



GRADUATE SCHOOL OF BIOMEDICAL SCIENCES

**Forensic Genetics
Student Handbook
2019-20**

The information provided in this document serves to supplement the requirements of the Graduate School of Biomedical Sciences detailed in the UNTHSC Catalog with requirements specific to the discipline of Forensic Genetics.

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Forensic Genetics Discipline

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Graduate Faculty: Allen; Phillips; Planz; Warren

A specialized program designed to offer a focused learning experience in forensic genetics with an emphasis on hands on training in current and future DNA technologies. The program prepares individuals for careers in forensic DNA sciences, emphasizing the application of current methods and technologies to human identification. The program was designed to meet all educational and many training requirements for Forensic DNA Analysts and Technical Leaders as outlined in the National Quality Assurance Standards for Forensic DNA Testing Laboratories adopted by the Federal Bureau of Investigation.

Forensic Genetics Graduate Faculty and Their Research

Michael Allen, PhD

Associate Professor, Microbiology, Immunology & Genetics
Category III



Our research focuses on understanding the ecological principles and factors that underlie microbial community dynamics in living and engineered systems, the mechanisms bacteria use for sensing changes in their environment, and the global genetic regulatory systems involved in adaptation. Specific areas of interest include: the microbiomes of ticks and other vectors and how these influence disease transmission, methods to manipulate microbial community composition, genetically engineered microbes as therapeutic treatments, lung microbiomes and disease resistance, and applications of microbial community analysis in forensics.

Nicole Phillips, PhD, MS

Assistant Professor, Microbiology, Immunology & Genetics
Category II



We are interested in how genetics and lifestyle intersect in diseases that are increasingly prevalent with advancing age. We study the underlying genetics of the co-occurrence of type 2 diabetes and Alzheimer's disease in Mexican American populations where there is an increased burden of both conditions. We also study genetic factors that may confer risk for Alzheimer's and cancer, which have a reported inverse relationship. By studying individuals who have co-occurrence of multiple conditions, we hope to learn what genetic factors may render some people more vulnerable than others to age-related changes in metabolic function and cognition. In doing so, more tailored therapies for individual risk factors may be developed to better treatment and prevention strategies in at-risk populations.

John V. Planz, PhD

Associate Professor, Microbiology, Immunology & Genetics
Category III



Dr. Planz's research interests are in the areas of molecular evolutionary genetics and population genetics applications for studying inter- and intra-specific diversity and the effects of admixture on energy metabolism, genetic diseases and the genetics aspects of health disparities. Dr. Planz's lab is currently optimizing approaches related to Nanopore sequencing which allow for long read (>10KB) direct sequencing of genomic DNA. These methods will allow for direct phasing of polymorphisms in gene regions, exon/intron junctions and recombination hotspots. These approaches are being applied to mitochondrial genome studies, microbial genome characterization and evaluation of recombination signatures and their biomedical impact in admixed populations, especially Hispanics.

Joseph Warren, PhD

Assistant Professor, Microbiology, Immunology & Genetics
Category III



Dr. Warren's main research interest include mutation rates of human mitochondrial DNA and it's implications for human identification, development of Y- STR test kits, the mechanisms of PCR inhibition and improved methods for DNA analysis on skeletal remains and other compromised samples and the viability of using human blood substitutes in the training of bloodstain pattern analysts.

Requirements

The requirements below are in addition to the GSBS requirements listed in the [GSBS Degree Programs](#) chapter of the [UNTHSC Catalog](#).

Students are responsible for their own completion of the requirements and each item must be completed in the sequence and time period indicated. Forms are subject to revision and should be obtained from the Graduate School of Biomedical Sciences at: The Department of Molecular and Medical Genetics follows all [UNTHSC Graduate School of Biomedical Sciences Guidelines for M.S. & Ph.D. Degrees, Forms](#), and [Graduation Deadlines](#). It is the responsibility of the student to meet or exceed these criteria.

The Graduate School of Biomedical Sciences Admission Committee will review all applicants for acceptance into the Forensic Genetics Master of Science Professional Program. The applications are evaluated on overall GPA, GPA in specific coursework related to Forensic Genetics, GRE scores, letters of recommendations, transcripts, student's comments and experiences. A student must meet the general requirements of the graduate school as described in the current graduate catalog. All applications must be completed and received into the Graduate School according to the deadlines on the academic calendar posted by the Graduate School.

