

BIPN 145 Neurobiology Laboratory

FALL 2023

Instructor

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Instructional Assistants

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(Hybrid) Office hours
Monday 11 AM-12 PM
H&SS 1145I or on Zoom:
(<https://ucsd.zoom.us/j/6858999405>)

Staff Research Associate
Haley Stott (hstott@ucsd.edu)

Lecture: A00 (A01+A02) MWF 1-1:50 PM (PODEM 1A19)

Lab: A01 9:30 AM-12:50 PM (York Hall 1310)

A02 2:00-5:20 PM (York Hall 1310)

PODEM (Podemos) is a brand new building south of Galbraith Hall (see red arrow):



Course website: On Canvas and **Course google Drive:** [Google Drive](#)

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

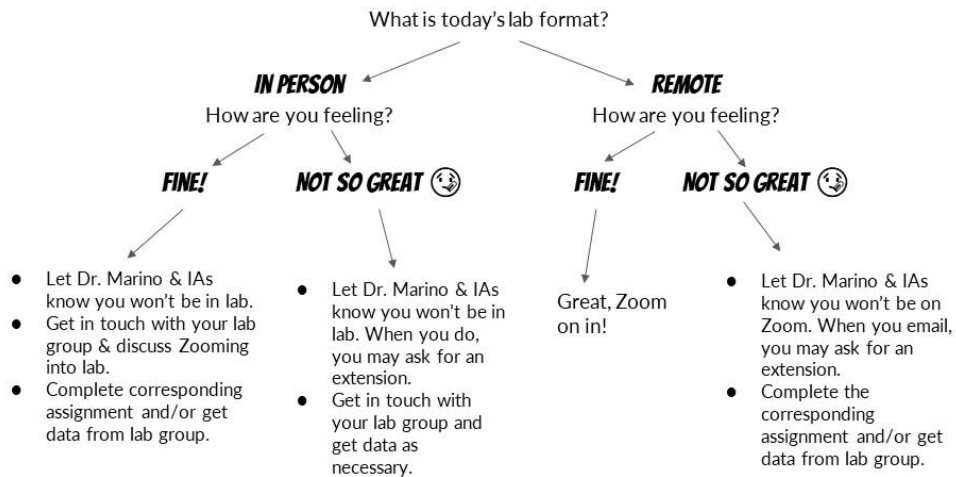
Notes on COVID-19 Safety

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 Spring quarter 2023 as per UCSD [guidelines](#) masks are no longer required in the classroom and lab. I appreciate your patience as we work together to figure out how to live and learn in these rather unreasonable times. Be aware that these guidelines may change at any time. I encourage everyone to **test regularly** and be **mindful of any viral symptoms**. **If you suspect you have been exposed I encourage you to mask**. **If you feel sick and have symptoms consistent with COVID-19 or another respiratory virus: stay home, contact your IA and instructor, and get tested.**

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**. If you cannot attend a lab session due to a positive COVID-19 test, confirmed exposure, or for any other reason, **please contact BOTH the instructor and IAs ASAP (ideally prior to lab time) so that we can work with you on accommodations**. If you do not have a valid excuse for missing the lab or do not contact the instructor, you will be marked as absent and lose points on any assignments related to that particular lab day. Anyone with three or more **unexcused** absences will be at risk of automatically failing the class. I personally believe that there is a benefit to conducting our experiments in-person as well as being in lecture together. **Lecture sessions will be held in person and podcasted/recorded**, but you will be expected to make up any activities that you missed. Enrolled and waitlisted students must attend the first lab session (on Tuesday, April 4th). 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 or another respiratory virus such as Flu or RSV, **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."

