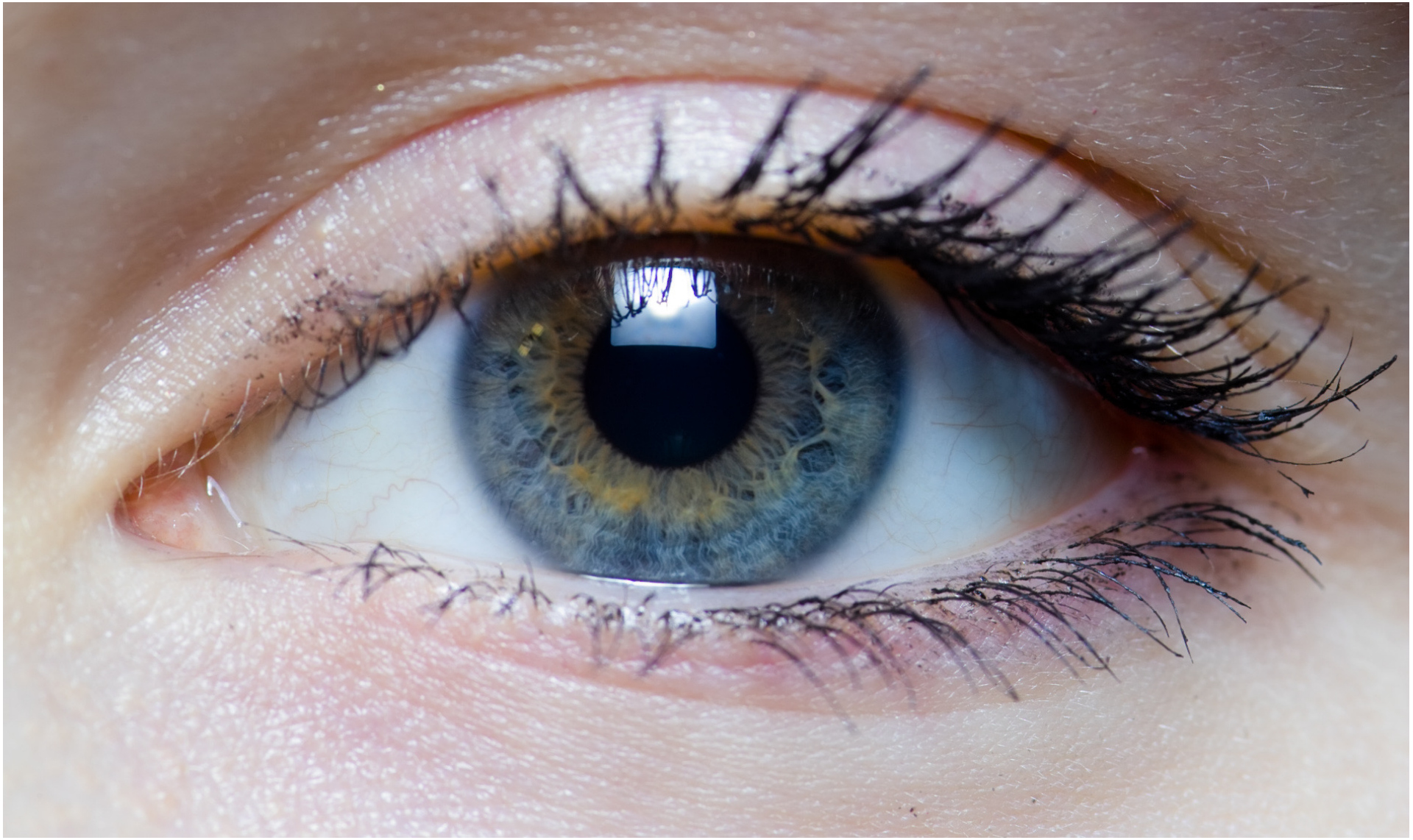
Visual Object Recognition
Computational Models and Neurophysiological Mechanisms
Neurobiology 130/230. Harvard College/GSAS 78454



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Please fill in this poll to get to know more about you:

https://forms.gle/GfJHKhFATxC5rYPU9

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Web site: http://tinyurl.com/visionclass
→ Class notes, Class slides, Readings Assignments

Location: Northwest B108

Time: Mondays 03:00 – 05:00

Lectures:

Faculty: Gabriel Kreiman (and invited guests)

Contact information:

Gabriel Kreiman
gabriel.kreiman@tch.harvard.edu

Dianna Hidalgo
diannahidalgo@g.harvard.edu

Office Hours: Before class (Mondays 2pm), after class (Mondays 5pm). By appointment

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GRADING

Class participation	15%
Comments on lecture notes	15%
Homework	50%
Final paper	20%

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GRADING. Comments on lecture notes* 15%

Lecture notes available at:

http://klab.tch.harvard.edu/academia/classes/Neuro230/2023/Neuro_130_230_Notes_2023.html

Maximum grade per week = 10 points.