During the student's first semester a major professor will be chosen by the student with the consent of the faculty member, from within the department and an advisory committee consisting of two other graduate faculty members will be determined. One of the two faculty members has to be from the Department of Microbiology, Immunology and Genetics, the other can be a faculty member from another department in the GSBS, or school in the UNTHSC or at another university or forensic laboratory if their participation will aid a student in obtaining specific expertise needed for their thesis research. After receiving consent from all committee members, the student must complete and submit the [Designation of Advisory Committee](#) form for transmittal to the GSBS office. When the advisory committee has been formed, the dean will appoint a University Member. All advisory committee members must have UNTHSC GSBS graduate faculty status.

Students in the Forensic Genetics program are required to take the Core Curriculum courses that focus on Biochemistry, Molecular and Cell Biology and Genetics.

Students experiencing difficulty in the Core Curriculum courses are highly encouraged to contact the Course Director responsible for the material for additional assistance. The students are also encouraged to contact the Course Director(s) for assistance and/or clarification of course expectations. Academic assistance is available to all students in The Center for Academic Performance (CAP), located in EAD 254. An appointment can be made with the CAP by email CAP@live.unthsc.edu, or by calling 735-2505, Monday through Friday, 8 AM - 5 PM.

Upon completion of the program's coursework, the student will complete a moot court experience (FGEN 5095) which serves as their oral qualifying exam. Grading is on a Pass/Fail basis and the grade will be determined by the FGEN scoring criteria. The student is permitted

two attempts to pass the qualifying examination. Failure to pass the qualifying examination after two attempts will result in dismissal from the program.

Students may begin working on their thesis or internship practicum project anytime after they have a major professor and assembled their research advisory committee. The thesis research or internship project proposal must be approved by the research advisory committee and filed with the graduate school prior to the semester the student first enrolls in thesis (BMSC 5395) or Internship Practicum (BMSC 5697). **Beginning in the 2nd Spring Semester of the program the student is focused on completing their hypothesis-driven thesis research or internship practicum project. The student needs to be aware that completion of the thesis or internship may take longer than the Second Spring semester and the student is required to maintain enrollment until the successful completion of the thesis.**

The proposal is to follow the [GSBS Proposal Guidelines](#). A finalized proposal, approved by their major professor, is to be submitted to their advisory committee no later than 5 working days from the beginning of their individual research project. Once a student has enrolled in thesis, he/she must maintain continuous enrollment in thesis (BMSC 5395) or internship practicum (BMSC 5697) until the thesis has been approved and accepted by the Graduate School. Failure to maintain continuous enrollment will either invalidate any previous thesis credit or will result in the student's dismissal from the degree program unless granted an official leave of absence by the graduate dean for medical or other exceptional reasons.

Students will present their work in an oral presentation and written thesis. The oral presentation will be open to the public and will be followed by a private defense with the advisory committee. Students should coordinate the reservation of a seminar room with the department's graduate secretary a minimum of one (1) month prior to the intended defense date. The major professor must approve the thesis prior to the student submitting it to committee members. Committee members must receive the approved thesis a minimum of ten working days prior to the scheduled defense date. Committee members can also review the thesis and direct comments to students prior to oral defense.

Following the defense, the major professor together with the other members of the committee will assign a Pass/Fail for BMSC 5395 or BMSC 5697 based on guidelines outlined in the [MS Defense Scoring Rubric](#). The student must submit the signed [Report of Final Comprehensive Examination \(Defense\)](#) form to the GSBS office. A copy of the approved Thesis must be submitted to the graduate school before graduation in accordance with the graduate school rules and time limits for the Master's thesis.
(<http://www.hsc.unt.edu/education/gsbs/gradinstructions.cfm>)

Students are instructed to reference the current GSBS catalog for general Masters degree requirements and timelines.

Laboratory Requirements

Students will participate in several laboratory courses during their tenure in the program. These laboratory courses require that students will, on occasion, handle hazardous chemicals. Students will be instructed in the proper handling of any chemical hazards. Students are expected to provide two laboratory coats, one pair of safety glasses and a bound laboratory notebooks capable of generating removable copies. Nitrile or latex gloves will be provided to the students. Students must inform the Course Director(s) of any allergies or any other health issues that might affect their ability to participate fully in these courses. A student who is pregnant, suspects that she is pregnant, or becomes pregnant during these courses should consult the [*UNTHSC Online Policy Manual, 07 – Student Affairs, Education and Funding, Number7.104 “Participation in Special Environments”*](#) for information.

