

BIPN 145 Neurobiology Laboratory

Spring 2022

Instructor

Marc Marino, PhD
mjmarino@ucsd.edu
m2marino@ucsd.edu

(Virtual) Office hours

Monday @ 11 AM
(<https://ucsd.zoom.us/j/6858999405>)

Instructional Assistants

Kevin Mazo (kmazo@ucsd.edu)
Tiffany Naing (nnaing@ucsd.edu)
Kaili Inouye (kminouye@ucsd.edu)
Yifei (Skyley) Zhou (yiz099@ucsd.edu)

Staff Research Associate

Haley Scott/Dennis Hickey
hstott@ucsd.edu/dhickey@ucsd.edu

Lecture: B00 (B01+B02) MWF 1-1:50 PM (CSB 001/ZOOM)

Lab: B01 9:30 AM-12:50 PM (York Hall 1310)

B02 2:00-5:20 PM (York Hall 1310)

Course website: <https://sites.google.com/ucsd.edu/bipn145> (note that the syllabus found on the course website is for the WF lab section with Dr. J NOT our T/TH sections)

Course learning objectives:

- **Collect** and **evaluate** neural data from various organisms
- **Apply** principles of neural communication to multiple model systems
- **Describe** the breadth of techniques in neuroscience and the experimental questions they are suited to answer
- **Build** an appreciation for and practical insight into the process of research
- **Develop** critical thinking and problem solving in the context of difficult biological experimentation
- **Communicate** research to peers as well as a broader audience

Notes on our how class will run during a global pandemic

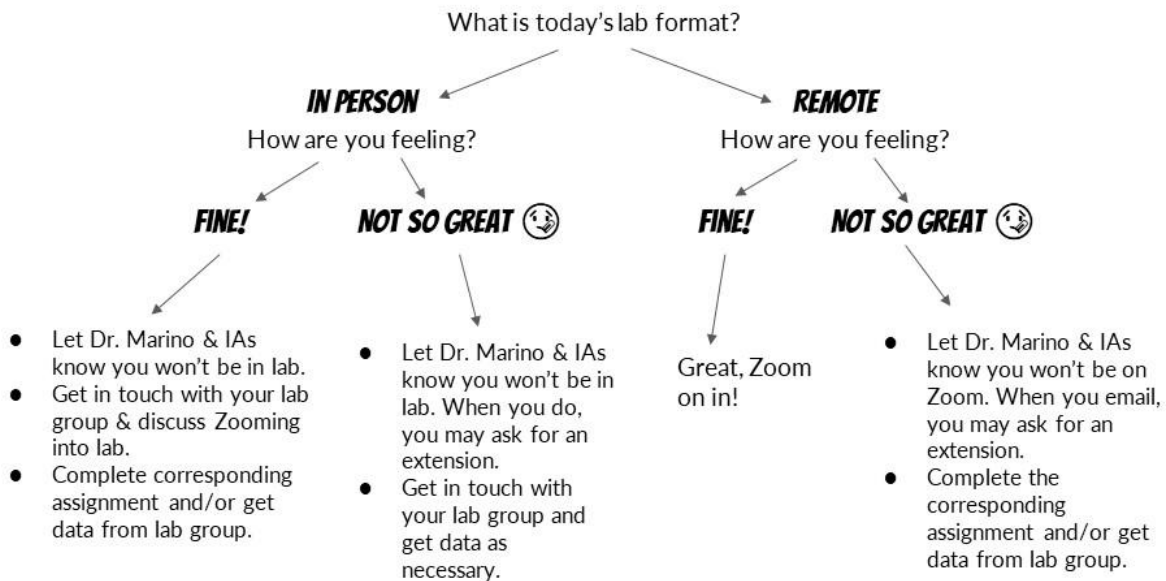
I realize that it is tough to stay engaged and motivated during year two of a global pandemic. I also realize many of you are eager to get back to “normal” life at UC San Diego and beyond. We’re going to do what we can in this class to productively learn what we can together in person, while maintaining a safe and flexible environment. As of now spring quarter will be in person with masks on for all indoor classroom/lab activities. I appreciate your patience as we work together to figure out how to live and learn in these rather unreasonable times.

