**Quantitative Biology Course (Specialized Discipline), 2022**

**Instructors**: Justin Kinney (lead), jkinney@cshl.edu
Ivan Iossifov, iossifov@cshl.edu
Alex Dobin, dobin@cshl.edu
Peter Koo, koo@cshl.edu
Adam Siepel, asiepel@cshl.edu
David McCandlish, mccandlish@cshl.edu
Saket Navlakha, navlakha@cshl.edu
Jon Preall, jpreall@cshl.edu
Hannah Meyer, hmeyer@cshl.edu
**Course TAs**: Carlos Marti Gomez Aldaravi, martigo@cshl.edu
Armin Scheben, scheben@cshl.edu

Quantitative reasoning is a powerful means of understanding biological systems and uncovering biological principles. With the advent of high-throughput technologies, it has become increasingly necessary for researchers in Biology to be able to analyze and interpret large data sets and to quantitatively frame scientific hypotheses. To this end, the 2022 Quantitative Biology (QB) Course will aim to equip the students with a working knowledge of statistics and Python programming, as well as provide exposure to more advanced topics in machine learning, algorithms, evolution, genomics, and biophysics.

**Homework:** Problem sets will be assigned most weeks during the QB Course, and will generally be due by midnight on Friday the week after the lectures that cover the relevant material. Optional problem sessions will be held by the TAs each week that a problem set is due. Unless otherwise stated, problem sets should be completed as Jupyter notebooks and emailed to the TAs. Generally, an assignment submitted after the specified date will be accepted with a late penalty of 30% off of the final grade, and will not be accepted after one week past the deadline. If you will be unable to turn in your assignment on time due to an emergency or other unavoidable circumstance, please contact Justin Kinney.

**Student Evaluation:** Problem sets: 80%, Lecture participation: 20%

**Bootcamp:** August 29-31. Lecturers: Justin & Ivan

**Lectures** (subject to change):

| Number | Topic | Lecturer | Date |
|---|---|---|---|
| 1 | Statistics I | Justin | September 7, Wednesday, 2pm-4pm |
| 2 | Statistics II | Justin | September 9, Friday, 2pm-4pm |
| 3 | Statistics III | Justin | September 14, Wednesday, 2pm-4pm |
| 4 | Statistics IV | Justin | September 16, Friday, 2pm-4pm |
| 5 | Statistics V | Justin | September 21, Wednesday, 2pm-4pm |
| 6 | Statistics VI | Justin | September 23, Friday, 2pm-4pm |
| 7 | Machine Learning I | Alex | September 28, Wednesday, 2pm-4pm |
| 8 | Machine Learning II | Alex | September 30, Friday, 10am-12pm |
| 9 | Machine Learning III | Peter | October 5, Wednesday, 2pm-4pm |
| 10 | Machine Learning IV | Peter | October 7, Friday, 2pm-4pm |
| 11 | Evolution I | Adam | October 12, Wednesday, 2pm-4pm |
| 12 | Algorithms I | Adam | October 14, Friday, 2pm-4pm |
| 13 | Algorithms II | Saket | October 19, Wednesday, 2pm-4pm |
| 14 | Algorithms III | Saket | October 21, Friday, 2pm-4pm |
| 15 | Genomics I | Jon | October 26, Wednesday, 2pm-4pm |
| 16 | Genomics II | Jon | October 28, Friday, 2pm-4pm |
| 17 | Genomics III | Hannah | November 2, Wednesday, 2pm-4pm |
| 18 | Genomics IV | Hannah | November 4, Friday, 2pm-4pm |
| 19 | Evolution II | David | November 9, Wednesday, 2pm-4pm |
| 20 | Evolution III | David | November 11, Friday, 2pm-4pm |
| 21 | Biophysics I | Justin | November 16, Wednesday, 2pm-4pm |
| 22 | Biophysics II | Justin | November 18, Friday, 2pm-4pm |