Academic Dishonesty: Instances of cheating or other academic dishonesty will be handled according to the Policies of the University of North Texas Health Science Center, Section 07, [*Number 7.126 Student Code of Conduct and Discipline.*](#)

The UNT Health Science Center reserves the right to make changes at any time to reflect current board policies, administrative regulations and procedures, and/or amendments by state law and fee changes. Information provided in this document is subject to change without notice and does not constitute a contract between the UNT Health Science Center and a student or an applicant for admission. The institution is not responsible for any misrepresentation or provisions that might arise as a result of errors in preparation.

Director(s) of any allergies or any other health issues that might affect their ability to participate fully in these courses. A student who is pregnant, suspects that she is pregnant, or becomes pregnant during these courses should consult the [*UNTHSC Online Policy Manual, 07 – Student Affairs, Education and Funding, Number7.104 “Participation in Special Environments”*](#) for information.

FGEN Curriculum

The following curriculum is required for all students enrolled in the Forensic Genetics Master of Science program:

MS Degree Plan for FGEN MS		
Year 1: Fall		
BMSC 6201	Fundamentals of BMSC 1	2 SCH
BMSC 6202	Fundamentals of BMSC 2	2 SCH
BMSC 6203	Fundamentals of BMSC 3	2 SCH
MIMG 5305	Introduction to Molecular Laboratory Methods	3 SCH
MIMG 5101	Forensic Hair Analysis	1 SCH
MIMG 5170	Journal Club in Genetics	1 SCH
BMSC 6200	Experimental Design and Biostatistics	2 SCH
Year 1: Spring		
BMSC 5160	Responsible Conduct in Research (Biomedical Ethics)	1 SCH
MIMG 6301	Molecular Genetics	2 SCH
MIMG 5170	Journal Club in Genetics	1 SCH
MIMG 5304	Forensic Anthropology	1 SCH
MIMG 5203	Overview of Forensic Sciences	3 SCH
MIMG 5306	Basic Methods in Forensic Molecular Genetics	3 SCH
Year 1: Summer 2		
MIMG 5307	Advanced Methods in Forensic Molecular Genetics	4 SCH
Year 2: Fall		
MIMG 5400	Biological Evidence Evaluation	4 SCH
MIMG 5401	Population Genetics and Forensic Statistics	3 SCH
MIMG 5170	Journal Club in Genetics	1 SCH
MIMG 5300	Expert Testimony in Forensic Science	3 SCH
MIMG 5102	Blood Spatter Analysis	1 SCH
Year 2: Spring		
MIMG 5095	Oral Qualifying Exam - Moot Court	0 SCH
BMSC 5998	Individual Research	6 SCH
BMSC 5395/5697	Thesis/ Internship Practicum	3 SCH
TOTAL		49 SCH

Current Topics

All students in the Forensic Genetics discipline required to enroll and participate in the Seminar in Current Topics course (MIG 5103) during each Fall and Spring semester of their first year and Fall semester only of their second year. Students are responsible for presenting a synopsis and critical review of an assigned journal article. Students in the second year of their Professional Master's Forensic Genetics discipline are exempt from enrolling in the Current Topics Course starting in the Spring semester of their second year.

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All Course Descriptions can be found in the Catalog

<https://www.unthsc.edu/graduate-school-of-biomedical-sciences/catalogs/>

Opportunities for Graduates in Forensic Genetics

Graduates of the Forensic Genetics program have found employment in federal, state, regional, city and private forensic laboratories as forensic biologist and DNA analysts. This program also provides the groundwork for someone who wants to obtain doctorate level education in genetics, molecular biology medicine or even law.

Obtaining a Master of Science degree in Forensic Genetics will also provide an opportunity to advance into management positions such as DNA Technical Leader/ Manager, DNA Section Supervisor or Laboratory Director.

A graduate, who is a new employee will typically undergo a six month to one year period of training and then start at a basic analyst level which entails identifying evidence and performing presumptive and confirmatory biological testing. The next step will involve promotion to becoming a DNA analyst where the responsibility involves independent DNA testing, analysis and interpretation of casework. A DNA analyst will also be required to testify in court when needed.

The next stage is a Technical Leader or Manager. The requirements for this position are three years experience as a DNA analyst and a Master of Science degree in a biological or forensic science. An MS in Forensic Genetics provides all of the criteria need to qualify as a Technical Leader/Manager minus the three years experience. A Technical Leader/Manager is responsible for reviewing all DNA case files and laboratory reports, validating and implementing new technologies and methods, DNA section Quality Control/ Quality Assurance and training of laboratory personnel .

Other opportunities for graduates include working as a research assistant or scientist in an academic or private laboratory or as a science instructor at the high school or community college level. Graduates from the Forensic Genetics discipline have also gone on to obtain terminal degrees (Ph.D., M.D., D.O or J.D.) from a variety of universities.