

Program Overview

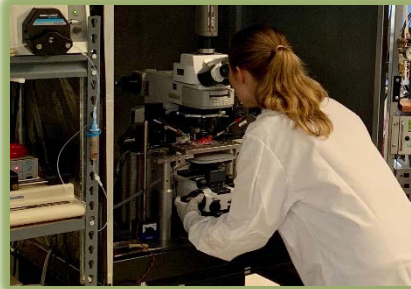
The doctoral program in Genetics & Genome Sciences is an interdepartmental program administered by the College of Natural Science. The objectives of the program are to train students for careers in research, teaching and other science-related fields that rely on a deep understanding of the scientific method and of the nature and significance of genetics and genomics as a whole. Students are therefore expected to develop a broad familiarity with the various areas of genetics and genomics, and related areas of biochemistry, molecular biology, and computational biology so as to be able to appreciate and contribute to new developments in this rapidly changing field.

Because entering doctoral students have heterogeneous academic backgrounds, students complete a series of five graduate-level courses in genetics, molecular biology, and computational biology in their first two years. Additional course work in an area of specialization may be undertaken in consultation with the student's guidance committee.

- BMB 801: Molecular Biology*
- MMG 833: Microbial Genetics, or MMG 835: Eukaryotic Molecular Genetics, or alternative genetics course
- Three electives – At least one related to bioinformatics or computational biology
- GEN 810: Theory and Practice of Teaching Genetics
- GEN 840: Genetics Writing Skills
- GEN 800: Genetics Seminar (4 semesters)
- One semester as a TA for IBIO 341: Fundamental Genetics
- Completion of comprehensive examination:
 - Written research proposal
 - Public seminar
 - Oral exam with committee

*PLB 856 fulfills this requirement for MPS students

Research Areas



As an interdepartmental program, the GGS Program faculty is composed of nearly 100 faculty from 24 different departments and academic programs. Areas of research excellence include:

- Gene Expression & Regulation
- Epigenetics & Chromatin Structure
- Computational Genomics
- Cancer Genetics
- DNA Replication and Repair
- Ecological and Evolutionary Genetics
- Genetics of Animal & Plant Improvement
- Genetics of Development & Aging
- Genetics of Infectious Diseases
- Genetics of Inherited Diseases
- Genetics of Plant-Microbe Interactions
- Omics Science
- Plant Genetics
- Quantitative & Statistical Genetics



Students interested in biomedical research may seek research opportunities with College of Human Medicine faculty, or with affiliated faculty at the Van Andel Research Institute, based in Grand Rapids.



Extra Opportunities

The Genetics & Genomes Program features several student-focused activities and opportunities to enhance and support professional development.

- Annual Career Workshop
- Annual Mini-Symposium
- Outreach Activities
- Peer writing groups including research proposal preparation organized through GEN 840
- Teaching opportunities (beyond TA requirement)
- Active GGS Graduate Student Organization (GSO) with many leadership opportunities
 - GSO Board officer positions
 - Outreach
 - Dean's Student Advisory Comm.
 - COGS



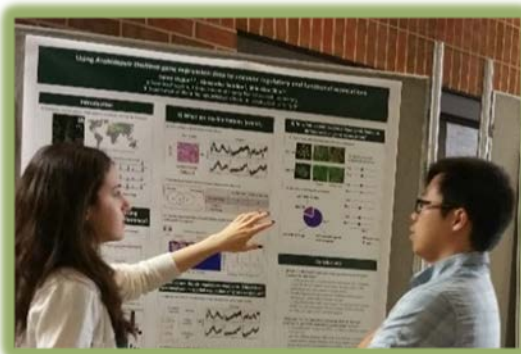
GGS students often pursue joint majors with affiliated programs such as MPS, EITS or EEBB, and the program provides flexibility for students in dual-degree medical school/PhD programs. Students interested in computational biology may also consider pursuing a dual-major or certificate in Computational Mathematics, Science and Engineering (CMSE).



Students interested in plant molecular genetics have the opportunity to pursue collaborative international research through an exchange program with the Heinrich Heine University of Düsseldorf, in the Rhine Valley of Germany.

WHY GENETICS & GENOME SCIENCES?

The exponentially increasing pace of new developments and the enormity of their scientific, economic, environmental and social impact has created a high demand by industry, academia, and governmental and private organizations for young scientists with expertise in human, animal, plant, microbial, medical, population and environmental genetics/genomics. The degree-granting, interdepartmental Genetics & Genome Sciences Program is ideally situated to provide graduate training that can address these growing needs. Because of its size and the breadth in expertise of its faculty, the MSU GGS Program exposes students to a broad range of genetics/genomics research, while allowing each student to focus on a particular topic for his or her doctoral research.



Funding

Students are supported in their first year by graduate assistantships or fellowships through the BioMolecular Science Gateway, as they undertake rotations. Subsequent funding is provided by the faculty mentor from research grants, through teaching assistantships, or from training grant funds.

Information and Contacts

Additional information can be found on the program web site:
<http://ggs.natsci.msu.edu>  Follow @msugenetics

Genetics Program Director

Dr. Cathy Ernst
2209 Anthony Hall
ernstc@msu.edu
517-432-1941

Genetics Program Assoc. Dir.

Dr. Susanne Hoffmann-Benning
223A Biochemistry Building
hoffma16@msu.edu
517-355-9644

Genetics Administrative Asst.

Alaina Burghardt
2168 BPS
genetics@msu.edu
517-884-5299

GSO President

Amanda Koenig
223 Biochemistry Building
koenigam@msu.edu
517-432-9281

