Experimental Phonetics

Jolanta Bachan, Ph.D.

Contact

- Jolanta Bachan, Ph.D.
- email: jbachan@amu.edu.pl
- website: http://bachan.speechlabs.pl/
  - http://bachan.speechlabs.pl/en/teaching/sum2025/exphon
- duty hours, room 204B or computer room 313a, Collegium Novum, building B, Al. Niepodległości 4:
  - Wednesdays, 12:30-13:30
  - Thursdays, 13:00-13:45

Requirements

- Be active in class.

- It is allowed to miss 2 classes in a semester.

- Do the tasks in class and the homework.

- Design and carry out a phonetic experiment. Present the results in a report.

- Register in USOS.

Good luck!

Please, bring your headphones to the class.

Syllabus

1. Phonetics as a scientific study of speech: objectives, methods and applications.
2. Description of articulatory and acoustic features of vowels and consonants.
3. Initiation of speech, airstream mechanisms and phonation types.
4. Speech production and perception.
5. Introduction to speech analysis tools.
6. Visual representation of speech sounds: spectrograms and oscillograms.
7. Segmentation of continuous speech using audio and visual representation.
8. Acoustic measurements of distinctive features of speech segments.
9. Measurements of suprasegmental features.
10. Phonetic experiment: Formulating experimental hypotheses. Creation/selection of recording scenarios and realization of recordings. Annotation of speech recordings for use in the phonetic experiment. Extraction of speech parameters and creation of a database. Testing experimental hypotheses. Presentation of the experimental results and the final report.

Report & Exam

- Presentation of the experiment results and the final report:
  - 2025-06-05 and 2025-06-12 (*and 2025-06-16)
  - Final grade
- Some students may need a written exam,
  then the final exam will take place: 2025-06-24

- Academic calendar:
  - https://amu.edu.pl/en/education/academic-calendar

Fat Thursday

Tradition: eat a *pączek w Tłusty Czwartek*

SMACZNEGO!

Bon appetite!

Presentation

- Please, present yourself.

- How many languages do you speak?

- How long are you in Poland?

- Have you studied acoustic phonetics before?

Record yourself!

The North Wind and the Sun

The North Wind and the Sun were disputing which was the stronger, when a traveler came along wrapped in a warm cloak.

They agreed that the one who first succeeded in making the traveler take his cloak off should be considered stronger than the other.

Then the North Wind blew as hard as he could, but the more he blew the more closely did the traveler fold his cloak around him; and at last the North Wind gave up the attempt. Then the Sun shined out warmly, and immediately the traveler took off his cloak.

And so the North Wind was obliged to confess that the Sun was the stronger of the two.

IPA chart

- International Phonetic Alphabet - IPA

Introduction to Praat

Praat: doing phonetics by computer

Download Praat:
* Macintosh
* Windows
* Linux, FreeBSD
* SGI, Solaris, HPUX
* the source code

Information on Praat:
* Introductory tutorial: choose **Intro** from Praat's **Help** menus.
* Extensive manuals and tutorials: in Praat's **Help** menus.
* Beginner's manuals by Sidney Wood and Pascal van Lieshout.
* Paul Boersma's publications on algorithms and tutorials.

The authors

Paul Boersma and David Weenink
Institute of Phonetic Sciences
University of Amsterdam
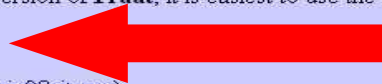Spuistraat 210
1012VT Amsterdam
The Netherlands

Paul

David

Downloading Praat for Windows

New: Praat requires the Doulos SIL or Charis SIL phonetic font; see below.

To download the latest **Windows** (2000, XP, Vista...) version of **Praat**, it is easiest to use the self-extracting archive:

praat5023_winsit.exe (May 9, 2008; 1.7 MB)

