

School of Medicine

Degrees Offered

- M.D., Doctor of Medicine
- M.D./Ph.D., Dual Doctor of Medicine and Doctor of Philosophy
- Ph.D., in Biochemistry and Molecular Biology
- Ph.D. in Cancer Cell Biology
- Ph.D. in Cellular and Integrative Physiology
- M.S., Ph.D. in Clinical and Translational Science
- Ph.D. in Immunology and Microbial Pathogenesis
- Ph.D. in Neuroscience
- M.H.S. in Pathologists' Assistant
- M.S., Ph.D., Exercise Physiology
- M.O.T., Master of Occupational Therapy
- D.P.T., Doctor of Physical Therapy
- Ph.D., Pharmaceutical and Pharmacological Sciences
- M.S., Biomedical Sciences
- M.S., Health Sciences

Introduction

The West Virginia University School of Medicine is a part of the Robert C. Byrd Health Sciences Center, a comprehensive academic health system with three campuses in the state, a network of affiliated hospitals and practice plans, and a mission of education, research, clinical care, and service to the state. On the main Morgantown campus, students have access to a full range of research and clinical facilities, including a relatively new, four-story laboratory building and a wide range of advanced research centers. West Virginia University hospitals feature sophisticated medical technology, including magnetic resonance imagery, lithotripsy, and laser surgery; the campus includes a large and busy tertiary hospital, a trauma center, children's hospital, cancer center, a psychiatric hospital, primary care and specialty clinics, a rehabilitation hospital, and many other patient care facilities.

Graduate study in the biomedical sciences is in seven Ph.D. graduate programs: biochemistry and molecular biology; cancer cell biology; cellular and integrative physiology; exercise physiology; immunology and microbial pathogenesis; neuroscience; and pharmaceutical and pharmacological sciences (a collaboration with the School of Pharmacy). Biomedical sciences graduate students take a common core curriculum the first semester and match with a faculty mentor and select one of the seven Ph.D. training programs after the first semester or by the end of year one. There is also a M.S. degree in the Biomedical Sciences. Core coursework for this M.S. degree is similar to that of the first semester of Ph.D. training in the biomedical sciences.

There is also a combined M.D./Ph.D. dual degree option for students interested in pairing medical and basic science education at the doctoral level.

The Department of Human Performance and Applied Exercise Sciences offers graduate degrees in the clinical areas of exercise physiology, physical therapy, and occupational therapy. There is also a master's of health sciences degree (M.H.S.) for the pathologist's assistant available through the Department of Pathology. All graduate and professional programs in the School of Medicine complement other existing programs in health professions offered through other schools (dentistry, nursing, and pharmacy and public health) that are part of the Health Sciences Center.

The M.S. and Ph.D. programs in Clinical and Translational Science, housed within the West Virginia Clinical and Translational Science Institute, foster the training and career development in clinical and translational research.

The M.S. in Health Sciences is a 12-month, non-thesis master's program that targets students who desire to enhance their competitiveness for entry into advanced professional or graduate programs or who are interested in more in-depth study in biomedical or public health disciplines.

ADMINISTRATION

DEAN

- Clay Marsh - M.D. (West Virginia University School of Medicine)

VICE DEAN FOR MEDICAL EDUCATION & ACADEMIC AFFAIRS

- Norman D. Ferrari III - M.D. (West Virginia University School of Medicine)

VICE DEAN-PROFESSIONAL & UNDERGRADUATE PROGRAMS

- MaryBeth Mandich - Ph.D. (West Virginia University School of Medicine)

VICE DEAN FOR CLINICAL SERVICES & CMO WVU HEALTHCARE

- Judie Charlton - M.D. (West Virginia University School of Medicine)

