# DEPARTMENT OF PATHOLOGY AND LABORATORY MEDICINE (GRAD)

Graduate work in the Department of Pathology and Laboratory Medicine is offered through the Pathobiology and Translational Science graduate program to those interested in acquiring more extensive knowledge of disease pathogenesis. Major emphasis is given to the laboratory investigation of molecular and cellular mechanisms responsible for disease initiation, progression, and treatment. Students are given the opportunity to undertake candidacy for the doctor of philosophy degree. Participation in research activities leading to an original dissertation is required of all advanced degree candidates.

Prospective candidates must hold a bachelor's degree from an accredited college or university. Admission to the program is through the Biologic and Biomedical Sciences program (http://bbsp.unc.edu/).

The department is located across multiple buildings on the UNC campus and offers well-equipped, internationally recognized laboratories for research and advanced work in investigating the mechanisms of diseases.

Please visit the graduate program's website (https://www.med.unc.edu/pathology/) for more graduate program information.

## Clinical Professors

**Frederic Askin,** Surgical Pathology, Pulmonary Pathology
**Michelle Aurelius,** Forensic Pathology
**Peter Banks**
**Russell R. Broaddus,** Molecular Pathogenesis of Endometrial Cancer
**Leslie G. Dodd,** Surgical Pathology, Cytopathology
**Ronald J. Falk,** Glomerular Disease, Lupus, Vasculitis, Dialysis
**George Fedoriw,** Hematopathology; Applications of Flow Cytometry
**Paul Googe,** Dermatopathology
**J. Charles Jennette,** Renal Pathology, Immunopathology
**Susan J. Maygarden,** General Surgical Pathology, Cytopathology, Prostate Carcinogenesis
**Melissa B. Miller,** Molecular Diagnostics, Antimicrobial Resistance, Molecular Epidemiology of MRSA
**Volker Nickeleit,** Renal Pathology, Fibronectins
**Yara Park,** Transfusion Medicine
**Charles M. Perou,** Breast Cancer, Genomics, Microarrays, Tumor Classification, Drug Resistance
**John L. Schmitz,** Flow Cytometry, HIV, Diagnostic Immunology, Sexually Transmitted Diseases
**Jan Silverman,** Cytopathology, Gastrointestinal Pathology, Genitourinary Pathology
**Harsharan K. Singh,** Cytopathology, Fine Needle Aspiration Biopsy, Renal Pathology
**James A. Swenberg,** Chemical Carcinogenesis, Toxicology, Mass Spectroscopy, DNA Damage and Repair, Endogenous DNA Damage
**Leigh B. Thorne,** Molecular Pathology, Autopsy Pathology
**Karen E. Weck,** Molecular Genetic Pathology
**Wendell Yarbrough,** Otolaryngology/Head and Neck Surgery

## Clinical Associate Professors

**Kevin Alby,**Clinical Microbiology
**Jessica K. Booker,**Genetics, Breast Cancer
**Christine Bookhout,** Surgical Pathology
**Benjamin Calhoun,** Breast Pathology
**Steven Cotten,** Clinical Chemistry
**GeorgetteA.Dent,** Hematopathology, Medical Education
**Nabila Haikal,**Forensic Pathology
**Laleh Hakima**
**Jonathon W. Homeister,**Leukocyte Trafficking, Inflammatory Vascular Disease, Thrombosis and Hemostasis, Cardiovascular Pathology, Autopsy Pathology
**Alina Iuga,**Histopathology; Inflammation and Neoplastic Disorders of the Digestive System
**Matthew Karafin,**Transfusion Medicine
**Nicole L. Korpi-Steiner,** Clinical Chemistry
**Danielle Maracaja**
**Stephanie P. Mathews,**Hematopathology
**Jason Merker,** Molecular Pathology
**Jayson Miedema,**Dermatopathology
**Siobhan M. O'Connor,**Breast Pathology, GYN Pathology, Cytopathology
**LoriR.Scanga,**#Surgical Pathology, Cytopathology
**Eric T. Weimer,**Histocompatibility, Flow Cytometry and Clinical Microbiology/Immunology
**Herbert C. Whinna,**Mechanisms of Hemostasis and Thrombosis, Biochemistry and Vascular Biology of Blood Coagulation, Protein Structure-Function
**Sara E. Wobker,**Genitourinary Pathology
**Lee-Ching Zhu**