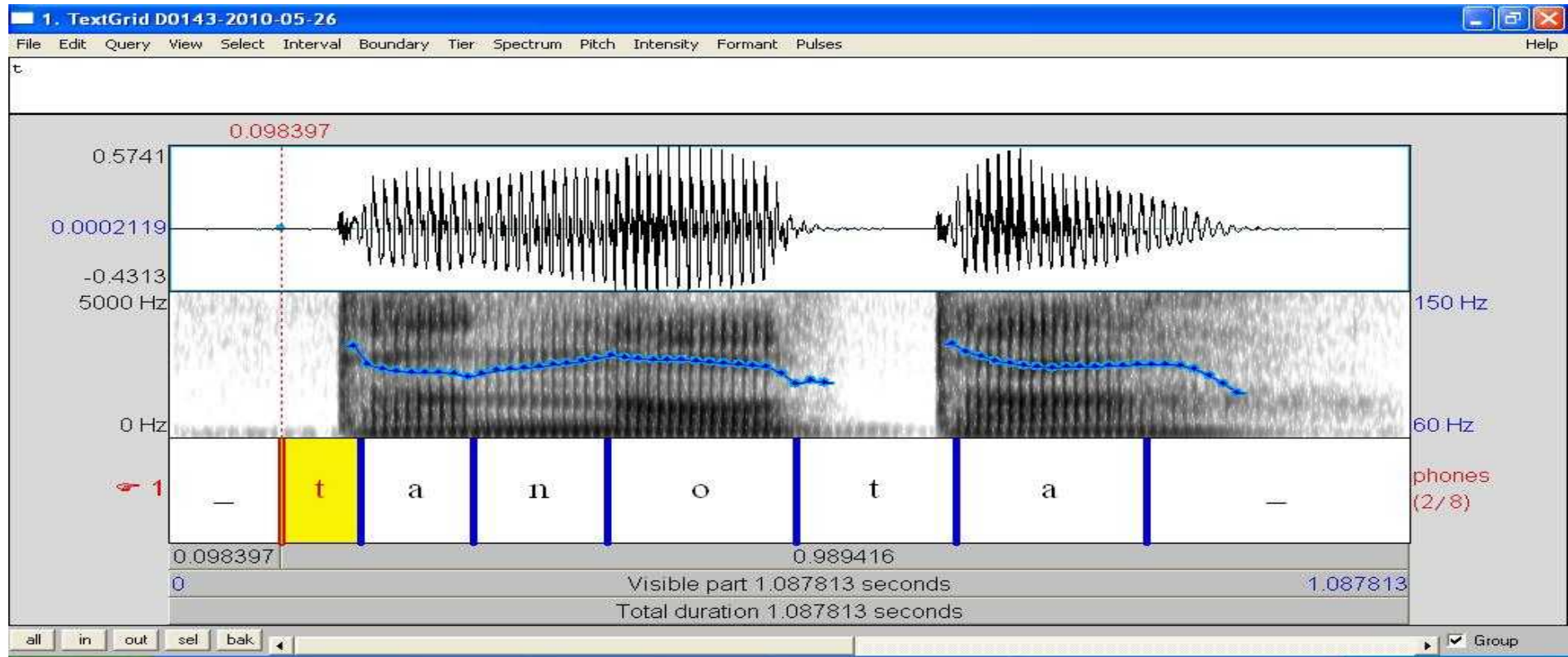(if you have Windows 95/98/NT4/ME, try praat4601_win98sit.exe)
After downloading this file, double-click it and click OK to install Praat on your desktop. If this installation does not work, you may use the ZIP archive instead (after downloading, double-click to open):

praat5023_win.zip (May 9, 2008; 1.9 MB)

