Computational Biology
Genomes - Networks - Evolution

BLAST algorithm visualization for rapid string search
Protein interaction network of the yeast S. cerevisiae
Evidence of vertebrate whole-genome duplication

Prof. Manolis Kellis (CSAIL) and Dr. James Galagan (Broad)

Covers the algorithmic and machine learning foundations of computational biology, combining theory with practice. We cover both foundational topics in computational biology (1st half), and current research frontiers (2nd half). We study fundamental computational techniques, and apply them to recent large-scale biological datasets.

Genomes: Biological sequence analysis, hidden Markov models, gene finding, sequencing technologies, genome assembly, sequence alignment

Networks: Gene expression analysis, clustering/classification, regulatory motifs, EM, bayesian networks, metabolic flux modeling, synthetic biology

Evolution: Comparative genomics, phylogenetics, genome duplication, medical and population genomics, evolutionary theory

Satisfies TQE requirement in AI (6.878)
Serves as EC elective in Theory (6.047)

First class: Thu Sept 6 at 11am in 2-105

Lectures: TR11-12:30 in 2-105
Prereqs: 6.001, 7.01, 6.041
Units: 12 (3-0-9)
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6.047 (U) Undergraduate version. Includes midterm, final project. No final exam.
6.878 (G) Graduate version. Satisfies AI TQE. Includes additional assignments, a more ambitious final project, which can lead to a thesis / publication.