ASSOCIATE DEANS

- Scott A. Cottrell - Ed.D. (West Virginia University College of Education and Human Services)
Student Services and Curriculum
- Robert Gustafson, MD, FACS (Interim) - M.D. (West Virginia University School of Medicine)
Faculty Services
- James P. Griffith - M.D. (West Virginia University School of Medicine)
Charleston Campus Student Services
- Stephen Hoffmann - MD (University of Cincinnati)
Clinical Programs
- Rosemarie Cannarella Lorenzetti - M.D. (West Virginia University School of Medicine)
Eastern Campus Student Services

ASSOCIATE DEAN FOR RESEARCH

- Laura F. Gibson - PhD (West Virginia University School of Medicine)

ASSISTANT DEANS

- Kathleen Bors - M.D. (West Virginia University School of Medicine)
Charleston Campus
- Julie Green
Finance
- Linda Nield - M.D. (Dartmouth Medical School)
Admissions for the MD degree program
- Becky Stauffer - CPA
Finance
- Manuel Vallejo - MD DMD (West Virginia University School of Medicine)
Graduate Medical Education and DIO
- Dorian Williams - M.D. (West Virginia University School of Medicine)
Technology & Simulation

ASSOCIATE VICE PRESIDENT FOR HEALTH SCIENCES

- John Linton - PhD
Dean, Charleston Campus
- Emma Morton Eggleston - M.D. (University of North Carolina)
Dean, Eastern Campus

Degree Designation Learning Outcomes

MASTER OF SCIENCE (MS) IN THE BIOMEDICAL SCIENCES

This program is designed to assist in the selection of a career path, albeit industry, teaching, or a professional program, and/or for the transition to a biomedical Ph.D. program. The first-year curriculum imparts a fundamental understanding of the functional components of a cell and the basis for regulation of cellular processes and organ systems. After selecting a mentor, students take additional courses that align with their research interests.

Students will:

- Integrate molecular, cellular, and integrative systems concepts
- Critically interpret the current scientific literature
- Develop critical thinking and problem-solving skills
- Design and interpret experiments to test molecular, cellular, and integrative systems mechanisms
- Demonstrate technical skills in conducting scientific experimentation
- Articulate, verbally and in writing, their understanding of concepts during scientific discussions
- Discuss relevant scientific ethical issues presented as case studies
- Engage with fellow students and faculty and demonstrate teamwork

MASTER OF SCIENCE (MS) IN CLINICAL AND TRANSLATIONAL SCIENCE

This program is designed to foster the training and career development of health professionals in clinical and translational research. The target group for this program is junior faculty, fellows, residents, and PhDs. Trainees acquire a well-rounded education in the areas of biostatistics, epidemiology, translational science, clinical trials, scientific ethics, and scientific writing (grant and manuscript) and obtain research training in a mentored environment.

Students will:

- Differentiate between parametric and nonparametric methodologies
- Test hypotheses, using statistical software (SAS, R) to perform basic biostatistical analyses
- Examine mortality and morbidity trends
- Measure frequency and association
- Design research studies and interpret data
- Screen from an epidemiological perspective
- Translate research discoveries into policies and practices that promote health
- Critically evaluate the clinical trial literature
- Design an original clinical trial
- Write a grant proposal and manuscript
- Discuss relevant scientific ethical issues presented as case studies

MASTER OF SCIENCE (MS) IN EXERCISE PHYSIOLOGY

This program is designed with a clinical and a thesis track. The clinical track specializes in working with persons with diseases such as obesity, cardiovascular disease, and diabetes and aging. The thesis track provides opportunities for students to study mechanisms leading to and contributing to health diseases and disparities and to understand the impact of exercise on these health issues. The graduates of the masters program will become leaders who will supervise Exercise Physiologists in hospitals, rehabilitation, aquatic therapy programs, fitness, or academic settings.

