



BIMM 121: MICROBIOLOGY LABORATORY

CoViD-19 SEMI-ONLINE EDITION

WINTER
'22

LECTURE, 9:30A - 10:50A, SEQUOYAH HALL 148 (IN-PERSON) OR ZOOM (REMOTE)
LAB, 11A - 1:50P, TATA HALL 2101 + 2102 (IN-PERSON) OR ZOOM (REMOTE)

WELCOME!

In this class we will explore microbes in the world around us, their interactions with each other, and their use as laboratory models to better understand biology. **The division is requiring our first three weeks of class to be remote, and the current plan is to return to in-person at the beginning of week four. Please pay attention to your email and canvas announcements in case things change.** We hope that when we get back in person, you will have the opportunity to learn hands-on wet lab techniques for working with microbes, from the fundamentals of basic sterile technique to the preparation of microbial genomes for sequencing. In our remote sessions, you will also learn how to use scientific literature, how to design experiments, and how to analyze data, including bioinformatic analysis of microbial genomes.

Please keep in mind that instructors found out about the remote three weeks at the same time you did and we've done our best to come up with a plan that works in a very short amount of time. The schedule is a bit complicated, so we all need to be patient and understanding with each other as we navigate our way through the course. **We're in this together, so if you have any issues or concerns, please let me know right away.**



INSTRUCTOR: DR. KATHERINE PETRIE, kpetrie@ucsd.edu

ZOOM OFFICE HOURS (BY APPOINTMENT): T 3-4 PM
SEE CANVAS FOR OFFICE HOURS SIGN-UP INFORMATION

IAS: LOGAN CHIN, AO1, lchinn@ucsd.edu

LEX KORETOF, AO2 akoretov@ucsd.edu

WILL WE GO REMOTE FOR THE WHOLE QUARTER?

I don't know. Instructors have generally been given the exact same notice as students with regards to these things. The remote/in-person decision is not made by me. We'll all just have to watch the covid numbers and hope for the best. Whatever format we end up with, I will do my best to make sure you learn transferrable lab skills this quarter!

IN-PERSON ATTENDANCE AND COVID:

Because of covid, we do not want you to feel pressured to attend every in-person lab session in order to earn a good grade. So we have a way for you to remotely make-up for missed in-person labs if you are unable to attend (see 'Earning your daily lab points' on the next page). However, because we are offering in-person lab activities and must plan them in advance, everyone enrolled in BIMM121 will be charged a lab fee, and this is unfortunately non-refundable. Please prioritize the health of yourself

and others: if you have any symptoms, tested positive, have been exposed, or have been advised to quarantine, please stay home! When in doubt - don't come out!

COURSE STRUCTURE:

Lectures: during lecture we will go over important concepts and background information needed to accomplish your lab tasks. **On in-person lab days, lectures will also be in-person**, but they will be recorded if you are unable to attend. **On remote lab days, lectures will be broadcast live on Zoom**; recordings for zoom lectures will also be made available.

Labs: Labs will be held via live synchronous Zoom sessions through week 3, then we plan to return to in-person labs. **You are responsible for attending both types of lab session.** For both the in-person and remote labs, you will work in small groups to complete each day's lab tasks and document your accomplishments in a daily lab notebook. Groups will be assigned at the beginning of the quarter, and you must attend the lab section you are officially enrolled in.

EARNING YOUR DAILY LAB POINTS:

Each lab day you will have a **notebook grade** and an **attendance grade**:

The **notebook grade** is based on pre-lab work, answering notebook questions, and recording and analyzing results as directed during each lab. If you miss an in-person lab, you are still responsible for filling in your google doc notebook - it is your responsibility to check in with your group-mates to get the required information. Notebooks must be completed by the end of the lab day (11:59 PM). (We design the labs so that you should be able to fill out your notebook as you go and be done by the end of lab, but we wanted to provide a little buffer).

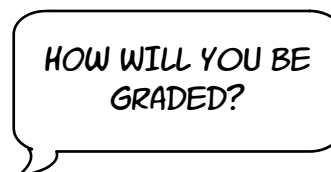
The **attendance grade** is based on attendance - whether or not you were there in person (in-person labs) or on zoom (remote-labs). However, as long as you **let your instructor and IA know** you can't attend in-person, you can make up you missed in-person attendance grade by completing a **make-up assignment** (see canvas 'course information' for directions) by the end of the lab day (11:59 PM) (in addition to making sure your notebook is fully up-to-date for your notebook grade).

We do not have a make-up assignment for remote (Zoom) lab attendance grades, but if you are sick or experiencing circumstances **beyond your control** that make you **miss a remote lab**, just **email me and your IA** to discuss the possibility of an excused absence. Similarly, if you are sick or circumstances beyond your control cause you to need **extra time** to complete your notebook, make-up assignment, lab report, etc., email me and your IA to discuss the possibility of an extension. Unless the situation is a medical emergency, you must contact us **ahead of time**.

