



BSCI 111: The Art of Neuroscience Research
M-F 10AM – 12PM
Summer II (July 14 - Aug 1), 2025

How do brains work? Globally, neuroscience research has rapidly expanded in recent years; yet, we have not found an overarching scientific theory to explain how the brain actually works. Students will examine the (often) Nobel Prize-winning research underlying fundamental principles of neuroscience and compare nervous systems of diverse organisms such as jellyfish, fruit flies, squids, mice, and humans, to understand how common designs and mechanisms generate behavior.

The specific learning objectives of this course are:

1. Understand how a nerve cell (neuron) is different from other cells and the relationships between a neuron, a circuit and how they collectively affect a behavior.
2. Understand fundamental mechanisms of topics such as action potential formation and propagation, synaptic transmission and plasticity, and modern research advances including brainbow and optogenetics.
3. Explore the creative and scientific processes of some of the greatest discoveries in neuroscience.
4. Understand and evaluate articles from popular science magazines in the field of neurobiology.

Class Time & Location

Online synchronous M-F 10AM -12PM

Instructor

Chan Lin, Ph.D. (linc@umd.edu)

Teaching Assistant

Aastha Patel (apatel70@terpmail.umd.edu)

Office Hours

M-F 12PM or by appointment

Prerequisites:

High School Biology

Textbooks and Course Information Access

Supportive readings are selected from the following textbooks and will be posted on ELMS course site.

Neuroscience: Exploring the Brain, Fourth Edition

Edited by Mark Bear, Barry Connors, Michael Paradiso

Publisher: Jones & Bartlett Learning (2015)

ISBN: 978-0781778176

Neuroscience, Sixth Edition

Edited by Purves D, Augustine GJ, Fitzpatrick D, Hall WC, LaMantia A, McNamara JO, White LE

Publisher: Oxford University Press (2018)

ISBN: 978-1605353807

Course Organization

Course will be taught online with synchronous lectures, review sessions, and group activities. *Attendance to all synchronous sessions is required.*

Approximate Schedule

Date	Topic	Group Activity
Week 1. How does a single nerve cell work?		
7/14	Neurons & Glia	Meet & Greet, Group Introduction
7/15	Ionic Basis of Membrane Potentials	Article 1 discussion: Cajal vs. Golgi
7/16	Action Potentials (I)	
7/17	Action Potentials (II)	Article 2 discussion: Sodium hypothesis
7/18	Ion Channels & Active Transporters	
Week 2. How does a group of nerve cells work together?		
7/21	Synaptic Transmission: Electrical Synapse	Group Project: Plans to Interview a Neuroscientist
7/22	Synaptic Transmission: Chemical Synapse	Article 3 discussion: Calcium hypothesis
7/23	Neurotransmitters & Their Receptors	
7/24	Synaptic Plasticity	Article 4 discussion: Lateral Inhibition
7/25	Visual System & Processing	
Week 3. Where does the nervous system come from?		
7/28	Comb Jellies & the Origin of Neurons	Group Project: Interviewing a Neuroscientist
7/29	Fruit Flies & Genetic Dissection of Behavior	Article 5 discussion: Optogenetics
7/30	Bees & Animal Cognition	
7/31	Nervous System Evolution	Group Project: Making Presentations
8/1	Group presentations	

Grading Distribution

- Group participation: 20%
- Reading assignments: 35%
- Quizzes: 15%
- Team project & presentation: 30%

Letter Grade Distribution

- A:** 89.5 - 100%
- B:** 79.5 - 89.49%
- C:** 69.5 - 79.49%
- D:** 59.5 - 69.49%
- F:** <59.5%

Participation policy

Attendance for all synchronous sessions and active participation in article discussion and group work are required. Clicker questions/participation quizzes will be used throughout the course to ensure that all students understand the key concepts.

Late Work Policy

As the answers to a quiz or reading assignment will be posted following the due date, **no late work or makeup will be possible**. Make-up presentations will only be given for University-approved reasons. Details of University Policy can be found here:

<http://www.ugst.umd.edu/courserelatedpolicies.html>

Re-Grades

Any request for re-grading must be submitted to the course instructor within three days of grade release.

