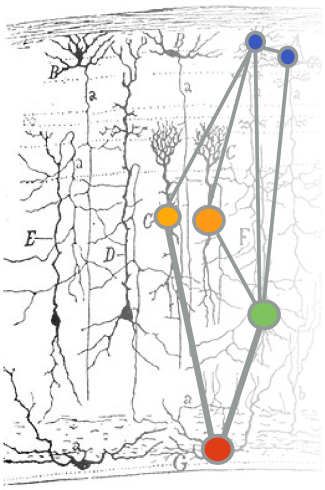

BIPN 145 Neurobiology Laboratory

Fall 2022

Instructor
Ashley Juavinett

Instructional Assistants
Qiyu Chen
Jo-hsien Yu

Office hours
Mondays, 1:30 - 2:30 pm
Mandeville Coffee Cart
(or by appointment)

Staff Research Associate
Haley Stott

Lecture: MWF 11-11:50 AM in Sequoyah Hall 148
Lab: WF 1 - 4:20 PM in York 1310

Course website: https://sites.google.com/ucsd.edu/bipn145

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 *three* 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**. 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.

Updated Sep 18, 2022

If you cannot attend a lab session due to a positive COVID-19 test, exposure, or for any other reason, **please contact both Dr. J and IAs ASAP so that we can work with you on accommodations.** Enrolled and waitlisted students must attend the first lab session (on Wednesday, 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. Please see the Exposure & Contact Tracing page on the UC San Diego website for more information.

Testing & Masking Policies

Everyone needs to wear a properly fitted mask when we are indoors together, without exception. 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 twice-weekly asymptomatic testing**. See details here.

Additional resources

There is a list of resources listed here to help you thrive this quarter. If there is anything you think we can help you out with, please feel free to reach out to the IAs or Dr. J.

Grading

Laboratory reports *(250 pts, 75-100 pts each)*
Data collected as a group, **written individually**

Assignments (300 pts, *20-50 pts each*)
Includes smaller lab write-ups, pre-lab quizzes, and in-class assignments

Final group project *(225 pts)*
Project proposal, presentation, and written report

Midterms *(200, 100 pts each)*

Professionalism *(25 pts)*

Late Assignments

- 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: https://forms.gle/SAeRJKyCWRtdhbFx7.
- Assignments not protected by the late bank will lose -10% for each day they are late.
- In the case of extenuating circumstances requiring a submission more than three days late, please contact Dr. J directly.

Additional notes on grading

- 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

Lab Manual

BIPN 145 has a lab manual! You can purchase it in the bookstore by searching for our course.

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 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	Lecture	Sequoyah Hall 148	An introduction to BIPN 145 & nervous systems	Take the incoming survey
	Lab		*No lab on this day*	
Week 1				
Sept 26	Lecture	Sequoyah Hall 148	The passive neural membrane	Take the incoming survey
Sept 28	Lecture	Sequoyah Hall 148	Modeling neural activity	
	Lab	York 1310	Neuromembrane (Note: This experiment is not in your lab manual! It can be found here.)	Online safety test
Sept 30	Lecture	Sequoyah Hall 148	Statistics for Biologists	DUE @ 5 pm: Neuromembrane Quiz
	Lab	York 1310	**Experiment #1**: RC Circuits	
Week 2				
Oct 3	Lecture	Sequoyah Hall 148	Recording from the nervous system	DUE @ 5 pm: RC Circuit Quiz
Oct 5	Lecture	Sequoyah Hall 148	The action potential	**READ** Hodgkin & Huxley (1939)
	Lab	York 1310	**Experiment #2:** String Lab	
Oct 7	Lecture	Sequoyah Hall 148	Earthworm nervous systems	DUE @ 5 pm: String Data

	Lab	Sequoyah Hall 148	**Experiment #3:** Earthworm Experiments	**READ** Earthworm Protocol & **Complete Earthworm Pre-Lab Quiz**

