

BIMM 101 - Recombinant DNA Techniques, Summer Session II 2020

Welcome!

Virtual Time and Place:

Lecture: Tues/Wed/Thurs/Fri 11:00 – 12:20p, Zoom (will be recorded)

Lab: Tues/Wed/Thurs/Fri 1:00 – 3:30p, Zoom

Instructor:

Emily Grossman, PhD

Virtual Office Hours: Mondays 10:30 – 11:30a, Zoom

egrossma@ucsd.edu

Instructional Assistants:

Bryn Lopez bnl009@ucsd.edu

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Learning goals:

- Learn the theory behind molecular techniques, and the applications of the methodologies in biological research
- 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

Learning in this Course:

This course is designed to be an environment for everyone to learn and construct a shared understanding of the material. **Active participation by engaging with the lecture material, asking and answering questions (e.g. on the discussion board), and contributing to breakout sessions during lab time is expected.** Being able to communicate understanding, and confusion, is critical to success in any discipline, and is very useful for learning. To encourage collaboration, lab discussions will be done in groups, and grades will not be assigned on a curve. Being proactive to ask questions during office hours and on the discussion board will be critical for success, especially given the online nature of the course.

Instead of memorization, we will focus on developing an understanding of fundamental concepts as they apply to different examples. Therefore, quizzes will include questions that are based on solving problems in new contexts.

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)

Required Materials

BIMM101 Lab Manual – provided on Canvas

Accessibility

Any student with a disability is welcome to contact me in order to work out reasonable accommodations to support their success in this course. Students requesting accommodations for this course due to a disability must work through the Office for Students with Disabilities (OSD). Instructors will receive Authorization for Accommodations Letters from the OSD online portal. 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 get in touch!

If you received accommodations during Spring 2020 and would like to request the same accommodations for Summer and/or Fall 2020, please email your OSD specialist so that they can create Authorization for Accommodation (AFA) letters through the OSD student portal. Use the subject line "Requesting Summer/Fall Accommodations." You will receive an email from your Specialist letting you know when you may access your AFA letters electronically.

Students Who Have Not Received Accommodations Through The OSD Previously

This includes those with temporary limitations (concussions, broken bones, etc.)

All intake appointments will take place over the phone/Zoom. Call the OSD at 858.534.4382 to schedule an appointment. If campus is closed, send an email to osd@ucsd.edu and put "Request for Intake Appointment" in the subject line. Indicate dates and times during the subsequent two weeks that you are available for a 60 minute phone appointment, and you will be contacted via phone or email. If you are deaf or

hard of hearing and would prefer to have your intake conducted via email or through Zoom with captions, please let us know.

Before your appointment, complete the intake and consent forms which may be found on the OSD website: osd.ucsd.edu/students/forms.html#Student-Forms and email them back to osd@ucsd.edu. These will be forwarded to your Disability Specialist before your appointment.

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

Inclusion

It is our goal to create a learning environment that supports diversity of thought, perspective, experience, and identities. We encourage all of you to participate in discussion and contribute to the field from your perspective. If you have feedback on how to make the class more inclusive, please get in touch!

Office of Equity, Diversity, and Inclusion:
858.822.3542 | diversity@ucsd.edu | <https://diversity.ucsd.edu/>
<https://students.ucsd.edu/student-life/diversity/index.html>
<https://regents.universityofcalifornia.edu/governance/policies/4400.html>

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 Canvas (<https://coursefinder.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 250 points total, with the following components and each of their respective percentages of the total.

Grading Component	Points	Percentage
Post-lecture, pre-lab quizzes (over 85% correct earns a full score)	25	10.0%
Lab Discussion (attendance and participation at 85% of sessions earns full score)	12.5	5.0%
Lab Notebooks	62.5	25.0%
Problem Sets (3)	87.5	35.0%
CRISPR Writeup	60	24.0%
Professionalism	2.5	1.0%

The following grading scheme will be used. The course is **not** graded on a curve (i.e. 20% of students getting A, B, C, and such). Thus, the ability to do well in this course is not dependent on others doing poorly.

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. Post lecture, pre-lab quizzes, 10%

The quizzes posted on Canvas are meant to reinforce importance concepts covered in the video lectures. Quizzes are to be completed *prior* to the start of lab (deadlines will be posted on Canvas). Because mastery is not necessarily expected after watching the video lecture, scoring 85% or higher overall will result in full points. If your average score overall on the quizzes falls below 85%, you will earn your average percent (out of 25 points) for this portion of the grade. **It is very important to follow-up in office hours or via discussion boards on concepts you were unclear on.**

2. Lab Discussion Participation, 5%

Links to join the video lab sessions will be provided on Canvas. Discussions will be facilitated by the Instructional Assistants and Instructor and are meant to be a time to work collaboratively to analyze data, design experiments, and engage in troubleshooting of results. Participation in at least 85% of the lab sessions will result in full points. **It is highly recommended that you participate in as many as possible because this is an opportunity to ask questions and get feedback.** *If circumstances beyond your control interfere with your ability to participate, please get in touch with me so we can devise a plan for you to succeed in the course.*

