Committee on Immunology

Chair
• Alexander Chervonsky

Professors
• Erin Adams, Biochemistry and Molecular Biology
• Maria Luisa Alegre, Medicine
• John Alverdy, Surgery
• Albert Bendelac, Pathology
• Eugene Chang, Medicine
• Alexander Chervonsky, Pathology
• Anita Chong, Surgery
• Marcus Clark, Medicine
• Aaron Dinner, Chemistry
• Thomas Gajewski, Pathology and Medicine
• Yoav Gilad, Human Genetics
• Tatyana Golovkina, Microbiology
• Chuan He, Chemistry
• Jeffrey Hubbell, Molecular Engineering
• Bana Jabri, Medicine
• Vinay Kumar, Pathology
• Rima McLeod, Surgery
• Cathryn Nagler, Pathology
• Anthony Reder, Neurology
• Raymond Roos, Neurology
• Olaf Schneewind, Microbiology
• Hans Schreiber, Pathology
• Melody Swartz, Molecular Engineering
• Martin Weigert, Pathology

Associate Professors
• Fotini Gounari, Medicine
• Haochu Huang, Medicine
• Barbara Kee, Pathology
• Avertano Noronha, Neurology
• Glenn Randall, Microbiology
• Peter Savage, Pathology
• Anne I. Sperling, Medicine
• Patrick Wilson, Medicine

Assistant Professors
• Kenneth Cohen, Medicine
• Jill De Jong, Pediatrics
• Jun Huang, Molecular Engineering
• Seungmin Hwang, Pathology
• Justin Kline, Medicine
• James LaBelle, Pediatrics
• Vu Nguyen, Medicine

Emerita Professor
• Ursula Storb, Molecular Genetics and Cell Biology

The Committee on Immunology offers a graduate program of study leading to the Doctor of Philosophy degree in Immunology. The committee is dedicated to the open exchange of ideas among scholars of all fields, a commitment
enhanced by an organizational structure that completely integrates the basic biological sciences with the clinical sciences. This multidisciplinary and integrated approach corresponds well with the reality of the new biology, where molecular and structural techniques are applied widely and with great success to clinical problems.

The Committee on Immunology is a member of the Biomedical Sciences Cluster, which also includes graduate programs from the Committee on Cancer Biology, Committee on Microbiology, and the Committee on Molecular Metabolism and Nutrition. The four academic units share several common courses, a seminar series and additional common events for students and faculty within the cluster. The goal of the cluster system is to encourage interdisciplinary interactions among both trainees and faculty, and to allow students flexibility in designing their particular course of study.

In addition to formal course work, the Committee on Immunology sponsors a weekly seminar series, an annual retreat where students and faculty present their research, and several focused group meetings.

Admission

Prospective students interested in obtaining the Ph.D. in Immunology should submit an application to the Biological Sciences Division by December 1st of each year; indicate their cluster of interest as Biomedical Sciences and select Immunology as their proposed degree program.

The Degree of Doctor of Philosophy

Ph.D. requirements include:

• Completion of 9 course credits consisting of basic science, immunology and elective courses.
• A preliminary examination.
• A dissertation based on original research.
• A final thesis examination.

Immunology Courses

**IMMU 30010. Immunopathology. 100 Units.**

This course will expand on general immunological concepts that have implications for our understanding of immune-related disorders such as autoimmunity diseases, inflammatory bowel diseases, infection immunity, immunodeficiencies and transplant rejection. Students will read and discuss primary immunological papers and become familiarized with typical experiment designs in immunology. At the end of course, students will have learned how to design experiments in order to address specific hypotheses related to immune-mediated disorders.

Instructor(s): B. Jabri Terms Offered: Winter

Prerequisite(s): BIOS 25256 with a grade of B or higher.

Equivalent Course(s): PATH 30010, BIOS 25258

**IMMU 31200. Host Pathogen Interactions. 100 Units.**

This course explores the basic principles of host defense against pathogens, including evolutionary aspects of innate and adaptive immunity and immune evasion strategies. Specific examples of viral and bacterial interactions with their hosts are studied in depth. A review of immunological mechanisms involved in specific cases is incorporated in the course.

Instructor(s): A. Chervonsky Terms Offered: Autumn

Equivalent Course(s): MICR 31200

**IMMU 31500. Advanced Immunology 1. 100 Units.**

This course explores the basic principles of the immune system, including tolerance, the development and differentiation of lymphocyte subsets, the regulation of the class of immune responses, memory, cell homing and migration, cell-cell interactions, antigen presentation and recognition.

Instructor(s): A. Bendelac Terms Offered: Winter

**IMMU 32000. Advanced Immunology 2. 100 Units.**

This class will explore the molecular and biochemical mechanisms by which lymphocytes develop and are activated in response to antigen. This will include the signal transduction pathways and transcriptional networks involved in these processes, as well as the molecular mechanisms underlying the generation of receptor diversity.

Instructor(s): B. Kee Terms Offered: Spring

**IMMU 40200. Experimental Immunology. 050 Units.**

This course centers around the Immunology Journal Club and the Immunology Seminar Series and has two purposes. The first is to provide background knowledge for the seminar given each week by an outside speaker or a member of the Committee on Immunology. The second is to allow the students an opportunity to develop skills in analyzing the literature with students at the same stage of training. First and second year students are required to participate in this course. The two-year course counts towards one credit.

Instructor(s): Staff Terms Offered: Autumn, Winter, Spring
IMMU 47300. Genomics and Systems Biology. 100 Units.
This lecture course explores the technologies that enable high-throughput collection of genomic-scale data, including sequencing, genotyping, gene expression profiling, assays of copy number variation, protein expression and protein-protein interaction. We also cover study design and statistical analysis of large data sets, as well as how data from different sources can be used to understand regulatory networks (i.e., systems). Statistical tools introduced include linear models, likelihood-based inference, supervised and unsupervised learning techniques, methods for assessing quality of data, hidden Markov models, and controlling for false discovery rates in large data sets. Readings are drawn from the primary literature.
Instructor(s): Y. Gilad Terms Offered: Spring
Prerequisite(s): Three quarters of a Biological Sciences Fundamentals sequence and STAT 23400 or BIOS 26210 and BIOS 26211
Equivalent Course(s): HGEN 47300,BIOS 28407
Font Notice

This document should contain certain fonts with restrictive licenses. For this draft, substitutions were made using less legally restrictive fonts. Specifically:

- Times was used instead of Trajan.
- Times was used instead of Palatino.

The editor may contact Leepfrog for a draft with the correct fonts in place.