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 (200 pts, 65-100 pts each)

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

Assignments (320 pts, 10-45 pts each)

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

Final group project (150 or 250 pts)

- Project proposal (mandatory), presentation (mandatory), and written report (optional). If you choose to write the final lab report (individual optional assignment) your grade will be out of 1000 if not it will be out of 900

Two midterms (200 pts, 100 pts each)

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

Professionalism (30 pts)

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

Attendance Bonus Points (+20 Pts)

- Lecture Attendance and Participation using iClickers (optional)

Additional notes on grading

- For **individual assignments only**, you have a 3 day late bank that you may use over the course of the quarter to extend your deadlines without penalty.
- You can request a late bank **before the deadline** by filling out this form: [Late Bank](#)
- Lab reports, essays, and assignments **will lose -10%** for each day they are late without protection from the late bank or a pre-approved extension from the instructor.
- 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 plus 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.

To help accomplish this:

- I’ll ask for your preferred name & pronouns on our incoming survey. If these change over the course of the quarter, please let me know.
- Please don’t hesitate to come and talk with me if you feel like your performance in the class is being impacted by your experiences outside of class.
- I am constantly learning about diverse perspectives and identities. If something was said in class (by anyone) that made you feel uncomfortable, please talk to me about it.
- As a participant, you should also strive to honor the diversity of your classmates.

On the equity & diversity of our course content

In an ideal world, science would be objective. However, much of science is subjective and is historically built on a small subset of privileged voices. In this class, we will make an effort to show the work of diverse scientists, but limits still exist on this diversity. I acknowledge that it is possible that there may be both overt and covert biases in the material due to the lens with which it was written, even though the material is primarily of a scientific nature. Integrating a diverse set of experiences is important for a more comprehensive understanding of science. To this end, we will discuss diversity in neuroscience as part of the course from time to time.

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>. We will use the Triton Testing Center (TTC) for OSD tests, please make sure you are signed up on register blast and able to take your exams there.

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/>

A brief note on ChatGPT and other AI language models: It is not acceptable to use AI to write lab reports or assignments for this class. All the words in your assignments need to be written by you. You can, however, use AI to assist you in brainstorming, outlining, and/or to address content questions. I would recommend against using it to find references as the AI tends to make up references and these will be checked by a TA, so you need to verify and read real references. Typically these AI models are not 100% trustworthy, and I would be extremely careful utilizing them without confirming from a trusted source the AI generated information.

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. 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 your 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. (Due dates on Canvas)

Week 0

Sep 28 *No Lab on this day*

Sep 29 Lecture **PODEM 1A19** Introduction to BIPN 145 + Nervous systems Take the Incoming [Survey](#)

Week 1

Oct 2 Lecture **PODEM 1A19** Passive potentials

Oct 3 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](#)

Oct 4 Lecture **PODEM 1A19** Modeling Neural Activity **DUE @ 11:59pm:** Neuromembrane Quiz

Oct 5 Lab **York 1310** **Experiment #1:** RC Circuits ([drop deadline for labs](#))

Oct 6 Lecture **PODEM 1A19** The action potential **DUE @ 11:59 pm:** RC Circuit Quiz & **READ:** Hodgkin & Huxley 1939

Week 2

Oct 9 Lecture **PODEM 1A19** Recording from the nervous system

Oct 10 Lab **York 1310** **Experiment #2:** String Lab **DUE in Lab:** Exit Check In

Oct 11 Lecture **PODEM 1A19** Earthworm nervous systems

Oct 12 Lab **York 1310** **Experiment #3:** Earthworm Experiments **READ** Earthworm Protocol & **DUE @ 9AM:** Complete **Earthworm Pre-Lab Quiz**

Oct 13 Lecture **Recorded-Available on Canvas** **No in person class Oct 13th:** Recorded Lecture- Writing lab reports **DUE @ 11:59 PM:** String Lab Data

Course Schedule Subject to Change. (Due dates on Canvas)

Week 3

Oct 16		PODEM 1A19	The speed of the nervous system	
Oct 17	Lab	York 1310	Experiment #3: Earthworm Experiments/Analysis	
Oct 18	Lecture	PODEM 1A19	Intracellular & patch clamp recording	
Oct 19	Lab	York 1310	Experiment #4: Intracellular Equipment	READ Leech Intracellular Protocol DUE in Lab: Exit Check In
Oct 20	Lecture	PODEM 1A19	Intrinsic Physiology	

