

Spring 2021 Class Syllabus Computational Neuroscience

General Information

Instructor: Odelia Schwartz (odelia at cs dot miami dot edu)

Class is entirely online: Tuesday and Thursday 1:00PM - 2:15PM.
<https://miami.zoom.us/j/4084343641>

Office hours online: Please send me an email to odelia at miami dot edu, to set up a time.

Attendance: Students attending are required to have their video enabled.

Class content: Class slides and recordings (see below) will be placed on BB.

Grading: midterm assignment (40%), final project (60%).

Academic honesty: Assessment items must be completed individually. While general interaction between students is highly encouraged, plagiarism is a breach of the Honor code. It is OK to talk to other students about general solution techniques to assignments; but it is not OK to copy solutions in part or as a whole. The university now requires faculty to report all instances of academic integrity violations, and faculty are not allowed to handle such cases on their own:

See the Students Rights and Responsibilities Handbook p. 12:

https://doso.studentaffairs.miami.edu/_assets/pdf/policies/student_rights_and_responsibilities_handbook.pdf : "Faculty must immediately report the suspected violation to the Department Chair (or relevant administrator in the non-departmentalized schools) and complete the online Academic Integrity Reporting Form. The Department Chair will immediately inform the Academic Dean for Undergraduate Studies of the school."

Recordings: Students are expressly prohibited from recording any part of this course. Meetings of this course will be recorded by me. Any recordings will be available to students registered for this class as they are intended to supplement the classroom experience. Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Recordings may not be reproduced, shared with those not in the class, or uploaded to other online environments. If the instructor or a University of Miami office plans any other uses for the recordings, beyond this class, students identifiable in the recordings will be notified to request consent prior to such use.

Class schedule: (exact details might change)

- Jan 26: Introduction
- Jan 28: Computer lab: setting up Matlab; intro to Matlab tutorial
- Feb 2: Neural Coding 1
- Feb 4: Computer lab: Lab1_Poisson
- Feb 9: Neural Coding 2
- Feb 11: Computer lab: Spike-triggered average
- Feb 16: Spike-triggered approaches
- Feb 18: Computer lab: Spike-triggered covariance
(Midterm assignment assigned)
- Feb 23: Natural scenes and visual processing in the brain
- Feb 25: Discuss assignment; Computer lab: natural scenes
- March 2: Discussion on deep learning and vision: Kriegeskorte 2015
- March 4: Initial discussion on final projects
(Midterm assignment due)
- March 9: Talk on fMRI approaches (guest lecture)
- March 11: Hippocampus modeling (Xu Pan)
- March 16: Spatial context, salience and eye movements
- March 18: Computer lab: Neural Networks 1
- March 23: Introduction to reinforcement learning
- March 25: Lab: Deep Convolutional Networks
- March 30: Brain machine interfaces discussion
- April 1: Lab: Intro to reinforcement learning
- April 6: Discussion on Eliasmith paper; large scale model of the functioning brain
- April 8: Lab: Integrate and Fire and relating to Eliasmith Raven task code
- April 13: Lecture topic - TBA
- April 15: Lab: discuss final projects
- April 20: Hierarchical processing in olfaction, and in the songbird.
- April 22: Lab: work on final projects
- April 27: final project presentations
- April 29: final project presentations
(Final project due)