

BIPN 145 Neurobiology Laboratory

Fall 2021

Instructor

Marc Marino, PhD
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Instructional Assistants

Mary Alarcon (m1alarco@ucsd.edu)
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(Virtual) Office hours

Monday @ 11:15 AM
(Link on Canvas)

Staff Research Associate

Brandon Chechile
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Lecture: B00 (B01+B02) MWF 1-1:50 PM (Location varies; see Schedule below)

Lab: B01 9:00 AM-12:20 PM (Location varies; see Schedule below)

B02 1:30-4:50 PM (Location varies; see Schedule below)

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
- **Develop** an appreciation for and practical insight into the process of research
- **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. 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 as well as be on Zoom for online labs.** 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 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.

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 10 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. In Lab you are required to wear either a KN95 or to double mask (cloth+surgical) per the Division of Biology. 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 10-15 minute break outside 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

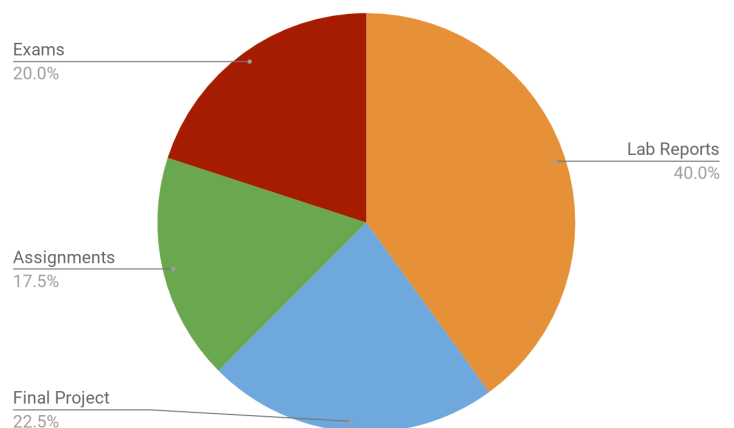
Laboratory reports (400 pts)

Assignments (175 pts)

- Includes smaller lab write-ups & class participation

Final group project (225 pts)

- Project proposal, presentation, and written report



Two midterms (100 pts each)

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. We do not have any PPE requirements for this Lab other than closed toed shoes and long pants.

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.**

Date	Location	Topic	Due/Reading
Week 0			
Sept 23	N/A	N/A	No Lab
Sept 24	Lecture	Cognitive Science Building 002	An introduction to nervous systems Before 1st Lab on Sep 28: Online safety test
Week 1			
Sept 27	Lecture	Cognitive Science Building 002	Resting membrane potentials & recording from the nervous system
Sept 28	Lab	York 1310	Lab Safety Demonstration Experiment #1: String Lab DUE Before Lab: Online Safety Test
Sept 29	Lecture	CSB 002 OR Zoom	Passive potentials & modeling neural activity
Sept 30	Lab	Zoom	Experiment #2: RC Circuits Note: Our virtual version of this differs from the lab manual and can be found here .
Oct 1	Lecture	CSB 002 OR Zoom	The action potential DUE @ 11:59 pm: String Data READ: Hodgkin&Huxley 1939
Week 2			
Oct 4	Lecture	Cognitive Science Building 002	Earthworm Physiology DUE @ 11:59 pm: RC Circuit Quiz
Oct 5	Lab	York 1310	Experiment #3: Earthworm Experiments
Oct 6	Lecture	Zoom	The speed of the nervous system
Oct 7	Lab	Zoom	Experiment #3: Earthworm Analysis
Oct 8	Lecture	Zoom	Writing lab reports

Week 3

Oct 11	Lecture	Cognitive Science Building 002	Intracellular recording & leech recording	
Oct 12	Lab	York 1310	Experiment #4: Intracellular Equipment	
Oct 13	Lecture	Zoom	Coding in neuroscience & introduction to the Allen Brain Institute datasets	
Oct 14	Lab	Zoom	Computer Lab #1: Electrophysiological signatures of cell types in mouse & humans	
Oct 15	Lecture	Zoom	Statistics for biologists	DUE @11:59 pm: Earthworm Lab Report

