

## Neurobiology 204: Neurophysiology of Central Circuits, Spring 2006

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TA: Nic Price

Mon., Wed 10:00-12:00, Alpert 336.

Introduction to the physiology of circuits in the vertebrate central nervous system. Topics include the visual (retina, thalamus, cortex), auditory, olfactory, and somatosensory systems, the neural control of eye movements, reward, and perception. The behavior of these systems will be analyzed at three levels: the electrophysiological properties of single neurons, synaptic interactions between neurons *in vitro*, and the behavior of the circuits *in vivo*.

### Monday

- 1) Feb 6 **Born** VOR
- 2) Feb 13 **Raviola** Retina
- 3) Feb 20 *President's day*
- 4) Feb 27 **Reid** Thalamocortical circuit
- 5) Mar 6 **Reid** Visual cortex
- 6) Mar 13 **Livingstone** Stereopsis
- 7) Mar 20 **Born** Motion integration
- Mar 27 *Spring Break*
- 8) Apr 3 **Wilson** Olfaction
- 9) Apr 10 **Assad** Auditory system
- 10) Apr 17 **Cardozo** Somat. & perception
- 11) Apr 24 **Assad** Reward
- 12) May 1 **Born** Neurons & perception

### Wednesday

- Feb 1 **Born** Intro; Vestibulo-ocular reflex
- Feb 8 **Raviola** Retina
- Feb 15 **Reid** Thalamus: a simple circuit
- Feb 22 **Reid** Thalamocortical circuit
- Mar 1 **Reid** Visual cortex
- Mar 8 **Livingstone** Color
- Mar 15 **Livingstone** Direction selectivity
- Mar 22 **Wilson** Olfaction
- Mar 29 *Spring Break*
- Apr 5 **Assad** Auditory system
- Apr 12 **Cardozo** Somatosensation
- Apr 19 **Assad** Reward
- Apr 26 **Born** Neurons & perception
- May 3 Final exam handed out.

Wednesday classes will generally consist of a two-hour lecture. Mondays we will discuss several papers. Discussions of papers in class should be very interactive. Each student should be prepared to discuss the following for each of the assigned papers: 1) The big picture (abstract and introduction), 2) methods, 3) each figure, 4) main conclusions.

Assignments, due before class Monday, will be to write a stylized summary and critique of one paper, which will be available from the website below. The review should contain:

- a summary (~500 words) of the paper. The first paragraph should give the big picture: the question, methods, and main results. The following paragraphs should go figure by figure, describing the methods and results. For long papers, we will tell you which figures to concentrate on.

- a critique (~500 words) of the paper in the style of a referee's report. Some instructors will choose papers that are clearly flawed or brilliant. Thus it is your job to assess the positives and negatives of each paper.

You need not follow the format exactly, for instance you can make critiques along with the discussions of each figure, but don't be too free form. This sounds like a lot, but try to keep the reviews as terse as possible (750-1250 words total).

Marks may be deducted for going over 1250 words or late submission.

The final exam will be to write more complete reviews of 3-4 new papers.

The grade will be computed as follows:

homework - 40%; final exam - 40%; class participation - 20%.

Please e-mail homework to [nicholas\\_price@hms.harvard.edu](mailto:nicholas_price@hms.harvard.edu) by 10AM Monday.

Name your file nb204surnameX.doc, where X is the week of the assignment. E.g. nb204smith1.doc in Week 1 and please put "nb204" in the subject line.

Papers will be made available at:

<http://www.hms.harvard.edu/bss/neuro/bornlab/nb204/>

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