

Second Year Courses

Fundamentals of Grant Writing: A course in the essential aspects of grant writing, using the student's thesis proposal.

Machine Learning for Biomedical Informatics: This course will teach students the primary machine learning algorithms used in biomedical informatics.

Foundations of the Linear Model: Linear models; Least squares estimates; Multivariate normal distribution; Maximum likelihood estimators; Covariance matrices, information matrices; Quadratic forms; Principal components; Orthogonal polynomial regression; Non-central distributions.

Applied Bayesian Analysis: This course aims to provide a general introduction to Bayesian, modeling, analysis and computing.

Elective coursework: Choose one or more areas of research emphasis and begin elective coursework.

Summer Term

During the summer session of the second year, all students will enroll in BSGP 8999 and be working in their chosen lab. In addition, the BMI students are required to take the **Machine Learning for Biomedical Informatics** course to learn advanced computational skills.

Autumn and Spring Semester

Beginning in autumn all second year students start a two-semester grant writing course. Students are taught essential aspects of grant writing by a faculty member who is experienced and successful in writing research grant proposals. This course explains the processes involved in the identification of an appropriate funding agency and in the preparation of a grant proposal. Students continue to learn about grant writing and begin to write a research proposal based on a proposed interdisciplinary dissertation research project under the guidance of the course director and their dissertation advisor.

During this time of grant preparation, the students are encouraged to seek assistance with the statistical aspects of their proposal to help them with the complexities of experimental designs that integrate concepts and experimental procedures from different disciplines.

Students continue to prepare their proposals and watch a small panel of faculty members do a "mock" study section review of a grant proposal. Each student will submit their grant proposal to a "mock" peer review panel on which they and their fellow classmates will participate as study section members.

All students outside of the Biomedical Sciences Graduate Program must contact the program office for permission to register for the courses.

The BMI students are all required to take the advanced statistical courses **Machine Learning for Biomedical Informatics** and **Foundations of the Linear Model** to meet the rigorous level of statistical expertise needed by our trainees.

Area of Research Emphasis

After successful completion of core first year curriculum and at least two research rotations to ensure that the student has received interdisciplinary curriculum knowledge and research experience, students choose their

Dissertation Advisor and an area-of-research emphasis in consultation with their dissertation advisor. Although the Biomedical Sciences Graduate Program is an interdisciplinary program and promotes collaborative interactions, we realize that each student needs to develop a strong core of expertise within an established area of research.

Therefore, students begin to focus their studies on one or more of several established research disciplines referred to as *Areas of Research Emphasis* in which the student must complete curricular requirements in a specific area, for which the student can request a graduate specialization transcript designation.

It must be emphasized that no barriers are present to inhibit students from being involved in more than one area-of-research emphasis. Indeed, the fluidity of the program has allowed many students to develop dissertation research projects that are interdisciplinary in nature, such as those in neuroimmunology. If a student fulfills the course requirements for both areas-of-research emphasis, then they will receive dual transcript designations. (An area of research emphasis is not required).