PSYC W3265 Auditory Perception Fall 2009
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Introduction

How does the human brain make sense of the acoustic world? What properties of sound are important for the discrimination and recognition of sounds with specific meaning? What aspects of auditory perception do humans share with other animals? How does the brain perform the computations necessary for skills such as sound localization? How do we focus our auditory attention on one voice in a crowd? What acoustic cues are important for speech perception? What’s special about music? We will address these questions and more by studying the basics of auditory perception in a textbook, and reading classic and current literature to understand the scientific progress in the field today. Our reading of the literature will be critical, with a focus on good scientific design.

This course will systematically review the main topics of auditory perception such as: 1) the physics of sound; 2) the anatomy and physiological functioning of the auditory system; 3) perception of loudness; 4) frequency selectivity and discrimination; 5) perceptual phenomena such as forward and backward masking; 6) temporal processing; 7) pitch and timbre perception in simple and complex sounds; 8) auditory attention; 9) scene analysis; 10) speech and music perception. We will examine the current literature on such topics as sound localization in humans and other animals, how the brain forms a map of auditory space, acoustic communication in humans, birds and other mammals, and how the brain may be specialized to encode the unique communication sounds of individual species. We will analyze the studies demonstrating categorical perception and lateralization of the brain for language processing. And we will study how people perceive and process music.

Course requirements

Professor Woolley’s permission to join the class is **required**. Attendance at the first day of class is **required**. Each week, students will participate in a two-hour seminar. Class time will be devoted to the presentation and discussion of journal articles. The textbook reading is intended to provide background knowledge on the relevant topics. The publications have been chosen to cover the current and most exciting research on auditory perception, and to serve as a stimulus for discussion. Two students sign up to lead the discussion each week.

The reading list and weekly schedule

**Week 1 – Sept 14**

The physical properties of sound, the ear, the auditory system, functions of hearing, model systems in understanding auditory perception

**Relevant textbook chapters:** 1, 2, 3, 6, 7 and 8

Students select presentation topics this week

**Week 2 – Sept 21**

Sound Intensity and Loudness Perception

**Presenters:**

**Relevant textbook chapters:** 9 – 11, 13, 15


**Week 3 – Sept 28**

Processing Frequency and Temporal Information

**Presenters:**

**Relevant textbook chapters:** 4, 5, 15

**Reading only:** Irvine, D, Wright, BA (2005) Plasticity of Spectral Processing. *Int Rev Neurobiol* 70: 435-72


**Week 4 – Oct 5**

**Sound Localization**

**Presenters:**

**Relevant textbook chapters:** 12, 15


**Week 5 – Oct 12**

**Auditory Attention**

**Presenters:**

**Relevant textbook chapters:** 14


**Week 6 – Oct 19**

No meeting Annual Society for Neuroscience Meeting

**Week 7 – Oct 26**
Complex Sounds, Streaming and Scene Analysis

Presenters:

Relevant textbook chapters: 11, 14, 15


Week 8 – Nov 2

Academic holiday

Week 9 – Nov 9

Midterm Exam

Week 10 – Nov 16

Speech Perception

Presenters:

Relevant textbook chapters: 14


TBA

TBA

Week 11 – Nov 23
Neural Basis of Speech Perception
Presenters:

**Relevant textbook chapters**: 14, 15, 16


**Week 12 – Nov 30**

Auditory communication in nonhuman animals
Presenters:

**Relevant textbook chapters**: 15


TBA

**Week 13 – Dec 7**

Music Perception
Presenters:

**Week 14 – Dec 14**

*Neural Basis of Music Perception*

*Presenters:*

**Relevant textbook chapters:** 14, 15


**THERE IS NO FINAL EXAM**

**Grading**

<table>
<thead>
<tr>
<th>The students take a written midterm exam with essay questions covering the material in the textbook, the papers and the class discussions.</th>
<th>25%</th>
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</thead>
<tbody>
<tr>
<td>Presentations</td>
<td>50%</td>
</tr>
<tr>
<td>Participation</td>
<td>25%</td>
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