BIOL-GA 1130 Applied Genomics

Instructors:
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Course Description:
This course provides a comprehensive introduction to the analysis of next generation DNA sequence (NGS) data. Through a combination of lectures, hands-on computational training, discussions of scientific papers, and assignments using real data, students will learn the foundations of analytical methods, the computational skills to implement those methods, and the reasoning skills to critically assess the primary literature in genomics. The course will cover all commonly used NGS methods including genome sequence analysis, gene expression analysis and protein-nucleic acid interactions. To gain practical expertise in executing bioinformatic analyses, students will undertake a series of assignments using real data. Students will also complete an individual project that integrates skills and concepts covered during the class and that is tailored to meet their background and training.

Pre-requisite:
Statistics in Biology (BIOL-GA 2030)

Textbook and Required Materials:
N/A

Grading:
Homework assignments  50%
Final project  40%
Class participation  10%

Topics:
Unix and accessing NYU’s HPC facility
Intro to next generation sequencing
Sequence alignment
Programming with R
RNA-seq
ChIP-seq
Single Cell RNA-seq
Detecting variants with next generation sequencing
Transcript and genome assembly
Gene networks