Spelling/grammar/wrong citation/wrong figure reference/etc:	1 point
Undefined word in text, undefined variable in equation:	2 points
Error in equation:	10 points
Erroneous statement:	5 points
Suggestion for figure improvement:	4 points
Specific clarification question:	3 points
Relevant work missing in notes:	3 points

Filename: <YOURNAME>_LECTURE<LECTURENUMBER>_COMMENTS

Format: PDF, Word, Text, Latex

Lecture number, line number, your comments/edits

Due date: Monday, day of the lecture at midnight.

Upload to Canvas

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GRADING. Homework* **50%**

One reading assignment per class.

Original scientific literature

Total of 11 reading assignments

Write two paragraphs about the paper:

Paragraph 1: Discuss one missing control or one problem with the interpretation.

Paragraph 2: Discuss a logical follow-up question.

Note: Do NOT copy and paste the paper. We have already read it.

Filename: <YOURNAME>_Assignment<AssignmentNumber>

Format: PDF, Word, Text, Latex

Due date: One week after assignment discussion in class. Monday, midnight. See specific dates on website.

Upload to Canvas

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Note: no class on 09/04/2023 (Labor Day)

Class 1 [09/11/2023]. Introduction to Vision

Class 2 [09/18/2023]. The Phenomenology of Vision

Class 3 [09/25/2023]. Natural image statistics and the retina

Class 4 [10/02/2023]. Learning from Lesions

Note: no class on 10/09/2023 (Indigenous Day)

Class 5 [10/16/2023]. Primary Visual Cortex

Class 6 [10/23/2023]. Adventures into *terra incognita*

Class 7 [10/30/2023]. From the Highest Echelons of Visual Processing to Cognition

Class 8 [11/06/2023]. First Steps into in silico vision

Class 9 [11/13/2023]. Teaching Computers how to see

Class 10 [11/20/2023]. Computer Vision

Class 11 [11/27/2023]. Connecting Vision to the rest of Cognition [Dr. Will Xiao]

Class 12 [12/06/2023]. Visual Consciousness

FINAL EXAM, PAPER DUE 12/11/2023. No extensions.

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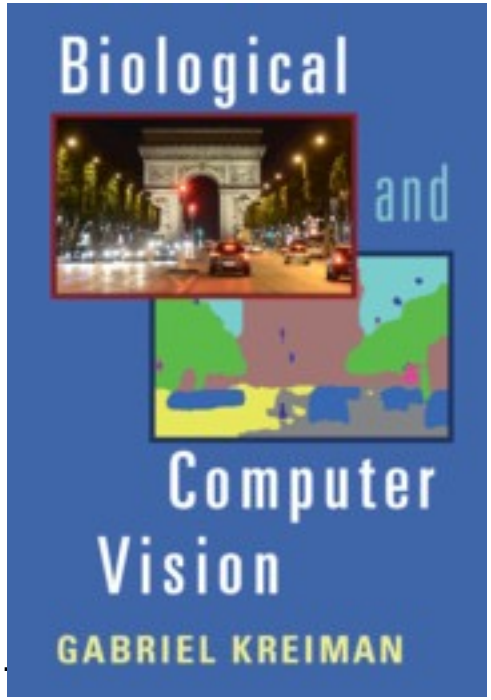
Recommended books

Kreiman G (2021). Biological and Computer Vision. Cambridge University Press



Other good books

Ullman S (1996) High-level vision. MIT Press.
Wandell BA (1995) Foundations of vision. Sunderland Sinauer Associates.
Chalupa LM and Werner JS (editors) (2003). The Visual Neurosciences. MIT Press.
Frisby and Stone (2010). Seeing. MIT Press.
Kriegeskorte and Kreiman (2011). Visual population codes. MIT Press.
Purves and Lotto. (2003). Why we see what we do. Sinauer Books.
Deco and Rolls (2004). Computational Neuroscience of Vision. Oxford University Press.
Ripley. Pattern recognition and neural networks (1996). Cambridge University Press.
Rao, Olshausen and Lewicki (eds) (2002). Probabilistic models of the brain. MIT Press.
Koch C (2005) The quest for consciousness. Roberts & Company Publishers.
Regan (2000) Human perception of objects. Sinauer Books.
Dayan and Abbott (2002). Theoretical Neuroscience. MIT Press.

Academic Integrity Policy

All reading assignments will be discussed in class. During class, collaboration and discussion is not only permitted but actually encouraged.

After class, each student must prepare the homework on his/her own. Students should be aware that in this course collaboration of any sort on any work submitted for formal evaluation is not permitted. This means that you may not discuss your problem sets, paper assignments, exams, or any other assignments with other students. All work should be entirely your own.

The use of textbooks, books and articles is encouraged. Students must use appropriate citation practices to acknowledge the use of books, articles, websites or lectures, that were consulted to complete your assignments.

You are welcome to use Large Language Models (like chatGPT) for the class. You must indicate how you used it (specific LLM, prompt used, etc). Also, you are responsible for the answers that you provide (e.g., if the answer is wrong, you cannot blame the Large Language Model).

Reading Assignment 1

Horowitz and Wolfe (1998). ”Visual search has no memory". Nature 394: 575-577.

Discussion: Monday 09/18/2023

Reading assignment paper due: Monday 09/25/2023

Reading available at:

http://klab.tch.harvard.edu/academia/classes/Neuro230/2023/Neuro_130_230_Reading_Assignments_2023.html