Committee on Genetics, Genomics & Systems Biology

Chair
• Yoav Gilad

Professors
• Graeme Bell, Biochemistry & Molecular Biology
• Joy Bergelson, Ecology & Evolution
• Douglas K. Bishop, Radiation & Cellular Oncology
• Jerry Coyne, Ecology & Evolution
• Sean Crosson, Biochemistry & Molecular Biology
• Anna DiRienzo, Human Genetics
• M. Eileen Dolan, Medicine
• Wei Du, Ben May Department for Cancer Research
• Martin Feder, Organismal Biology & Anatomy
• Richard Fehon, Molecular Genetics & Cell Biology
• Edwin L. Ferguson, Molecular Genetics & Cell Biology
• Yoav Gilad, Human Genetics
• T. Conrad Gilliam, Human Genetics
• Benjamin Glick, Molecular Genetics & Cell Biology
• Michael Glotzer, Molecular Genetics & Cell Biology
• Christopher Gomez, Neurology
• Jean Greenberg, Molecular Genetics & Cell Biology
• Robert Grossman, Medicine
• Robert Ho, Organismal Biology & Anatomy
• Richard R. Hudson, Ecology & Evolution
• Martin Kreitman, Ecology & Evolution
• Stephen J. Kron, Molecular Genetics & Cell Biology
• Bruce T. Lahn, Human Genetics
• Michelle M. LeBeau, Medicine
• Manyuan Long, Ecology & Evolution
• Mary Sara McPeek, Statistics
• Carole Ober, Human Genetics
• Olufunmilayo Olopade, Medicine
• Brian J. Popko, Neurology
• Trevor Price, Ecology & Evolution
• Victoria Prince, Organismal Biology & Anatomy
• Ilaria Rebay, Ben May Department for Cancer Research
• John Reinitz, Ecology & Evolution
• Carrie Rinker-Schaeffer, Surgery
• Marsha Rosner, Ben May Department for Cancer Research
• Lucia Rothman-Denes, Molecular Genetics & Cell Biology
• Andrey Rzhetsky, Medicine
• James A. Shapiro, Biochemistry & Molecular Biology
• Jonathan P. Staley, Molecular Genetics & Cell Biology
• Joseph W. Thornton, Ecology & Evolution
• Aaron Turkewitz, Molecular Genetics & Cell Biology
• Kevin White, Human Genetics
• Chung-I Wu, Ecology & Evolution

Associate Professors
• Jack Gilbert, Ecology & Evolution
• Tong-Chuan He, Surgery
• Akira Imamoto, Ben May Department for Cancer Research
• David Kovar, Molecular Genetics & Cell Biology
• Gayle K. Lamppa, Molecular Genetics & Cell Biology
• Jocelyn Malamy, Molecular Genetics & Cell Biology
• Laurens J. Mets, Molecular Genetics & Cell Biology
• Ivan Moskowitz, Pediatrics
• Marcelo Nobrega, Human Genetics
• Kenan Onel, Pediatrics
• Abraham Palmer, Human Genetics
• Urs Schmidt-Ott, Organismal Biology & Anatomy

Assistant Professors
• David Biron, Physics
• D. Allan Drummond, Biochemistry & Molecular Biology
• Xin He, Human Genetics
• Sally Horne-Badovinac, Molecular Genetics & Cell Biology
• Vincent Lynch, Human Genetics
• Megan McNerney, Pathology
• Edwin Munro, Molecular Genetics & Cell Biology
• Minoli Perera, Medicine
• Alex Ruthenburg, Molecular Genetics & Cell Biology
• Barbara Stranger, Medicine

Emeritus Faculty
• Wolfgang Epstein, Molecular Genetics & Cell Biology
• Robert Haselkorn, Molecular Genetics & Cell Biology
• Samuel Refetoff, Medicine
• Bernard Roizman, Molecular Genetics & Cell Biology
• Angelo Scanu, Medicine
• Bernard Strauss, Molecular Genetics & Cell Biology

