Course Information

Teaching Assistant
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Meeting Time and Place

Meeting Dates: 2020/3/31 - 2020/6/8

<table>
<thead>
<tr>
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<th>Time</th>
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<tbody>
<tr>
<td>Lecture:</td>
<td>TuTh 12:30PM -1:50PM via Zoom</td>
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<tr>
<td>Office hour:</td>
<td>Th 2:00-3:00PM, or by appointment (Smyth/Zurale)</td>
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<tr>
<td>Final presentations</td>
<td>M 11:30AM-2:30PM, 6/8/2020 (scheduled final exam)</td>
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COVID 19: Spring 2020 will be available BOTH synchronously and asynchronously.

Course Description


Prerequisites

Music 170 or 171 (or permission by instructor).
Grading

- Quizzes (3 X 15% each): 45%
- Selected paper presentation: 15%
- Assignments/Discussions: 20%
- Final project 20%

Required Textbooks

- Brian Moore. An Introduction to the Psychology of Hearing (available).
- Music 175 on-line notes.

Quizzes

Quizzes will be available on Canvas and will based on lectures, assigned readings, and student presentations.

Important Dates

- Thursday, April 9, 2020: Paper sign-up;
- Tuesday, April 21, 2020: Quiz 1;
- Thursday, May 7, 2020: Project proposals;
- Thursday, May 14, 2020: Quiz 2;
- Thursday, June 4, 2020: Quiz 3;
- Monday June 8, 2020, 11:30AM-2:30PM: Final project presentations;

Schedule and Online Lecture Notes (subject to change)

- Week 1:
  - Introduction to Music 175
  - Sound:
    * what is sound? acoustics vs. psychoacoustics.
Waves: time representation of sound, sinusoids, partials/overtones, harmonics.
Spectrum: frequency representation of sound, fourier analysis, spectrograms, periodicity.

- Pd patches: harmonicity.pd, pitchFreq.pd.
- Reading: Cook, Chapter 4.

• Week 2:
  - Hearing
    * sound level: pressure, power, intensity, dB scale
    * ear physiology: The ear and how it works
    * loudness: phons, sones, Fletcher-Munson equal loudness curves, masking
  - Pd patches: db.pd, FrequencyAndLoudness.pd, max.pd.
  - Reading: Cook, Chapter 1 and 6.

• Week 3:
  - Hearing in Time and Space
    * time and space: “cocktail party effect”, binaural masking, precedence effect, reverberation, localization.
  - Reading: Cook, Chapter 8.

• Week 4:
  - Hearing in Time and Space (cont.)
  - Field trip: Audio Spatialization Lab (Spat Lab), Calit2 (cancelled, COVID 19).
  - Quiz 1: Tuesday April 21, 2020 (last 45 mins of class)
  - Student paper presentations Hearing in Time and Space
    * studentname: “A General Model for Spatial Processing of Sounds”
    * studentname: “Comparative Study of European Concert Halls”
    * studentname: “Synchronization in Performed Ensemble Music”

• Week 5:
  - Student paper presentations Hearing in Time and Space
    * studentname: “Monaural Detection of Phase Difference Between Clicks”
    * studentname: “The CIPIC HRTF Database”
    * studentname: “Discriminability of Time-Reversed Pairs of Clicks”
studentname: “The effects of neighborhood views containing multiple environmental features on road traffic noise perception at dwellings”

- **Cognitive Psychology and Music**
  - **unconscious inference vs. direct perception (Gibson)**, size and loudness constancy, perceptual completion, gestalt grouping principles.

- **Reading**: Cook, chapter 3

- **Week 6:**
  - **Timbre**
    - average spectral shape, formants, missing harmonics, time variation.
  - **Reading**: Cook chapter 7.
  - **Student paper presentations** Timbre/Signal Discrimination
    - studentname: “Multidimensional Perceptual Scaling of Musical Timbres”
    - studentname: “Timbre Space as a Musical Control Structure”
    - studentname: “Squeezing speech into the deaf ear.”
    - studentname: “Auditory Illusions and Confusions”
    - studentname: “Hearing Lips and Seeing Voices”

- **Week 7:**
  - **Ambiguity in Music**
    - **Auditory Streaming** ambiguity, common fate, separation with apparent motion, Shepard tones, tritone paradox
  - **Quiz 2: May 14, 2020** (Thursday, last 45 minutes)
  - **Reading**: Cook chapter 10.

