

Genomic Approaches and Analysis
Biology 493/593 Winter 2014
TTh 12:00-1:20, DEA 303.
Project work in Streisinger 315.

Instructor:

Eric Johnson,
Streisinger 312
eric-johnson@molbio.uoregon.edu
346-5183
Office hour: Friday 10-11 AM

Course Goals: This course will introduce students to methods for studying biological questions on a genome-wide level. We will examine approaches to measure changes in genomic DNA composition, transcript and protein levels, and molecular interactions as a function of history, genetics, or environment. Analytical methods for interpreting the large bodies of data generated by these methods of experimentation will be discussed. These concepts will be put into practice by a course project and presentation at the end of the term.

Course requirements:

Students are required to attend class, to read the assigned material and to participate in class discussions. Small groups will present recent papers for discussion. In addition each small group will analyze the data from our sequencing project and present their results and analyses. There will be two graded tests.

Readings and Homework

The required readings are the primary literature papers, pdfs of which will be available on the class website, and readings from Genomes, links to which are on the syllabus.

Grading

Tests: 40%

Project: 20%

Homework and Labs: 30%

Class participation: 10%

Class schedule

Week 1

Jan 7

Introduction to genomes – size and complexity, and sequencing technologies

Readings: <http://www.ncbi.nlm.nih.gov/books/NBK21120/> sections 2.1.1 up to 2.2.2
<http://www.ncbi.nlm.nih.gov/books/NBK21134/> sections 1.2

1

Jan 9

Introduction to genomes - sequencing

<http://www.ncbi.nlm.nih.gov/books/NBK21117/> Sections 6.2 and 6.3

Week 2

Jan 14
No class
Reading on 23andme

2
Jan 16
Sequencing computer lab
[sequence lab](#)

Week 3

Jan 21
SNP mapping intro
<http://www.ncbi.nlm.nih.gov/books/NBK21116/> the whole chapter

3
Jan 23
SNP computer lab
[SNP lab](#)

Week 4

Jan 28
Team presentations: Sequence & SNP papers

4
Jan 30
Test 1

Week 5

Feb 4
Project set-up
Str 315

5
Feb 6
Project work
Str 315

Week 6

Feb 11
Project work
Str 315

6
Feb 13
SAGE & HTS expression intro
<http://www.ncbi.nlm.nih.gov/books/NBK21136/> up to 7.3.2. Also, see <http://www.ncbi.nlm.nih.gov/books/NBK12777/>

Week 7

Feb 18
Team presentations: Gene expression papers

7
Feb 20
Gene Networks/Function

Epigenetics

Week 8

Feb 25

Network/Functional genomics computer lab

Kla 33

[Network lab](#)

8

Feb 27

Team presentations: Network/Functional genomics papers

Week 9

Mar 4

Project Data Analysis

[Midterm 2 due](#)

9

Mar 6

Project Data Analysis

Week 10

Mar 11

Student presentations

10

Mar 13

Student presentations