Music 175: Psychoacoustics  
Spring 2017  
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Department of Music  
University of California, San Diego (UCSD)  
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Course Information  
Teaching Assistant  
• Tahereh (Tara) Afghah tafghah@ucsd.edu  

Meeting Time and Place  
Meeting Dates: 2017/4/4 - 2017/6/8  

<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>Lecture:</td>
<td>TuTh 12:30PM-1:30PM</td>
<td>CPMC 367</td>
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<tr>
<td>Office hours:</td>
<td>Tu 2:00-3:00PM (after class)</td>
<td>CPMC 231 (office) Smyth</td>
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<td>Office hours:</td>
<td>Tu 11:30-12:30PM (before class)</td>
<td>CPMC 367 Afghah</td>
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<td>Final Exam (projects):</td>
<td>M 11:30AM-2:30PM (2017/6/12)</td>
<td>CPMC 367 NA</td>
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Course Description  

Prerequisites  
Music 170 or 171 (or permission by instructor).
2. Cory Bark: “Interval-Class Content in Equally Tempered Pitch-Class Sets: Common Scales Exhibit Optimum Tonal Consonance”
3. Amir Mohseni: “Octave Generalization and Time Recognition”
5. Timothy Wang: “Attaining Consonance in Arbitrary Scales”

- Week 10:
  - Tuesday: 6 student presentations Pitch Perception (cont.) and Bioacoustics/Animal Perception
    1. Nancy Xu: “Theoretical and Experimental Exploration of the Bohlen-Pierce Scale”
    2. Mugilai Joshi: “Bat echolocation calls facilitate social communication”
    3. Kelli Rico: “Squeezing speech into the deaf ear”
    6. Gavin Badillo: “Extremely high frequency sensitivity in a ‘simple’ ear”
  - Thursday: Exam 3

Assignments

- Week 1:
  - Due Tuesday April 11:
    - Download and create a sine wave for which you can change the frequency.
    - Reading: Cook, chapter 4.

- Week 2:
  - Due April 20, 2017:
    - Download and answer the following questions.
      1. Play a square and then triangle wave. Describe (qualitatively) the difference you hear between the tones. The difference is the timbre (pronounce TAMBRR).

Short Presentation

- Choose a paper from references below and prepare a 10-minute paper presentation. Sign up for a time slot by the end of week 3.

- Hearing in Time and Space:

- Pitch:

- For BOTH square and triangle waves, change the frequency of the 3rd harmonic until you no longer perceive the sound as having a clearly defined pitch (you can do this while the note plays continuously or by turning it on and off). Note the change in frequency. Is it different for each of the waveforms?

- Reset the frequencies and select a SQUARE wave. Change the 7th harmonic until you no longer perceive a pitch. Note the change in frequency. Is it the same, more, or less than for the 3rd harmonic for the square wave in the previous step?

- Reset frequencies and change the amplitude of the 5th harmonic until you hear a change in the timbre (tone quality of the sound). Note the amplitude (in terms of the quanta number).

- Lower the amplitude of the fundamental by raising the quanta number until increasing no longer makes a difference in the perceived sound. Do you still hear the same pitch?

- Reading: Cook, chapter 1 and 6.

- Week 3:
  - Due April 27, 2017:
    - Download [Frequency/Audience.ppt] and [message1.wav]
    - **Play example 1 and try to transcribe the text of the two spoken messages.**
    - **Play example 2 and see if it’s easier to transcribe, correcting your transcriptions where necessary.**
    - Submit your final transcriptions of both texts.

- Week 5:
  - Due April 27, 2017:
    - Download [Frequency/Audience.ppt]
      - Test your hearing, compares to 2 of Fletcher’s Women’s equal loudness curves, one at 20 phons and one at 60 phons, by setting a reference tone to 80 Hz and a second tone to 2000 Hz.
      - Determine from the curves at what level an 80-Hz reference tone should be when testing the 20 phn curve. Write this value down (as part of your submission) and use the value to set the level of the reference tone in the patch.
      - Without looking at the curve, at what level did you set the 2000 Hz tone so that it sounded equally loud?

- Now looking at the curve, at what level does the curve suggest it should have been?

- Repeat for the 60 phon curve, answering the same questions.

- If you haven’t already done so, choose a paper (from section Short Presentation below) and sign up for a 8-10 minute presentation. Email your selection directly to me (trstmyth@ucsd.edu) with subject **Music 175 Short Paper Selection.**

- Reading: Cook, chapter 8.

- **PITCH:**

- **Timbre/Perception:**

- **Timbre/Consonance/Scales:**


- **Timbre:**


- **Speech Perception:**

**Animal Hearing/Perception**

- (***taken***): Mirjam Kornhult et al. “Bat echolocation calls facilitate social communication”, available here.

**Student Choices (added Spring 2016-2017)**


**Project**

The project may consist of:

- “pure” research
- pd listening experiment + paper
- music analysis/create (yours or another) illustration of an auditory effect + paper
- other

**Final project presentation**

- Presentations will be during the final exam period.
- Papers should be constrained to 5-10 pages.
- The paper’s grade will be based on both its style, i.e., that it consistently follows a standard research style (e.g., MLA, APA, Chicago, etc), and its content, i.e., that it is well written and clear, the information is correct and accurate, etc.

- Proposals: Each student must submit a list of 2 proposed topics, each with a brief description (and possibly a drawing if appropriate), ranked in order of preference.

**Exams**

Exams will be based on lectures, assigned readings, and student presentations.