

Current research at Karolinska Institute, site Huddinge

- New technical methods for assessment of voice pathology
- Vocal fold tissue repair with bioimplants and stem cells
- Voice loading in the workplace and dosimetry
- Treatment evaluation studies
- Voice transformation of sex-changed patients
- Follow-ups of botox administered for spasmodic dysphonia
- The phonetograph as a tool for therapy and voice training

Current research at Karolinska Institute, site Huddinge

PhD projects:

Laryngectomy speech research

Elisabet Lundström

Neurogenic speech and voice disorders

Ellika Schalling

Methods for measuring vibratory patterns and
viscoelasticity of the vocal folds

Hans Larsson

Current research at Karolinska Institute, site Huddinge

Largest site for clinical voice research in Sweden

Clinical load is high - projects are all fairly small in terms of funding, and can be pursued only at intervals.

The unit for Logopedics & Phoniatics also hosts a major SLP training programme, from which many student final-year projects have a lasting research value.

The academic staff includes *Britta Hammarberg*, *Maria Södersten* (MC member), *Per-Åke Lindestad*, *Stellan Hertegård* and *Eva B Holmberg*.

KTH Stockholm



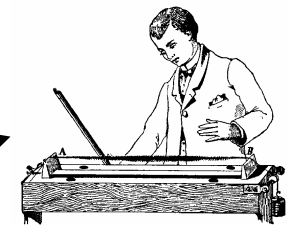
KTH Tal, musik och hörsel

**KTH – Kungliga Tekniska Högskolan
(Royal Institute of Technology), Stockholm**

School of Computer Science and Communication

Department of Speech, Music and Hearing

**KTH Music Acoustics Group
with the KTH Voice Research Centre**



KTH
voice
research centre

Researchers in voice at KTH

Staff

Sten Ternström, prof of music acoustics

Johan Sundberg, prof em

Dr Svante Granqvist

Eva Björkner, new PhD

Anick Lamarche, doctoral student

Johan Sundberg also co-supervises

Susanne Rosenberg (folk singing) and

Daniel Zangger-Borch (rock singing)

Visitors

Glauca Salomao, Brazil

Major topics at KTH

Completed

A series of studies of loud voice as provoked by ambient noise

Sten Ternström, Maria Södersten, Mikael Bohman, Carina Aronsson

Why so different? Voice source differences between opera and musical theatre singers

Eva Björkner, PhD dissertation December 2006. Work done mostly in Helsinki and York.

Ongoing

Voice assessment of professional female singers using phonetographic techniques

PhD topic of Anick Lamarche, supervisor Sten Ternström

Falsetto and modal voice in males studied by inverse filtering

Glaucia Salomao, Brazil, and Johan Sundberg

Modelling of the shape of the vocal tract for articulatory synthesis and facial animations Olle Engwall

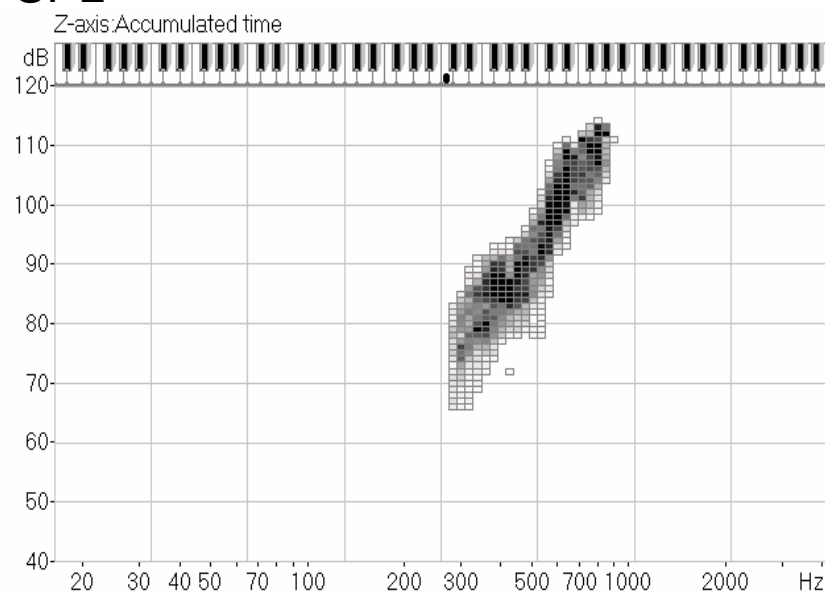
Minor threads and student projects at KTH

