

BIPN 145 Neurobiology Laboratory

Fall 2022

Instructor

Marc Marino, PhD
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(Hybrid) Office hours

Monday @ 11 AM
H&SS 1145I or on Zoom:
(<https://ucsd.zoom.us/j/6858999405>)

Instructional Assistants

Elizabeth Diaz (eld003@ucsd.edu)
Kaili Inouye (kminouye@ucsd.edu)
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Staff Research Associate

Haley Scott (hstott@ucsd.edu)

Lecture: A00 (B01+B02) MWF 1-1:50 PM (CSB 002/ZOOM)

Lab: A01 9:00 AM-12:20 PM (York Hall 1310)
A02 1:30-4:50 PM (York Hall 1310)

Course website: On Canvas

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 neuro-biological experimentation
- **Communicate** research to peers as well as a broader audience

Notes on our how class will run during a global pandemic

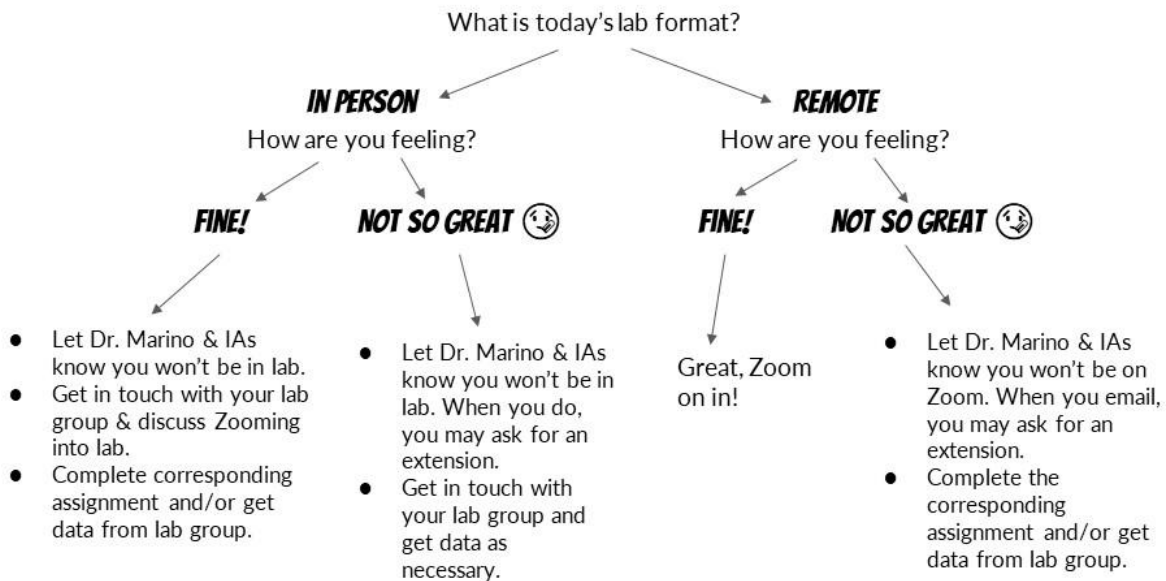
I realize that it is tough to stay engaged and motivated during year three of a global pandemic. I also realize we are all eager to get back to “normal” life at UC San Diego and beyond. We’re going to do what we can in this class to productively learn what we can together in person, while maintaining a safe and flexible environment. As of Fall quarter will be in person with masks on for all indoor classroom/lab activities as per UCSD [guidelines](#). 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 close contact with someone who has tested positive for COVID-19 or has COVID-19 symptoms, as per UCSD [guidelines](#) get tested upon your exposure notification and on day 5. **If you develop symptoms stay home**. “In close contact” means you were within 6 feet of this person for more than 15 minutes without a mask. If someone in your lab group tests positive for COVID-19 you are encouraged to get tested, however “merely being present in the same classroom where all individuals are masked does not meet the public health definition of a close contact.”

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 or cloth mask) indoors in the Lab setting. All students must conduct a daily symptom and exposure screening. If you are fully vaccinated, you are not required to complete weekly 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

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 (250 pts, 40-85 pts each)

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

Assignments (300 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)

- Multiple Choice and short answer exams focused on lecture/lab material

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 or an IA 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.**

In terms of safety equipment the only requirement is a basic dress code: long pants, closed toed shoes, and N95 mask. The lab is BSL0 so there is *no requirement* for lab coats, nor safety glasses/goggles, nor rubber gloves. Please do not bring your lab coat from lab or another lab course. We will provide nitrile gloves and clean lab coats when required.

