Procurement Committee (HOTPC)
Member, UNC Committee for the Communication of Genetic Research Results (CCGR)

ROSANN A. FARBER, Ph.D.

Member, University APT Committee
Member, SOM Conflict of Interest Committee
Member, COI monitoring committees (Strahl, Albritton)
Member, Review panel for Carolina Medical Research Program

GEORGE D. FEDORIW, M.D.

Member, UNC Heme/onc tissue procurement committee (HOTPC: Lineberger CCC)
Chair, UNC SOM: new curriculum development, application phase committee

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

Member, UNC Search Committee for Associate Vice Chancellor of Research
Member, UNC Facilities Planning Committee
Member, UNC Facilities Work Group
Member, UNC University Safety and Security Committee

PETER H. GILLIGAN, Ph.D.

Member, Faculty Council
Member, MD/PhD selection committee

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

Member, SOM Fixed Term Promotions
Member, Alternate member, IACUC

KEVIN G. GREENE, M.D.

Member, MS2 GI block planning committee (old curriculum)
Member, 2nd year curriculum committee (CC2)

MARGARET L. GULLEY, M.D.

Member, UNC Clinical Genetics Advisory Group to Univ Cancer Research Fund
Member, Executive Director's Advisory Group, UNCH McLendon Labs

Member, UNC Post-tenure review committee (2013-)
Member, TraCS Translational Advancements Resource Committee
Member, UNC School of Medicine Post-tenure review committee
Member, UNC Pathology Residency Education Committee, and Director of Molecular Pathology

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

Member, Medical School TEC Foundations Committee
Member, 2nd Year Curriculum Committee (Medical School)
Member, 4th Year Clinical Capstone Course (Medical School)
Member, Interview MS 2 Students for Ashville Program (Medical)
Member, Dental School Admissions Committee
Member, Dental School 1st Year Teaching Committee
Member, Assessment Revision Committee (Dental School)

CATHERINE A. HAMMETT-STABLER, Ph.D.

Member, SOM Information Technology Strategic Planning Task Force
Member, SOM Professor Appointment, Promotion, Tenure Committee
Member, Clinical Documentation Committee
Member, CDC, Documents sub-committee
Member, MS2 Course directors
Chair, IRB, IACUC, SOM, Admissions Committee, IRB Committee B

TRACY M. 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
Chair, IACUC/DLAM Leadership Committee
Chair, Vice Chancellor for Research (VCR) Compliance Task Force
Founder and Co-Chair, Network of Laboratory Animal Coordinator Steering Committee

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

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 Physicians & Associates Board
Member, Medical Staff Executive Committee
Member, UNC Physicians and Associates Payor Relations Committee

Member, NC TraCS Institute/CTSA Translational Science Advisory Board (TSAB)

DAVID G. KAUFMAN, M.D.

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

WILLIAM K. KAUFMANN, PH.D.

Member, Department of Pathology and Laboratory Medicine Research Advisory Committee

NICHOLE L. KORPI-STEINER, Ph.D.

Chair, UNC Hospitals Point of Care Testing Committee

JIANDONG LIU, Ph.D.

Member, Zebrafish Aquaculture Core Mentoring Committee

CHRISTOPHER P. MACK, Ph.D.

Member, UNC McAllister Heart Institute executive committee
Member, IVB Training Grant executive committee
Chair, IVB Training grant selection committee

NOBUYO N. MAEDA, Ph.D.

Member, Pathology Research Advisory Committee
Member, Department of Pathology and Laboratory Medicine Space Committee

SUSAN J. MAYGARDEN, M.D.

Member, GME Committee
Chair, IRB, IACUC
SOM, Admissions Committee

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

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

MELISSA B. MILLER, Ph.D.

Member, Anti-infective Subcommittee of the Pharmacy and Therapeutics Committee, UNC Health Care
Member, Hospital Infection Control Committee, UNC Health Care
Chair, SOM, Associate Professor Appointments, Promotions and Tenure Committee

VOLKER NICKELEIT, M.D.

