BIMM 101 - Recombinant DNA Techniques, Fall 2018

Welcome!

Time and Place:
<u>Lecture</u>:   Mon/Wed/Fri   1:00 – 1:50p, CSB 005
<u>Lab</u>:   Wed/Fri   2:00 – 5:50p, York 3306/3406 (C01/C02)

Instructor:
Emily Grossman, PhD
Office: H&SS 1145C
Office Hours: Mondays 4:30 – 5:30p, H&SS 1145L
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Instructional Assistants:
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Learning goals:
- Learn the theory behind molecular techniques, and the applications of the methodologies in biological research
- Become proficient at basic molecular biology techniques
- Learn the importance of proper controls in designing experiments and interpreting results
- Improve lab math skills and ability to graph data correctly
- Learn to make logical conclusions from experimental data
- Become familiar with bioinformatics databases and applications
- Learn to find, read, and evaluate primary literature
- Become aware of the implications of the technology for society

Resources
1. Support for student writers:
Writing + Critical Expression Hub (part of the Teaching + Learning Commons)
There are undergraduate writing mentors on staff who are in Biological Sciences degree programs, so they have training not only in working with student writers, but also familiarity with science reasoning and science writing. Please don't hesitate to meet with a writing mentor for help—every writer can benefit from these conversations. Students can make appointments via https://ucsd.mywconline.com

2. Tutoring
OASIS: Office of Academic Support and Instructional Services
From the OASIS website (https://students.ucsd.edu/sponsor/oasis/): We are the learning center at UC San Diego and provide most of the free tutoring on campus in a collaborative, supportive environment. All UC San Diego students are eligible to receive OASIS services. Each year, OASIS serves 3,000 students in language, math, science, study skills, and writing as well as peer counseling and peer mentoring.

They are located on the third floor of Center Hall, (858) 534-3760 (phone), oasis@ucsd.edu (email)

3. Optional reading resource:
From Genes to Genomes by Dale (1st, 2nd, or 3rd edition). Electronic versions of the 3rd and 1st editions are available on roger.ucsd.edu. The text is also on reserve in the library.

Required Materials - bring to lab each day, required by second day of lab:
1. Labcoat – must go to knees (available at bookstore)
2. UV blocking safety glasses (also at bookstore)
3. BIMM 101 Lab manual (available at bookstore)
4. Notebook with carbon copies
5. Fine point Sharpie for labeling – get a dark color
6. Calculator – you cannot use a cell phone for quizzes!
7. iClicker (available at bookstore, version 2 preferred)
8. Long pants and closed-toed shoes are always required in lab (entire legs and feet covered, including ankles)

Lab Safety Training: Enrolled and waitlisted students MUST successfully complete the Biology Lab Safety Training and Assessment before the first lab session: https://dbsportal3.ucsd.edu:3443/safety-training/. Please note that courses offered by other departments (Chemistry, for example) may have additional safety training requirements.

Attendance: Enrolled and waitlisted students MUST attend the first lab session. Additional details: http://biology.ucsd.edu/go/ug-labs. **Remember that lab attendance is required – if you miss more than two labs, you will be asked to drop the course.** If you are ill, you must leave a message with me, not your IA, and make up the lab in a way that I will determine. If you miss one lab with no excuse, you will lose 5% from your final grade. If you miss more than two labs, you will receive an F for the course. You must be on time for lab; the IAs go over the experiments at the beginning of lab, and quizzes are given then. If you are habitually late to lab, you will lose 5% from your final grade.

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.

Makeup Quizzes:
The lowest quiz score will be dropped, so if you miss one quiz for any reason, this will count for your dropped quiz. If another quiz is missed, this will only be excused for medical reasons where documentation can be provided. At Dr. Grossman's discretion, this missed quiz will either be dropped from the student's point total for the class, or the quiz score will be averaged from other quizzes taken.

Accommodations: Students requesting accommodations for this course due to a disability must provide a current Authorization for Accommodation (AFA) letter issued by the Office for Students with Disabilities (OSD), which is located in University Center 202 behind Center Hall. Students are required to present their AFA letters to Faculty (please make arrangements to contact me privately) and to the OSD Liaison in the Department of Biological Sciences in advance so that accommodations may be arranged.

