



Speech and Digital Humanities

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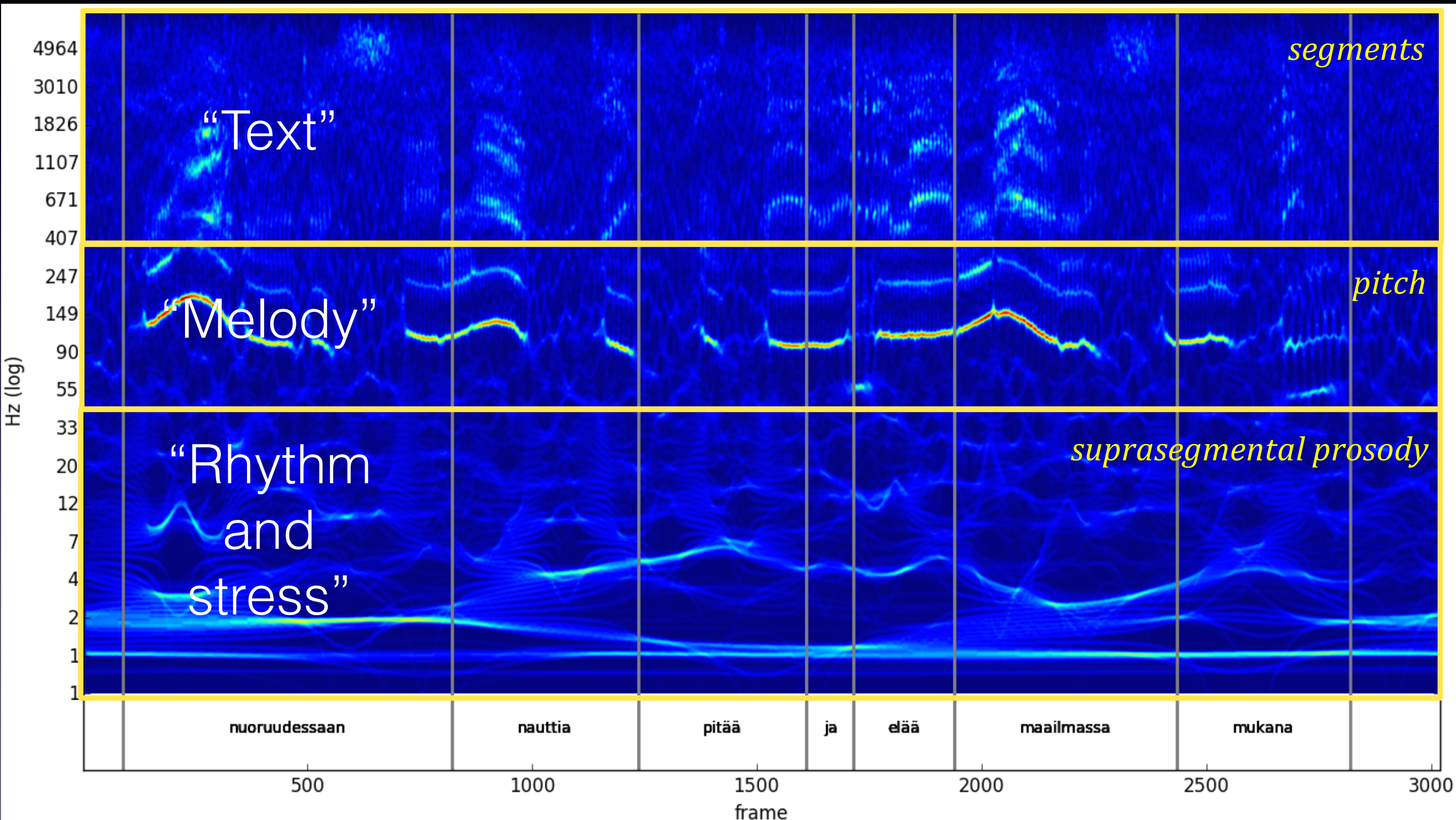
Digital Humanities Summit — Helsinki, 18.10.2017



Speech and Digital Humanities

- **Speech synthesis**: one of the oldest digital enterprises in humanities
- I.e., before engineers took over —> applied research
- However, engineers are not interested in **speech** and **language**, *per se*
- Recently the methods have started to converge; basic research in phonetics and speech synthesis are again unified

