Computational Biology

Overview

Computational biology is an academic growth area that binds together multiple areas of biological research with the mathematical and computational sciences. It takes center stage in the new data-oriented biology by facilitating scientific discoveries based on high-throughput methods. The genomic revolution has fundamentally changed the biological sciences, and computational biology provides the means for translation of genomic discoveries into a new understanding of complex biological systems and eventually into improvements of the human condition through development of solutions to environmental problems, new drug discoveries, and personalized medicine.

The Center for Computational Biology is Berkeley's hub for research and training in computational biology and bioinformatics. Through courses, seminars, scientific meetings, and innovative training programs for PhD students administered by the Graduate Group in Computational Biology, the Center catalyzes biological discoveries at the interface of biology, computation, and mathematics/statistics. As a campus strategic initiative, the Center fosters an interactive, innovative, and collegiate environment for faculty, students, and post-doctorates drawn from five colleges and over a dozen academic departments. Faculty research interests are likewise diverse, ranging from computational and statistical genomics to population, comparative, and functional genomics; from bioinformatics and proteomics to evolutionary biology, phylogenomics, and statistical and computational methods development for modeling biological systems.

Undergraduate Programs

There is no undergraduate program in Computational Biology.

Graduate Programs

Computational Biology (http://guide.berkeley.edu/archive/2014-15/graduate/degree-programs/computational-biology) : PhD
Computational and Genomic Biology (http://guide.berkeley.edu/archive/2014-15/graduate/degree-programs/computational-biology) : Designated Emphasis (DE)

Computational Biology

CMPBIO 98BC Berkeley Connect in Computational Biology 1 Unit
Berkeley Connect is a mentoring program, offered through various academic departments, that helps students build intellectual community. Over the course of a semester, enrolled students participate in regular small-group discussions facilitated by a graduate student mentor (following a faculty-directed curriculum), meet with their graduate student mentor for one-on-one academic advising, attend lectures and panel discussions featuring department faculty and alumni, and go on field trips to campus resources. Students are not required to be declared majors in order to participate. Course may be repeated.
Rules & Requirements

Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of discussion per week

Additional Details

Subject/Course Level: Computational Biology/Undergraduate

Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.

Instructor: Nielsen

CMPBIO 198BC Berkeley Connect in Computational Biology 1 Unit
Berkeley Connect is a mentoring program, offered through various academic departments, that helps students build intellectual community. Over the course of a semester, enrolled students participate in regular small-group discussions facilitated by a graduate student mentor (following a faculty-directed curriculum), meet with their graduate student mentor for one-on-one academic advising, attend lectures and panel discussions featuring department faculty and alumni, and go on field trips to campus resources. Students are not required to be declared majors in order to participate. Course may be repeated.
Rules & Requirements

Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of discussion per week

Additional Details

Subject/Course Level: Computational Biology/Undergraduate

Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.

Instructor: Nielsen

CMPBIO 201 Classics in Computational Biology 3 Units
Research project and approaches in computational biology. An introducton to the diverse ways biological problems are investigated computationally through critical evaluation of the classics and recent peer-reviewed literature. This is the core course required of all Computational Biology graduate students.
Rules & Requirements

Prerequisites: Acceptance in the Computational Biology Phd program; consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of lecture and 2 hours of discussion per week

Additional Details

Subject/Course Level: Computational Biology/Graduate

Grading: Letter grade.

CMPBIO 290 Special Topics - Computational Biology 1 - 4 Units
A graduate seminar class in which students closely examine recent computational methods in molecular and systems biology, for example for modeling mechanisms related to the regulation of gene expression and/or high-throughput sequencing data. The course will focus on computational methodology but will also cover relevant and interesting biological applications.
Rules & Requirements

Prerequisites: Graduate standing in EECS, MCB, Computational Biology or related fields; or consent of the instructor

Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format

Fall and/or spring: 15 weeks - 1-3 hours of lecture per week

Additional Details

Subject/Course Level: Computational Biology/Graduate

Grading: Letter grade.

Instructor: Yosef

CMPBIO 294A Introduction to Research in Computational Biology 2 - 12 Units
Closely supervised experimental or computational work under the direction of an individual faculty member; an introduction to methods and research approaches in particular areas of computational biology.
Rules & Requirements

Prerequisites: Standing as a Computational Biology graduate student

Repeat rules: Course may be repeated for credit. Course may be repeated for credit when topic changes.

Hours & Format

Fall and/or spring: 15 weeks - 2-20 hours of laboratory per week

Additional Details

Subject/Course Level: Computational Biology/Graduate

Grading: Letter grade.

CMPBIO 294B Introduction to Research in Computational Biology 2 - 12 Units
Closely supervised experimental or computational work under the direction of an individual faculty member; an introduction to methods and research approaches in particular areas of computational biology.
Rules & Requirements

Prerequisites: Standing as a Computational Biology graduate student

Repeat rules: Course may be repeated for credit. Course may be repeated for credit when topic changes.

Hours & Format

Fall and/or spring: 15 weeks - 2-20 hours of laboratory per week

Additional Details

Subject/Course Level: Computational Biology/Graduate

Grading: Letter grade.

CMPBIO 295 Individual Research for Doctoral Students 1 - 12 Units
Laboratory research, conferences. Individual research under the supervision of a faculty member.
Rules & Requirements

Prerequisites: Acceptance in the Computational Biology PhD program; consent of instructor

Repeat rules: Course may be repeated for credit. Course may be repeated for credit when topic changes.

Hours & Format

Fall and/or spring: 15 weeks - 1-20 hours of laboratory per week

Summer: 10 weeks - 1.5-30 hours of laboratory per week

Additional Details

Subject/Course Level: Computational Biology/Graduate

Grading: Letter grade.

CMPBIO 477 Introduction to Programming for Bioinformatics Bootcamp
1.5 Unit
The goals of this course are to introduce students to Python, a simple and powerful programming language that is used for many applications, and to expose them to the practical bioinformatic utility of Python and programming in general. The course will allow students to apply programming to the problems that they face in the lab and to leave this course with a sufficiently generalized knowledge of programming (and the confidence to read the manuals) that they will be able to apply their skills to whatever projects they happen to be working on.
Rules & Requirements

Prerequisites: This is a graduate course and upper level undergraduate students can only enroll with the consent of the instructor

Hours & Format

Summer: 3 weeks - 40-40 hours of workshop per week

Additional Details

Subject/Course Level: Computational Biology/Other professional

Grading: Offered for satisfactory/unsatisfactory grade only.