Religious Observances

The University System of Maryland policy "Assignments and Attendance on Dates of Religious Observance" states that students should not be penalized in any way for participation in religious observances and that, whenever feasible, they be allowed to make up academic assignments that are missed due to such absences. However, in accordance with school policy, it is your responsibility to inform the instructor of any intended absences for religious observances or school-sanctioned activities in advance.

Attendance Responsibilities and Expectations

It is important to attend class and be on time. Announcements made at the beginning of class often are vital and arriving late may also result in missing an assignment. Regular attendance and participation in this class is the best way to grasp the concepts and principles being discussed.

If a student has an unplanned absent on the day when the final exam is scheduled, the student is required to notify the instructor **before the start of class**.

- If the absence is due to an illness, in addition to notification prior to the start of class, and upon returning to class, bring documentation of the illness on official letterhead and signed by a health care professional.
- For a medical absence, discharge papers are not considered documentation, instead a medical note excusing the student from school/work for the time of the exam is required. This is in alignment with the university health center policy " In some circumstances, a student may choose to share a "medical discharge summary" from the UHC, as evidence of their visit to the UHC. This document should not be construed to imply that absence from class was recommended. If a student misses a "major scheduled grading event" and they are evaluated at the UHC, a medical excuse may be provided. This will depend on the medical provider's assessment of the severity of the illness."

Students with approved excused absences will be provided the opportunity to complete a make-up exam.

Academic Dishonesty

The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. ***It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism.*** For more information on the Code of Academic Integrity or the Student Honor Council, please visit: <http://www.studenthonorcouncil.umd.edu/whatis.html>

Students with Disabilities

The course staff is committed to providing appropriate accommodation for students with recognized disabilities. If you have been evaluated by Accessibility and Disability Services (ADS) and qualify for specific services, please inform you're the instructor at the beginning of the semester. If you think that you may qualify for some accommodation but have not yet been evaluated, please contact ADS at 301-314-7682 to arrange a consultation.

Inclusive Learning Environment

Positive class community and climate is important for everyone's personal and academic success in the course. Students will be invited to share their thoughts in class; a diversity of opinions is welcome. Respectful communication is expected, even when expressing differing perspectives. Supporting one's statements with research findings is encouraged. In accordance with free speech statutes, speech that contains threats of violence is prohibited.

Names/Pronouns & Self Identifications

The University of Maryland recognizes the importance of a diverse student body, and we are committed to fostering inclusive and equitable classroom environments. I invite you, if you wish, to tell us how you want to be referred to both in terms of your name and your pronouns (he/him, she/her, they/them, etc.) or use ELMS to do so. Please note that the pronouns

someone indicates are not necessarily indicative of their gender identity. Visit trans.umd.edu to learn more.

Additionally, how you identify in terms of your gender, race, class, sexuality, religion, and dis/ability, among all aspects of your identity, is your choice whether to disclose (e.g., should it come up in classroom conversation about our experiences and perspectives) and should be self-identified, not presumed or imposed. I will do my best to address and refer to all students accordingly, and I ask you to do the same for all of your fellow Terps.

Notice of Mandatory Reporting

Notice of mandatory reporting of sexual assault, sexual harassment, interpersonal violence, and stalking: As a faculty member, I am designated as a “Responsible University Employee,” and I must report all disclosures of sexual assault, sexual harassment, interpersonal violence, and stalking to UMD’s Title IX Coordinator per University Policy on Sexual Harassment and Other Sexual Misconduct.

If you wish to speak with someone confidentially, please contact one of UMD’s confidential resources, such as [CARE to Stop Violence](#) (located on the Ground Floor of the Health Center) at 301-741-3442 or the [Counseling Center](#) (located at the Shoemaker Building) at 301-314-7651. You may also seek assistance or supportive measures from UMD’s Title IX Coordinator, Angela Nastase, by calling 301-405-1142, or emailing titleIXcoordinator@umd.edu.

To view further information on the above, please visit the [Office of Civil Rights and Sexual Misconduct's](#) website at ocrsm.umd.edu.