Students will:

- Critically apply theories, methodologies, and knowledge to address fundamental questions in health specific issues related to exercise physiology
- Demonstrate skills in written and oral communication and critical thinking by critically analyzing research that is significant and novel in exercise physiology and within the sub-discipline associated with it
- Plan and conduct this research or implement this project under the guidance and approval of their research mentors while developing the intellectual independence that typifies true scholarship (thesis track students)
- Critically evaluate published research data and demonstrate clinical skills in working with patients and evaluating health and exercise-stress test data for appropriate exercise treatment (clinical track students)
- Follow the principles of ethics associated with appropriate research conduct (thesis track students) or clinical treatment of patients (clinical track students)
- Interact productively with people from diverse backgrounds including mentors and team members/peers with integrity and professionalism

MASTER OF SCIENCE (MS) IN THE HEALTH SCIENCES

This is a terminal degree program targeting students interested in developing their skills toward a career requiring knowledge in the biomedical sciences. The objectives of this program are to:

- Provide integrative scientific education in the biomedical and public health sciences to graduates from an accredited undergraduate institution
- Develop integrative and critical thinking skills to allow application of scientific knowledge to traditionally non-scientific fields
- Train students in the rudiments of research on a basic science, public health, or clinical topic, including hypothesis testing, data collection, and manuscript preparation
- Enhance students' competitiveness for admission to a health professional and/or Ph.D. program
- Provide the opportunity to explore career options in various health professional disciplines
- Enhance skills for job placement including resume and cover letter evaluation, and interviewing preparation

Students will:

- Demonstrate mastery of basic science information in at least two basic science courses
- Demonstrate mastery of core public health knowledge
- Be able to learn new information via reading the scientific literature and attending seminars
- Demonstrate mastery of public speaking and written communication skills

- Be able to develop novel hypotheses, collect data to test this hypothesis, and report their findings
- Enhance their competitiveness for career placement

MASTER OF OCCUPATIONAL THERAPY (MOT)

This program is designed to meet the needs of rapidly changing and dynamic health and human services delivery systems that require the occupational therapist to possess basic skills as a direct care provider, consultant, educator, manager, researcher, and advocate for the profession and the consumer.

Students will:

- Successfully complete the coursework and fieldwork components of the program; completing the program with a grade point average of 3.0 or higher and a passing grade on all fieldwork
- Graduate within a time frame of three years following acceptance to the program; completing all academic work, clinical fieldwork, and community service within that time frame
- Demonstrate professional behaviors, attitudes, and values that are in agreement with and as outlined in the West Virginia Student Occupational Therapy Program Handbook and the American Occupational Therapy Association (AOTA) Occupational Therapy Code of Ethics and Ethics Standards
- Demonstrate an appreciation for the attitudes, values, and behaviors of peoples of various cultures and backgrounds
- Utilize an occupation and evidence-based approach as components of occupational therapy practice.
- Successfully complete all elements of a master degree level research project including an oral presentation.
- Demonstrate the ability to adapt to appropriate, varying, and novel situations and circumstances within their educational and clinical environments.
- Demonstrate the ability to frame issues and problems of human occupation that are consistent with and reflective of current frames of reference and theoretical models and approaches within the profession of Occupational Therapy.
- Demonstrate an appreciation for and understanding of the value of professional advocacy and promotion of the profession of Occupational Therapy
- Demonstrate entry-level competence in areas of evaluation, treatment, communication, critical reasoning, and leadership upon graduation
- Develop the skills necessary, as well as an appreciation, for becoming a life-long learner

All graduates must:

- Have acquired, as a foundation for professional study, a breadth and depth of knowledge in the liberal arts and sciences and an understanding of issues related to diversity
- Be educated as a generalist with a broad exposure to the delivery models and systems used in settings where occupational therapy is currently practiced and where it is emerging as a service
- Have achieved entry-level competence through a combination of academic and fieldwork education
- Be prepared to articulate and apply occupational therapy theory and evidence-based evaluations and interventions to achieve expected outcomes as related to occupation
- Be prepared to articulate and apply therapeutic use of occupations with individuals or groups for the purpose of participation in roles and situations in home, school, workplace, community, and other settings
- Be able to plan and apply occupational therapy interventions to address the physical, cognitive, psychosocial, sensory, and other aspects of performance in a variety of contexts and environments to support engagement in everyday life activities that affect health, well-being, and quality of life
- Be prepared to be a lifelong learner and keep current with evidence-based professional practice
- Uphold the ethical standards, values, and attitudes of the occupational therapy profession
- Understand the distinct roles and responsibilities of the occupational therapist and occupational therapy assistant in the supervisory process
- Be prepared to effectively communicate and work inter-professionally with those who provide care for individuals and/or populations in order to clarify each member's responsibility in executing components of an intervention plan
- Be prepared to advocate as a professional for the occupational therapy services offered and for the recipients of those services