UNC Nephropathology staff cont. education

JUDITH N. NIELSEN, D.V.M.

Member, ACUC
Member, IACUC Animal Concern Subcommittee
Member, Lab Animal Enrichment Committee
Member, NLAC Steering Committee
Member, DLAM Leadership Committee

SIOBHAN M. O'CONNOR, M.D.

Member, Curriculum Competency Committee

YARA A. PARK, M.D.

Member, Pharmacy and Therapeutics Committee

JAY S. RAVAL, M.D.

Member, UNC Honor Council
Member, Living Donor Kidney Transplant Committee
Member, Pulmonary Transplant Committee
Member, Bone Marrow/Hematopoietic Progenitor Cell Transplant QA/QI Committee
Member, Transfusion Medicine Service and Transplant Service Laboratories QA Committee
Member, Sickle Cell Disease Patient Committee

LI QIAN, Ph.D.

Member, UNC School of Medicine Assistant Professor Advisory Committee
Member, Human Stem Cell Core Mentoring Committee
Member, Pathology Department Preliminary Exam Committee

KATHLEEN W. RAO, Ph.D.

Member, Education Committee, MS Curriculum
Member, Curriculum Operations Committee

Member, Block 9 course committee
Member, Executive Committee of the SOM Academy of Educators
Co-Chair, MS Second Year Curriculum Committee

JAY S. RAVAL, M.D.

Faculty Liaison, UNC Honor Council
Member, Living Donor Kidney Transplant Committee
Member, Pulmonary Transplant Committee
Member, Bone Marrow/Hematopoietic Progenitor Cell Transplant QA/QI Committee
Member, Transfusion Medicine Service and Transplant Service Laboratories QA Committee

HOWARD M. REISNER, Ph.D.

Member, Student Promotions Committee (Medical School
Member, Medical School Admissions Committee (Medical School)
Member, Second year course directors committee (Medical School)
Member, University Hearings Board (University)

JOAN M. TAYLOR, Ph.D.

Member, Search Committee, Chair of Cell Biology and Physiology
Member, Core Facilities Advisory Committee
Member, Animal Models Core Oversight Committee
Member, Department of Pathology, Research Advisory Committee
Member, School of Medicine Strategic Planning Committee (SP3)
Member, McAllister Heart Institute, Executive Committee
Member, School of Medicine Conflict of Interest Committee

RICHARD R. TIDWELL, Ph.D.

Chair, Advisory Board, Absorption Distribution Metabolism and Elimination Mass Spectrometry Center (ADME)

CYRUS VAZIRI, Ph.D.

Member, Research Advisory Committee (Dept of Pathology)
Member, Departmental Retreat Organizing Committee (2013)
Member, Graduate Program in Molecular Pathology Executive Committee
Member, Pathology Qualifying exam Committee
Member, GMB Program Qualifying exam Committee
Member, Curriculum in Toxicology Executive Committee
Member, Pathogenesis Admissions Committee
Member, Junior Faculty Mentoring meeting for Scott Williams

KAREN E. WECK-TAYLOR, M.D.

Member, Department of Pathology Research Advisory Committee
NC TraCS Institute/CTSA Translational Advancements Resource Committee

BERNARD E. WEISSMAN, Ph.D.

Member, Curriculum in Toxicology, Executive Committee
Chair, Tissue Culture Facility Advisory Committee
Chair, Animal Procedures Core Advisory Committee

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

Member, UNCH POC Committee
Member, UNCH Transfusion Committee
Member, UNCH MSEC
Member, UNCH Credentials Committee
Member, Epic ePIC committee
Member, Epic eLIP committe

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

Member, Institutional Animal Care and Use Committee (IACUC)

DAVID C. WILLIAMS, M.D.

Member, UNCSeq Molecular Tumor Board

ALISA S. WOLBERG, Ph.D.