Contact the OSD for further information:
858.534.4382 (phone) osd@ucsd.edu (email) http://disabilities.ucsd.edu (website)

Whenever possible, we will use universal designs that are inclusive. If you have feedback on how to make the class more accessible and inclusive, please let me know!

A Culture of Respect: The Office for the Prevention of Harassment & Discrimination (OPHD) provides assistance to students, faculty, and staff regarding reports of bias, harassment, and discrimination. Students have the right to an educational environment that is free from harassment and discrimination.

Students have options for reporting incidents of sexual violence and sexual harassment. Sexual violence includes sexual assault, dating violence, domestic violence, and stalking. Information about reporting options may be obtained at OPHD at (858) 534-8298, ophd@ucsd.edu, or http://ophd.ucsd.edu. Students may receive confidential assistance at the Sexual Assault Resource Center at (858) 534-5793, sarc@ucsd.edu, or http://care.ucsd.edu, or through Counseling and Psychological Services (CAPS) at (858) 534-3755 or http://caps.ucsd.edu

Students may feel more comfortable discussing their particular concern with a trusted employee. This may be a UCSD student affairs staff member, a department Chair, a faculty member or other University official. These individuals have an obligation to report incidents of sexual violence and sexual harassment to OPHD. This does not necessarily mean that a formal complaint will be filed.

If you find yourself in an uncomfortable situation, ask for help. UCSD is committed to upholding policies regarding nondiscrimination, sexual violence and sexual harassment*.*

Class Web Site:
The class web site is on TritonEd (https://tritoned.ucsd.edu/). All class notices, the syllabus, and other important information will be posted here. Please check the web site regularly for updates, since this will be the main form of distribution of information to the class. My lecture notes will be posted to the site.

Course Requirements and Grading

The class will be out of 500 points, and the grades will be assigned as follows:

Total percentage	Grade	80.0 – 81.9%	B-
98.0 – 100%	A+	78.0 – 79.9%	C+
92.0 – 97.9%	A	72.0 – 77.9%	C
90.0 – 91.9%	A-	70.0 – 71.9%	C-
88.0 – 89.9%	B+	60.0 – 69.9%	D
82.0 – 87.9%	B	<59.9%	F

Due to the generous amount of extra credit opportunities, I do not round final scores.

1. Quizzes: 35% Starting the week of Oct 1st, there will be a quiz once a week (usually on Fridays) at the beginning of lab every week (see calendar on TritonEd). Each quiz is worth 5% of your final grade. The quizzes will cover the lectures, readings, and lab experiments from the previous week. **Your lowest quiz score will be dropped. Note:** If you come into lab late and miss the quiz, you will receive a zero for that quiz.

2. Assignments: 30% You will turn in five lab reports as well as 2-3 homework assignments, varying in worth and format, that will total 30% of your final grade. Guidelines for each assignment will be posted on TritionEd and due dates will be on the TritonEd calendar. Lab reports must be submitted to Turnitin on TritonEd before the start of lab, and all assignments must be handed in within 10 minutes of the start of your lab. Assignments that are handed in late that day will be penalized by deducting 5%, and each additional day an assignment is late another 5% will be deducted. Although you will be doing the experiments and collecting data with a partner, you must hand in your own assignments, written in your own words. **Copying someone else's homework (including past quarters!) is cheating (see below).**

3. Exam: 30% There will be a comprehensive exam on the last day of class, **Friday Dec 7th**, in lab during your regular lab class time. If you are unable to take the final for medical reasons <u>where documentation can be provided</u>, an incomplete will be given, and the final will be made up with me the following quarter.

4. Clicker participation (not for correctness), 5%
If you participate in answering clicker questions during 85% of the lecture sessions, you will get full points. Because you only need 85% participation for full points, if you forget your clicker one day do not worry about it.
For participation below 85%, the breakdown is as follows:
75% – 84.9%: 20pts
65% - 74.9%: 17pts
50% - 64.9%: 13pts
25% - 49.9%: 5pts
Below 25%: 0pts

5. Lab notebook (see pages 8-9 in lab manual): It is mandatory that you keep a lab notebook, which your IA's will check at the end of every lab for completeness. It should include:

- Purpose: objective of the lab in your own words (why are you doing the experiment?)
- Methods: pages of protocol/procedure and any changes you made to it, relevant charts
- Results: all calculations and data you collect, observations
- Conclusions: summarize and interpret results, labeling & location of samples

6. Extra credit opportunities (opportunity to earn up to 10pts)
Extra credit problems will be presented throughout the quarter on quizzes, as well as on the final. In addition, if 90% of the class completes a CAPE evaluation at the end of the quarter for me, everyone will receive 2pts of extra credit as well.

