ANATOMY, PH.D.

Saint Louis University's doctoral degree in anatomy provides training in clinical human anatomy and independent research for individuals seeking a career in teaching and research at the medical school or university level.

Teaching faculty and mentors in Saint Louis University’s anatomy Ph.D. program are drawn from a select group of scientists and clinicians at the School of Medicine. The anatomy faculty are united by their extensive experience in teaching and training young scientists, medical students and physicians-in-training.

Curriculum Overview
A total of 48 credits (36 credits of coursework and 12 credits of dissertation research) are required for graduation. A concentration in neurobiology provides training for students preparing for academic or professional careers in neuroscience-related areas.

Dissertation research is related to the Saint Louis University’s Center for Anatomical Science and Education's current research focus, including examining clinically relevant topics in neurobiology, pathology, and/or biological structure and function.

Fieldwork and Research Opportunities
Graduate students in anatomy at SLU perform research projects by working with a faculty mentor whose research interests match their own. Doctoral students are expected to publish and present a minimum of two research projects.

Faculty members are engaged in multidisciplinary research of biological structure and function ranging from ultrastructural to gross anatomical levels, with a major interest in clinically relevant anatomy and neurobiology. Other research interests include cell biology and pathobiology.

Facilities are available for autoradiography, electrophysiology, gel electrophoresis, immunoblotting, immunostaining (immunocytochemistry, immunohistochemistry, immunofluorescence), high-performance liquid chromatography, in situ hybridization, microsurgery, stereotoxic neurosurgery, microinjections and animal behavioral assays. The Saint Louis University Center for Anatomical Science and Education is also equipped to perform optical imaging, including bright field, phase contrast and fluorescence microscopy.

Careers
Possible careers for graduates with a Ph.D. in anatomy include medical doctor, allied health professional and university professor.

Admission Requirements
Applicants are admitted on a competitive basis and must have a B.S. or B.A. degree from an accredited U.S. college or university with a minimum overall GPA of 3.0 and/or science GPA of 2.8. In addition, applicants must have a GRE general test score at the 40th percentile.

Application Requirements
- Application form and fee
- Transcript(s)
- Three letters of recommendation

Requirements for International Students
All admission policies and requirements for domestic students apply to international students along with the following:

- Demonstrate English Language Proficiency
- Proof of financial support must include:
  - A letter of financial support from the person(s) or sponsoring agency funding the time at Saint Louis University
  - A letter from the sponsor’s bank verifying that the funds are available and will be so for the duration of study at the University
- Academic records, in English translation, of students who have undertaken postsecondary studies outside the United States must include the courses taken and/or lectures attended, practical laboratory work, the maximum and minimum grades attainable, the grades earned or the results of all end-of-term examinations, and any honors or degrees received. WES and ECE transcripts are accepted.

Application Deadlines
Students should apply by March 1 for fall admission.

Scholarships and Financial Aid
For priority consideration for graduate assistantship, apply by Feb. 1.

For more information, visit the student financial services office online at http://finaid.slu.edu.

Requirements

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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ANAT 5000</td>
<td>Human Gross Anatomy</td>
<td>8</td>
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<tr>
<td>ANAT 5100</td>
<td>Human Histology and Ultrastructure</td>
<td>5</td>
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<tr>
<td>ANAT 5200</td>
<td>Human Embryology</td>
<td>2</td>
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<td>ANAT 5300</td>
<td>Human Systems Neurobiology</td>
<td>5</td>
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<td>ANAT 5400</td>
<td>Human Systems Physiology</td>
<td>4</td>
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<tr>
<td>ANAT 5440</td>
<td>Basic Research Techniques</td>
<td>2</td>
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<tr>
<td>BBS 5100</td>
<td>Ethics for Research Scientists</td>
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<tr>
<td>BST 5000</td>
<td>Principles of Biostatistics</td>
<td>3</td>
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<td>ANAT 6900</td>
<td>Anatomy Journal Club</td>
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Elective Courses
Select 5-6 ANAT 6xxx courses

Dissertation Research

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<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ANAT 6990</td>
<td>Dissertation Research (taken over multiple semesters)</td>
<td>12</td>
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Total Credits 48

Neurobiology Concentration
For a concentration in Neurobiology, students must conduct dissertation research in neurobiology and are required to complete at least 7 credits from the following courses:
oral exam will be public and designed to test the student's fundamental knowledge of the graduate faculty and will be approved by program director. The preliminary experiments to substantiate the proposal and the dissertation submitted a detailed dissertation research proposal, conducted under the guidance of a faculty member. A Ph.D. dissertation committee will then be formed as the student prepares their research proposal.

