

MOLB 7910 Practical Computational Biology for Biologists: R Spring 2019

Organization and Contacts:

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Room = P28-CTL-2201DE Computer Lab

February 25 to March 15

MWF 9am - 11am

Office hours: Tuesday 9-11am in RC1 South 10115 or 10112, Thursday 1-3pm in RC1 South 9 floor fishbowl

Goals and Learning Objectives. The goal of this course is to introduce students to basic concepts in computational biology using the R programming language. Students are not expected to have prior experience in R, however there will be a list of tasks that students are expected to complete before the first class. The goal of this class is to familiarize students with the concepts and tools necessary for data-analysis. At the completion of the course, students will be able to perform basic computational biology tasks that are crucial nowadays given the increase in genomic datasets in biology.

The **primary learning objectives** are therefore to work towards being able to:

1. Retrieve genomic data from public sources and import into R.
2. Prepare data for analysis ("tidy"-ing).
3. Conduct basic exploratory analysis - getting familiar with your dataset.
4. Test specific hypotheses using computational methods.
5. Visualize and communicate your results.
6. Practice reproducible analysis.

Prerequisites. A personal laptop for a student is not required, but if one is available, it is highly encouraged that the coursework and materials be performed on the laptop so that the student has continuous access. Please reach out to us ASAP if you do not have access to a laptop.

Students will write R code within Rstudio to complete assignments, which will include generating reports in Rmarkdown. Although we do not require students to have prior R or other programming experience, students must work through the [pre-class assignment](#). After completion, the student should have R, Rstudio, and Rmarkdown working on their laptop/computer. (**Important:** Configuring software will not be done once the classes have begun, so if you are not able to install these software reach out to instructors by 02/21/19.)

Structure Overview. Classroom time will consist of a brief lecture on the theory and principles behind the day's material. This will be followed by interactive exercises implementing these topics and concepts. There will be assigned exercise that students will complete in the form of an Rmarkdown document.

Examinations and Grading. Class participation and exercise will account for 60% of the student's grade. The remaining 40% will be comprised of a take-home final exam that will require you to synthesize all of the skills and concepts covered during the course and apply them to a distinct biological problem. This exam will also be completed in Rmarkdown format and must be turned in to the instructors by 5 PM on the last day of class.