## Clinical Assistant Professors

**Thomas Alexander**
**Janet Baranello**
**Sue Ann Berend,** Cytogenetics
**Sandra Bishop-Freeman,** Forensic Toxicology
**Amy Brownlee**
**Benjamin Cho**
**Mariama Evans**
**Jonathan Galeotti,** Hematopathology
**Johann D. Hertel,** Cytopathology
**Kimberly Janssen,** Forensic Pathology
**Steven Johnson**
**Dona Kanavy**
**Staci Keene**
**Vanessa Moreno**
**Craig Nelson,** Forensic Pathology, Water-Related Deaths, Including Drowning of All Kinds and Particularly Scuba, Rebreather, and Freediving Deaths
**Lori Ramkissoon,** Clinical Cytogenetics, Molecular Genetics
**T. Danielle Samulski,** Gynecologic Pathology, ENT Pathology, and Cytopathology
**Lauren Scott,** Forensic Pathology, Preventive Health, Especially Suicide and Accident Prevention, the Value of Autopsy in Medical Education
**Bart Singer,** Surgical Pathology
**Tam Sneddon**
**Susan Venuti,** Forensic Pathology
**Alisha Ware**
**Sam Wu,** Dermatopathology

## Clinical Instructors

**Michelle Bartlett,** Pathologists' Assistant
**Kimberly Calabrese,** Pathologists' Assistant
**Shelby Currier,** Pathologists' Assistant
**Nicola Gerken,** Pathologists' Assistant

**Steve Holmes,** Examination of Simple and Complex Specimens, Surgical Pathology
**Andre Phelan,** Pathologists' Assistant: Surgical Pathology Training for Residents and Students

## Research Professors

**Claire Doerschuk,** Diseases Affecting the Airways of the Lung
**Craig A. Fletcher,** Vascular Biology
**Matthew Flick,**Elucidating Mechanisms Linking Coagulation and Fibrinolytic Factors to Inflammatory, Infectious, and Malignant Disease
**Virginia L. Godfrey,** Veterinary Pathology, Animal Models of Genetic Disease, Autoimmunity
**Ajay Gulati,** Pediatric Gastroenterology
**Tracy M. Heenan,** Laboratory-, Exotic- and Companion-Animal Medicine
**Mehmet Kesimer,** Mucin Glycobiology and Airway Epithelial Pathobiology
**Nigel Key,** Thrombosis and Hemostasis
**Christopher P. Mack,** Transcriptional Regulation in the Cardiovascular System, Smooth Muscle Cell Biology
**Nigel Mackman,** Thrombosis and Hemostasis
**Nobuyo Maeda,** Molecular Genetics of Atherosclerosis, Transgenic Laboratory Animals as Model Systems, Molecular Evolution
**Valerie Murrah,** Oral, Head, and Neck Pathology
**Timothy C. Nichols,** General Cardiology, Cardiac Catheterization, Percutaneous Transluminal Coronary Angioplasty
**Volker Nickeleit,** Renal Pathology, Fibronectins
**Li Qian**, Cardiovascular and Stem Cell Biology
**Rani Sellers**
**Jonathan Serody**
**Harsharan K. Singh,#Cytopathology,** Fine Needle Aspiration Biopsy, Renal Pathology Adhesion Signaling, Cardiovascular Disease
**Melissa Troester,** Molecular Studies with Human Populations
**Cyrus Vaziri,** Regulation of DNA Replication, S-Phase Checkpoints, and Post-Replication DNA Repair on Mammalian Cells
**Gregory Wilkerson**
**Alisa S. Wolberg,** Cellular and Molecular Mechanisms in Hemostasis and Thrombosis
**Maimoona A. Zariwala,** Genetic Analysis of Patients With Primary Ciliary Dyskinesia (PCD)