Member, UNC Thrombosis and Hemostasis Program Seminar Series
Member, Faculty Search Committee, UNC MHI
Member, McAllister Heart Institute Executive Committee (Member)
Chair, UNC Molecular and Cellular Pathology Graduate Program Qualifying Exam

QING ZHANG, Ph.D.

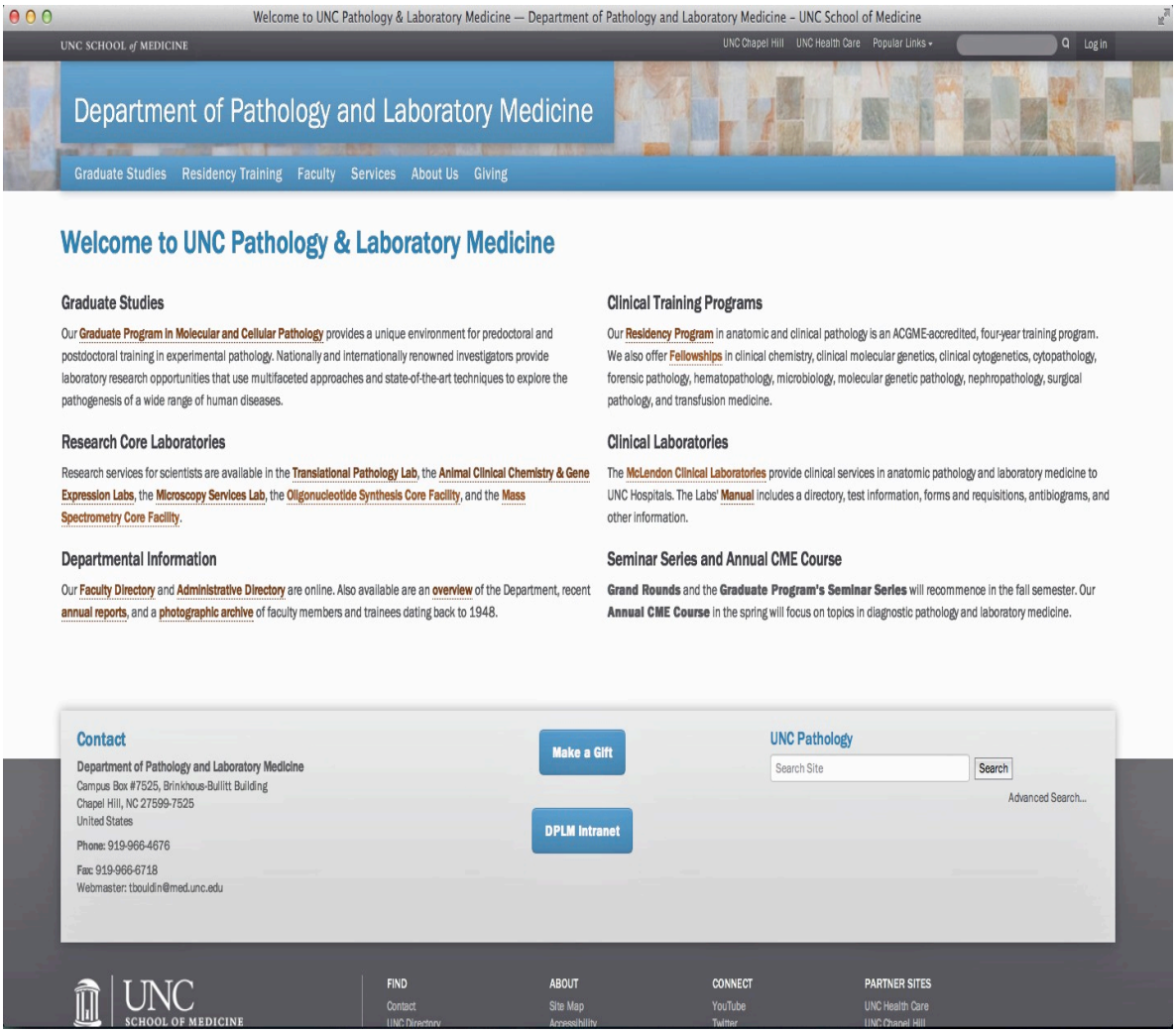
Member, Assistant Professor Advisory Committee

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.