Week 3

Oct 10	Lecture	Sequoyah Hall 148	Writing lab reports	
Oct 12	Lecture	Sequoyah Hall 148	The speed of the nervous system	
	Lab	York 1310	**Experiment #3:** Earthworm Experiments/Analysis	
Oct 14	Lecture	Sequoyah Hall 148	Intracellular & patch clamp recording	
	Lab	Sequoyah Hall 148	**Experiment #4:** Intracellular Equipment	**Complete Leech Pre-Lab Quiz**

Week 4

Oct 17	Lecture	N/A	Leech Physiology & Cell Types *(Pre-recorded lecture)*	**DUE @11:59 pm:** Earthworm Lab Report
Oct 19	Lecture	Sequoyah Hall 148	Coding in neuroscience **In-Class Assignment**	
	Lab	York 1310	**Experiment #4:** Recording from the Retzius Cell of the Leech	
Oct 21 (drop deadline)	Lecture	Sequoyah Hall 148	**Review for the midterm**	
	Lab	York 1310	**Experiment #4**: Filling a cell in the leech	

Week 5

Oct 24	*No Lecture*	Sequoyah Hall 148	**Midterm #1**	
Oct 26	Lecture	Sequoyah Hall 148	Analysis & Catch Up Day	

	Lab	York 1310	**Experiment #5:** EMG lab	
Oct 28	Lecture	Sequoyah Hall 148	Introduction to final projects	
	Lab	York 1310	Motor circuits & EMG	DUE SUNDAY @ 11:59 pm: Leech Lab Report

Week 6

Oct 31	Lecture	Sequoyah Hall 148	Ethology & behavior	**DUE @ 5 pm**: EMG Quiz
Nov 2	Lecture	Sequoyah Hall 148	Drosophila behavior In-Class Assignment	READ your Drosophila behavior handout
	Lab	York 1310	**Experiment #7:** The Case of the Mislabeled Vials	
Nov 4 (deadline to drop w/ "W")	Lecture	Sequoyah Hall 148	Drosophila genetics & optogenetics	**WATCH** Re-engineering the brain
	Lab	York 1310	**Experiment #7:** The Case of the Missing Methods	

Week 7

Nov 7	Lecture	Sequoyah Hall 148	Electroencephalography (EEG)	DUE @ 5 pm: Drosophila Methods
Nov 9	Lecture	Sequoyah Hall 148	Drosophila Presentations	DUE THURSDAY @ 11:59 pm: Drosophila Presentation slides
	Lab	York 1310	**Experiment #8: EEG**	
Nov 11	Lecture		*No Class or Lab (Veteran's Day)*	

Week 8

Nov 14	Lecture	Sequoyah Hall 148	Visualizing the nervous system	DUE @ 11:59 pm: Project proposals

Nov 16	Lecture	Sequoyah Hall 148	Mapping neural circuits	
	Lab	York 1310	Mouse brain connectivity	
Nov 18	Lecture	Sequoyah Hall 148	Remaining Drosophila Talks **Review for Midterm #2**	**DUE @ 5 pm:** Mouse brain connectivity
	Lab	York 1310	**Work on final projects**	**DUE @ 11:59 pm**: EEG Lab Report **Submit** Final Project Equipment & Needs Survey

Week 9

Nov 21	*No Lecture*	Sequoyah Hall 148	**Midterm #2**	
Nov 23	Lecture	Sequoyah Hall 148	Expectations for final project presentations	
	Lab	York 1310	**Work on final projects**	
Nov 25			*No Class — Thanksgiving Break*	

Week 10

Nov 28	Lecture		Careers in neuroscience	
Nov 30	Lecture	Sequoyah Hall 148	IA Talks	
	Lab	York 1310	**Work on final projects**	
Dec 2	Lecture	Sequoyah Hall 148	Final project presentations	
	Lab	York 1310	Final project presentations	
				DUE DEC 7th @ 11:59 pm: Final project lab reports