## Research Associate Professors

**Silvio Antoniak,** Protease-Activated Receptors in Cardiovascular Diseases, Myocarditis, and Heart Failure Animal Models
**Pablo Ariel,** Director of the Microscopy Services Laboratory
**Andrew Gladden,** Epithelial Cell Biology; Reproductive Tract Development and Neoplasia
**Peiqi Hu,** Immune-Mediated Kidney Disease
**Feng Li,** Cardiovascular Biology
**Jiandong Liu,** Cardiovascular Biology
**Steven Shipley,** Comparative Medicine, Infectious Disease
**Young E. Whang,** Androgen Receptor, Prostate Cancer
**Scott Williams,** Stem Cell and Developmental Biology
**Melinda Yates**

## Research Assistant Professor

**Hannah Atkins,** Comparative Medicine
**Jessica Bowser,** Dynamics of Epithelial Integrity and Regeneration at the Interface of Inflammation and Cancer, Molecular and Biochemical Mechanisms of Endometrial Cancer Progression
**Ilana Galex**
**Nneka George**
**Meghan Free,** Nephrology and Hypertension
**Natalia Isaeva,** Otolaryngology
**Yukako Kayashima,** Atherosclerosis
**Boa Kim**
**Sushant Patil,** Bioinformatics
**Reinhardt-Boris Reidel,** Airway Protein Function in Health and Disease
**Allison Rogala,** Comparative Medicine, Host-Microbial Interactions
**Blake Rushing**
**Jonathan Schisler,** Translational Research in Patients with Myocardial Infarcts
**Travis Schrank**
**Erica Sparkenbaugh**
**W.H. Davin Townley-Tilson**
**Haofei Wang**
**Morika Williams,** Comparative Medicine

## Research Instructor

**Diane Armao,** Neuropathology

## Adjunct Professors

**Albert Baldwin**, Biology
**Bryan Dangott**
**Peter H. Gilligan,** Diagnostic Bacteriology, Pulmonary Disease in Cystic Fibrosis, Toxin Mediated Diarrheal Disease
**M. David Goodman,** Medical Education and Autopsy Pathology
**H. Michael Jones,** Medical Education at Medical Student and Resident Level, Medical History, Autopsy Pathology, Research Support
**William Kaufmann**
**Myla Lai-Goldman,** Personalized Molecular Diagnostics
**Chad A. Livasy,** Surgical Pathology
**Roger Lundblad,** Consultant
**C. Ryan Miller**
**Judith N. Nielsen,** Animal Health Maintenance, Diagnosis and Eradication
**Howard M. Reisner,** Immunogenetics of Blood Coagulation, Immunochemistry
**Gary J. Smith,** Prostate Cancer, Cancer Cell-Tissue Microenvironmental Interaction, Angiogenesis
**Richard Tidwell**

## Adjunct Associate Professors

**Delores Grant,** Cancer Research
**David G. Kaufman**
**Thomas Lightfoot,** American Red Cross Blood Services
**Christopher McKinney,** General Pathology
**Stephanie Montgomery**
**Jay S. Raval,** Transfusion Medicine
**Nobuyuki Takahashi,** Animal Models of Hypertension, Preeclampsia, Diabetic Nephropathy and Obesity

## Adjunct Assistant Professors

**Edward Bahnson,** Vascular Biology, Diabetes and Metabolic Syndrome
**Victoria Baxter**
**Nikia Laurie**
**Brian Le**
**Nathan Montgomery**
**Avani Pendse,** Surgical Pathology
**Ricky Thompson**
**Tamiwe Tomoka,** General Pathology
**Patrick Wilson**

# Professors Emeriti

**Nadia Malouf Anderson**
**C. Robert Bagnell Jr.**
**Dwight Bellinger**
**Stuart Bentley**
**Debra A. Budwit**
**John D. Butts**
**John F. Chapman Jr.**
**Myra L. Collins**
**Marila Cordeiro-Stone**
**Robert E. Cross**
**Frederic G. Dalldorf**
**Cora-Jean S. Edgell**
**James D. Folds**
**Donald T. Forman**
**Joe W. Grisham**
**Catherine A. Hammett-Stabler**
**John E. Hammond**
**Susan T. Lord**
**William W. McLendon**
**James R. Pick**
**Marjorie S. Read**
**Harold Roberts**
**Kinuko I. Suzuki**
**Michael Topal**

# PATH

## Graduate-level Courses

**PATH 713. Molecular and Cellular Pathophysiological Basis of Disease: Mechanisms of Disease. 3 Credits.**
A graduate course on cell injury and pathogenesis of disease with emphasis on basic mechanisms at the molecular, cellular, and organismal levels. Three lecture hours with a complementary two-and-a-half-hour laboratory each week.