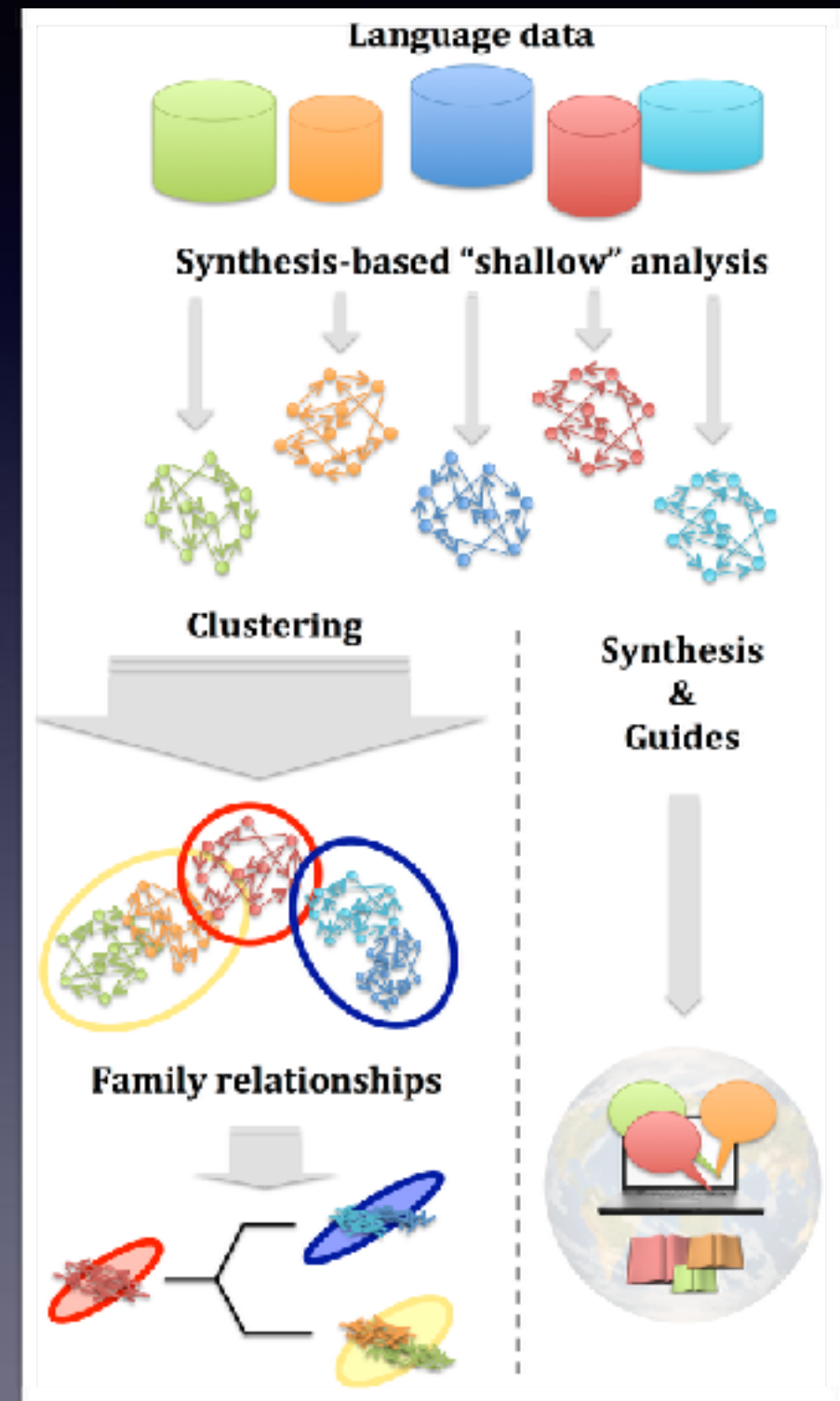
Hierarchical Nature of Speech



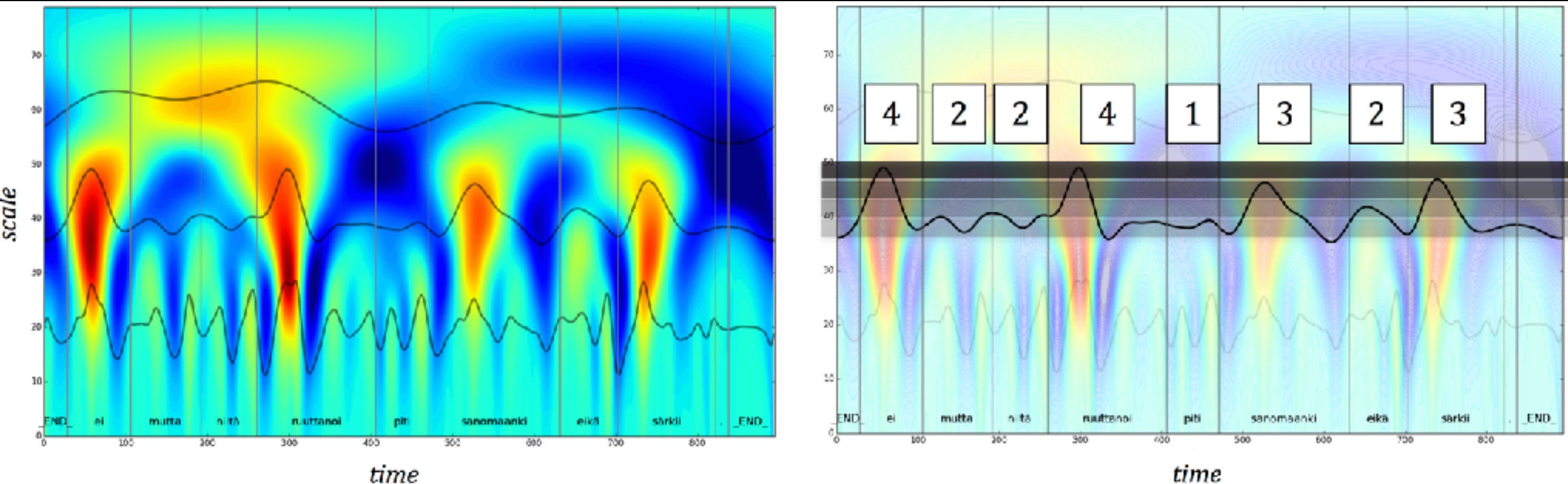


Digital Language Typology

- Finnish Academy programme on Digital Humanities
 - Phonetics at UH,
 - Computer Science at UH, Prof. Hannu Toivonen
 - Information Sciences, UTA, Prof. Markku Turunen Big Data (relatively)
- Shallow but non-trivial analyses — based on speech and language technology
- Data visualisazation