INCOMPLETES: If health or family emergencies make you miss too many assessments, see Dr. Petrie to discuss the possibility of an “Incomplete.” Per UCSD Policy, your grade must be in good standing to be eligible.

ASSESSMENTS AND BASIS FOR FINAL GRADE:

Assessment	Weight
quizzes	30%
lab reports	39%
notebook grade	15%
attendance grade	5%
packback	10%
reflection assignments (surveys)	1%



GRADING SCALE - NO BELL CURVE (YOU WON'T BE COMPETING)

letter	F	D	C-	C	C+	B-	B	B+	A-	A	A+
percent	<60	60-70	70-73	73-77	77-80	80-83	83-87	87-90	90-93	93-97	97-100
gpa pts	0	1.0	1.7	2.0	2.3	2.7	3.0	3.3	3.7	4.0	4.0

ASSESSMENTS IN BRIEF:

Quizzes (30% of grade): weekly quizzes will cover material we’ve covered since the last quiz. Canvas quizzes will be available from 5 PM Sunday until 5 PM Monday and can be taken any time within that window (first quiz opens 10/3). Once you open a quiz, you must complete it within 1 hour. Quizzes are open-note, but you must work on your own - any consultation with humans or help-services will be considered violations of academic integrity. **Your lowest scoring quiz will be dropped.**

Lab reports (39% of grade) There will be three lab reports. As long as you request it ahead of the due date, there are 2, 1-day extensions available to use on your lab reports, no questions asked. Additional late reports may be subject to a 10% penalty, and cannot be accepted more than 5 days late. But please reach out to me if you have any extenuating circumstances. **Your lowest scoring lab report will be dropped.**

Daily lab points (20% of grade). These are reflected in your **notebook grade** (15%) and your **attendance grade** (5%). You must complete a lab notebook entry for every lab session. See ‘earning your daily lab points’ on the previous page for more information about your attendance grade. **Your lowest scoring notebook grade will be dropped.**

Packback (10% of grade) This ai-moderated discussion forum is driven by your curiosity and will help you make connections between what we learn in class and the real world. Every week, you are required to **make 2 posts, at least 1 of which must be a response to someone else’s post.** To earn credit, your posts must meet certain guidelines. Packback will assign a curiosity score to each post

based on its depth, credibility, and presentation. Consistently high curiosity scores are an opportunity for extra credit. **You can miss 1 packback week**, no questions asked.

Reflection assignments (1% of grade). These brief, reflective surveys will be scored for completion - they're easy points!

WHAT DO YOU NEED FOR THIS CLASS? (CHECKLIST)

- ☐ **A computer:** You will need a computer or a laptop to interact with cloud computing resources online. Operating system (mac/linux/unix/PC) doesn't matter, but mobile devices (ipads, smartphones, etc.) will not be sufficient for the bioinformatics work we do starting in week 8. If you do not have access to a computer at home, please see 'campus and community resources' on our canvas page to request a loaner.
- ☐ **Internet access:** all course documents will be posted on canvas, so you'll need the internet to get them. Additionally, all bioinformatics work will be done in a cloud computing environment, so you'll have to be connected to do your work for the class.
- ☐ **Zoom access and a mic:** for live remote class meetings
- ☐ **Packback access code:** we'll be using this AI-moderated forum to dive deeper into the topics we cover in class. Your account will be automatically charged (~\$29) for Packback access unless you opt out of inclusive access within a certain time period.
- ☐ **In-person PPE & manual:** If you attend in-person labs (starting week 4), you will need the following items, available at the bookstore. However, **if we stay online, you will not need these items**; we recommend **waiting** a few weeks to get a better sense of the university's plans.
 - ☐ **Printed lab manual:** If we return to in-person, you will need to purchase the BIMM 121 lab manual (ISBN: 9781533923905) available at the UCSD bookstore (\$28). However, **if we stay online, you will not need this lab manual.**
 - ☐ **Knee-length lab coat:** this cannot be a lab-coat you currently use in another setting; for safety reasons, it must remain in the BIMM 121 TATA hall lab for the quarter.
 - ☐ **KN95 mask or double mask (i.e. surgical + fabric):** To best protect students and staff due to the long duration of in-person lab sessions, the Division of Biological Sciences has decided to go above and beyond the mask requirements for the campus, and you will need to be sure you are wearing one of these options on in-person lab days.
 - ☐ **Safety glasses:** ANSI Z78.1-rated safety glasses (standard prescription eye ware is not sufficient, but chemical splash goggles are NOT required, and they may fog easily and tend to get uncomfortable). You may want to consider anti-fog safety glasses; the Division has tested and recommends Pyramex™ S2510ST with Ztek antifog, which you can find on Amazon.