**Rules & Requirements**
**Requisites:** Co-requisite, PATH 714L.
**Grading Status:** Letter grade.

**PATH 714L. Molecular and Cellular Pathophysiological Basis of Disease: Laboratory I. 2 Credits.**
A graduate-level laboratory course on basic mechanisms of disease pathogenesis, emphasizing cell and tissue-based examples of major disease mechanisms.

**Rules & Requirements**
**Requisites:** Pre- or corequisite, PATH 713.
**Grading Status:** Letter grade.

**PATH 715. Molecular and Cellular Pathophysiological Basis of Disease: Systemic Pathology. 3 Credits.**
A graduate-level laboratory course on systemic pathology, emphasizing diseases of major organ systems. A follow-up to PATH 713/714L. Three lecture hours (three credits) with a complementary two-and-a-half-hour laboratory ( two credits) each week.

**Rules & Requirements**
**Requisites:** Co-requisite, PATH 716L.
**Grading Status:** Letter grade.

**PATH 716L. Molecular and Cellular Pathophysiological Basis of Disease: Laboratory II. 2 Credits.**
A graduate-level laboratory course on mechanisms of systemic disease pathogenesis, emphasizing cell and tissue-based examples of diseases of the major organ systems.

**Rules & Requirements**
**Requisites:** Pre- or corequisite, PATH 715.
**Grading Status:** Letter grade.

**PATH 723. Practical Considerations for Translational Research. 2 Credits.**
Permission of the instructor. A multi-disciplinary course providing students principles involved in translating basic science into clinically applicable diagnostics and therapies to improve human disease outcomes. The course is focused on bioinformatics, bioethics, trial design, FDA approval, and commercialization of laboratory diagnostics.

**Rules & Requirements**
**Grading Status:** Letter grade.

**PATH 725. Cancer Pathobiology. 3 Credits.**
Permission of the instructor. This course examines pathobiological features of cancer. An interdisciplinary approach draws from epidemiology, genetics, molecular biology, and clinical medicine to investigate cancer etiology, pathogenesis, prevention, and treatment.

**Rules & Requirements**
**Grading Status:** Letter grade.

**PATH 726. Human Environmental Disease. 1-3 Credits.**
This course will study human disease processes that are induced or exacerbated by our environment. Environmental disease stressors include solar radiation, air and water pollution, bioreactive substances in foods, pesticides, metals, dusts, particles, and allergens. Lectures will emphasize epidemiology, mechanisms of toxicity, and human disease pathogenesis.

**Rules & Requirements**
**Grading Status:** Letter grade.

**PATH 730. Cancer Immunology. 2 Credits.**
The goal of this graduate-level course is to learn about recent advances in the field, acquire specialized knowledge and to develop a foundation of critical thinking skills in cancer immunology. The course format will combine lectures and in-class discussion of assigned readings, with particular emphasis on state-of-the art research methods. Students should be familiar with modern concepts of immunology and should consult with the course director before enrolling. The course meets for half a semester.

**Rules & Requirements**
**Grading Status:** Letter grade.
**Same as:** MCRO 730.

**PATH 766. Current Topics in Cardiovascular Biology. 3 Credits.**
Permission of the instructor. Second-year graduate students only. This manuscript-based course will emphasize recent advances in heart and blood vessel development, the molecular mechanisms that regulate cardiovascular cell function, and current methodologies in the cardiovascular field. It will be team taught by members of UNC's McAllister Heart Institute.

**Rules & Requirements**
**Grading Status:** Letter grade.

**PATH 767. Molecular and Cellular Biology of Cardiovascular Diseases. 3 Credits.**
Second year graduate students or permission of the instructor. Course reviews the molecular, cellular, and organismal pathogenesis of cardiovascular disease. It is team-taught by faculty with topic expertise and stresses primary literature and current methodologies. May be taken as a companion to PATH 766 or on its own.

**Rules & Requirements**
**Grading Status:** Letter grade.

**PATH 770. Mouse Efficacy and Disease Models. 3 Credits.**
The Mouse Efficacy and Disease Models class is designed for second to third year students who intend on performing in vivo animal research. This course is intended to familiarize graduate students in the issues associated with the development and interpretation of mouse models and also an introduction to alternative models.

