

BIMM 171B Genomics Research Initiative Spring 2015

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Office hours: Wednesdays at 11 AM
York 3080 D

Lecture and lab : Tues- Thurs 2 to 5 PM York 4124

Learning goals and objectives:

- Each student will learn to use the bioinformatics tools necessary to finish and annotate bacteriophage genomes.
- Each student will complete annotation of specific segments of the bacteriophage genome isolated in BIMM 171A and maintain documentation of their annotations.
- Each student will be able to explain and justify their annotations to their classmates and, as a group, and reach consensus on the final annotations of the complete bacteriophage genome.
- The class as a whole will prepare annotated bacteriophage genomes for submission to GenBank.
- The class as a whole will assist in preparation of a poster for presentation at the UCSD Research Showcase and the SEA symposium.

Grading:

Annotation file	20
Homeworks (5 worth 5% each)	25
Quizzes	30
Posters	25
Total	100

Annotation:

You will use keep an “annotation binder” on your computer and on Google docs in which you will document the best versions of various program outputs, including:

1. Coding potential map from GeneMark
2. Original annotation from DNA Master
3. Changes to the auto annotation, along with your justification of the changes
4. tRNA scans
5. Frameshift Finder
6. Other output, as specified in class

Tentative schedule:

	Lecture	Lab activities
Mar 31	Overview of class Introduction to genes and genomes, transcription and translation	Install DNA Master and set up preferences Follow pp.5-15 in DNA Master Annotation Guide
Apr 2	More on transcription; translation and reading frames; Introduction to BLAST	Do translation and reading frame exercises BLASTn the Kersh genome (Follow pages 17-21 in the Annotation Guide) <i>Homework 1 on bacterial gene organization</i>
Apr 7	No class	Read "In Silico" on TED
Apr 9	Homework 1 due Operons and coding potential Using DNA Master and Genemark	Upload Kersh into DNA Master and auto- annotate (Follow pages 23-36 in annotation guide) Generate Genemark map (pp. 45-48) Work on genes 1 to 6 in Kersh (pp. 63-80) BLASTp all ORFs in DNA Master (pp. 37- 39) <i>Homework 2 on DNA Master</i>
Apr 14	Homework 2 due Intro to phage genes and genome organization; Using BLAST and GeneMark to help annotate genes Introduction to tRNA scan	Run tRNA scan (pp. 90-93); set up annotation folder. Generate six-frame translation (pp.41-43) Assign genes and start annotation in groups <i>Download Phamerator for next lab</i>
Apr 16	Making changes in DNA Master; Comparison of Kersh genome to related phages using Phamerator and DNA Master	Begin using Phamerator (pp 49-61) Work on annotation (pp.59 to 83)
Apr 21	Quiz 1; Structural proteins How to read a paper Mycobacteriophage L5 genome	Work on annotation in class <i>Mycobacteriophage L5 paper Homework 3</i>
Apr 23	Each group presents problem area How to add notes	Work on problem areas; start adding notes
Apr 28	Discuss annotation so far L5 paper discussion	Begin assigning gene functions pp. 99-107
Apr 30	Guest lecture 3 PM: An introduction to proteomics:	Use proteomics data to support annotation <i>Proteomics homework 4</i>
May 5	More on proteomics	Use proteomics data to support annotation
May 7	Quiz 2 Discussion: Does the proteomic data support our annotation	Polish annotation
May 12	Functional annotation; Stoperators,	Merge files pp.109-116

	repeat sequences, MPMEs etc	
May 14	How to make a poster Poster assignments	Discuss topics for poster and form teams
May 19		<i>Assign Phage cluster paper by Pope 2011 Homework 5</i>
May 21	Discuss Phage cluster paper by Pope	Continue posters
May 26		
May 28		Finish Poster (must be finished by end of class)
June 2	Quiz 3	Practice presenting posters in class
W June 3	Research showcase set up	Starts at 4 PM
June 4		

Info on Research showcase

<http://www.biology.ucsd.edu/education/undergrad/research/showcase/>