Biology 610: Scientific programming for biologists

This purpose of this course is to introduce graduate students to core concepts in programming using the Python language. Students are not required to have any previous experience with programming— if you do have previous experience consider this an excellent opportunity to practice “Beginner’s mind”. The course will be taught in an interactive, workshop-like environment where we will go over code together. This environment will benefit the active participant, so please do your best during class to concentrate on the material at hand rather than blowing it off until later (even if Andy is terribly boring). Below is the tentative schedule for the course. Depending on the speed we go through topics there might be shifts in the schedule.

January 3. Getting Python going on your machine
Installing anaconda, jupyter notebooks, python baby steps

January 5. Python programming language
Printing, data structures, indexing

January 7. Python language continued
Control flow, conditionals, looping, functions. Assignment 1 handed out.

January 10. Numpy and Scipys
Using numpy and scipy to boost our productivity. ndarrays, indexing, etc.

January 12. Matplotlib, plotting data
Basics of matplotlib, histograms, scatterplots, making things pretty.

January 14. Scipy for data, optimization, Pandas
Getting more useful with Scipy for data analysis. First looks at Pandas. Assignment 2 handed out.

January 17. Simulation of Genetic Drift
Using our skills to simulate some the population genetic model of genetic drift.

Using biopython to handle sequence data. More advanced string stuff
January 21. Scikit-allel for population genetics

Population genetic analysis using Alistair Miles’ very excellent scikit-allel package. Assignment 3.

January 24. tbd