Attendance Policies

If you feel well and have *not* knowingly been exposed to COVID-19, **you are expected to attend our in-person lab sessions**. I personally believe that there is a benefit to conducting our experiments in-person as well as being in lecture together. As you soon will see, even our lecture sessions will not be unidirectional – these will be active learning sessions where we co-create our learning. These lecture sessions will be held in person, as well as broadcast on ZOOM synchronously, and podcasted/recorded, but you will be expected to make up any activities that you missed.

If you cannot attend a lab session due to a positive COVID-19 test, exposure, or for any other reason, **please contact both the instructor and IAs ASAP so that we can work with you on accommodations**. Enrolled and waitlisted students must attend the first lab session (on Tuesday, September 28th). Additional details: <http://biology.ucsd.edu/go/ug-labs>. You do not need to inform us if you will be missing a lecture session. See this flow chart:

I HAVE COVID-19 SYMPTOMS, OR RECEIVED A POSITIVE TEST, AND/OR WAS TOLD TO QUARANTINE... WHAT DO I DO?



Isolation Policies

If you have any symptoms or test positive for COVID-19, please stay home. If you come in contact with someone who has tested positive for COVID-19 or has COVID-19 symptoms, **please quarantine for 5 days**. "In contact" means you were within 6 feet of this person for more than 5 minutes without a mask. If someone in your lab group tests positive for COVID-19, you are encouraged but not required to quarantine.

Testing & Masking Policies

Everyone needs to wear a properly fitted mask when we are indoors together, without exception. Currently, the Division of Biology requires an KN95 or Double Mask (disposable cloth mask) indoors in the Lab setting. If you are fully vaccinated, you do not need to complete COVID-19 testing, *but you are still encouraged to*. If you have an exemption and are not fully vaccinated, **you need to complete weekly asymptomatic testing.** [See details here](#). During each in-person lab section, we will be taking a 10 minute break where we all leave the room to let the air circulate. You are welcome to remove your mask during this break, while you are outside.

Additional resources

If you need additional help getting online, please check out [this resource](#) from the Teaching +Learning Commons. There are many more resources listed [here](#) to help you thrive this quarter. If there is anything you think we can help you out with, please reach out to the IAs or Dr. Marino.

Grading

Laboratory reports (275 pts, 50-100 pts each)

- Data collected as a group, **written individually**

Assignments (275 pts, 10-50 pts each)

- Includes smaller lab write-ups, pre-lab quizzes, lab practicals & class participation

Final group project (225 pts)

- Project proposal, presentation, and written report

Two midterms (200 pts, 100 pts each)

Professionalism (25 pts)

- Safety, clean up, teamwork, attendance & lab decorum

Additional notes on grading

- Lab reports, essays, and assignments will lose -10% for each day they are late.
- Final scores will be converted to letter grades, where A=90-100%, B=80-89.99%, C=70-79.99%, D=60-69.99%, and F=0-59.99%. For positive and minus grades, A+ = 97-100, A = 93-96.99, A- = 90-92.99, B+ = 87-89.99, B = 83-86.99, B- = 80-82.99, and so on.
- Final scores are as you see them on Canvas, once all of your assignments are graded. There is **no rounding up** to the closest score.

Please note that 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>.

Course Philosophy

A note on our course's environment

We'll be working together to create an equitable and inclusive environment of mutual respect, in which we all feel comfortable to share our moments of confusion, ask questions, and challenge our understanding. Everyone should be able to succeed in this course. If you do not feel that is the case please let me know.

Course accommodations

If you need accommodations for this course due to a disability, please contact the Office for Students with Disabilities (osd@ucsd.edu) for an Authorization for Accommodation letter. Please speak with me in the first week of class if you intend to apply for accommodations. For more information, visit <http://disabilities.ucsd.edu>.