The Committee on Genetics, Genomics & Systems Biology (http://cg.uchospitals.edu) (GGSB) is an interdisciplinary degree-granting program that brings together biologists from over a dozen academic departments. The program is aimed at training Ph.D. scholars for careers as independent scientists in basic and applied biomedical research and education. The Genetics, Genomics, & Systems Biology graduate program offers a program of basic study leading to Doctor of Philosophy in genetics. The Ph.D. training program combines a foundation in modern genetic analysis with training in current methods for formulating and addressing biological questions in the context of complex systems. Such systems are studied in physiological, developmental and evolutionary contexts. The presence of both basic and clinical sciences in the Biological Sciences Division (BSD) enhances the committee’s broad based interdisciplinary approach to teaching and research. The committee provides an exciting environment in which to pursue rigorous, high quality training with flexibility in designing programs to meet individual needs. The focus of GGSB is to train students to utilize sophisticated genetic analysis, genomics, modeling and systems level analysis of regulations networks in their own research program. Opportunities are available to study diverse areas of biology and genetics, including bioinformatics, developmental processes, gene structure and regulation, genetic recombination and mutation, chromosome mechanics, evolution, human disease, immunology, and other areas of modern genetics. Students receive broad training in these sub-disciplines, while specializing in one of them for their research career. The committee’s goal is to provide an intellectually stimulating, collegial and supportive environment for students to progress smoothly from research training to research independence.

CURRICULUM AND TIMELINE - FIRST YEAR

The first year of graduate study is spent completing coursework, exploring research opportunities and doing laboratory rotations

CORE COURSES AND ELECTIVES (HTTP://CG.UCHOSPITALS.EDU/GRADUATE-PROGRAM/CURRICULUM-AND-TIMELINE-FIRST-YEAR)

Graduate students in the BSD are required to take nine credits of coursework for the Ph.D. program. Each class is one credit.

• 4 required courses in genetics
• 4 electives
• 2 graded lab rotations for 1/2 credit each

In addition to the course requirements, students attend the Faculty Research Seminar Series (also referred to as "AllStars"), to acquaint themselves with the research community and potential mentors. All first year students in the BSD are required to attend a scientific ethics course.
REQUIRED COURSES

• Genetic Analysis of Model Organisms PLUS
• Genomics & Systems Biology PLUS one of the following three courses:
  • Fundamentals of Molecular Biology OR Molecular Biology I OR Molecular Biology II

Students must then choose one of the following to satisfy their final course requirement:

• Fundamentals of Molecular Evolution OR
• Principals of Population Genetics I OR
• Evolutionary Genomics OR
• Human Variation and Disease

The remaining four courses are chosen as elective courses from a host of courses offered in the BSD, the Department of Statistics and the Department of Computer Science. All elective courses are to be approved by an academic advisor. The curriculum and research training are designed to take full advantage of the strength of genetics, genomics & systems biology research at the university. The program sponsors a regular colloquium, an annual symposium on a chosen topic, a biweekly journal club, and a biweekly genetics of model organisms club.

Students undertake short research projects in at least two different laboratories before beginning their dissertation research. The purpose of the rotation is to expose the student to different research environments, broaden his/her acquaintance with useful laboratory techniques, and introduce him/her to the conceptual framework of experimental design. The distribution of course offerings makes it difficult for students to undertake rotations in Autumn Quarter of the first academic year. Therefore, rotations are performed in the winter or spring and summer quarters. The winter and spring rotations last 10 weeks to coincide with the academic quarter. The summer rotation lasts 5 weeks, when the student is able to devote full-time to research. Students wishing to do a third rotation may do so during the second half of Summer Quarter.

APPLICATION

For information about applying to our graduate program, please visit our website at http://cg.uchospitals.edu/index.php

GENETICS COURSES

GENE 31900. Introduction to Research. 100 Units.
Lectures on current research by departmental faculty and other invited speakers. A required course for all first-year graduate students
Instructor(s): Staff Terms Offered: Autumn, Winter
Equivalent Course(s): MGCB 31900, BCMB 31900, DVBI 31900, HGEN 31900
GENE 32500. Evolutionary Aspects of Gene Regulation. 100 Units.
Using primary research literature, this course will examine recent advances in understanding of evolution of gene regulation. Among others it will cover the following topics: patterns and forces of evolutionary change in regulatory DNA and transcription factors, genetic changes that are responsible for phenotypic evolution, and discovery and evolutionary implications of gene control by microRNAs.
Instructor(s): I. Ruvinsky Terms Offered: Autumn
Equivalent Course(s): ECEV 32500, BIOS 23281, EVOL 32600, ORGB 32600, DVBI 32500

GENE 39900. Readings Genetics. 100 Units.
A course designed by a student and faculty member. All reading courses must be approved by the Curriculum/Student Affairs Committee prior to registration.
Terms Offered: Autumn, Winter, Spring, Summer

GENE 40100. Thesis Research: Genetics. 300 Units.
No description available.
Instructor(s): Gilad Terms Offered: Autumn, Winter, Spring, Summer

GENE 40200. Non-Thesis Research: Genetics. 300 Units.
No description available.
Instructor(s): Gilad Terms Offered: Autumn, Winter, Spring, Summer

GENE 40206. Genetics: Lab Rotation 3. 150 Units.
No description available.
Terms Offered: Autumn, Winter, Spring, Summer