Estimating prosodic hierarchies

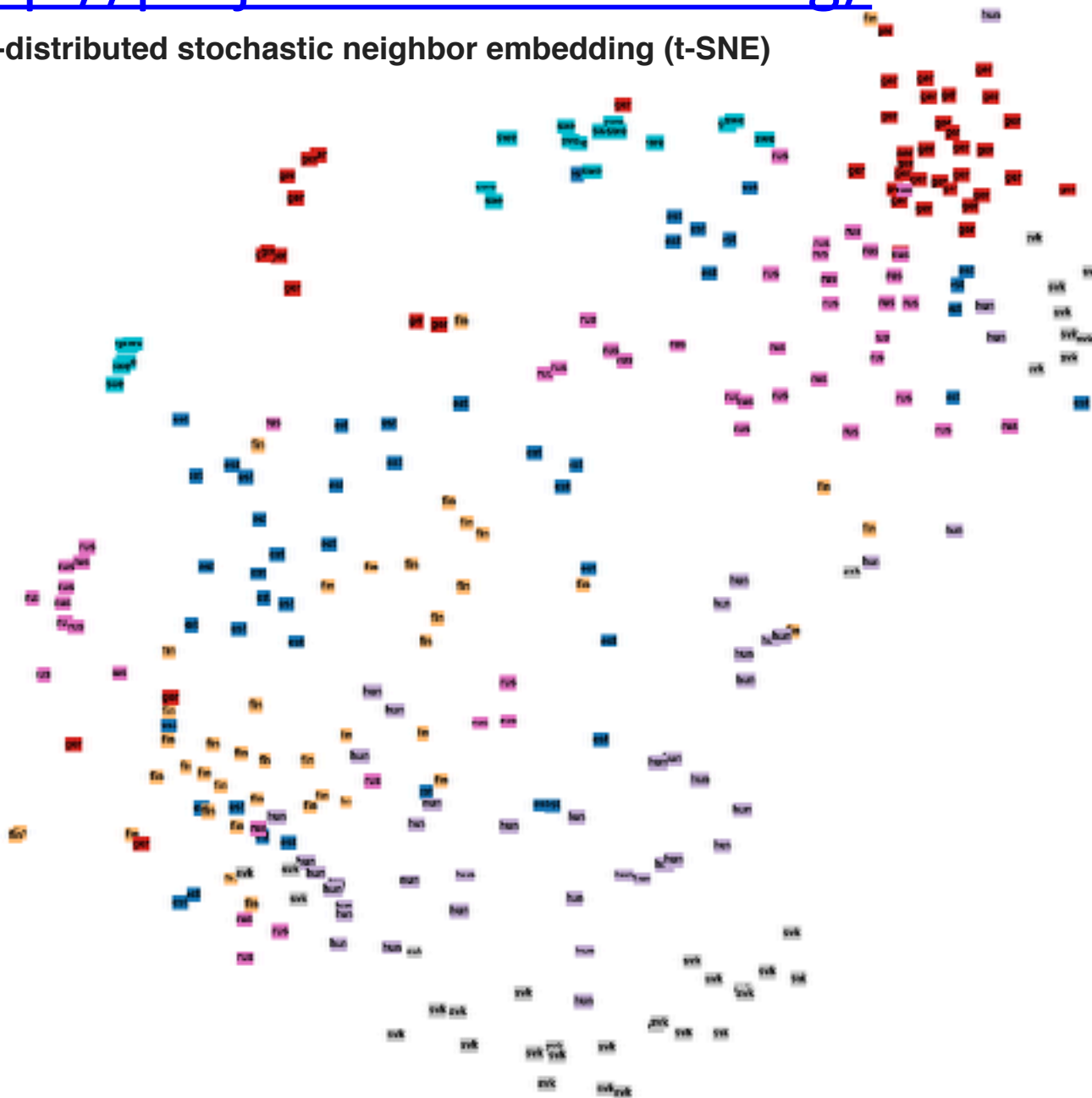


- CWT analysis can be used to estimate prominences and boundaries at several levels