- **Week 8:**
  - **Pitch**
    - **Pitch Perception** place theory of pitch, repetition pitch, pitch paradox, jnd, mel scale
  - **Reading**: Cook, chapter 5
  - **Student paper presentations** Pitch (Perception)
    - studentname: “Periodicity and Pitch Perception.”
    - studentname: “Circularity in Judgments of Relative Pitch.”
● Week 9:

- Pitch cont.
  * jnd, mels scale, pitch spaces
  * scales, periodicity, intervals, beating, Rameau and inversions, pitch errors in scales, cents
- Reading: Cook chapter 13 and 14
- Student paper presentations Pitch (Consonance)
  * studentname “Harmony and Nonharmonic Partials.”
  * studentname “Beat Theories of Musical Consonance.”
  * studentname “Tonal Consonance and Critical Bandwidth.”
  * studentname “Attaining Consonance in Arbitrary Scales.”
- Student paper presentations Pitch (Scales)
  * studentname: “Interval-Class Content in Equally Tempered Pitch-Class Sets: Common Scales Exhibit Optimum Tonal Consonance.”
  * studentname: “Local Consonance and the Relationship Between Timbre and Scale.”
  * studentname: “Theoretical and Experimental Exploration of the Bohlen–Pierce Scale.”
  * studentname: “More than Just Notes: Psychoacoustics and Composition”
  * studentname “Calculation of the acoustical properties of triadic harmonies.”

● Week 10:

- Student paper presentations Bioacoustics (Animal Hearing/Perception)
  * studentname: “Bat echolocation calls facilitate social communication”
  * studentname: “Extremely high frequency sensitivity in a ’simple’ ear” (Hearing in moths)
  * studentname: “Fin Whale Sound Reception Mechanisms”
- Quiz 3: June 4 2020 (last 45 minutes)
Assignments

Assignments are to be submitted on CANVAS by 12:30PM (before class) on the day they are due.

• Week 1:
  – Due Tuesday April 7, 2020.
  – Download: [assignment file]
  – A1
  – Reading: Cook, chapter 4.

• Week 2:
  – Due Tuesday April 14, 2020.
  – Download: [assignment file]
  – A2
  – Reading: Cook, chapter 1 and 6.

• Week 3:
  – Due April 21, 2020
  – Download: [assignment file]
  – A3
  – Reading: Cook, chapter 8.

• Week 4:
  – Due April 28, 2020
  – A4 (to be posted)
  – Reading: Cook, chapter 3.

• Week 5:
  – Reading: Cook, chapter 7.

• Week 6:
  – Final project proposal: write a brief (1-2 paragraph) proposal describing your project and submit on CANVAS. Once you receive approval from the TA, you may begin working on your project.
Selected Paper Presentation

- Select a paper from the list below (additional paper suggestions are welcome, but should be approved by the instructor);
- Prepare a 10-minute paper presentation for the class;
- Sign up (on Canvas) by the end of the second week.
- A precise date will be assigned after the second week, however an approximate date can be found in the Schedule.

Hearing in Time and Space
(student suggestion)

Timbre/Signal Discrimination


**Pitch (Perception)**


**Pitch (Consonance)**


Pitch (Scales)


Bioacoustics (Animal Hearing/Perception)

27. Hannah M. Moir, Joseph C. Jackson and James F. C. Windmill. “Extremely high frequency sensitivity in a ‘simple’ ear” (hearing in moths), available


29. Mirjam Knörrnschild et all. “Bat echolocation calls facilitate social communication”, available


Final Project

The project includes a proposal (a brief 1-2 paragraph description to be approved by TA/instructor), a presentation (five minutes during the final exam period) and may consist of:

● research paper (5-10 pages): topic of choice with the following rubric:

1. style: consistently follow a standard research style, e.g. APA, Chicago, etc.;
2. **content**: well written and clear, the information is correct and accurate, and includes at least two scientific sources (citations).

- design a listening experiment in pd + (shorter) paper;
- analyze a musical composition (or create your own) illustrating an auditory effect + (shorter) paper
- other