This course, and the work it entails, is for you

So, you won't benefit if others do your work. Cases of academic dishonesty or cheating will be first handled by me, and then by the Academic Integrity Office. If you become aware of cheating in this class, you can anonymously report it: <https://academicintegrity.ucsd.edu/>

Lab safety is important

Enrolled and waitlisted students must successfully complete the Biology Lab Safety Training and Assessment before the first lab session: <https://biolabclass-safetyquiz.ucsd.edu/introduction>. Please note that courses offered by other departments (Chemistry, for example) may have additional safety training requirements. If you arrive at the first lab session having not passed the safety assessment, you'll only be able to observe the lab. **You will not be allowed into the lab for the second in-person lab session unless you have successfully passed the safety assessment.**

Course management & texts

Canvas

This course will be using Canvas to manage content and grades. You can log in by going to <http://canvas.ucsd.edu>. It's recommended that you **avoid Safari** for Canvas quizzes and exams ([Firefox or Chrome works great](#)). If you need any technical assistance with Canvas, please alert your instructor and send an email to servicedesk@ucsd.edu.

DataHub

We'll be using the UCSD DataHub for coding exercises and to run analysis code. Check your login at <http://datahub.ucsd.edu>.

Textbook

There is a Lab Manual (Bipn 145 Lab Manual, 9781533941329) that you can pick up at the UCSD Bookstore. This is a new lab manual that Dr. Juavinett has put together for us. There is no mandated textbook for this course, but most of the background material can be found in Purves et al. (2018) *Neuroscience*. We'll also use Carter & Shieh (2015) *Guide to Research Techniques in Neuroscience*, which can be found online [here](#) (link is also under *Resources* on Canvas). In addition, for each module I have curated resources that will be useful to you. You can find these on Canvas, or on the [course website](#).

Software for this class

Since we'll often be relying on your personal computers (rather than our lab computers), there are also various programs you'll be asked to install and use throughout the quarter. If you have any issues with these or would prefer not to download anything onto your personal computer, you are welcome to rely on a teammate or reach out to us for additional accommodations.

Microsoft Office

It will be really useful to have Microsoft Office in this course. You can find it [here](#).

LabChart Reader

If you can, please download [LabChart Reader](#) on your personal computer. We'll be using this to analyze previously collected data.

Course schedule

Subject to change. **You can find readings & due dates for assignments on Canvas.**

Week 1

Mar 28	Lecture	CSB 001/Zoom	Introduction to BIPN 145 + nervous systems/ Passive potentials	
Mar 29	Lab	York 1310	Computer Lab #1: Neuromembrane (Note: This experiment is not in your lab manual! It can be found here.)	
Mar 30	Lecture	CSB 001/Zoom	Modeling Neural Activity	DUE @ 11:59pm: Neuromembrane Quiz
Mar 31 (drop deadline for labs)	Lab	York 1310	Experiment #1: RC Circuits	
Apr 1	Lecture	CSB 001/Zoom	Recording from the nervous system	DUE @ 11:59 pm: RC Circuit Quiz

Week 2

Apr 4	Lecture	CSB 001/Zoom	The action potential	READ: Hodgkin & Huxley 1939
Apr 5	Lab	York 1310	Experiment #2: String Lab	DUE in Lab: Exit Quiz
Apr 6	Lecture	CSB 001/Zoom	Earthworm nervous systems	
Apr 7	Lab	York 1310	Experiment #3: Earthworm Experiments	READ Earthworm Protocol & DUE @ 9AM: Complete Earthworm Pre-Lab Quiz
Apr 8	Lecture	CSB 001/Zoom	Writing lab reports & two-sample statistics	DUE @ 11:59 PM: String Lab Data

Week 3

Apr 11		CSB 001/Zoom	The speed of the nervous system	
Apr 12	Lab	York 1310	Experiment #3: Earthworm Experiments/Analysis	
Apr 13	Lecture	CSB 001/Zoom	Intracellular & patch clamp recording	
Apr 14	Lab	York 1310	Experiment #4: Intracellular Equipment	DUE in Lab: Exit Quiz
Apr 15	Lecture	CSB 001/Zoom	Statistics in Neuroscience	