DEPARTMENT WEB SITE

The Departmental web site (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 web site is a comprehensive, detail-rich resource for those seeking information about the educational, research, and clinical training programs of the Department. The web site 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 web site also provides an overview of the Department, including its history, recent annual reports, administrative directory, and photographic archive. The web site is on a server maintained by the UNC School of Medicine. Dr. Thomas Bouldin is the webmaster and authors the web pages for the faculty and clinical training programs. Dr. Jonathon Homeister authors the web pages for the graduate program.



PUBLICATIONS

Department of Pathology and Laboratory Medicine
School of Medicine
University of North Carolina at Chapel Hill
July 1, 2013 – June 30, 2014

JAMES TODD AUMAN, Ph.D.

The Cancer Genome Atlas Research Network (Auman JT, member of Genome Characterization Center), Comprehensive molecular characterization of urothelial bladder carcinoma. Nature. 2014:507:315-322.

The Cancer Genome Atlas Research Network (Auman JT, member of Genome Characterization Center), The somatic genomic landscape of glioblastoma. Cell 2013:155:462-477.

The Cancer Genome Atlas Research Network (Auman JT, member of Genome Characterization Center), The Cancer Genome Atlas Pan-Cancer analysis project. Nat Genet. 2013:45:1113-1120.

The Cancer Genome Atlas Research Network (Auman JT, member of Genome Characterization Center), Integrated genomic characterization of endometrial carcinoma Nature 2013:500:67-73.

The Cancer Genome Atlas Research Network (Auman JT, member of Genome Characterization Center), Comprehensive molecular characterization of clear cell renal carcinoma. Nature 2013:499:43-49.

Wang P, Dong Q, Zhang C, Kuan PF, Liu Y, Jeck WR, Andersen JB, Jiang W, Savich GL, Tan TX, Auman JT, Hoskins JM, Misher AD, Moser CD, Yourstone SM, Kim JW, Cibulskis K, Getz G, Hunt HV, Thorgeirsson SS, Roberts LR, Ye D, Guan KL, Xiong Y, Qin LX, Chiang DY. Mutations in isocitrate dehydrogenase 1 and 2 occur frequently in intrahepatic cholangiocarcinomas and share hypermethylation targets with glioblastomas. Oncogene 2013 Jun 20; 32:3091-100.

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

Fan Z, Wang J, Ahn M, Shiloh-Malawsky Y, Chahin N, Elmore S, Bagnell CR Jr, Wilber K, AnH,Lin W, Zhu H, Styner M, Kornegay JN., Characteristics of magnetic resonance imaging biomarkers in a natural history study of golden retriever muscular dystrophy. Neuromuscul Disord. 2014 Feb;24(2):178-91.

Vance RB, Mühlbauer M, Dreesen EB, Bagnell CR, Dent GA, Herfarth HH, Jobin C, Dellon ES. Glass microparticulate ingestion: An unusual and difficult to diagnose cause of chronic abdominal pain. ACG Case Rep J. In press, 2014

Bagnell, Robert: Light Microscopy, "Histopathology: Methods and Protocols." "Methods in Molecular Biology", Humana Press, USA, 2014, in press.

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

Du LM, Nurden P, Nurden AT, Nichols TC, Bellinger DA, Jensen ES, Haberichter SL, Merricks E, Raymer RA, Fang J, Koukouritaki SB, Jacobi PM, Hawkins TB, Cornetta K, Shi Q, Wilcox DA. Platelet-targeted gene therapy with human factor VIII establishes haemostasis in dogs with haemophilia A. Nat Commun. 2013;4:2773.