- **Acoustic correlates of perceived buzziness in synthesised voice**
Sten Ternström and David Howard, Univ. of York (STINT)
- **Studies of whispering**
Johan Sundberg, with Markus Hess, Frank Müller and Ron Scherer
- **Whistle register in sopranos**
Jan Švec and Johan Sundberg (Wenner-Gren Foundation)
- **Guidelines and best practices for recording voice for research**
Jan Švec and Svante Granqvist
- **Subglottal pressures in belting**
Monika Hein and Johan Sundberg
- **Collision threshold pressure**
Laura Enflo, Maria Sjöberg, Johan Sundberg
- **Vowel pronunciation when singing in one's native language or a foreign language**
Åsa Bäverstam and Johan Sundberg
- **Vocal tract simulation using a dynamic digital waveguide mesh**
Damian Murphy, Simon Shelley, Sten Ternström, David Howard (EPSRC)
- **Synthesis of different singing styles**
Johan Sundberg and Sten Ternström
- **Castrato synthesis**
Johan Sundberg, Bernhard Richter, Marianne Tråvén
- **Simulation of vocal fold dynamics**
Svante Granqvist

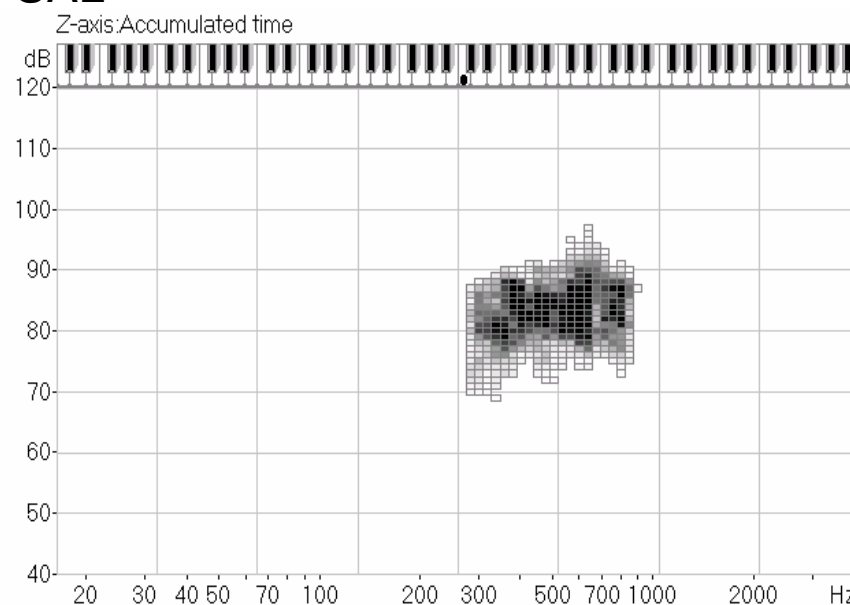
Contact mikes for phonetograms?

Anick Lamarche

SPL



SAL



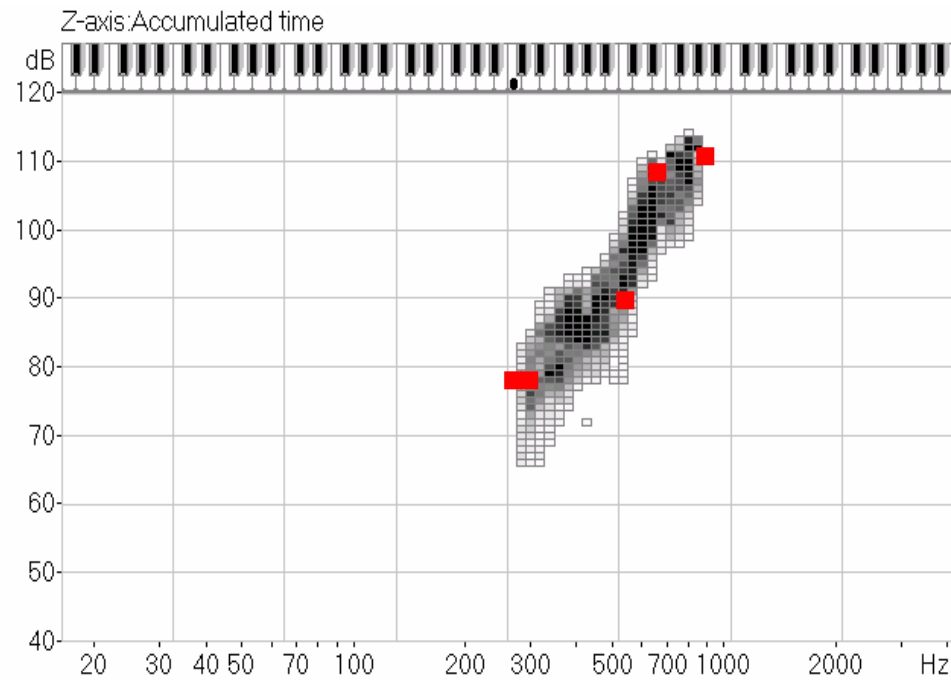
p – mf – f accumulated over several soprano singing tasks

