

# Phonetics & Phonology

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# Areas of phonetics

- Speech production
- Speech acoustics
- Speech perception

# Speech production [1]

- respiration (sub-glottal activities)
- phonation (glottal activities)
- articulation (supra-glottal activities)

## ***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.*

# Speech recordings

- Microphone signals
- [www.praat.org](http://www.praat.org)  
(by Paul Boersma & David Weenink, Phonetics Amsterdam)

# Speech production [2]

- Scotland beats France.
- Scotland beats France?
  
- Could you come to my office?
- Could you come to my office?



# Speech production [3]

## Consonant articulation



- Places

- lips (labial)
- teeth (dental)
- alveolar ridge (alveolar)
- hard palate (palatal)
- soft palate (velar)
- uvula (uvular)
- pharynx (pharyngeal)
- larynx/glottis (glottal)

- Manners

- stop/plosive
- fricative
- nasal
- lateral
- glide/approximant
- trill
- tap/flap

# Speech production [4]

- IPA table

## THE INTERNATIONAL PHONETIC ALPHABET (revised to 2005)

CONSONANTS (PULMONIC)

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	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ		
Trill	ʙ			ɾ					ʀ		
Tap or Flap		ⱱ		ɾ		ɽ					
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative				ɬ ɮ							
Approximant		ʋ		ɹ		ɻ	j	ɰ			
Lateral approximant				l		ɭ	ʎ	ʟ			

Where symbols appear in pairs, the one to the right represents a voiced consonant. Shaded areas denote articulations judged impossible.



# Phonology

- systematic use of sound segments and prosody in a specific language
- examples:
  - final devoicing in German
  - plural formation in English
  - stress rules in compound words in German

# Consonants vs. vowels [1]

- e ea e o ea o o o o : a e ou y n  
e o i i a e u y e i e a e oo .




# Consonants vs. vowels [2]

- Th w th r f r c st f r t mm r w: r th r cl d  
n th m rn ng w th f w s nn sp lls n  
th ft rn n.




# Consonants vs. vowels [3]

- The weather forecast for tommorow: rather cloudy in the morning with a few sunny spells in the afternoon.

# Consonants vs. vowels [4]

- The weather forecast for tommorow: rather cloudy in the morning with a few sunny spells in the afternoon.
- speech versions
  - only consonants 
  - only vowels 
  - original 

# Consonants vs. vowels [5]

- only vowels – without silences 
- only vowels – with silences 
- only vowels – monotonous 

# Connected speech

- The president will be elected for a period of four years.
- connected speech 🗣️
- with silences between words 🗣️
- as chain of isolated words 🗣️
- as chain of isolated without silences 🗣️
- function words: isolated vs. connected 🗣️

# Applications

- foreign language teaching/learning
- pronunciation dictionaries
- speech pathologies
- forensic phonetics
- speech technology



# Speech synthesis

- "Mary": <http://mary.dfki.de>