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 (2022), ISBN: 9781533945556) that you can pick up at the UCSD [Bookstore](#). This is an updated lab manual for 2022 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 0

Sep 22

No Lab on this day

Sep 23

Lecture **CSB**
002/Zoom

Introduction to BIPN 145 +
Nervous systems

Take the Incoming [Survey](#)

Week 1

Sep 26	Lecture	CSB 002/Zoom	Passive potentials	
Sep 27	Lab	York 1310	Computer Lab #1: Neuromembrane (Note: This experiment is not in your lab manual! It can be found here .)	Due Prior to First Lab: Lab Safety Quiz
Sep 28	Lecture	CSB 002/Zoom	Modeling Neural Activity	DUE @ 11:59pm: Neuromembrane Quiz
Sep 29 (drop deadline for labs)	Lab	York 1310	Experiment #1: RC Circuits	
Sep 30	Lecture	CSB 002/Zoom	The action potential	DUE @ 11:59 pm: RC Circuit Quiz READ: Hodgkin & Huxley 1939

Week 2

Oct 3	Lecture	CSB 002/Zoom	Recording from the nervous system	
Oct 4	Lab	York 1310	Experiment #2: String Lab	DUE in Lab: Exit Quiz
Oct 5	Lecture	CSB 002/Zoom	Earthworm nervous systems	
Oct 6	Lab	York 1310	Experiment #3: Earthworm Experiments	READ Earthworm Protocol & DUE @ 9AM: Complete Earthworm Pre-Lab Quiz
Oct 7	Lecture	CSB 002/Zoom	Writing lab reports & two-sample statistics	DUE @ 11:59 PM: String Lab Data

Week 3

Oct 10		CSB 002/Zoom	The speed of the nervous system	
Oct 11	Lab	York 1310	Experiment #3: Earthworm Experiments/Analysis	
Oct 12	Lecture	CSB 002/Zoom	Intracellular & patch clamp recording	
Oct 13	Lab	York 1310	Experiment #4: Intracellular Equipment	READ Leech Intracellular Protocol DUE in Lab: Exit Quiz
Oct 14	Lecture	CSB 002/Zoom	Intrinsic Physiology	

Week 4

Oct 17	Lecture	CSB 002/Zoom	Leech Physiology & Cell Types	DUE @11:59 pm: Earthworm Lab Report
Oct 18	Lab	York 1310	Experiment #4: Recording from the Retzius Cell of the Leech	DUE @ 9AM: Complete Leech Pre-Lab Quiz
Oct 19	Lecture	CSB 002/Zoom	Visualizing the nervous system	
Oct 20	Lab	York 1310	Experiment #4: Filling a cell in the Leech	
Oct 21	Lecture	CSB 002/Zoom	Review for Midterm #1	

Week 5

Oct 24	No Lecture	CSB 002	Midterm #1	IN PERSON EXAM
Oct 25	Lab	York 1310	Experiment #4: Leech Lab Statistics + Analysis Day	Jupyter Hub Coding Intro
Oct 26	Lecture	CSB 002/Zoom	Motor Circuits and EMG	
Oct 27	Lab	York 1310	Experiment #5: EMG lab	
Oct 28	Lecture	CSB 002/Zoom	Coding in Neuroscience	Due @ 11:59 pm: EMG Lab Quiz

Week 6

Oct 31	Lecture	CSB 002/Zoom	Drosophila behavior	
Nov 1	Lab	York 1310	Experiment #6: The Case of the Mislabeled Vials (Drosophila Behavioral Experiments)	READ your Drosophila behavioral handout DUE @ 9AM: Complete Drosophila Pre-Lab Quiz
Nov 2	Lecture	CSB 002/Zoom	Drosophila genetics & optogenetics	
Nov 3	Lab	York 1310	Experiment #6: The Case of the Missing Methods (Drosophila Optogenetic Experiments)	WATCH Re-engineering the brain
Nov 4	Lecture	CSB 002/Zoom	Introduction to final projects	DUE @11:59 pm: Leech Lab Report

Week 7

Nov 7	Lecture	CSB 002/Zoom	Recording & analyzing EEG signals	
Nov 8	Lab	York 1310	Experiment #7: EEG	
Nov 9	Lecture	Zoom	Drosophila Presentations	DUE @ 12 PM: Drosophila Presentation slides
Nov 10	Lab	York 1310	Experiment #7: EEG	DUE @ 11:59 PM: Drosophila Methods Lab Report
Nov 11			No Class or Lab (Veteran's Day)	

([drop deadline](#) for W)

Week 8

Nov 14	Lecture	CSB 002/Zoom	Mapping Neural Circuits	DUE @ 11:59 pm: Project proposals
Nov 15	Lab	York 1310	Computer Lab #2: Mouse brain connectivity	
Nov 16	Lecture	CSB 002/Zoom	Neuroanatomy and Introduction to the Allen Brain Atlas	DUE @ 11:59: Computer Lab #2 Submit: Final Project Equipment & Needs Survey
Nov 17	Lab	York 1310	Work on final projects	
Nov 18	Lecture	CSB 002/Zoom	Review for Midterm #2	DUE @ 11:59 pm: EEG Lab Report

Week 9

Nov 21	Lecture	CSB 002/Zoom	Midterm #2	IN PERSON EXAM
Nov 22	Lab	York 1310	Work on final projects	
Nov 23			No Class on this day-Thanksgiving	
Nov 24			No Lab on this day-Thanksgiving	
Nov 25			No Class on this day-Thanksgiving	

Week 10

Nov 28	Lecture	CSB 002/Zoom	Expectations for final project presentations	
Nov 29	Lab	York 1310/Zoom	Final Projects analysis & presentation preparation	
Nov 30	Lecture	CSB 002/Zoom	Careers in neuroscience	
Dec 1	Lab	York 1310	Final project presentations	DUE @ 9AM: Final Presentations
Dec 2	Lecture	CSB 002/Zoom	Final project presentations	

DUE Dec 7th @ 11:59 pm:
Final project lab reports