Week 4

Apr 18	Lecture	CSB 001/Zoom	Leech Physiology & Cell Types	DUE @11:59 pm: Earthworm Lab Report
Apr 19	Lab	York 1310	Experiment #4: Recording from the Retzius Cell of the Leech	DUE @ 9AM: Complete Leech Pre-Lab Quiz
Apr 20	Lecture	CSB 001/Zoom	Visualizing the nervous system	
Apr 21	Lab	York 1310	Experiment #4: Filling a cell in the Leech	
Apr 22	Lecture	CSB 001/Zoom	Review for Midterm #1	

Week 5

Apr 25	No Lecture	CSB 001	Midterm #1	
Apr 26	Lab	York 1310	Experiment #4: Statistics + Analysis Day	
Apr 27	Lecture	CSB 001/Zoom	Motor Circuits and EMG	
Apr 28	Lab	York 1310	Experiment #5: EMG lab	
Apr 29	Lecture	CSB 001/Zoom	Ethology & behavior	Due @ 11:59 pm: EMG Lab Quiz

Week 6

May 2	Lecture	CSB 001/Zoom	Drosophila behavior	DUE @11:59 pm: Leech Lab Report
May 3	Lab	York 1310	Experiment #7: The Case of the Mislabeled Vials (Drosophila Behavioral Experiments)	READ your Drosophila behavioral handout DUE @ 9AM: Complete Drosophila Pre-Lab Quiz
May 4	Lecture	CSB 001/Zoom	Drosophila genetics & optogenetics	
May 5	Lab	York 1310	Experiment #7: The Case of the Missing Methods (Drosophila Optogenetic Experiments)	WATCH Re-engineering the brain
May 6 (drop deadline for W)	Lecture	CSB 001/Zoom	Introduction to final projects	

Week 7

May 9	Lecture	CSB 001/Zoom	Recording & analyzing EEG signals	DUE @ 11:59 PM: Drosophila Methods Lab Report
May 10	Lab	York 1310	Experiment #8: EEG	
May 11	Lecture	Zoom	Drosophila Presentations	DUE @ 9 AM: Drosophila Presentation slides
May 12	Lab	York 1310	Experiment #8: EEG	
May 13	Lecture	CSB 001/Zoom	Coding in Neuroscience	

Week 8

May 16	Lecture	CSB 001/Zoom	Comparative Neuroanatomy	DUE @ 11:59 pm: Project proposals
May 17	Lab	York 1310	Computer Lab #2: Comparative Anatomy	DUE @ 11:59: Computer Lab #2
May 18	Lecture	CSB 001/Zoom	Mapping Neural Circuits	
May 19	Lab	York 1310	Computer Lab #3: Mouse brain connectivity	
May 20	Lecture	CSB 001/Zoom	Two-photon calcium imaging	DUE @ 11:59: Computer Lab #3 Quiz Submit Final Project Equipment & Needs Survey

Week 9

May 23	Lecture	CSB 001/Zoom	Expectations for final projects & planning period	DUE @ 11:59 pm: EEG Lab Report
May 24	Lab	York 1310	Work on final projects	
May 25	Lecture	CSB 001/Zoom	Review for Midterm #1	
May 26	Lab	York 1310	Work on final projects	
May 27	No Lecture	CSB 001/Zoom	Midterm #2	

Week 10

May 30			No class-Memorial Day	
May 31	Lab	York 1310/Zoom	Final Projects analysis & presentation preparation	
Jun 1	Lecture	CSB 001/Zoom	Careers in neuroscience/IA Talks	
Jun 2	Lab	York 1310	Final project presentations	DUE @ 9AM: Final Presentations
Jun 3	Lecture	CSB 001/Zoom	Final project presentations (if necessary)	

DUE JUNE 8th @ 11:59 pm:
Final project lab reports