3. Lab notebook (see pages 8-9 in lab manual), 25%:

Each student will be assigned an individual digital lab notebook (Google Doc) that you will use for the quarter. Compete and organized lab notebook entries are a critical part of effective work in a research lab. As such, we expect students to practice good lab notebook entry habits. Please consult the lab manual for what we expect in the lab notebooks, and use the template provided in the Google Doc. **Lab notebook entries will be regularly checked** and scored for various components: pre-lab work which often includes a summaries and predictions, in-lab work such as data analysis and discussion of data, and drawing conclusions in the form of an argument: claims, data to support claims, and explanations in the form of a biological or procedural mechanism, troubleshooting results when necessary. A grading rubric will be provided on Canvas.

4. Problem Sets: 35% There will be three Problem Sets due throughout the summer (Weeks 2 – 4). Starting Week 2, Problem Sets will be released on Thursday mornings and due the following Monday at 11:59pm (see calendar on Canvas). Problem Sets will be uploaded to GradeScope by the student (instructions provided on Canvas). Problem Sets will be cumulative but will focus on the most recent material.

5. CRISPR Lab report: 24% You will turn in a written report that is based on data and work from the majority of the quarter. Guidelines will be posted on Canvas and due dates will be on the Canvas calendar. Lab reports must be submitted to Turnitin on Canvas. Although you will be working together to analyze data with your lab group, you must hand in your own assignments, written in your own words. **Copying someone else's homework or lab reports (including past quarters!) is cheating** (see Academic Integrity statement below).

6. Professionalism, 1%

This portion of the course grade is intended to motivate students to consider the impact of their actions on their own learning and the learning of others in the course. Unprofessional interactions consume time yet have no meaningful benefits to you, your fellow students, and/or the teaching team. Analogously in the workplace, being unprofessional to your colleagues or supervisors will only discount you. When you are discounted, you will not be invited for new opportunities that you may or may not be aware of. Professionalism can be demonstrated through individually demonstrating maturity and professionalism, as well as contributing meaningfully to our lab community (2.5 points (1%) described here). By default, every student is assumed to be

professionally mature. Hence, this component is awarded to every student at the beginning of the quarter. During the quarter, based on observations by the teaching team, which includes but is not limited to one-on-one interactions, electronic communication, contributing data to class data sets according to deadlines, and follow-up conversations on grades, your professionalism credit may be deducted.

7. Extra credit opportunities (opportunity to earn up to 5pts (2%))

Extra credit problems will be presented throughout the quarter on Problem Sets. In addition, if 90% of the class completes a CAPE evaluation at the end of the quarter for me, everyone will receive 1pt of extra credit as well.

Late policy:

Assignments must be submitted on time to be eligible for full credit. Except in the case of medical or family emergencies, late assignments will be subjected to a 5% deduction per day if submitted within 72 hours after the posted due date. Assignments not submitted within 72 hours of the due date will receive a score of 0.

Regrades:

If a grading error has been made, you should submit a re-grade request to your Instructional Assistant or Dr. Grossman. Students who submit items for re-grading understand that we may re-grade the entire item and the score may go up or down.

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	<ul style="list-style-type: none"> ➤ Honestly demonstrate your knowledge and abilities ➤ Communicate openly without using deception, including citing sources appropriately 	<ul style="list-style-type: none"> ➤ 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	<ul style="list-style-type: none"> ➤ Complete your assignments on time and be fully prepared for class ➤ Arrive to lecture and lab on time and be active participants 	<ul style="list-style-type: none"> ➤ 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	<ul style="list-style-type: none"> ➤ Speak openly with others while honoring diverse viewpoints and perspectives ➤ Allow others to voice their opinions and perspectives 	<ul style="list-style-type: none"> ➤ Respect your perspective even while we challenge you to think more deeply and critically ➤ Help facilitate the respectful exchange of ideas in class
Fairness	<ul style="list-style-type: none"> ➤ Contribute fully and equally when working in teams ➤ Not seek unfair advantage over others 	<ul style="list-style-type: none"> ➤ Create fair assessments and grade in a fair and timely manner ➤ Treat students and teams equally
Trustworthy	<ul style="list-style-type: none"> ➤ 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 	<ul style="list-style-type: none"> ➤ Be available when we say we will be ➤ Follow through on our promises ➤ Not modify the expectations or standards without communicating with everyone
Courage	<ul style="list-style-type: none"> ➤ Say or do something when you see actions that undermine any of the above values 	<ul style="list-style-type: none"> ➤ 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.

All course materials are the property of the instructor, the course, and the University of California, San Diego and **may not** be posted online, submitted to private or public repositories, or distributed to unauthorized people outside of the course. 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.

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.

Synchronous Class Sessions:

You are welcome to have children with you during video sessions, as I fully understand that childcare situations may be complicated for many of us at this time. Do your best to participate and engage, but also please get in touch with me if you have any questions or concerns.

