

Genomics Research Initiative Laboratory

BILD70

Fall 2020

2-6 PM Wednesday

2-6 PM Friday

Online!

INSTRUCTOR:

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TEACHING ASSISTANT:

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Date	Online Activities	Assignment	Discussion topics	Lecture Reading
1. F Oct 2	Overview of class			
2. W Oct 7	Introduction to bacteriophages 1 <ul style="list-style-type: none"> • Discovery of phage • Lytic and lysogenic cycle • Breaking and Entering- details of phage infection 	Assignment #1 RNA Viruses Due Wednesday Oct. 14 Read Pogliano Jumbo Phage article before Friday Oct. 9		
3. F Oct 9	Introduction to bacteriophages 2 <ul style="list-style-type: none"> • Replication of very large (Jumbo) phage lecture • Introduction to GFP 		Discuss Jumbo phage replication mechanisms	Pogliano Jumbo Phage article Read before class.
4. W Oct 14	Discovering phage proteins Part 1. <ul style="list-style-type: none"> • Central Dogma DNA-RNA-Protein • Discovering phage proteins using BLAST • Introduction to our phage 	Assignment #2 Translation Due Friday Oct. 16 Assignment #3: BLAST 28 proteins Due Friday Oct. 16	Turn in assignment #1 and discuss similarities and differences between RNA phage and SARS-CoV2	
5. F Oct 16	Discovering phage proteins Part 2. <ul style="list-style-type: none"> • Introduction to the basics of protein structure 	Assignment #4 Phyre 28 proteins, Due Wed Oct. 21	Turn in assignment #2 Turn in and discuss assignment #3 (BLAST results)	

	<ul style="list-style-type: none"> Discovering phage proteins using Phyre 			
6. W Oct 21	<p>Discovering phage proteins Part 3.</p> <ul style="list-style-type: none"> Discuss Phyre results 	<p>Assignment #5 My favorite protein</p> <p>Due Fri Oct. 23</p>	<p>Turn in and discuss assignment #4 (PHYRE results)</p> <p>Discuss Phyre results</p> <p>Students present their top 3 to 5 proteins</p>	
7. F Oct 23	<p>Alumni Career Day Panel</p> <p>Students present 1 favorite protein</p>		<p>Turn in and discuss assignment #5</p> <p>Discuss your favorite protein, what it might do for the phage or host cell.</p>	
8. W Oct 28	<p>Introduction to creating protein fusions</p> <ul style="list-style-type: none"> History of gene and protein fusions How to design your own protein fusions 	<p>Assignment #6 Design your own protein-GFP fusion Due Fri. Oct 30</p> <p>Read Giant Phage Article before class Fri. Oct. 30</p>		

9. F Oct 30	Introduce Giant Phage project <ul style="list-style-type: none"> • Turn in protein fusion assignments • Giant phage 	Assignment #7 Analyze the largest phage ever discovered Due Wed. Dec. 9 Read Dutton Microbiome Article before class Wed. Nov 4	Turn in and discuss assignment #6 (Creating your GFP fusion) Discuss giant phage	Giant Phage article Read before class
10. W Nov 4	Microbiome 1 Dr. Rachel Dutton <ul style="list-style-type: none"> • Cheese microbiome 	Assignment #8 What's your favorite microbiome? Due Fri Nov. 6.	Rachel Dutton Guest lecture	Dutton Microbiome article Read before class
11. F Nov 6	Microbiome 2 <ul style="list-style-type: none"> • Tara Hafnia phage • My favorite microbiome 		Turn in and discuss assignment #8 (Your favorite microbiome) Discuss phage Hafnia	
12. W Nov 11	Veterans Day No Class			
13. F Nov 13	Microscopy 1 <ul style="list-style-type: none"> • Light Microscopy • Electron microscopy • Foldascope 	Assignment #9 Foldascope Build your own microscope Due Wed. Nov. 18 Read Meyer Phage Evolution Article before class Wed. Nov 4	Discuss microscopy Discuss Giant Phage project progress	

14. W Nov 18	Microscopy 2 <ul style="list-style-type: none"> Share Foldascope results Viral Evolution <ul style="list-style-type: none"> How viruses evolve 	Read Strathdee Phage Therapy Article before class Wed. Nov 20	Turn in and discuss assignment #9 (Foldascope images) Discuss viral evolution paper	Meyer Phage Evolution article Read before class
15. F Nov 20	Phage Therapy <ul style="list-style-type: none"> Promise and challenges of phage therapy 	Read CRISPR article before class Wed. Dec 2	Discuss phage therapy promise and challenges Discuss Giant Phage project progress	Strathdee Phage Therapy article Read before class
16. W Nov 25	Optional class discussion/review		Discuss/review class topics	
17. F Nov 27	No Class	Thanksgiving	No Class	No Class
18. W Dec 2	CRISPR/Cas <ul style="list-style-type: none"> The basics of how it works 	Assignment#10 Read CRISPR Applications article and answer questions for Fri Dec. 4.	Discuss CRISPR paper	CRISPR article Read before class
19. F Dec 4	Applications of CRISPR/Cas technology <ul style="list-style-type: none"> Gene editing Diagnostics 		Discuss CRISPR/Cas applications	CRISPR applications article Read before class
20. W Dec 9	GFP fusion results <ul style="list-style-type: none"> Amy presents results Giant phage analysis What did we learn that was		Turn in and discuss assignment #7 (Giant phage) Discussion results from	