Week 4

Oct 23	Lecture	PODEM 1A19	Leech Physiology & Cell Types	DUE @11:59 pm: Earthworm Lab Report
Oct 24	Lab	York 1310	Experiment #4: Recording from the Retzius Cell of the Leech	DUE @ 9AM: Complete Leech Pre-Lab Quiz
Oct 25	Lecture	PODEM 1A19	Visualizing the nervous system	
Oct 26	Lab	York 1310	Experiment #4: Filling a cell in the Leech	
Oct 27	Lecture	PODEM 1A19	Review for Midterm #1	

Course Schedule Subject to Change. (Due dates on Canvas)

Week 5

Oct 30	No Lecture	PODEM 1A19	Midterm #1	IN PERSON EXAM
Oct 31	Lab	York 1310	Experiment #4: Leech Lab Statistics + Analysis Day	Jupyter Hub Coding Intro
Nov 1	Lecture	PODEM 1A19	Motor Circuits and EMG	
Nov 2	Lab	York 1310	Experiment #5: EMG lab	Due @ 11:59 pm: Leech Figures
Nov 3	Lecture	PODEM 1A19	Stats and Coding in Neuroscience	Due @ 11:59 pm: EMG Lab Quiz

Week 6

Nov 6	Lecture	PODEM 1A19	Drosophila behavior	
Nov 7	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 8	Lecture	PODEM 1A19	Drosophila genetics & optogenetics	
Nov 9	No Lab (Veteran's Day)			
Nov 10	No Class (Veteran's Day)			

Course Schedule Subject to Change. (Due dates on Canvas)

Week 7

Nov 13	Lecture	PODEM 1A19	Recording & analyzing EEG signals	DUE @ 11:59 PM: Drosophila Methods Protocol
Nov 14	Lab	York 1310	Experiment #6: The Case of the Missing Methods (Drosophila Optogenetic Experiments)	WATCH Re-engineering the brain
Nov 15	Lecture	PODEM 1A19/ Zoom	Drosophila Presentations	DUE @ 12 PM: Drosophila Presentation slides
Nov 16	Lab	York 1310	Experiment #7: EEG	DUE @ 11:59 PM: Drosophila Methods Assignment
Nov 17	Lecture	PODEM 1A19	Introduction to final projects	

Week 8

Nov 20	Lecture	PODEM 1A19	Mapping Neural Circuits + Introduction to the Allen Brain Atlas	DUE NOV 20th @ 11:59 pm: Project proposals
Nov 21	Lab	York 1310	Computer Lab #2: Mouse brain connectivity	Submit: Final Project Equipment & Needs Survey
Nov 22			<i>No Class on this day-Thanksgiving</i>	DUE @ 11:59: Computer Lab #2
Nov 23			<i>No Lab on this day-Thanksgiving</i>	
Nov 24			<i>No Class on this day-Thanksgiving</i>	

Course Schedule Subject to Change. (Due dates on Canvas)

Week 9

Nov 27	Lecture	PODEM 1A19	21st Century Neuroscience Techniques	
Nov 28	Lab	York 1310	Work on final projects	
Nov 29		PODEM 1A19	Review for Midterm #2	DUE @ 11:59 pm: EEG Lab Report
Nov 30		York 1310	Work on final projects	
Dec 1		PODEM 1A19	Midterm #2	IN PERSON EXAM

Week 10

Dec 4	Lecture	PODEM 1A19	Expectations for final project presentations	
Dec 5	Lab	York 1310	Final Projects analysis & presentation preparation	
Dec 6	Lecture	PODEM 1A19	Careers in neuroscience	
Dec 7	Lab	York 1310	Final project presentations	DUE @ 9AM: Final Presentations
Dec 8	Lecture	PODEM 1A19/Zoo m	Final project presentations	(If necessary)

DUE Dec 13th @ 11:59 pm:
Final project lab reports
(optional)