Academic Integrity:

We hold the following values (adapted from the International Center for Academic Integrity) as important to academic integrity and for maintaining an inclusive classroom environment. Although we will expect students to work together, all lab reports for the class must be independently written, i.e., **your own work in your own words**. While discussion of data among lab partners is encouraged, each student on their own must complete all text, references, figures, graphs, and tables. If you have questions about the difference between discussing your work with others and unauthorized collaboration, please ask your instructor or IA for clarification. Directly copying material from other sources without putting it in your own words is also plagiarism, even if the source is cited as a reference **(including the lab manual for this class! Please put it into your own words!)**

	As students, this means **you will…**	As the Instructional team, this means **we will…**
Honesty	➢ Honestly demonstrate your knowledge and abilities ➢ Communicate openly without using deception, including citing sources appropriately	➢ Give you honest feedback on your demonstration of knowledge and abilities on assignments and exams ➢ Communicate openly and honestly about the expectations and standards of the course through the syllabus and guidelines for course assignments
Responsibilities	➢ Complete your assignments on time and be fully prepared for class ➢ Arrive to lecture and lab on time and be active participants	➢ Give you timely feedback on your assessments ➢ Arrive to lecture and lab on time and be active participants ➢ Create relevant assessments and class activities

Respect	➢ Speak openly with others while honoring diverse viewpoints and perspectives ➢ Allow others to voice their opinions and perspectives	➢ Respect your perspective even while we challenge you to think more deeply and critically ➢ Help facilitate the respectful exchange of ideas in class
Fairness	➢ Contribute fully and equally when working in teams ➢ Not seek unfair advantage over others	➢ Create fair assessments and grade in a fair and timely manner ➢ Treat students and teams equally
Trustworthy	➢ Not engage in personal affairs while on class time ➢ Be open and transparent about what you are doing in class ➢ Not distribute course materials to others in an unauthorized fashion	➢ Be available when we say we will be ➢ Follow through on our promises ➢ Not modify the expectations or standards without communicating with everyone
Courage	➢ Say or do something when you see actions that undermine any of the above values	➢ Say or do something when we see actions that undermine any of the above values

This class statement and table of values is adapted from Dr. Tricia Bertram Gallant.

Any suspected instances of a breach of academic integrity will be reported to the Academic Integrity Office for review. A breach of academic integrity may result in a zero on the assignment/test/participation item in question and/or a failed grade in the course. The impact of the breach on a grade will be determined by the instructor in consultation with the Academic Integrity Office.

If you observe anyone not acting in accordance with the above values we are trying to foster, please bring your concerns to my or the instructional team's attention, and we will do our best to determine appropriate actions to uphold and protect these values.

Submitting reports to Turnitin.com: Students agree that by taking this course all required papers will be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers.

Tentative Course Schedule: (subject to change)

