Computational Biology Program

Computational Biology Graduate Program

Computational Biology is an interdisciplinary science at the interface of biology, chemistry, medicine, mathematics, and computer science. Its goal is development and application of computational approaches to studies of life processes and improvement of human health. The Computational Biology Graduate Program recruits students with bachelor's or master's degrees who made a choice to pursue a career in computational biology. The Ph.D. degree in Computational Biology requires successful completion of formal courses and demonstration of accomplishments in basic research, qualifying examinations, scientific writing, and formal presentations of research data.

Courses

BINF 701. Computational Biology I. 5 Credits.
First semester of a two-semester course in bioinformatics and computational biology. Topics include basic concepts of bioinformatics and molecular modeling, bioinformatics databases, computational tools and modeling methods, protein sequence and structure alignment, conformational analysis, secondary structure determination, tertiary structure modeling (homology, threading, ab initio, protein folding and dynamics), networks, data mining and machine learning, as well as student presentations of material from current papers in the field of study and their own on-going research for discussion and critique. Students will also learn responsible scholarship, including allocation of credit, treatment of data, scientific misconduct, collaborative research, and mentor/trainee responsibilities. Prerequisite: College introductory biochemistry (no requirement for specific courses), math, and computer courses or concurrent enrollment in such courses and consent of instructor.

BINF 702. Computational Biology II. 5 Credits.
Second semester of a two-semester course in bioinformatics and computational biology. Topics include protein quaternary structure modeling (protein-protein/DNA/small ligand docking, binding, computer-aided drug design), protein structure-function relationships, modeling of genome-wide protein interaction networks based on structure, systems biology, mathematical and computational modeling of complex systems, synthetic biology and dynamics of chemical reaction networks as well as student presentations of material from current papers in the field of study and their own on-going research for discussion and critique. Students will also learn responsible scholarship, including allocation of credit, treatment of data, scientific misconduct, collaborative research, and mentor/trainee responsibilities. Prerequisite: BINF 701.

BINF 709. Topics in: _____. 1-3 Credits.
Advanced courses on special topics in Bioinformatics, given as need arises, including lectures, discussions, readings, or laboratory. Students may select sections according to their special interests.

BINF 999. Doctoral Dissertation. 1-12 Credits.
Original research that is to be incorporated into a PhD dissertation.