- The prosodic structure can be discretised on several relevant linguistic levels

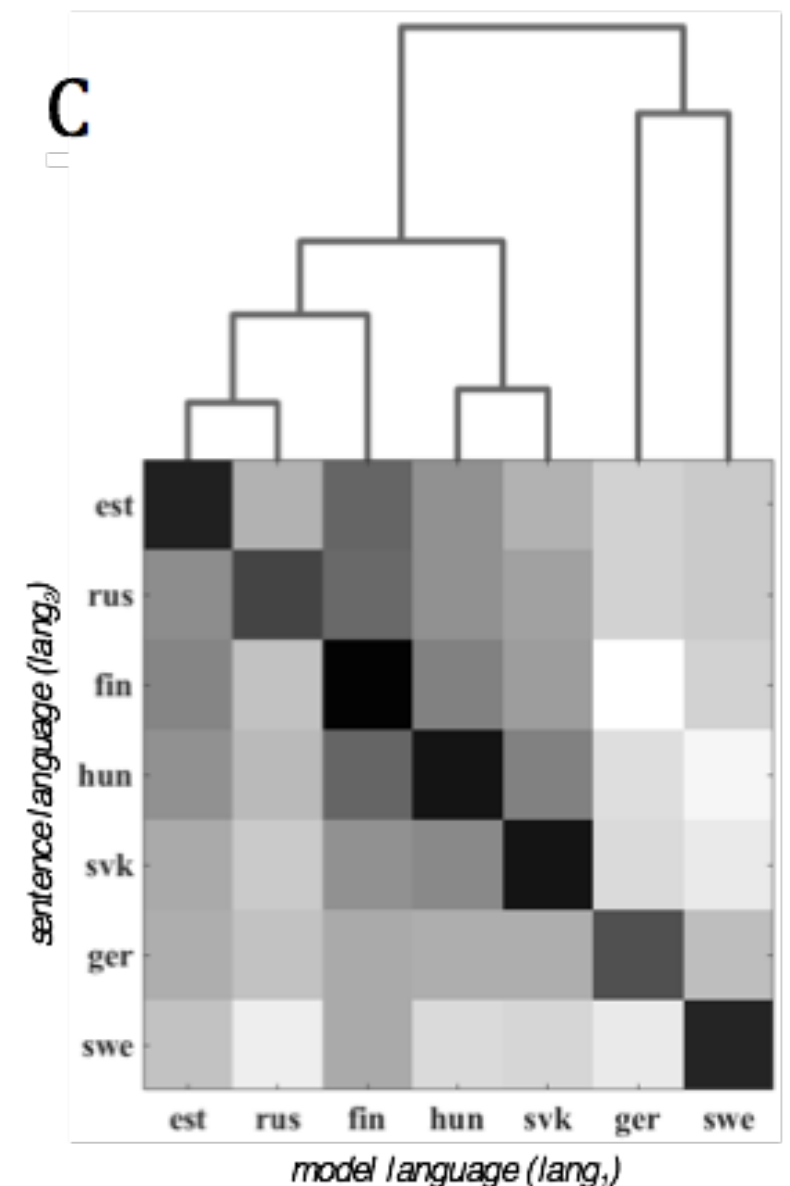
Transition probabilities, similarities, and family relationships