Davis BT, Wang XJ, Rohret JA, Struzynski JT, Merricks EP, Bellinger DA, Rohret FA, Nichols TC, Rogers CS. Targeted disruption of LDLR causes hypercholesterolemia and atherosclerosis in Yucatan miniature pigs. PLoS One. 2014 Apr 1;9(4):e93457.

Bender DE, Kloos MT, Pontius JU, Hinsdale ME, Bellinger DA. Molecular Characterization of Cat Factor XII Gene and Identification of a Mutation Causing Factor XII Deficiency in a Domestic Shorthair Cat Colony. Vet Pathol. 2014 (In Press).

DEBRA A. BUDWIT, M.D.

Montgomery ND, Biachi GD, Klauber-Demore N, Budwit DA. Bilateral Syringomatous Adenomas of the Nipple: Case report with immunohistochemical characterization of a rare tumor mimicking malignancy. Am J Clin Pathol 2014, 141:727-31.

Jiang XS, Pantaqnowitz L, Bui MM, Esther R, Budwit D, Dodd LG. Clear cell chondrosarcoma: Cytologic findings in six cases. Diagn Cytopathol. 2014, 42:784-91.

FRANK C. CHURCH, Ph.D.

Rein-Smith, C.M. and F.C. Church. Acute fibrinolysis. Current Opinion in Hematology, 2014, 21:438-44.

Rein-Smith, C.M. and F.C. Church, Vascular response to injury and disease. *In:* On Disease*:* Modern Approach to Pathology (H. Reisner, Editor) McGraw-Hill, 2015, pp. 21-91.

WILLIAM B. COLEMAN, Ph.D.

Sandhu, R., Rivenbark, A.G., Mackler, R.M., Livasy, C.A., and Coleman, W.B. (2014) Dysregulation of microRNA expression drives aberrant DNA hypermethylation in basal-like breast cancer. Int. J. Oncol. 44:563-572.

Roll, J.D., Rivenbark, A.G., Sandhu, R., Parker, J.S., Jones, W.D., Carey, L.A., Livasy, C.A., and Coleman, W.B. (2013) Dysregulation of the epigenome in triple-negative breast cancers: Basal-like and claudin-low breast cancers express aberrant DNA hypermethylation. Exp. Mol. Pathol. 95:276-287

Coleman, W.B. (2013) Breast cancer personalized medicine: Challenges and opportunities. Am. J. Pathol. 183:1036-1037.

Rivenbark, A.G., O'Connor, S.M., and Coleman, W.B. (2013) Molecular and cellular heterogeneity in breast cancer – Challenges for personalized medicine. Am. J. Pathol. 183:1113-1124.

Rivenbark, A.G. and Coleman, W.B. (2014) An introduction to the conspicuous and distinguishing characteristics of neoplasms. In: Pathobiology of Human Disease: A Dynamic Encyclopedia of Disease Mechanisms (R.N. Mitchell and L.M. McManus, Editors-in-Chief), Academic Press – Elsevier (San Diego, CA), pp. 349-366.

Rivenbark, A.G. and Coleman, W.B. (2014) Disease and the genome: Genetic, developmental, and neoplastic disease. In: Pathology: A Modern Case Study, H.M. Reisner (ed.), McGraw-Hill, New York, (In Press).

Molecular Diagnostics: 12 Tests That Changed Everything, W.E. Highsmith Jr. (ed.), Molecular and Translational Medicine, W.B. Coleman and G.J. Tsongalis (Series Editors), Humana Press – Springer (New York, NY), ISBN 978-1-4614-8126-3, c2014.

Molecular Pathogenesis of Breast Cancer: Implications for Personalized Breast Cancer Therapy, W.B. Coleman (Theme Issue Editor), The American Journal of Pathology Special Section, October 2013, 183:1036-1124.

BRIAN C. COOLEY

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