Hardly any vowel variation – good!

Poor correlation between Ps and SAL (probably for spectral reasons)

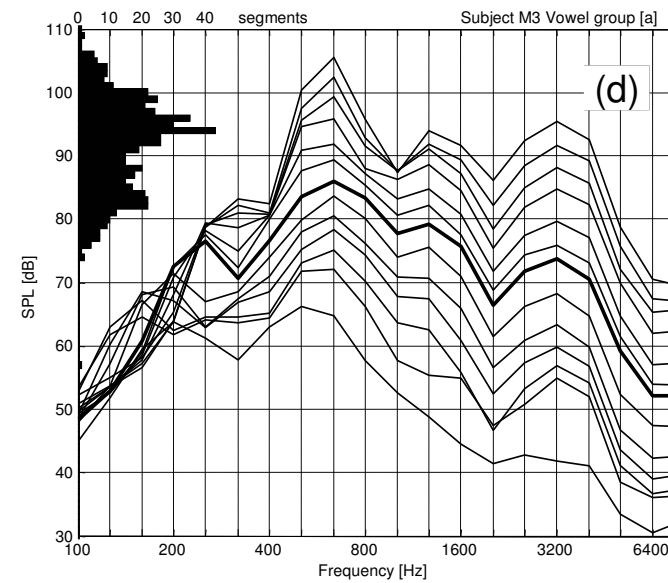
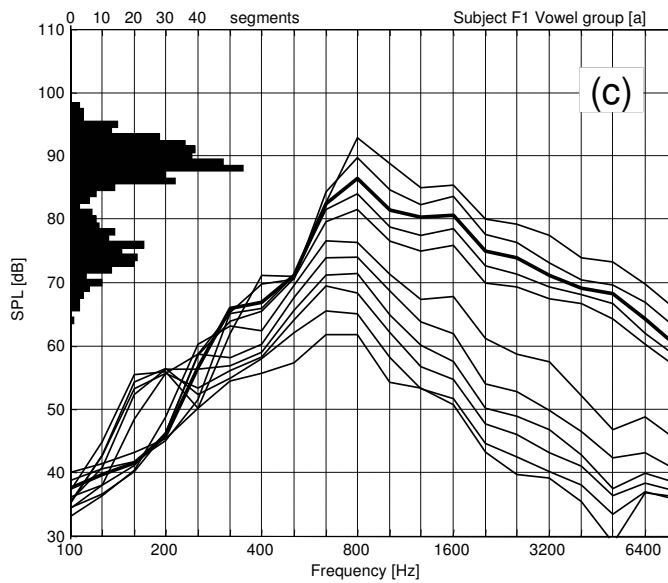
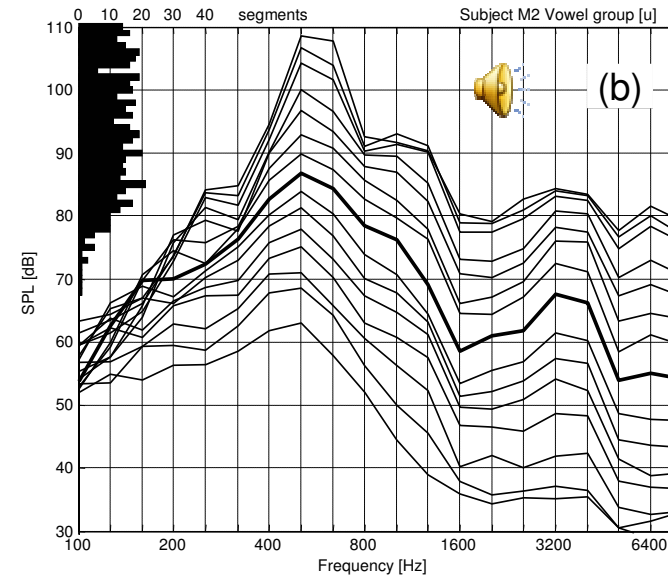
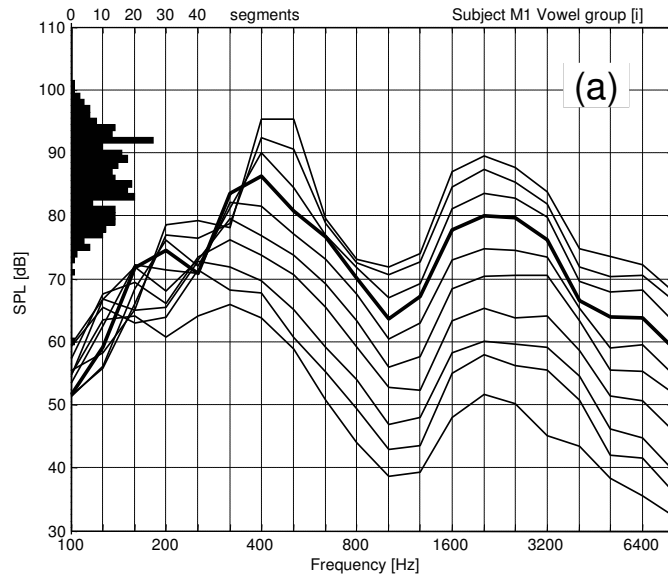
Singer self-perception mapped into in the phonetogram