**Rules & Requirements**
**Requisites:** Prerequisites, Students must be earning a degree in a Biological & Biomedical Sciences Program (BBSP) with preference given to students in the Pathobiology and Translational Science Graduate Program; students should also have selected a thesis lab prior to enrolling in this class.
**Grading Status:** Letter grade.

**PATH 792. Seminar in Carcinogenesis. 2 Credits.**
Permission of the instructor. Survey of classical and current literature on selected critical issues in carcinogenesis. Students discuss experimental methods and observations as well as theories and generalizations. Two seminar hours a week.

**Rules & Requirements**
**Grading Status:** Letter grade.
**Same as:** TOXC 792.

**PATH 801. Cell Cycle Regulation and Cancer. 3 Credits.**
This journal club-style discussion course will focus on molecular events that regulate normal cell cycle progression, and on how deregulation of the cell cycle leads to cancer. Classes will follow the development of the cell cycle field chronologically, learning how current concepts and paradigms have evolved through scientific inquiry.

**Rules & Requirements**
**Grading Status:** Letter grade.
**Same as:** GNET 801.

**PATH 850. Scientific Writing in Pathobiology and Translational Science. 1 Credits.**
The students will develop a research plan based on their thesis project and write a 6-page grant in the style of a NRSA F31 application. Students will learn to edit and critique their fellow student's proposals which will help prepare the students for writing and editing their preliminary exam and future grant applications. Restricted to students currently earning a degree in a Biological & Biomedical Sciences Program (BBSP) with preference given to students in the Pathobiology and Translational Science Graduate Program.

**Rules & Requirements**
**Grading Status:** Letter grade.

**PATH 890. Special Topics in Pathology. 1-3 Credits.**
A study in special fields under the direction of the faculty. Offered as needed for presenting material not normally available.

**Rules & Requirements**
**Repeat Rules:** May be repeated for credit. 6 total credits. 3 total completions.
**Grading Status:** Letter grade.

**PATH 900. Research in Pathology. 2-12 Credits.**
Permission of the department. This is a research course in which advanced students in pathology carry on investigations on mechanisms of disease. Six or more laboratory hours a week, to be arranged. May be repeated.

**Rules & Requirements**
**Repeat Rules:** May be repeated for credit.
**Grading Status:** Letter grade.

**PATH 920. Seminar in Interdisciplinary Vascular Biology. 1 Credits.**
Permission of the instructor. Participants in the Interdisciplinary Vascular Biology Training Program only. Students will be required to present their thesis work as a formal seminar, give an introductory lecture to introduce their project (in cooperation with their thesis advisor), and to attend and discuss the seminars of other students.

**Rules & Requirements**
**Repeat Rules:** May be repeated for credit. 6 total credits. 6 total completions.
**Grading Status:** Letter grade.

**PATH 940. Pathobiology and Translational Science Seminar. 1 Credits.**
A series of scientific seminars by graduate students, Post-doctoral Fellows, research faculty, and others in the Department of Pathology and Laboratory Medicine. Students will develop the skills necessary to deliver an effective and engaging oral scientific presentation of their research. They will become proficient in understanding the pathogenesis of the wide range of diseases being studied in the department, and the methodologies employed to determine the pathogenesis of those diseases.

**Rules & Requirements**
**Repeat Rules:** May be repeated for credit. 7 total credits. 7 total completions.
**Grading Status:** Letter grade.

**PATH 993. Master's Research and Thesis. 3 Credits.**
May be repeated.

**Rules & Requirements**
**Repeat Rules:** May be repeated for credit.

**PATH 994. Doctoral Research and Dissertation. 3 Credits.**
**Rules & Requirements**
**Repeat Rules:** May be repeated for credit.

# Contact Information

**Department of Pathology and Laboratory Medicine**
Visit Program Website (http://www.med.unc.edu/pathology/)

**Director of Graduate Studies**
Andrew B. Gladden
agladden@email.unc.edu

**Student Services Manager**
Angel Truesdale

angel_truesdale@med.unc.edu

**Chair**
Russell Broaddus
rbroaddus@med.unc.edu