- **A paper notebook:** your official lab notebook is a google doc, but you should bring a paper notebook of some kind (any type is fine) to in-person labs to jot down information, as you might not always have access to a computer.

INCLUSIVITY: Everyone comes to this course with different backgrounds, knowledge, and perspectives. We want to create a classroom culture that respects and revels in this human diversity. If you have concerns related to inclusivity or feel your identities are not being honored, please let us know! For more information on campus & community resources, check our canvas page.

EDUCATION RESEARCH: During this class, I'll be working to better understand how students learn and how to improve the learning experience. This means that some of your class data (like your reflective survey responses) might be used in research. Additional information (and an opportunity to opt-out of the research) will be provided later in the quarter, before research data is collected.

IMPORTANT DEADLINES: I will make every effort to announce these deadlines in class and post reminders in multiple places, but please make note of them in your personal calendar now.

Every Tuesday & Thursday, 11:59 PM: lab notebooks due (must be fully updated by this time - we will look at google doc timestamps)

Every Thursday, 11:59 PM: packback discussion board posting deadline (can post earlier!). First packback due Thursday, January 6th.

Monday, January 10th, 5PM: quiz 1 due (quiz opens 5PM Sunday)

Tuesday, January 18th, 5PM: quiz 2 due (quiz opens 5PM Sunday)

Monday, January 24th, 5PM: quiz 3 due (quiz opens 5PM Sunday)

Monday, January 31st, 5PM: Lab Report 1 (yogurt CRISPRs) due (no quiz)

Monday, February 7th, 5PM: quiz 4 due (quiz opens 5PM Sunday)

Monday, February 14th, 5PM: Lab Report 2 (biofilm morphotypes) due (no quiz)

Tuesday, February 22nd, 5PM: quiz 5 due (quiz opens 5PM Sunday)

Monday, February 28th, 5PM: Lab Report 3 (biofilm genotypes) due (no quiz)

Monday, March 7th, 5PM: quiz 6 due (quiz opens 5PM Sunday)

COURSE SCHEDULE (TENTATIVE):

Week	Lab	Date	Lecture	Lab
<i>Module: Microbes as models</i>				
1	1	1/4 (T)	(remote): lab overview, biofilms 1	(remote): introduction, dilution activity
	2	1/6 (H)	(remote): SBW25, experimental evolution	(remote): biofilm article discussion, biofilm microcosm proposal
<i>Module: Microbes as food</i>				
2	3	1/11 (T)	(remote): fermentation, cloud computing	(remote): cloud computing
	4	1/13 (H)	(remote): discovery of CRISPR, t-test measuring culture density 1	(remote): CRISPR 1
3	5	1/18 (T)	(remote): CRISPRs in LAB	(remote): CRISPR 2
	6	1/20 (H)	(remote): gut microbiome & consequences of eating CRISPRs	(remote): CRISPR 3
<i>Module: Microbes as models (continued)</i>				
4	7	1/25 (T)	(remote): serial dilution 1	(remote): serial dilution activity
	8	1/27 (H)	(remote): serial dilution 2	(remote): counting & calculating cfu/mL from SBW25 plate photos
5	9	2/1 (T)	(remote): Sanger sequencing, unix tips	(remote): unix tutorial
	10	2/3 (H)	(remote): Illumina sequencing, quality scores	(remote): breseq 1
6	11	2/8 (T)	(remote): common SBW25 biofilm mutations from literature	(remote): breseq 2
	12	2/10 (H)	(remote): SBW25 mutations from previous BIMM121	(remote): research & informal presentations

<i>Module: hands-on microbiology</i>				
7	13	2/15 (T)	(in-person): inoculation, isolation, sterile technique	(in-person): safety talk, BASICS 1 (micropipetting), A1 (surface swab & plate), A2 (inoculation)
	14	2/17 (H)	(in-person): examining cultures & colonies, microscopy	(in-person): A3 (streak plate of A2), BASICS 2 (microscopy with prepared slides)
8	15	2/22 (T)	(in-person): t-streaks, microscope calibration, wet mounts, protozoa	(in-person): A3 (observation), BASICS 3, bonus activity (tardigrades!)
	16	2/24 (H)	(in-person): microbes & global geochemical cycles	(in-person): H1 (set up growth tests) (measure growth)
9	17	3/1 (T)	(in-person): cell appearance & arrangement, heat fixation, simple staining	(in-person): H2 (measure growth) & bonus activity (simple staining + wet mounts SBW25)
	18	3/3 (H)	(in-person): gram staining	(in-person): H3 (measure growth) & bonus activity (gram staining commercial yogurt)
10	19	3/8 (T)	(in-person): go over presentation format	(in-person): H4 (measure growth) & presentation prep
	20	3/10 (H)	(in-person): review	(in-person): wrap-up & presentations