Anick Lamarche

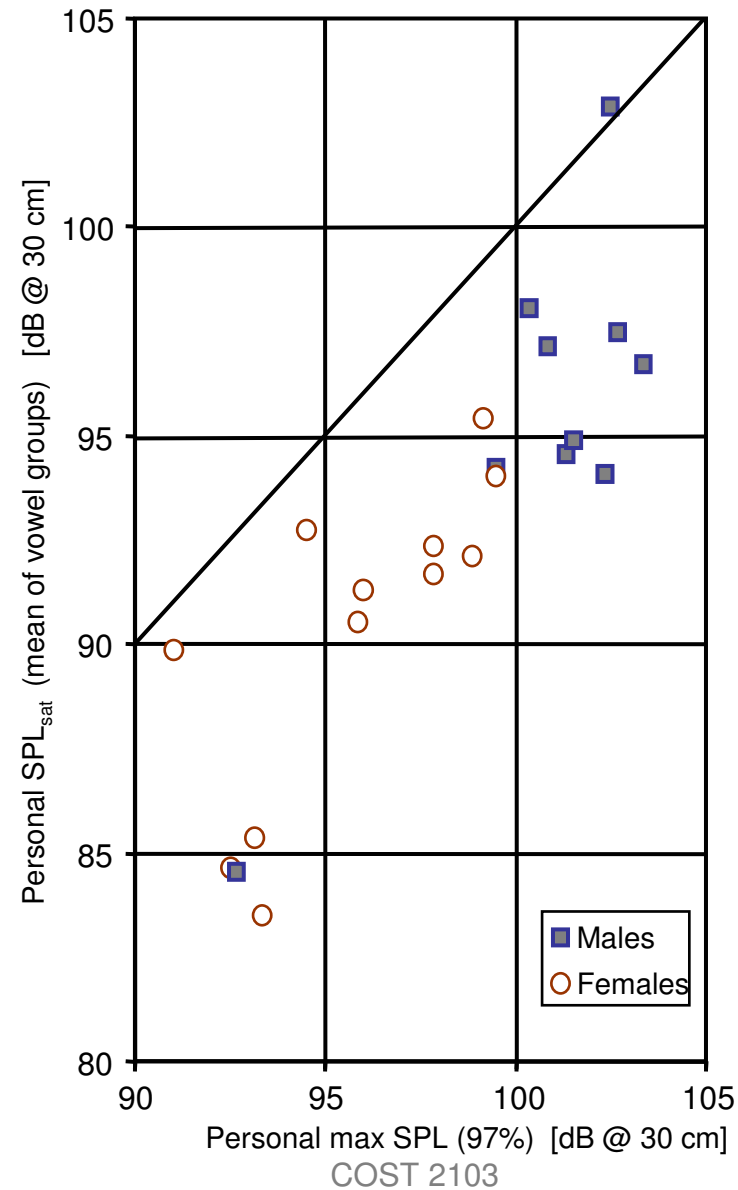


- Singer presses a button when voice control is perceived to be poor

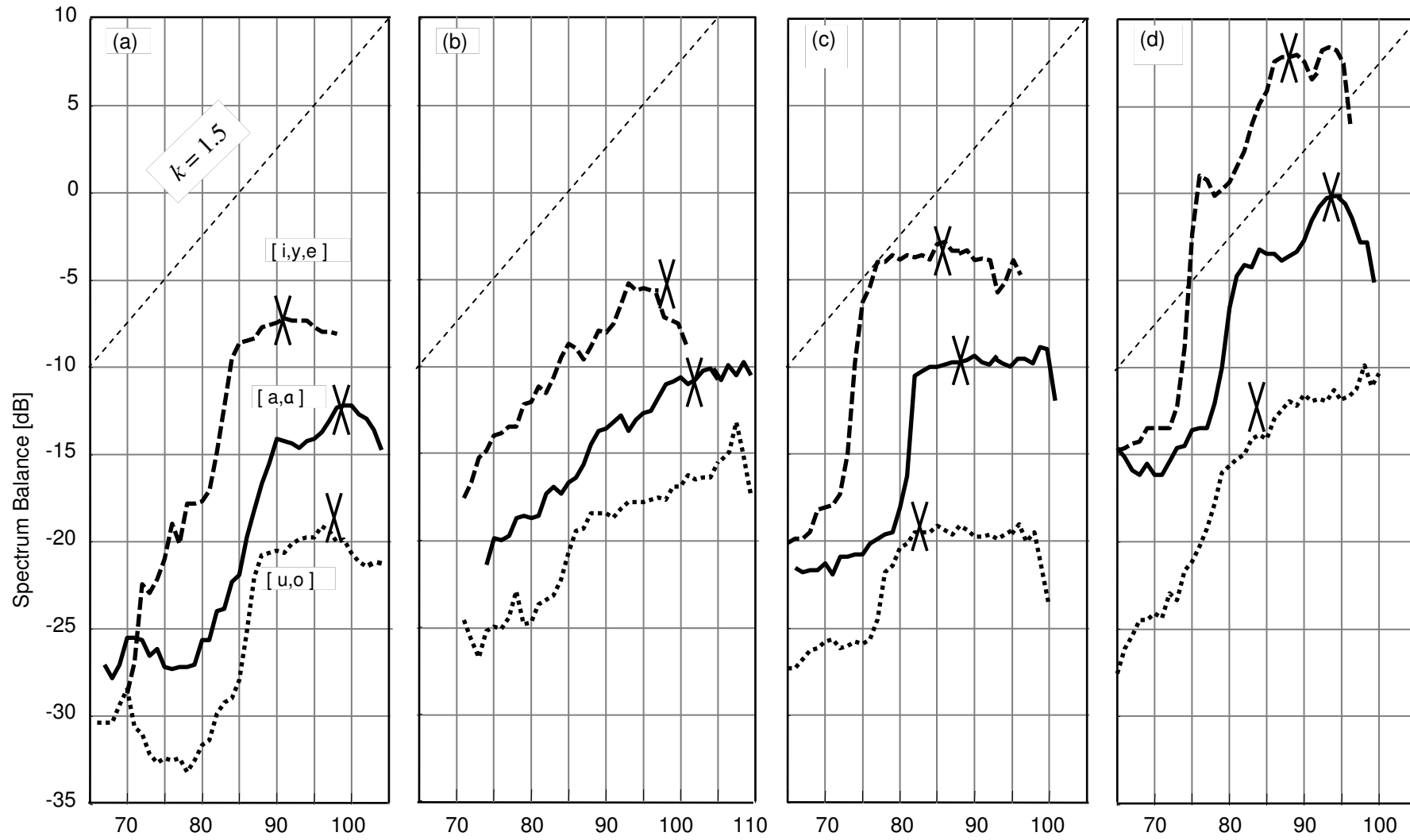
Vowel spectra from loud running speech, sorted by SPL



The spectrum balance "saturates" 8-10 dB below the *personal* maximum SPL



The spectrum balance increases differently with SPL for different individuals



Sweden KI & KTH

COST 2103

Ternström, Bohman, Södersten - JASA March 2006

*Source-filter syntheses
by rule from a score (notes + lyrics)*

Female, mixed belt-legit



Male jazz



Operatic baritone



Child singer



We are involved in
Sound and Music Computing (SMC)

There is now a new **roadmap** of future research
for the EU

- Will shape the calls coming in FP7
- Includes the voice as a source of sound

<http://www.soundandmusiccomputing.org>