<http://projector.tensorflow.org/>

t-distributed stochastic neighbor embedding (t-SNE)

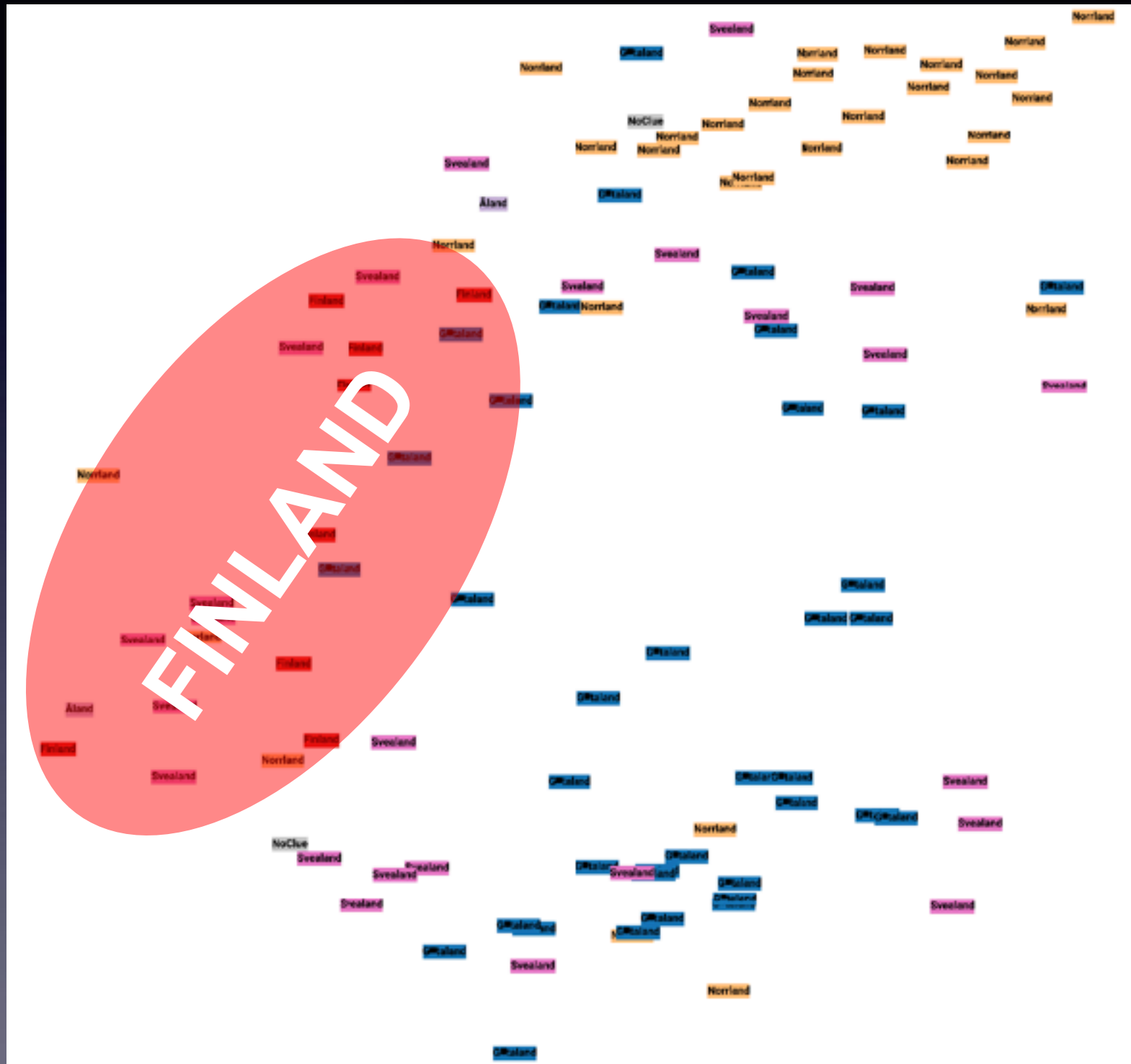


Energy'+'f₀'signals'
(discretization: 3 bins, pseudo 5 periods: 0.2!0.8!1.6!s!)





SWEDIA 2000 dialects



Norrland

Svealand

Götaland

Åland

Finland

- individual words from 104 locations from Sweden and Finland, different dialects
- about 2 days of words!
- 1.2 million files processed



Speech and Digital Humanities

Perfect match!

Thank you!