



BIPN 145 Neurobiology Laboratory

Spring 2023

Instructor

Ashley Juavinett

Instructional Assistants

Kancheng Yin (kayin@ucsd.edu)

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Office hours

Mondays at 1 pm

📍 Art of Espresso
(or by appointment)

Staff Research Associate

Haley Stott

Lecture: MWF 11-11:50 AM in Sequoyah 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

Attendance Policies

You are expected to attend our in-person lab sessions, but lecture attendance is not mandatory. However, 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 in-class 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 Dr. J and IAs ASAP so that we can work with you on accommodations.**

Enrolled and waitlisted students must attend the first lab session. Additional details: <http://biology.ucsd.edu/go/ug-labs>. You do not need to inform us if you will be missing a lecture session.

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**

Final group project (225 pts)

Project proposal, presentation, and written report

Assignments (300 pts, 20-50 pts each)

Includes smaller lab write-ups, pre-lab quizzes, and in-class assignments

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.

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, like others, am in the process of 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 in course discussions, 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>.

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

It will be helpful to have the following software on your computer, since you'll often need to rely on a personal computer. 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. If you need a laptop for the quarter, you can request a loaner laptop by filling out this form: <https://eforms.ucsd.edu/view.php?id=490887>.

Microsoft Office

It may be 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 1				
Apr 3	Lecture	VIRTUAL [Zoom]	An introduction to BIPN 145 & nervous systems	Take the incoming survey
Apr 5	Lecture	Sequoyah 148	The passive neural membrane & modeling neural activity	Complete the online safety test
	Lab	York 1310	Neuromembrane (Note: This experiment is not in your lab manual! It can be found here .)	
Apr 7	Lecture	Sequoyah 148	Coding for biologists <i>Plotting in Jupyter Notebooks</i>	DUE @ 5 pm: Neuromembrane Quiz
		York 1310	Experiment #1: RC Circuits	
Week 2				
Apr 10	Lecture	Sequoyah 148	Recording from the nervous system	DUE @ 5 pm: RC Circuit Quiz
Apr 12	Lecture	Sequoyah 148	The action potential	READ Hodgkin & Huxley (1939)
	Lab	York 1310	Experiment #2: String Lab	
Apr 14	Lecture	Sequoyah 148	Earthworm nervous systems & lab report <i>Fitting curves in Python</i>	DUE @ 5 pm: String Data
	Lab	Sequoyah 148	Experiment #3: Earthworm Experiments	

Week 3

Apr 17	Lecture	Sequoyah 148	Writing lab reports	
Apr 19	Lecture	Sequoyah 148	The speed of the nervous system	
	Lab	York 1310	<p>Note: Lab will start at 2:30 pm on this day. You're encouraged to join me at the Walkout for Climate from 12-2 pm. 🙌🌍</p> <p>Experiment #3: Earthworm Experiments/Analysis</p>	
Apr 21	Lecture	Sequoyah 148	Intracellular & patch clamp recording	
	Lab	Sequoyah 148	Experiment #4: Intracellular Equipment	READ Experiment #4 Protocol & Complete Leech Pre-Lab Quiz (DUE @ 11 am)

Week 4

Apr 24	Lecture	Sequoyah 148	Leech Physiology & Cell Types	DUE @11:59 pm: Earthworm Lab Report
Apr 26	Lecture	Sequoyah 148	Statistics for biologists	
	Lab	York 1310	Experiment #4: Recording from the Retzius Cell of the Leech	
Apr 28 (drop deadline)	Lecture	Sequoyah 148	Leech lab report details <i>Descriptive & Inferential Statistics in Python</i>	DUE @ 5 pm In Class Assignment
	Lab	York 1310	Experiment #4: Filling a cell in the leech	

Week 5

May 1		Sequoyah 148	Review for the midterm	
May 3	Lecture	Sequoyah 148	Midterm #1	
	Lab	York 1310	Analysis & Catch Up Day	
May 5	Lecture	Sequoyah 148	Motor circuits & EMG	
	Lab	York 1310	Experiment #5: EMG lab	
Week 6				
May 8	Lecture	Sequoyah 148	Ethology & behavior	In-Class Assignment due at 5 pm DUE SUNDAY TUESDAY @ 11:59 pm: Leech Lab Report
May 10	Lecture	Sequoyah 148	Drosophila behavior In-Class Assignment	DUE @ 5 pm: EMG Quiz READ your Drosophila behavior handout
	Lab	York 1310	Experiment #7: The Case of the Mislabeled Vials	
May 12 (deadline to drop w/ "W")	Lecture	Sequoyah 148	Drosophila genetics & optogenetics	WATCH Re-engineering the brain [TEDx]
	Lab	York 1310	Introduction to final projects Experiment #7: The Case of the Missing Methods	
Week 7				
May 15			Electroencephalography (EEG)	
May 17	Lecture	Sequoyah 148	Analyzing EEG Data in Python	DUE THURS @ 11:59 pm: Drosophila Presentation slides

	Lab	York 1310	Experiment #8: EEG	
May 19	Lecture	Sequoyah 148	Drosophila Presentations	DUE @ 11:59 pm: Drosophila Methods
	Lab	York 1310	Experiment #8: EEG (Analysis)	

Week 8

May 22	Lecture	Sequoyah 148	Visualizing the nervous system	DUE SUNDAY @ 11:59 pm: Project proposals
May 24	Lecture	Sequoyah 148	Mapping neural circuits	Submit Final Project Equipment & Needs Info
	Lab	York 1310	Mouse brain connectivity	
May 26	Lecture	Sequoyah 148	Two-photon imaging	DUE @ 5 pm: Mouse brain connectivity
	Lab	York 1310	Allen Brain Observatory (2p data)	

Week 9

May 29			<i>No Class – Memorial Day</i>	DUE MONDAY @ 11:59 pm: EEG Lab Report
May 31	Lecture	Sequoyah 148	Expectations for final project presentations & project planning period	DUE @ 5 pm: Allen Brain Observatory
	Lab	York 1310	Work on final projects	
June 2	Lecture	Sequoyah 148	Midterm Review	
	Lab	York 1310	Work on final projects	

Week 10

June 5	Lecture	Sequoyah 148	Midterm #2
June 7	Lecture	Sequoyah 148	Careers in neuroscience
	Lab	York 1310	Work on final projects
June 9	Lecture	Sequoyah 148	Final project presentations
	Lab	York 1310	Final project presentations

DUE JUNE 14th @ 11:59 pm:
Final project lab reports