Be prepared to be an effective consumer of the latest research and knowledge bases that support practice and contribute to the growth and dissemination of research and knowledge

DOCTOR OF PHYSICAL THERAPY (DPT)

This program is designed to educate individuals with the knowledge, skills, and behaviors consistent with professional excellence. Working as part of a community of professionals, the program strives to advance practice characterized by independence, professional judgment, and involvement.

Graduates will:

- Demonstrate basic and applied knowledge necessary to practice PT as a member of the health care team in diverse settings
- Demonstrate the ability to make sound clinical decisions using information literacy skills, critical thinking, and scientific evidence
- Find employment with special emphasis on recruitment and retention of graduates in WV

- Adhere to core professional values
- Demonstrate the ability to practice independently
- Adhere to legal and ethical standards
- Demonstrate a life-long commitment to the profession by activity in professional organizations, scholarship, education, and advocacy
- Deliver high quality physical therapy services to individuals and communities across a continuum of care, including rural settings.
- Demonstrate sound, independent clinical decisions utilizing information literacy, critical thinking skills, and scientific evidence
- Function as a unique member of the health care team, including receiving and providing appropriate referrals
- Provide culturally sensitive care distinguished by advocacy, trust, respect, and an appreciation for individual differences
- Demonstrate a commitment to the health of the community through participation in primary and secondary prevention programs
- Actively engage in local and professional advocacy in a changing health care environment

DOCTOR OF MEDICINE (MD)

This program is designed for students to develop knowledge, skills, and attitudes across six (6) competency areas: Patient Care, Medical Knowledge, Practice-Based Learning and Improvement, Interpersonal and Communication Skills, Professionalism, and Systems-Based Practice.

Students will:

Provide patient care that is compassionate, appropriate, and effective and promote life-styles that promote improved health:

- Gather essential and accurate patient information, including a complete and appropriately organized medical history and physical examination
- Evaluate patient information in order to formulate complete and accurate differential diagnoses and apply appropriate diagnostic tests to confirm diagnoses
- Develop patient management plans that are evidenced-based and considerate of cultural and ethnic preferences
- Counsel and educate patients and their families about prevention strategies, diagnostic tests, treatment options/plans, and patient orders/prescriptions
- Perform medical procedures appropriately and professionally
- Partner with patients to prevent health problems and improve health status

Demonstrate knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences and apply this knowledge to patient care:

- Describe normal structure and function of the human body and each organ system over the lifespan
- Describe molecular, cellular, and biochemical mechanisms of homeostasis
- Describe and apply normal cognitive and social growth and development of humans to diagnose abnormal cognitive and social development
- Describe causes of altered structure and function of organ systems and tissues that result in disease (genetic, developmental, nutritional, toxic, infectious, inflammatory, neoplastic, degenerative, traumatic, and behavioral)
- Describe foundations of diagnostic methods, therapeutic interventions, outcomes, and prevention with respect to specific disease processes in individuals and populations
- Describe genetic and physiologic basis of individual patient response to drugs
- Describe and apply foundational principles of epidemiology, statistics, and ethics to diagnosis and treatment of disease
- Explain the effect of social determinants, health behaviors, and preventative measures on health status and disease of individuals and populations
- Demonstrate use of scientific method and critical evaluation of scientific literature in establishing causation, diagnosis, and therapy of disease

Demonstrate the ability to investigate and evaluate their role in the care of patients, to appraise and assimilate scientific evidence, and to continuously improve their role in patient care based on constant self-evaluation and learning:

- Locate, appraise and assimilate evidence from scientific studies including basic, clinical, translational, and community (population) based research
- Apply knowledge of study designs and statistical methods to appraise studies
- Use information technology to manage information and support patient care decisions
- Develop the skills necessary for lifelong learning, as evidenced by demonstrating independent and self-directed study
- Utilize strategies to identify and analyze strengths, deficiencies, and limits in one's knowledge, collaboration skills, and professionalism

Demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, peers, and health professionals:

- Communicate effectively and demonstrate caring and respectful behaviors with patients and families across a broad range of socioeconomic and cultural backgrounds
- Collaborate with a team of health care professionals to provide patient-focused, preventive, acute, chronic, continuing, rehabilitative, and end-of-life care

- Provide an accurate and complete oral presentation of a patient encounter
- Demonstrate effective communication and collaboration with all members of a health care team
- Write timely, legible, accurate and complete documentation of a clinical encounter in written or electronic format

Demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles:

- Demonstrate respect, compassion, integrity, responsiveness to needs of patients, society, and profession that supersedes self-interest
- Demonstrate a commitment to ethical principles, including provision or withholding of care, confidentiality, informed consent, and respect for patient privacy and autonomy
- Demonstrate sensitivity and responsiveness to a diverse patient population, including but not limited to diversity in culture, age, gender, race, religion, disabilities, sexual orientation, and health
- Create and sustain a therapeutic and ethically sound relationship with patients
- Demonstrate timeliness and punctuality in the execution of learning and clinical duties

Demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to learn about other resources in the system to promote optimal health care:

- Define the roles of health care professionals and demonstrate how inter-professional collaboration improves patient safety, patient-centered outcomes, and system performance
- Describe and distinguish effective methods of organizing, financing, and providing health care
- Describe how the prevention and treatment of healthcare disparities may affect individual patients, populations, and the healthcare system
- Advocate for quality patient care, as evidenced by recognizing system limitations and failures and contributing to healthcare safety and improvement

DOCTOR OF PHILOSOPHY (PHD)

PhD in the Biomedical Sciences

Students in the first semester of year one in the Biomedical Sciences Graduate Programs take a common core curriculum that covers topics important to all biomedical sciences graduate programs. In addition, they begin training in the responsible conduct of research, and they conduct three short lab experiences to assist in the selection of a faculty mentor for dissertation research. The intended outcomes the first year in graduate school are to match with a faculty investigator who will guide the student to completion of dissertation research, and to successfully transfer into one of the Ph.D. degree-granting biomedical sciences programs.

Students will:

- Integrate molecular, cellular, and integrative systems concepts
- Critically interpret the current scientific literature
- Develop critical thinking and problem-solving skills

Demonstrate technical skills in conducting scientific experimentation

- Articulate, verbally and in writing, the understanding of concepts during scientific discussions
- Discuss relevant scientific ethical issues presented as case studies
- Apply responsible research practices to the conduct of their experiments
- Engage with fellow students and faculty and demonstrate teamwork

PhD in Biochemistry & Molecular Biology

Students will:

- Demonstrate a general knowledge of physics, chemistry, biology and cell biology, biochemistry and molecular biology, and a detailed knowledge of his or her area of research
- Be familiar with the research literature in biochemistry and in their specific field of study and should have the ability to keep abreast of major developments and to acquire a working background in any area
- Demonstrate skill in the recognition of meaningful problems and questions for research in Biochemistry and Molecular Biology
- Possess technical skill in laboratory manipulation
- Demonstrate that oral, written, and visual communication skills have been acquired
- Demonstrate skill in designing experimental protocols and in conducting productive self-directed research

PhD in Cancer Cell Biology

Students will:

- Stimulate critical thinking and communication of content related to cancer research to expert and non-expert audiences
- Understand the fundamental aspects of cancer origin, progression, and treatment
- Develop a basic understanding of the cancer types recognized as national health disparities to state residents
- Acquire in-depth knowledge about specific molecular and cellular aspects of cancer biology germane to the specific studied cancer type
- Become skilled in writing, publishing, and presenting cancer-based research findings to respected peer-reviewed journals, as well as at institutional, regional, and national meetings
- Understand the additional impact of student-based cancer research related to community outreach and health outcomes in the West Virginia, national, and international populations
- Understand how basic science advances in cancer research correspond and potentially impact changes in clinical patient management (bench to bedside)
- Be able to interact with and comprehend fundamental aspects of clinical cancer care in a cancer-specific manner and how it pertains to basic cancer research (bedside to bench)
- Remain current with recent advances in the cancer literature and with major advances in the field during and after graduation from the program
- Be competitive in securing and conducting post-doctoral research in academic, industrial, or government settings
- Be prepared to pursue alternative non-research careers related to cancer in fields of their choosing

PhD in Cellular & Integrative Physiology

Students will:

- Develop a vocabulary of appropriate terminology to effectively communicate information related to physiology
- Recognize anatomical structures and explain physiological functions of body systems
- Recognize and explain the principle of homeostasis and the use of feedback loops to control physiological systems
- Use anatomical knowledge to predict physiological consequences, and use knowledge of function to predict the features of anatomical structures
- Recognize and explain the interrelationships within and between anatomical and physiological systems of the human body
- Synthesize ideas to make a connection between knowledge of anatomy and physiology and real-world situations, including healthy lifestyle decisions and homeostatic imbalances
- Interpret graphs of anatomical and physiological data
- Demonstrate information literacy skills to access, evaluate, and use resources to stay current in the field of physiology
- Approach and examine issues related to physiology from an evidence-based perspective
- Communicate clearly and in a way that reflects knowledge and understanding of physiology and demonstrates the ability to adapt information to different audiences and applications

PhD in Exercise Physiology

Students will:

- Attain a comprehensive understanding of the important cellular and system processes that are regulated by exercise, lack of exercise, and clinically relevant diseases
- Develop a vocabulary of appropriate terminology to effectively communicate information related to exercise physiology
- Acquire a foundation for critically applying theories, methodologies, and knowledge to address fundamental questions in health-specific issues related to exercise physiology
- Obtain independent and critical thinking skills requisite for designing, conducting, and interpreting research data in an effort to advance knowledge related to health and disease through creative and innovative research
- Effectively communicate knowledge through oral and written means by disseminating research findings that have the potential to improve the health and livelihood of citizens of the state, nation, and world
- Demonstrate principles of ethics associated with appropriate research conduct

PhD in Immunology and Microbial Pathogenesis

Students will:

- Attain a comprehensive understanding of how the immune systems of humans and other animals function, and integrate this with an understanding of the diversity of microorganisms that cause disease in humans and other mammals
- Acquire a comprehensive knowledge of the life cycle and functioning of microorganisms and how they cause disease in mammals
- Develop novel hypotheses, test these experimentally, and interpret, evaluate and report the results
- Demonstrate excellent skills in written and oral communication

- Demonstrate the ability to understand the relationship between science and society and discuss ethical issues in immunology and microbial pathogenesis

PhD in Neuroscience

Students will:

- Have a basic knowledge in the principles of neuroscience including cellular and molecular biology of neurons, developmental neurobiology, systems neuroscience (motor systems, somatosensory systems, behavior, cognition, neural diseases) and neuroscience methods
- Demonstrate current knowledge of topics in neuroscience
- Formulate hypotheses and conduct cutting edge research

PhD in Pharmaceutical & Pharmacological Sciences

Students will:

- Be able to pursue independent research in specialized fields in interdisciplinary teams and to function and contribute as members of research teams
- Be competent scientists able to contribute to health-related research, industrial research and development, pharmaceutical education, and scholarship
- Learn basic and applied principles in specific disciplines and related fields in order to develop a broad background of knowledge
- Develop research skills including scientific communication and critical thinking/problem solving ability by participating in seminars and designated research skill courses
- Gain hands-on experience in conducting original research, including acquisition of background information (e.g., literature research), experimental design, and experimentation
- Develop research communication skills by writing abstracts for research presentations, manuscripts for publication, research grant proposals, and a thesis or dissertation
- Gain additional insight into research and scholarship by participating in scholarly exchanges with faculty and students in the WVU School of Pharmacy, the Health Sciences Center (HSC), and the West Virginia University community