Doctoral Oral Qualifying Examination
The qualifying exam is a written examination that is designed to test the student's fundamental knowledge of human structure and function, critical analysis and thinking, and design of an independent research proposal. An ad hoc exam committee will be constituted by the director of the anatomy graduate program and include five members of the graduate faculty, four of which shall be anatomists. The program director or associate director shall chair the committee. The written test shall occur over a five-day period (excluding weekends). The committee will request the faculty to submit questions on: material covered in any of the coursework completed by the student to date, research papers or reviews that will be provided to the student, and/or philosophical matters related to the history of anatomy and medicine or national or world events that impact medical education and biomedical research. The committee will review the submitted questions and questions will be selected or created by the committee to ensure the questions are fair and appropriate, that they test the student's knowledge base for areas of anatomy (gross anatomy, neuroanatomy, histology and embryology), and that they help evaluate the problem-solving skills of the student. Failing the qualifying exam will result in the student being recommended to be dropped from the Ph.D. program. In this case, the director of the anatomy graduate program can elect to offer the failed student the option of completing a terminal master's degree.

Non-Course Requirements
Qualifying Examination and Defense
After completing the core curriculum, Basic Research Techniques in Anatomy and Principles of Biostatistics, the student must prepare for and successfully pass the doctoral qualifying examination.

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Dissertation Defense
The defense of the dissertation provides an opportunity for the student to formally present their findings to their committee, the faculty and students in CASE, and to any family member or anyone from the general public wishing to attend. Two weeks before the dissertation defense, an electronic and print announcement of the date, time, location and title of the defense will be publicized to all members of CASE. A final draft of the student's dissertation must be placed in the anatomy conference room for faculty and students to review at least seven working days prior to the defense. The dissertation defense is two parts. First, the student will make an oral, PowerPoint presentation of no longer than 45 minutes duration where they present their research. Following the presentation, questions from the collective audience will be encouraged. Once all questions have been satisfactorily answered by the student, the audience is excused and the closed, or executive, part of the defense takes place with only the student and their committee present. The dissertation committee can ask detailed questions and expect the student to demonstrate thorough knowledge of their project and related research. Questions on general topics in anatomy, unrelated to their research, may also be asked. Following all questioning, the student is excused from the room and the committee members, without discussion, complete the defense ballot.

Continuation Standards
Students must maintain a cumulative GPA of 3.00 in all required graduate/professional courses.

Learning Outcomes
1. Graduates will be able to demonstrate:
   a. knowledge and application of the underlying concepts, advanced knowledge and analytical approaches used in general and advanced gross anatomy, microscopic anatomy, neuroanatomy, physiology, and embryology;
   b. the application of current scientific literature, especially in areas representing gaps of knowledge, through framing hypotheses-
driven experiments, independent reading and the completion of additional work; and

(c. the application of designing and conducting experiments and to analyze and interpret data.

2. Graduates will be able to demonstrate:
   (a) the ability to gather data to verify the existence of a problem, conduct extended research/analysis into a problem/topic, evaluate the evidence, generate ideas for possible solutions and formulate a thesis based on analysis; and
   (b) the ability to read materials carefully and analyze them critically

3. Graduates will be able to demonstrate:
   (a) written communication skills with respect to clarity, use of appropriate grammar, syntax and vocabulary appropriate to the development of a NIH-style grant proposal; organizes research materials to support an original thesis; and, present ideas and arguments clearly, logically and with an appropriate balance of text and graphic materials; and
   (b) oral communication skills with respect to designing, organizing and presenting main points concisely and clearly; providing persuasive arguments, using data and information, that are appropriate for the audience and occasion; using language vocal variety, pronunciation and physical behaviors that support the verbal message for the audience and occasion; using visual aids appropriate for technical presentation, and ability to answer audience questions.