Course Overview

“The behavior of every animal on the planet has been sculpted by evolution to optimize success in a particular natural environment.” (T. Carew)

Neuroethologists are driven by a curiosity for how animals with specialized behaviors have developed unique neural mechanisms for operating in their natural habitats. Typically, neuroethologists address these questions with a combination of field and laboratory experiments. In this course, we will explore the neural basis of a variety of interesting behaviors across the animal kingdom: locomotion in leeches, sensory integration in electric fish, prey detection in barn owls, motor patterns in crustaceans, echolocation in bats, mate calling in crickets, and insect flight. We will do this through a combination of lectures, round-table discussions of both early and contemporary scientific papers, written assignments, and an interactive grant proposal simulation. By studying these diverse nervous systems, we will gain insight regarding how discoveries in the field of neuroethology have contributed to our fundamental understanding of how nervous systems operate, in vertebrates and invertebrates alike.

Prerequisites. NBIO 140: Principles of Neuroscience and/or NPSY 11B: Introduction to Behavioral Neuroscience. Permission of instructor required for all students prior to registration.

Text. Behavioral Neurobiology: An Integrative Approach (2010), Zupanc

Learning Goals. This course has a dual focus on knowledge gain and skill development. Students will gain an understanding and appreciation of neuroethology and basic neuroscience research. In parallel, students will improve upon the skills that are critical to the work of being a scientist: reading, understanding, and discussing scientific literature; writing about scientific work for different audiences; defending one’s own scientific ideas.

Homework Policy. Late assignments will not be accepted without notice of illness or extreme circumstances.

Disabilities. If you are a student with a documented disability on record at Brandeis University and wish to have a reasonable accommodation made for you in this class, please see me immediately.

Academic Integrity. You are expected to be honest in all of your academic work. Please consult Brandeis University Rights and Responsibilities (http://www.brandeis.edu/studentlife/srcs/rr/) for all policies and procedures related to academic integrity. Students may be required to submit work to TurnItIn.com software to verify originality. Allegations of alleged academic dishonesty will be forwarded to the Director of Academic Integrity. Sanctions for academic dishonesty can include failing grades and/or suspension from the university. Citation and research assistance can be sought from LTS: https://lts.brandeis.edu/research/help/.
## Grading

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<thead>
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<th>Component</th>
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<tbody>
<tr>
<td>Participation</td>
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<td>Reading Question Completion</td>
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<td>Paper Presentation &amp; Discussion Facilitation</td>
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<td>Writing Assignment #1</td>
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<td>Grant Proposal Simulation</td>
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Standard grading scale will apply:

- A = 90-100%
- A- = 85-90%
- B+ = 80-85%
- B = 75-80%
- B- = 70-75%
- C+ = 65-70%
- C = 60-65%
- D+ = 55-60%
- D = 50-55%
- D- = 45-50%
- F ≤ 45%

## Course Requirements

### Reading Questions: A list of 5-6 short essay questions will be posted 2 days prior to each paper discussion. These should be submitted via LATTE before the relevant class period. These will be graded for completion, however, grammatically sound writing is expected. Students may drop 2 of the 10 reading questions assignments (or the 2 lowest scores received).

### Paper presentation and discussion facilitation. Students will facilitate and co-present a 15-minute Power Point introduction for two complementary scientific papers during the semester (see class periods shaded in gray). These students will then co-facilitate a round-table discussion of the papers’ figures and be responsible for explaining the techniques when applicable. These students will also be responsible for composing and posting the reading questions for the papers 48 hours in advance of the class period (see reading questions). Students are encouraged to meet with instructor prior to presentation.

### Layperson Writing Assignment. Students will compose an essay (3-5 pages; 1500-2000 words) describing a concept or main result discussed in the “Spatial Orientation and Sensory Guidance” unit. The format of the essay should be similar to that found in *Scientific American* and geared toward a general, layperson audience of non-scientists.

### News & Views Assignment. Students will compose a News & Views-style paper (~8 pages) describing the importance of 1 of 3 provided contemporary neuroethology journal articles. In this paper, students will discuss what was previously known about the topic of research, the authors’ main questions and findings, and the big-picture importance of the work. A minimum of 10 references will be expected. There will be several opportunities for review and revision, outlined in the course schedule.

### Grant Proposal Assignment. This is assignment is an exercise in creativity and experimental design. Students will build from their News & Views assignment by proposing the next 2-3 experiments in a grant-style paper including: Specific Aims (1 page) and an adapted Background & Research Strategy section (3-4 pages). Students will participate in a peer-review process, wherein they will read/edit 2-3 of their colleague’s proposals. They will prepare a brief introduction (1-2 paragraphs) describing one of these proposal’s goals, merits, and shortcomings. In lieu of a final exam, the class will gather to review all proposals in a panel discussion. Each proposal will be allotted 10-15 minutes of discussion time: the prepared introduction will be read aloud to the panel and the class will spend 10 minutes discussing the proposal’s originality and feasibility. By the end of the review panel, each student will have received both written and oral feedback regarding their grant proposal from their peers. By the end of the exam period, students will submit a package reflecting their
work, including: their original draft, the written comments of their peer editors, and a revised proposal prefaced with a brief cover letter (1 page) summarizing their reviewer’s comments and how the revised proposal addresses these concerns. The grade for this assignment will reflect the student’s participation in the review process and panel, as well as the quality of their proposal.

Bibliography