Doctoral Degrees

Policies for the Doctor of Medicine (MD) degree may be found in the MD Degree Student Handbook. This includes but is not limited to policies for evaluation and advancement as outlined in the Policy on Academic and Professional Standards Governing the MD Degree program.

The policies for the Doctor of Philosophy degree in the School of Medicine include program specific requirements, School of Medicine specific requirements and University wide requirements. Students should become familiar with the WVU graduate catalog and the handbooks provided to them by their graduate program and upon entry into graduate school.

Required Research Participation

Because the Doctor of Philosophy is a research degree, students will be expected to be involved in research from the beginning of their programs. Doctoral students participate in research rotations with faculty during the first, and if necessary, the second semester of enrollment. Students may choose a dissertation advisor in the first semester of study or by the end of year one. With the aid of the student's advisor a dissertation committee is chosen in the second year of enrollment. Students should work with their dissertation advisor to design appropriate pilot studies and with the data identify a dissertation project and appropriate research questions/hypothesis to be tested by the proposed research. All approved research projects must be hypothesis-based, and whenever possible, the research questions should address mechanistic questions that explain biological phenomenon relevant to the field of study.

Research is conducted throughout the doctoral program with the requirement that one manuscript, based on the student's dissertation research, is accepted for publication in a peer-reviewed scientific journal before defense of Ph.D. dissertation research. Students should strive to present their research findings at a minimum of one national/international meeting annually beginning in the second year of enrollment in the doctoral program.

Directed Research

All preliminary research must be collected under the supervision and approval of the dissertation chair, which is most graduate programs is the student's advisor. The student is expected to engage in directed research under the supervision of the dissertation advisor to learn techniques and collect pilot data that will be the basis of a future dissertation project. Studies to obtain pilot data should be presented to the dissertation committee to demonstrate the student's competency in research skills and that his/her research ideas and hypotheses are appropriate and justified. This process facilitates progression through the program in a timely and efficient manner. Nevertheless, the dissertation committee may require the student to obtain additional pilot data or research skills prior to approving the research proposal as a dissertation topic. The student's directed research efforts should be progressing towards approval of a dissertation topic from the members of the dissertation committee, once they have been identified (before the end of the first semester of year two). This research training will provide the student background data/information from which to base a pre-doctoral grant proposal and dissertation topic as part of the requirements for completing the defense of the Dissertation Proposal.

Comprehensive/Qualifying Examination

The comprehensive (qualifying/candidacy) examination is usually given after most formal coursework has been completed and, in general, will test the scientific knowledge pertinent to the student's chosen Ph.D. training program. The individual graduate programs conduct these examinations at different times and use different formats. Depending on the graduate program, the qualifying exam is scheduled either at the end of year one or year two or in association with the proposal defense.

Requirements of the Dissertation Proposal/Candidacy Examination

Graduate students are admitted to Ph.D. candidacy after successfully defending the Dissertation Proposal. The candidacy examination consists of writing a grant proposal, formatted similar to a National Institutes of Health pre-doctoral grant, and orally defending the dissertation proposal to the student's dissertation committee. Advancement to candidacy means that in the judgment of the faculty, the doctoral student has an adequate knowledge of their research area, knows how to use academic resources, and has potential to do original independent research. In other words, the student is qualified to complete the doctoral dissertation. No student with a grade point average of less than 3.0 will be eligible to take this examination.

Failure to successfully complete the Comprehensive Examination or the Dissertation Proposal by the end of the third year in graduate school is grounds for dismissal. A student has two attempts to pass the exam. Failure on the first attempt requires the student petition and receive approval from the dissertation committee to retake either exam a second time.