(if you have Windows 95/98/NT4/ME, try praat4601_win98.zip)
Either way, a file called **Praat** or **Praat.exe** will appear. This is the Praat program. You can put it anywhere on your hard disk (so that you can use Praat even if your system administrator does not allow you to install other programs!).
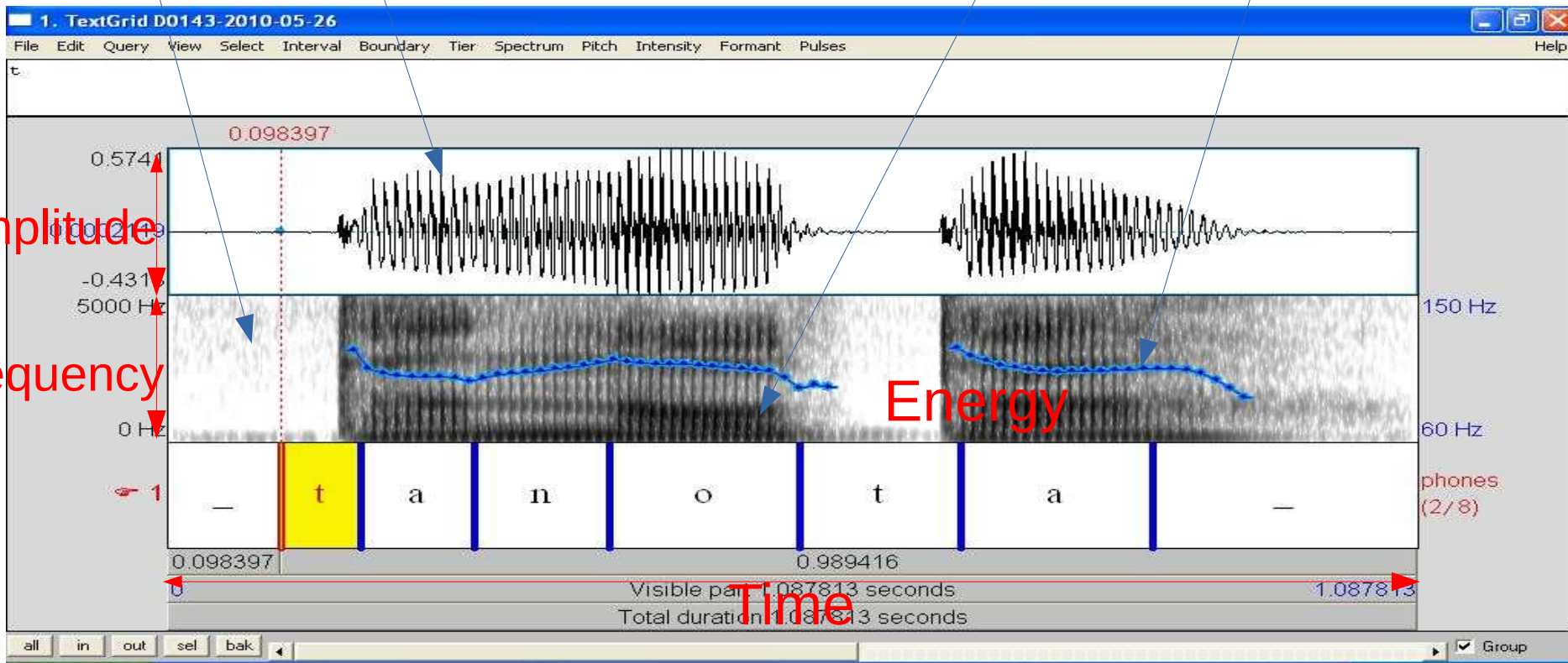
Annotation in Praat

Annotation in Praat

Vowels and their formants

- Formants are frequency peaks in the spectrum which have a high degree of energy. They are especially prominent in vowels. Each formant corresponds to a resonance in the vocal tract.

  https://www.sciencedirect.com/topics/medicine-and-dentistry/formant

Vowel formant centers

Vowel	IPA	Formant f_1	Formant f_2
u	u	320 Hz	800 Hz
o	o	500 Hz	1000 Hz
ɑ	ɑ	700 Hz	1150 Hz
a	a	1000 Hz	1400 Hz
ø	ø	500 Hz	1500 Hz
y	y	320 Hz	1650 Hz
æ	ɛ	700 Hz	1800 Hz
e	e	500 Hz	2300 Hz
i	i	320 Hz	2500 Hz

Praat: exercise

- Go to website: http://bachan.speechlabs.pl/en/teaching/sum2025/exphon
- Download the files
  - <u>English:</u> *If you go to heaven, then you've nothing to worry about.*
  - IrishmansPhilosophy_exercise.wav
  - IrishmansPhilosophy_exercise.TextGrid
- Open PRAAT
- Read in the WAV and TextGrid file to PRAAT
- Adjust the boundries

- -

- Choose a sound for in any language:
- Do annotation in PRAAT on word, syllable and phone levels

Praat: exercise

- Now try to use IPA made especially for PRAAT
  - Help > Search Praat manual > "Phonetic symbols"
- Inspect the TextGrid file and analyse the coding of annotation

Thank you for your attention!

See you next week! :-)