	Dates	Experiment/Activity	Experiment in Manual
Wk 0	Fri 9/28	Organization, dilutions, pipetting	Lab 1
Wk 1	Wed 10/3	Agarose gel electrophoresis	1A - 1D
	Fri 10/5	**Computer lab:** Image Studio Lite on Lab 2, graphing Set up liquid cultures of RFP and control promoter	Appendix A - C, Experiment 2A
Wk 2	Wed 10/10	Extract plasmids and check with gel electrophoresis and spectrophotometry	2B
	Fri 10/12	Design and set up RFP PCR experiment, **Computer lab**: Blasting primers, ApE to explore plasmid	2C, Appendix D
Wk 3	Wed 10/17	Run gel, clean up PCRs Set up digests Finish Appendix D	Appendix D, 2C-2E
	Fri 10/19	Clean stuffer from Pro1 Run gel of digests Plan ligations	2F - 2G
Wk 4	Wed 10/24	**Computer lab**: Design mutagenesis primers Set-up ligations and transform ligation mixtures into bacteria	2H, 2K
	Fri 10/26	Count colonies; plan how to analyze ligation data Start overnight culture	2I
Wk 5	Wed 10/31	**Computer lab**: Analyze ligation data Purify recombinant plasmid and check with gel Set up mutagenesis PCR	2J, 2L
	Fri 11/2	Gel of PCR, repeat if needed Kinase/Ligase/Dpn treatment Transform cells	2M, 2N
Wk 6	Wed 11/7	**Computer lab**: Bioinformatics lab Analyze transformations Repeat KLD and transformation if needed	Appendix F, 2O
	Fri 11/9	Set up liquid cultures of colonies from mutagenesis	2O
Wk 7	Wed 11/14	Purify plasmids, check using gel, and send for sequencing Streak cultures to maintain	2P, 2Q
	Fri 11/16	**Computer lab:** Analyze sequencing results Measure RFP fluorescence	2R, 2S, start 2T
Wk 8	Wed 11/21	**Computer lab**: Analyze RFP data Observe worms and induce RNAi	2T, Experiment 3A
	Fri 11/23	**Thanksgiving - No class or lab**	-
Wk 9	Wed 11/28	Observe worms and extract RNA Set up qRT-PCR	3B, 3C
	Fri 11/30	**Computer lab**: Analyze *C. elegans* qRT-PCR data PTC extraction and PCR	3D, Experiment 4A
Wk 10	Wed 12/5	Digest PTC PCRs, check genotype with agarose gel, taste-test for phenotype, paper disucssion, clean up	4B
	Fri 12/7	**Final Exam during lab**	-

Potentially Useful Resources (listed alphabetically):

Black Resource Center: The Black Resource Center is a Campus Community Center that serves everyone at UC San Diego while emphasizing the Black experience. We promote scholarship, foster leadership, and cultivate community for students through the committed, collaborative effort and support of faculty, staff, and the broader UC San Diego community.
http://brc.ucsd.edu/ (website)

Counseling And Psychological Services (CAPS): CAPS provides FREE, confidential, psychological counseling and crisis services for registered UCSD students. CAPS also provides a variety of groups, workshops, and drop-in forums.
http://caps.ucsd.edu/ (website)

Cross-Cultural Center: The Cross-Cultural Center strives for meaningful dialogues and context across all cultures, particularly those of underrepresented or underprivileged backgrounds. We offer supportive and educational services through art, social and educational programs, workshops, and outreach. We welcome creative venues for enhancing social consciousness and equity.
http://ccc.ucsd.edu/ (website)

LGBT Resource Center: The Lesbian Gay Bisexual Transgender Resource Center at UC San Diego provides a visible presence on campus and enhances a sense of connection and community among LGBT faculty, staff, students, alumni and the UC San Diego Community.
http://lgbt.ucsd.edu/ (website)

Office for Students with Disabilities (OSD): The Office for Students with Disabilities (OSD) at UC San Diego works with undergraduate, graduate, and professional school students with documented disabilities, reviewing documentation and determining reasonable accommodations.
https://disabilities.ucsd.edu/about/index.html (website)

Raza Resource Centro: The Raza Resource Centro team is committed to our student's success and we work collectively to meet the needs of our students. The Centro is a lively space where students study, meet, write, get tutoring, and most importantly are in community. It is a space where Latina/o Chicana/o organizations hold meetings, events and where culture, arte, and academics interconnect.
http://raza.ucsd.edu/ (website)

Student Veterans Resource Center: The Student Veterans Resource Center (SVRC) is committed to ensuring that military affiliated students successfully make the transition from the military environment to campus life, and are assisted in their progress toward completing their academic degree. The Center also provides opportunities for peer-to-peer support, mentoring and social networking.
https://students.ucsd.edu/sponsor/veterans/ (website)

Women's Center: The Women's Center serves as a resource for the entire campus community while placing the experiences of diverse women at the center through the resources we provide, the programming and learning opportunities we facilitate, and the dynamic community space that we create.
https://women.ucsd.edu/ (website)

There are many other resources available to you on campus, and if you wish to know more about where you can go for support – please let me know and we can find it together. If you would like me to include resources other than those I have listed above, let me know as well! I want to know what is important for everyone!