	new and interesting?		examining GFP fusions	
21. F Dec 11	Student Power point presentations <ul style="list-style-type: none"> • What I learned this quarter about my favorite phage and protein 		Students presentations ~ 3 to 5 minutes (5 slides).	
Finals Week	No Class	No Class	No Class	No Class

Class effort and conduct (200 points total, 20 collaborative)

Students will be evaluated on overall class performance, including participation in online class discussions, professional behavior towards other students, instructors and TA, coming to class prepared, and contributing to any collaborative team efforts. Everyone will start off with full credit, with points deducted at the discretion of the instructors and TA for consistently arriving late or leaving early, lapses in safety procedures, failing to clean up properly, breaking or abusing equipment, unexcused absences, and for failing to work well with classmates.

Class will be held synchronously, beginning at 2pm on Wednesdays and Fridays as indicated in the schedule above. If you are unable to attend a class, please let the instructor and TA know before class, so that an alternate make up assignment can be given (such as an oral exam or writing assignment designed to show understanding of the material missed).

Assignments (200 points total)

There will be a 10 assignments during the course (indicated on the syllabus). The assignments will cover reading material or be part of our bioinformatic discovery of virus genomes. The goal is to promote understanding of phage biology. The best way to study and complete assignments is read all assigned material, attend class, follow the given instructions, and ask questions. There are no make-ups for assignments. If an assignment is missed it must be completed at later date to receive full credit. Uncompleted assignments will result in a zero on that assignment.

Final Presentation (100 points)

At the end of the quarter, we will have a final presentation (rather than a final exam) in which each student will present their work for the quarter in a 5 minute powerpoint presentation. This year the final presentation is on the last day of class Friday, December 11th.

Laboratory notebook (50 points)

Students are required to keep a laboratory notebook, in which they record how their bioinformatic experiments were performed, their results, data interpretation and future experiments. The general goals of lab notebooks are to (1) record your results, (2) allow anyone to repeat the experiment exactly as you did it, (3) provide a resource for trouble shooting

experiments, with sufficient detail to later recognize small differences in experimental protocols (such as slight differences in time or mixing method) that can make the difference between a successful experiment and a failure, and (4) provide a legal record of your discoveries for future patenting activities (!). Just as in any scientific lab, we hope to publish our findings, and your lab notebooks must provide information how you performed your bioinformatic experiments—meaning what programs did you use and what did you find. The assignments that you turn in will contain a summary of what you have found.

Notebooks can be electronic in Microsoft Word. If you choose to write in be legible and neat enough for others to follow, but they do not have to be beautiful. If you use a hard copy of a notebook, write in pen and if you make a mistake cross it out and write the correction. Do not erase or add or remove pages! Bring the notebook to class everyday, because it will be periodically checked and graded during class time.

Summary:

200 points – Effort and conduct

200 points – Assignments

100 points – Presentation

50 points – Electronic Notebook

550 points total

Academic Integrity

Cheating is not tolerated. Scientific research is completely dependent on the integrity and transparency of the scientists involved. All work should be your own. This can feel less clear-cut for laboratory classes where you do almost all of your work with a lab partner. You will share data (numbers and outcomes) with your lab partner, but the words, interpretations, and notes should be your own words. The UCSD Office of Academic Integrity defines cheating as follows:

“Cheating occurs when a student attempts to get academic credit in a way that is dishonest, disrespectful, irresponsible, untrustworthy or unfair.”

All incidents of cheating will be reported to the Office of Academic Integrity. If you have any questions about academic integrity or cheating, please ask any of the instructors or your TA. When in doubt, ask first. We also encourage you to visit the website of the Office of Academic Integrity at UCSD: <http://academicintegrity.ucsd.edu>

Additional information:

ATTENDANCE – Enrolled and waitlisted students MUST attend the first lab session. Additional details: <http://biology.ucsd.edu/go/ug-labs>.

ADD/DROP DEADLINES are different for lab courses than lecture courses. Students who drop a Biology

lab class after the end of the second class meeting will be assigned a “W”. Additional details: <http://biology.ucsd.edu/go/ug-labs>