

# Laboratory Phonology

## LING 331, Fall 2015

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Office Hours  
Tuesday: 3–5:00pm;  
Friday: 10:00–11:00am,  
and by appointment

### 1 Overview

This course focuses on how to design, conduct and analyze a phonological experiment. We will approach laboratory phonology from two perspectives: that of the *speaker* and that of the *listener*, with each perspective constituting roughly half the course. In the process, we will gain and practice a fair amount of skills in laboratory phonetic work, while testing aspects of current phonological theory.

**Listening** to speech feels like about the easiest thing we do, but the separate operations it consists of – segmenting an utterance spoken as a continuous stream into its discrete components; identification of phonemes; recognizing words from among a vocabulary extending into the hundreds of thousands – are highly complex. How listeners carry out these operations is a product of exquisite adaptation, at all points, to the characteristics of their mother tongue. This process of adaptation begins in infancy at the earliest stages of listening. We will review evidence from three decades of listening experiments, with particular focus on what the evidence tells us about the universal architecture of listening, and the cross-language variation that it requires.

**Speaking** produces infinite phonetic detail which humans manage to map into discrete symbolic categories, permeable to linguistically meaningful alternations. The second half of this course examines this connection between continuous quality of speech production and phonological units and patterns in the grammar. We will cover the areas where phonetics helps shape phonology, to answer questions about how the sound systems of the world's languages are arranged.

In each component, we will ask questions such as, why are vowel inventories dispersed the way they are? Why do certain contrasts tend to neutralize in certain positions? What determines how far a phonetic feature can spread across a word? Why and how are tone and voice quality interrelated? Can fine phonetic details of articulation reveal aspects of prosodic structure and other phonological theories?

By the end of the course, students will acquire skills in the following areas:

- critical reading and evaluation of phonetic production and perception literature
- understanding how the phonology of a language influences how people listen
- forming a phonological hypothesis and deciding how to test that hypothesis
- designing and conducting an experiment
- using tools for measuring articulation and acoustics (Praat, Voicesauce, palatograms, electroglottograph, pneumotachograph), presentation of experiment (Praat, PsychoPy, ProRec) and quantitative analysis (R, Excel)
- presenting your research in a clear and well-reasoned manner to others

## 2 Course Requirements

### 2.1 Prerequisites

LING 211 INTRODUCTION TO LINGUISTIC ANALYSIS AND  
LING 320 PHONETICS OR LING 321 PHONOLOGY OR LING 312 ADVANCED PHONOLOGY

### 2.2 Books, Required Readings

There are two required texts that we will use extensively.

- Cutler. 2013. *Native Listening*.
- Hayes, Kirchner & Steriade (Eds.). 2008. *Phonetically based Phonology*.
- Johnson. 2012. *Acoustic and Auditory Phonetics*.

Additional readings will be shared via Moodle.

### 2.3 Course Components and Grade Composition

**Participation and Discussion (10%)**

**Labwork (60%)**

Once a week, we will focus on lab skills: experimental design, acoustic and articulatory measures, quantitative analysis. Lab assignments, which will test these practical skills to better answer a theoretical question, will often require working with classmates or other ad hoc language subjects. Your lowest lab score will be dropped.

**Project (30%)**

Each student will conduct laboratory research on a phonological topic of her choice. The project may be an extension of one of the lab assignments, or it may be a separate laboratory phonological topic. Students will turn in a final paper and present their findings in a short conference-style talk during finals week.

## 3 Honor Principle and other policies/notes

All Reed students must abide by the Honor Principle. Plagiarism, cheating, or any form of academic dishonesty will not be tolerated and will be reported immediately.

**Collaborating.** You *are* strongly encouraged to discuss any part of any assignment with me or your classmates, but your submitted work *must* be your own. I.e., one submission per student in their own words.

**Late and missed work** will receive considerably diminished grades if received before the next class session. If you are later than that, I am happy to provide feedback but no grade will be assigned.

Due to the size of the class, **Moodle** will be eschewed in favor of direct e-mail for distribution of readings, other course materials, and submission of assignments.

## 4 Schedule

<b>Mondays</b>		<b>Wednesdays</b>	
8/31	Set agenda	9/2	What is spoken language like? <i>Read: Cutler Ch.1, 2</i>
9/7	<b>Labor Day</b> - no class	9/9	Segmentation <i>Read: Cutler 4, 5</i>
9/14	Recognition and Lexical Activation <i>Read: Cutler Ch. 3</i>	9/16	Recognition and Lexical Activation <b>Lab:</b> Experimental design, Choosing the right task
9/21	Variability in the speech signal <i>Read: Cutler Ch. 6, Connine, Blasko &amp; Wang (1994)</i>	9/23	Cross-modal Priming Experiment <b>Lab:</b> PsychoPy tutorial, Experiment Presentation
9/28	Prosody  <i>Read: Cutler Ch. 7</i>	9/30	Cross-modal Priming Experiment <b>Lab:</b> Interpreting your results
10/5	Listening to a second language <i>Read: Cutler Ch.9, 10</i>	10/7	Discussion of course project proposals <b>Lab:</b> Experimental design, part II
10/12	Speech Acoustics <i>Read: Johnson Ch.1, 2; HKS Ch. 1 (Introduction)</i>	10/14	Speech Acoustics <b>Lab:</b> Recording and measuring in Praat, Intrinsic F0
<b>FALL BREAK</b>			
10/26	Vowel acoustics – vowel reduction <i>Read: Johnson Ch. 6; HKS Ch. 7 (Crosswhite)</i>	10/28	Vowelspace  <b>Lab:</b> Measure, plot vowels
11/2	Burst acoustics – perturbation theory <i>Read: Johnson Ch. ; HKS Ch. 2 (Wright)</i>	11/4	Burst acoustics – perturbation theory <b>Lab:</b> VOT, statistical tests
11/9	Consonantal Acoustics – metathesis <i>Read: Johnson Ch. 7, 8; HKS Ch. 5 (Blevins &amp; Garret)</i>	11/11	Consonantal Acoustics – metathesis <b>Lab:</b> Obstruent acoustics
11/16	Speech synthesis <i>Read: Carlson &amp; Granström (2010)</i>	11/18	Speech synthesis <b>Lab:</b> Speech synthesis
11/23	Voice Quality <i>Read: Esling (2011), DiCanio (2012)</i>	11/25	Voice Quality <b>Lab:</b> Voicesauce, Electroglottography
11/30	Nasalization, Nasalance <i>Read: Johnson Ch. 9, Cohn (1993)</i>	12/2	Nasalization <b>Lab:</b> Airflow masks, Pneumotachography
12/7	Other Laboratory techniques <b>Lab:</b> ERPs? Eyetracking? Revisit earlier technique?	12/9	Projects due Presentation!