Letters of Recommendation:

If you think you may want me to write you a letter of recommendation (or any other instructor), please consider what a good letter would contain and how your actions in the course demonstrate the qualities you will want highlighted in a good letter. When students ask me for a letter of recommendation, I ask them to write to me about how they demonstrated critical thinking, leadership, collaboration, and professionalism. I will be specifically looking for examples of these qualities *that I could have noticed* during lecture, lab and office hours. Be sure to actively participate in the discussions, talk to me during the lab and my office hours: ask questions, offer your own ideas and interpretations of your results, bring interesting facts/papers that are connected to the material we are studying. If you don't actively show the qualities that are needed to write a good letter, it will be hard for me to write a letter that is meaningful and useful.

Technical Support:

For help with accounts, network, and technical issues:

<https://acms.ucsd.edu/contact/index.html>

For help connecting to electronic library resources such as eReserves and e-journals:

<https://library.ucsd.edu/computing-and-technology/connect-from-off-campus/>

Tentative Course Schedule: (subject to change)

	Dates	Lecture topics	Lab activities	Relevant Lab Manual Sections
Week 1	Tues Aug 4	Introduction	No lab	-
	Wed Aug 5	Course goals, general intro to experiments, dilutions	Welcome, try out Zoom features, "meet" group	Preparing to Learn in an Online Environment; Zoom Basics
	Thurs Aug 6	Gene structure review & using plasmids in molecular biology research	Lab breakout groups: dilutions plan, analyze data	Background info on straight and serial dilutions; Lab 3
	Fri Aug 7	CRISPR-Cas9 editing process	Step 2 of the molecular biology review in breakout groups	Lab 4
Week 2	Tues Aug 11	DiCarlo et al paper: studying CRISPR-Cas9 editing in yeast	Journal Article Discussion (part of DiCarlo et al. 2012 paper)	CRISPR-Cas9 Project Overview; Lab 5
	Wed Aug 12	Our big-picture goals & experimental design	Designing a CRISPR-Cas9 experiment	Lab 6
	Thurs Aug 13	Using mutation to identify gene function; using bioinformatic tools	Bioinformatics - Exploring the ADE2 gene to identify important features and where to mutate	Lab 7
	Fri Aug 14	gRNA & HDR design process & considerations	Bioinformatics - Design gRNA & HDR template	Restriction enzyme cloning; Lab 8
Week 3	Tues Aug 18	Class gRNA/HDR chosen; Plasmid extraction; Agarose gel electrophoresis	Analyzing results of extracting plasmid and checking with agarose gel electrophoresis	Protocol 1-3, Agarose Gel Electrophoresis, Protocol 4, Lab 9
	Wed Aug 19	Restriction enzyme digestions of plasmid	Analyze results of plasmid digestions	Protocol 7 & 8, Lab 10
	Thurs Aug 20	Ligation & transformations - how to plan & making predictions	Planning ligation of pML104-gRNA and transforming <i>E. coli</i>	Protocol 9, 10, Lab 11
	Fri Aug 21	Colony PCR to check for pML104-gRNA recombinant plasmid; sequencing	Analysis of ligation-transformation results	Lab 12, Polymerase Chain Reaction; Protocol 11, 13
Week 4	Tues Aug 25	Synthesizing the HDR template, What transformations are needed to answer research questions	Planning yeast transformations and making predictions	Protocol 12, 15, Lab 13
	Wed Aug 26	Exploring yeast transformation data, PCR of ADE2 gene to check for mutations, Info on upcoming CRISPR write-up	Analyze yeast transformation data, Start working on what analysis you will present in your CRISPR-write-up	Lab 14
	Thurs Aug 27	How sequencing works (review if already covered); Analyzing sequencing results	Analyze results of PCR and sequencing of ADE2 to identify mutations	Protocol 16-18, Lab 15
	Fri Aug 28	TBD	Working on yeast transformation & sequencing data set and CRISPR write-up - get feedback on your ideas	
Week 5	Tues Sept 1	CRISPR journal article (RNA binding protein & CLIP experiments)	Analyzing RNA-binding protein/CLIP data	**Updated Lab 17 Instructions will be provided on Canvas**
	Wed Sept 2	TBD	Free time to work on chosen assignment	-
	Thurs Sept 3	TBD	Free time to work on chosen assignment	-
	Fri Sept 4	TBD	Free time to work on chosen assignment	-

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)

Hub Basic Needs Center & Triton Food Pantry: The Hub Basic Needs Center addresses the gaps and concerns students have with accessing nutritious food, stable housing, and financial wellness resources. We are committed to transforming dialogues surrounding the basic needs of students so they can focus on their academic success contributing to holistic well-being.

<https://basicneeds.ucsd.edu/> (website)

Inter-Tribal Resource Center: We are focused on supporting Native American students and promoting educational access in our tribal communities.

<https://itrc.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!