Laboratory course on physiology of speech and acoustic analysis.

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The course will provide hands-on instruction that will enable you to use computers to perform acoustic analysis of human speech as well as the vocal signals of other species. We will use the BLISS speech analysis system that has been developed at Brown over the past 30 years. It can be installed on any current Windows computer; you can put the system on your own computer if you wish (free). The course text presents the basics of the physiology of speech production and perception. It will integrate the findings of original research papers on WEB-CT with these laboratory sessions, as well as a monograph Nearey 1978, Phonetic features for vowels, on reserve at the Sciences Library.

The laboratory sessions will allow you to derive parameters that contribute to the intelligibility of speech and reveal the articulatory gestures that generate speech. These techniques will allow you to conduct research or work in areas that include: how children learn to talk, speech therapy, the psychological reality of sentences, why some sounds change in the course of time, computer speech recognition, and monitoring diseases, environmental factors and stresses that affect the human brain.

We will meet on Fridays 3 PM to 5:20 in Metcalf Research 204 where computers will be available for everyone enrolled. Additional computer time will be available. You can also use your own computer if it will work with BLISS software.

A midterm exam on paper and a final that will take the form of a speech analysis exercise will occur.

The course text is Speech physiology, speech perception and acoustic phonetics, Lieberman, P. and Blumstein, S. E. 1988 Cambridge University Press.

See WEB-CT for the papers.
General Framework:

1- Overview of the source-filter theory of speech production.
2- Laryngeal function – Waveform and fundamental frequency of phonation (F0) measurements. Linguistic and emotional aspects of intonation.
3- Formant frequencies. Physiologic basis, measurement, Fourier analysis and LPC.

   Traditional binary tongue position features (don't work)
   Acoustic features, Jakobson, Quantal theory.
5. Encoding, speech perception and vocal tract normalization,
   innate nature of normalization, other species and evolution
7. Neural control of speech production, modularity