



BIPN 145 Neurobiology Laboratory

Fall 2021

Instructor

Ashley Juavinett, PhD
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Instructional Assistants

Reina Bassil (rbassil@ucsd.edu)
Christopher Lee (crlee@ucsd.edu)

(Virtual) Office hours

Fridays @ 10 am
(Link on Canvas)

Staff Research Associate

Brandon Chechile
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Lecture: MWF 11-11:50 AM (Location varies; see Schedule below)

Lab: WF 12:30-3:50 PM (Location varies; see Schedule below)

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 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**. 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 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 Friday, September 24th). 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.** Please see the [Exposure & Contact Tracing page](#) on the UC San Diego website for the definition of “contact.” 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 the lab space, everyone is required to wear a KN95 mask or be double masked (a disposable mask under a cloth mask).

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 feel free to reach out to the IAs or Dr. J.

Grading

Laboratory reports (300 pts)

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

Assignments (275 pts)

- Includes smaller lab write-ups & in-class assignments

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.**

Course management & texts

Lab Manual

BIPN 145 has a lab manual for the first time, starting this quarter! 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 (see: Global Pandemic).

You can find readings & due dates for assignments on Canvas.

Date		Location	Topic	Due/Reading
Week 0				
Sept 24	Lecture	Mandeville B-104	An introduction to BIPN 145 & nervous systems	
	Lab	York 1310	AT 2 PM Check into lab for safety demonstration	Online safety test
Week 1				
Sept 27	Lecture	Zoom	Neurons, nervous systems, & recording from the nervous system	
Sept 29	Lecture	Mandeville B-104	Passive potentials & modeling neural activity	
	Lab	York 1310	Experiment #1: String nervous systems	
Oct 1	Lecture	Zoom	The action potential	READ: Hodgkin & Huxley (1939)

Lab **Zoom** **Experiment #2: RC Circuits** **DUE @ 5 pm: String Data**
 Note: Our virtual version of this differs from the lab manual and can be found [here](#).

Week 2

Oct 4	Lecture	Zoom	Writing lab reports	DUE @ 5 pm: RC Circuit Quiz
Oct 6	Lecture	Mandeville B-104	Earthworm Physiology	Read the earthworm protocol
	Lab	York 1310	Experiment #3: Earthworm Experiments	
Oct 8	Lecture	Zoom	The speed of the nervous system	
	Lab	Zoom	Experiment #3: Earthworm Analysis	

Week 3

Oct 11	Lecture	Zoom	Statistics for biologists	
Oct 13	Lecture	Mandeville B-104	Intracellular & patch clamp recording	
	Lab	York 1310	Experiment #4: Intracellular Equipment	
Oct 15	Lecture	Zoom	Coding in neuroscience & introduction to the Allen Brain Institute datasets	
	Lab	Zoom	Computer Lab #1: Electrophysiological signatures of cell types in mouse & humans	DUE @11:59 pm Earthworm Lab Report

Week 4

Oct 18	Lecture	Zoom	Intrinsic physiology & neural computation	DUE @ 5 pm: Computer Lab #1
Oct 20	Lecture	Mandeville B-104	Leech Physiology & Cell Types Details for Midterm #1	
	Lab	York 1310	Experiment #4: Recording from the Retzius Cell of the Leech	

Oct 22	Lecture	Mandeville B-104	Chemical neurotransmission & Review for the midterm
	Lab	York 1310	Experiment #4: Filling a cell in the leech

Week 5

Oct 25	No Lecture		Midterm #1 due at 11:59 pm
Oct 27	Lecture	Mandeville B-104	Motor circuits & EMG
	Lab	York 1310	Experiment #5: EMG lab
Oct 29	Lecture	Zoom	Comparative Anatomy
	Lab	Zoom	Experiment #6: Comparative anatomy Note: This is different than Experiment #6 in your lab manual and can be found here .

DUE @ 5 pm: EMG Assignment

DUE SUNDAY @ 11:59 pm:
Leech Lab Report

Week 6

Nov 1	Lecture	Zoom	Ethology & behavior	DUE @ 5 pm: Comparative Anatomy Data
Nov 3	Lecture	Mandeville B-104	Drosophila behavior	READ your Drosophila behavior handout
	Lab	York 1310	Experiment #7: The Case of the Mislabeled Vials	
Nov 5 (drop date)	Lecture	Mandeville B-104	Drosophila genetics & optogenetics Introduction to final projects	WATCH Re-engineering the brain
	Lab	York 1310	Experiment #7: The Case of the Missing Methods	

Week 7

Nov 8	Lecture	Zoom	GUEST LECTURE: Impulsivity, reward, and mania	WATCH: Recording brain activity in humans
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DUE @ 5 pm:
Drosophila Lab Write-Up

Nov 10	Lecture	Mandeville B-104	Perception as prediction Project proposals	
	Lab	York 1310	Experiment #8: EEG	DUE THURSDAY @ 11:59 pm: Drosophila Presentation slides
Nov 12	Lecture	Zoom	Drosophila Presentations	
			<i>No lab (Veterans Day)</i>	

Week 8

Nov 15	Lecture	Zoom	GUEST LECTURE: Genetic engineering, circuits, and behavior	DUE SUNDAY MONDAY @ 11:59 pm: Project proposals
Nov 17	Lecture	Zoom	Mapping neural circuits	
	Lab	Zoom	Groups 10-14 Drosophila talks	
			Computer Lab #2: Mouse brain connectivity	
Nov 19	Lecture	Mandeville B-104	Expectations for final projects & planning period, Midterm info	DUE @ 5 pm Computer Lab #2
	Lab	York 1310	Work on final projects	DUE FRIDAY @ 11:59 pm: EEG Lab Report

Week 9

Nov 22	Lecture	Zoom	Two-photon calcium imaging & the visual system	
Nov 24	Lecture	Mandeville B-104	Midterm #2	
	Lab	York 1310	Work on final projects	
Nov 26			<i>No Class (Thanksgiving Break)</i>	

Week 10

Nov 29	Lecture	Zoom	Careers in neuroscience	
Dec 1	Lecture	Zoom	Reina Research Talk Information for final presentations Prep period for final project presentations	
	Lab	Zoom	Chris Research Talk Computer Lab #3: Two-photon imaging data	
Dec 3	Lecture	Mandeville B-104	Final project presentations	DUE @ 5 pm Computer Lab #3
	Lab	York 1310	Final project presentations	

DUE DEC 10th @ 11:59 pm:
Final project lab reports