General Dissertation Requirements

The student must complete a dissertation in which they have obtained original data that makes a novel and important contribution to knowledge in the field of study and submit all manuscripts containing these data to peer-reviewed journals. At least one manuscript with the student as first author must be accepted for publication prior to defense of the dissertation. The dissertation must be constructed in a format suitable to the graduate school and the advisor. Preferable formats will include writing the data chapters as if they have been submitted to peer-reviewed journals (including abstract, introduction, methods and materials, results, discussion, and literature cited in each chapter). In addition, the final one to two chapters of the dissertation should include an integrative discussion concerning the total research project and evaluation of hypotheses that were tested.

Completion of the Ph.D. degree requires a written dissertation that is presented orally in front of a public forum and defended in private to the student's dissertation committee. To pass, the student must receive the approval of 4 of the 5 members on the dissertation committee.

Student Evaluations

Students are formerly evaluated annually by the dissertation committee and the program faculty with respect to courses, research, teaching, professional development, and progress through the program. The student also annually completes an Individual Development Plan that is reviewed by the student's advisor.

The MD program within the School of Medicine has specialized accreditation through the Liaison Committee on Medical Education (LCME).

The MHS in Pathologist's Assistant program within the School of Medicine has specialized accreditation through the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS).

The PhD in Physical Therapy program within the School of Medicine has specialized accreditation through the Commission on Accreditation in Physical Therapy Education.

The following list are Residency specialty training programs for MD degree holders include:

Anesthesiology within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) and Residency Review Committee for Anesthesiology.

Child and Adolescent Psychiatry within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) and Residency Review Committee for Psychiatry.

Dermatology within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) and Residency Review Committee for Dermatology.

Emergency Medicine within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) and Residency Review Committee for Emergency Medicine.

Family Medicine within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) with Residency Review Committee for Family Medicine.

Forensic Psychiatry within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) and Residency Review Committee for Psychiatry.

Geriatrics-Rural within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education with (ACGME) Residency Review Committee for Family Medicine.

Hematopathology within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) and Residency Review for Pathology.

Neonatology Fellowship within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) and Residency Review Committee for Pediatrics.

Neurology within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) and Residency Review Committee for Neurology.

NeuroRadiology Fellowship within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) and Residency Review Committee for Radiology.

Neurosurgery within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) with Residency Review Committee for Neurological Surgery.

Obstetrics and Gynecology within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) and Residency Review Committee for Obstetrics and Gynecology.

Ophthalmology within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) and Residency Review Committee for Ophthalmology.

Ophthalmic Plastic and Reconstructive Surgery within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) and Residency Review Committee for Ophthalmology.

Orthopedic Surgery within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) and Residency Review Committee for Orthopedic Surgery.

Otolaryngology within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) and Residency Review Committee for Otolaryngology .

Pathology within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) and Residency Review for Pathology.

Pediatrics within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) and Residency Review Committee for Pediatrics.

Plastic Surgery within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) and Residency Review Committee for Plastic Surgery.

Psychiatry within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) and Residency Review Committee for Psychiatry.

Radiation Oncology within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) and Residency Review Committee for Radiation Oncology.

Radiology Diagnostic within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) and Residency Review Committee for Radiology.

Rural Family Medicine (Harper's Ferry) within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) with Residency Review Committee for Family Medicine.

Surgery within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) and Residency Review Committee for Surgery.

Transitional Year within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) with Residency Review Committee for Transitional Year.

Urology within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) with Residency Review Committee for Urology.

Vascular Surgery within the School of Medicine has specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) and Residency Review Committee for Surgery.

The following programs within the School of Medicine have specialized accreditation through the Accreditation Council for Graduate Medical Education (ACGME) and Residency Review Committee for Internal Medicine: Core Internal Medicine, Cardiovascular Disease, Gastroenterology,

Endocrinology, Hematology/Oncology, Infectious Diseases, Interventional Cardiology, Nephrology, Pulmonary/Critical Care Medicine, and Rheumatology.