Genomics
HMGP 7620, STBB 7620 and CPBS 7620
Jointly listed by the programs in Human Medical Genetics and Genomics, Structural Biology and Biochemistry, and Computational Bioscience

2 unit lecture component

Course Directors: David Pollock, Jim Sikela and Mark Johnston

Lecturers: David Pollock, Mark Johnston, James Sikela, Richard Spritz, Katerina Kechris, Jay Hesselberth, Tamim Shaikh, Sandy Martin, There may be one or two guest lecturers as well.

Lectures Monday - Friday 8:00-10:00 am (first 3 weeks of semester)

Social impact discussions will be held separately, location TBA

L28 (Ed 2 South), Room 1308

Purpose

This course is designed to introduce biochemistry, genetics, and other molecular-oriented graduate students (and interested faculty and postdocs) to the field of genomics.

Course Description

An introduction to the theory and practice of genomics. Topics include sequencing and mapping, overview of genomes, transcriptomes, population genetics, bioinformatics and statistics, population-level variation, ethics, evolutionary genomics, epigenomics, proteomics, metagenomics, and functional genomics.

Course requirements

Prerequisites: A familiarity with basic biochemistry, genetics, and molecular biology. It is assumed that students may have only rudimentary training in computation and statistics.

Readings: Mostly review papers, TBA.

Goals for the Course

The course will familiarize students with the tools and principles of contemporary genomics. By the end of the course, students will have a working knowledge of current genomics technology and approaches as well as the types of databases and computational tools available.

This is a team-taught course. You will get a chance to meet and interact with five instructors from the Biochemistry and Molecular Genetics, Human Genomics, Computational Bioscience, and Immunology Programs. Profs. Pollock, Johnston, and Sikela are the course directors; please raise any concerns or questions about the course with them.

Syllabus

Lectures: Overview; Overview of Genomics and The History of Life; Genome Mapping and Sequencing; Genome Annotation and Assembly; The Human Genome; Human Genome Evolution and Structural Variation; Comparative Vertebrate Genomes; Sequence Search and Databases; Transposable Elements; Genome Architecture, Segmental Duplication, and Rearrangements; Transcriptomics; Proteomics; Transcription Factor Binding; RNA Genomics; Genome Evolution and Phylogenomics; Pharmacogenomics; Epigenomics; Metagenomics; Immunogenomics; Polymorphisms, Haplotypes, Linkage Disequilibrium, and Targeted Sequencing; Genome-Wide Association Studies; Human Genome Polymorphism and Association Studies; Epidemiology and Viral Genomics; Functional Genomics; Social Impact of Genomics.

Grading

Grading will be on the basis of a single take-home final.

Honor code

The Graduate School requires that this honor code be included in all course syllabi.

Education at the University of Colorado, Denver is conducted under the honor system. All students who have entered health professional programs should have developed the qualities of honesty and integrity, and each student should apply these principles to his or her academic and subsequent professional career. All students are also expected to have achieved a level of maturity, which is reflected by appropriate conduct at all times.