Fundamentals of Vision

From center/surround receptive fields, to simple and complex cells, to the what/where pathways, we learn a lot about the visual system in introductory neuroscience classes and from our textbooks. But how did we come to know those things? This course will explore the seminal papers that brought us much of our core knowledge about the visual system.

Course: NBIO 450 A: Fundamentals of Vision

Instructor: Leah Bakst, LBakst@uw.edu
Office hours will be by appointment, so email or talk to me in class to set up a time.

Location/Time: Wednesdays 3:30-5:20p in Hitchcock (HCK) 312

Credits: 2 credits, credit/no credit.

Course Goals:

This course is aimed at upper-level neurobiology or other science majors, but is open to other majors as well. I will assume some basic familiarity with neuroscience (i.e. what is a neuron, action potential, some exposure to neuroanatomy). If you are unfamiliar with these concepts please see me and we can talk about ways to catch you up.

By the end of the course students will:

- Demonstrate proficiency in reading and criticizing scientific papers.
- Understand the origins of our basic knowledge about the visual system.
- Develop the ability to examine scientific findings through in-class discussion as well as in writing.
- Feel comfortable leading the discussion of a scientific paper.

Coursework:

In this course we will read one journal article per week. The papers may range from being somewhat short and dense to long and more readable. For each paper, you will turn in answers to the following questions at the beginning of each class:

1. What questions does the paper address?
2. What are the main conclusions of the paper?
3. What evidence supports these conclusions?
4. Do the data actually support the conclusions?
5. What is the quality of the evidence?
6. Why are the conclusions important or interesting?

These answers should be brief, and they are intended to get you ready to discuss the paper (and these questions) in class.

Once during the quarter you will be expected to select and present a scientific paper. This will be done in pairs or small groups, depending on class size. I will approve your choice of paper, but as long as it has something to do with the visual system it will likely be just fine.

Grading:

This course is credit/no credit. As long as you turn in your weekly assignment and participate in discussions you will pass. There is no final exam. Let me know if you are going to be absent as soon as possible.

Schedule:

Date	Paper	Pages	Title
April 1	Little & Parker (2010)	8	How to read a scientific paper
	Hecht, et al. (1942)	20	Energy, quanta, and vision
April 8	Baylor, et al. (1979)	20	Responses of retinal rods to single photons
April 15	Hubel & Wiesel (1961)	13	Integrative action in the cat's lateral geniculate body
April 22	Hubel & Wiesel (1959)	17	Receptive fields of single neurons in the cat's striate cortex
April 29	Carandini et al. (1997)	24	Linearity and normalization in simple cells of the macaque primary visual cortex
May 6	Britten et al. (1992)	21	The analysis of visual motion: a comparison of neuronal and psychophysical performance
May 13	Moore & Armstrong (2003)	4	Selective gating of visual signals by microstimulation of frontal cortex
May 20	Student Presentation 1		TBA
May 27	Student Presentation 2		TBA
June 3	Student Presentation 3		TBA