Week 4

Oct 18	Lecture	Cognitive Science Building 002	Leech Physiology & Cell Types Details for Midterm #1	DUE @ 4 pm: Computer Lab #1
Oct 19	Lab	York 1310	Experiment #4: Recording from the Retzius Cell of the Leech & Filling a cell	
Oct 20	Lecture	Cognitive Science Building 002	Chemical neurotransmission & Review for the midterm	
Oct 21	Lab	York 1310 or Zoom	Experiment #4: Recording from the Retzius Cell of the Leech & Filling a cell	
Oct 22	Lecture	Zoom	Intrinsic physiology & neural computation	Midterm #1 DUE @ 11:59 PM MON Oct 25

Week 5

Oct 25	Lecture	Cognitive Science Building 002	Motor circuits & EMG	
Oct 26	Lab	York 1310	Experiment #5: EMG lab	
Oct 27	Lecture	CSB/Zoom	Comparative Anatomy	
Oct 28	Lab	Zoom	Experiment #6: Comparative anatomy Note: This is different than Experiment #6 in your lab manual and can be found here .	
Oct 29	Lecture	N/A	Ethology & behavior	DUE Sunday 10/31 @ 11:59 pm: EMG Lab

Week 6

Nov 1	Lecture	Cognitive Science Building 002	Drosophila behavior	DUE @ 11:59 pm: Comparative Anatomy Data READ your Drosophila behavior handout
Nov 2	Lab	York 1310	Experiment #7: The Case of the Mislabeled Vials	
Nov 3	Lecture	CSB/Zoom	Drosophila genetics & optogenetics Introduction to final projects	WATCH Re-engineering the brain; DUE Wednesday Nov 3 @ 11:59 pm: Leech Lab Report
Nov 4	Lab	York 1310	Experiment #7: The Case of the Missing Methods	
Nov 5	Lecture	CSB/Zoom	Recording brain activity in humans	

Week 7

Nov 8	Lecture	Cognitive Science Building 002	EEG Signal Processing & Perception	DUE @ 11:59 pm: Drosophila Lab Write-Up
Nov 9	Lab	York 1310	Experiment #8: EEG	DUE Nov 9th @ 11:59 pm: Drosophila Presentation slides
Nov 10	Lecture	CSB/Zoom	Drosophila Presentations	
Nov 11			<i>No Class (Veterans Day)</i>	
Nov 12	Lecture	CSB/Zoom	Drosophila Presentations	DUE SUN NOV 14 @ 11:59 pm: Project proposals

Week 8

Nov 15	Lecture	CSB/Zoom	Mapping neural circuits	
Nov 16	Lab	Zoom	Computer Lab #2: Mouse brain connectivity	
Nov 17	Lecture	Cognitive Science Building 002	Expectations for final projects & planning period	DUE @ 11:59 pm: EEG Lab Report
Nov 18	Lab	York 1310	Work on final projects	
Nov 19	Lecture	CSB/Zoom	Genetic engineering, circuits, and behavior	DUE @ 11:59 pm: Computer Lab #2

Week 9

Nov 22	Lecture	CSB 002	Midterm #2 IN PERSON	IN PERSON EXAM
Nov 23	Lab	York 1310	Work on final projects	
Nov 24	Lecture	Zoom	Two-photon calcium imaging & the visual system	
Nov 25-26			<i>No Class (Thanksgiving Break)</i>	

Week 10

Nov 29	Lecture	Zoom	Careers in neuroscience
Nov 30	Lab	Zoom	Computer Lab #3: Two-photon imaging data
Dec 1	Lecture	Zoom	Information for final presentations Prep period for final project presentations
Dec 2	Lab	York 1310	Final project presentations
Dec 3	Lecture	Cognitive Science Building 002	Final project presentations

DUE Dec 5th @ 11:59 pm:
Computer Lab #3
DUE DEC 10th @ 11:59 pm:
Final project lab reports