Link to course web page

Main Faculty:

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Office hours: Tuesdays, 12-1pm ET
Zoom only: https://harvard.zoom.us/j/8438302804
Please click here to book appointment

TAs:

Yervand Azatian (he/him), yazatian@hms.harvard.edu

Office hours: Tuesdays 6-7pm, Northwest building 243

Morgan Talbot (he/him), mtalbot@mit.edu

Office hours: Thursdays 5-7pm on Zoom. Please make an appointment here, or drop in here as availability allows.

Let us know if any links don't work or if you don't understand something.

Feel free to email us and CC all TA's on course material and grading related emails.

Also, please read course related announcements. Let us know if you have problems accessing them.

General Information

Course Goals:

This is a seminar-style and project-based class that aims to familiarize students with state-of-the-art work at the intersection of Artificial Intelligence and Natural Intelligence. Students will acquire expertise in modern machine-learning techniques while tackling actual research challenges and attending presentations by leaders in the field.

Course format:

The course will include weekly two-hour lectures by leaders in the field, tutorials (4 tutorials per semester, 1 hour each), and office hours to help students with their projects.

Typical enrollees:

We welcome both undergraduate and graduate students from all majors. The majority of students taking the course come from Computer Science, Engineering, Neurobiology, Psychology, Physics, and Applied Math, but there have also been highly successful students from other fields including Economics, Political Science, and History.

When is the course typically offered?

Spring term.

Assignments and grading:

Please see the course syllabus for a description of grading and the assignments link below for a the list of assignments. The core component of the class is a small research project in machine learning.

Please fill in this survey before class starts

Neuro140_Spring2024_Syllabus.pdf (Important, please check)

Meeting times and location

Reading materials for lectures

Notes and slides from lectures

Tutorial sessions (please note: we are working on room reservations for these, and the current video links are from last year's tutorials)

Assignments

Homework and credits timeline

List of projects (updated 01/26/2024)

Suggested books

Academic integrity policy

Contact/office hours

FAQ

Lecture Schedule

(See notes and slides for more detailed information)

Date	**Lecturer**	**Reading materials**	**Links**
01/23/2024	Gabriel Kreiman	Neuroscience-Inspired Artificial Intelligence. Hassabis et al. Neuron 2017	Slides Logistics
01/30/2024	Richard Born	Illusions, delusions, and your Backwards Bayesian Brain: A Biased Visual Perspective. Born et al. Brain, Behavior, and Evolution 2021 Evolving Images for Visual Neurons Using a Deep Generative Network Reveals Coding Principles and Neuronal Preferences. Ponce et al. Cell 2019	
02/06/2024	Jan Drugowitsch	Pouget, Beck, Ma & Latham (2013). Probabilistic brains: knowns and unknowns. Nature Neuroscience. doi:10.1038/nn.3495 Drugowitsch, MendonÃ§a, Mainen & Pouget (2013). Learning optimal decisions with confidence. PNAS.	
02/13/2024	Kanaka Rajan	Inferring brain-wide interactions using data-constrained recurrent neural network models	

		Rethinking brain-wide interactions through multi-region â€˜network of networksâ€™ models	
02/20/2024	Haim Sompolinsky	Geometry of Concept Learning. Separability and geometry of object manifolds in deep neural networks	
02/27/2024	Sam Gershman	Building machines that learn and think like people Human-Level Reinforcement Learning through Theory-Based Modeling, Exploration, and Planning	
03/05/2024	Tomer Ullman	Mind games: Game engines as an architecture for intuitive physics. Ullman et al. TICS 2017 Bayesian models of conceptual development: learning as building models of the world. Ullman et al. Ann. Rev. Psychology 2020	
03/12/2024	No class (spring break)	Read a classic during Spring Break. Alan Turing: Computing machinery and intelligence (1950) And/or read a fun book. Brian Christian: The most human human. What talking with computers teaches us about what it means to be alive (1984).	
03/19/2024	Andrei Barbu	TBD	
03/26/2024	Thomas Serre	Beyond the feedforward sweep: feedback computations in the visual cortex	
04/02/2024	Cengiz Pehlevan	TBD	
04/09/2024	Gabriel Kreiman	AMA with Prof. Kreiman. Potential topics include biological intelligence, artificial intelligence, ethics, legal issues surrounding AI, the future of AI, and any	Enter your questions here!

		related topics of interest.	
04/16/2024	Will Xiao	Fundamental Tradeoffs between Invariance and Sensitivity to Adversarial Perturbations Chapter 9 ("Game On") from Artificial intelligence: A guide for thinking humans	
04/23/2024	Student Project Presentations Pt. 1	N/A	
04/30/2024	Student Project Presentations Pt. 2	N/A	

Academic Integrity Policy

Collaboration Policy Statement
Discussion with other students and with people outside the class is permitted throughout the course. Students can also utilize any relevant material from the library or the web. Students must adequately cite any material that they use.

Each student must work on his/her own project. No two projects can be identical. There can be no group projects. All work should be entirely the student's own work. The use of textbooks, books, articles and web resources is encouraged.

The final write-up has to be exclusively the work of the student. If material is reported from other sources, it should be reported as a quote and cited. Projects involving code and algorithms can use existing code from public repositories. Any such code should be adequately cited. All code used in any models or simulations should be turned in accompanying the final report.