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COST action 2103
"Advanced Voice Function Assessment"

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Abstract of voice-related activities at RWTH Aachen University

The following activities of RWTH Aachen University are within the scope of the COST action.

Voice diagnosis and therapy: At the Department of Phoniatrics, Pedaudiology, and Communication Disorders a team of four clinicians, four speech therapists, two audiometrists, one phonetician and two engineers work on diagnosis and therapy of disorders of voice, speech, hearing, and swallowing. Among the tools for diagnosis of voice and speech disorders the following devices are available: Endoscopy, Sonography, EGG (Laryngograph, EG2, RWTH developments), Nasometer, Voice range profile (Phoneto/RWTH), Vocal tract resonance measurement (VTMI/RWTH), Online Voice Analysis Laboratory (OVALA/RWTH) including voice quality analysis (e.g. Göttingen Hoarsenenss Diagram). A focus of current clinical projects is the investigation of occupational voice disorders (choristers, teachers, politicians), speech production and gender-related voice therapy.

Voice parameter assessment: Research and development aim at objective analysis of voice properties. In cooperation of several institutes of RWTH these methods have been investigated for functional voice assessment:

- Acoustic impedance analysis of the vocal tract resonances
- Voice range profile according to the recommendations of the UEP
- Device for simultaneous measurement of glottis opening and larynx position
- Acoustical triggering of MRI devices for assessment of articulatory and phonatory maneuvers
- Client-Server system for assessment, storage and evaluation of voice parameters (OVALA)

Voice simulation: A combined multiple-mass model of the vocal folds and waveguide model of the vocal tract has been developed for the simulation of various voice conditions. Applications of the model have been investigated for singing voice synthesis, modeling of voice disorders, and the interaction of intra- and extralaryngeal muscles.

In cooperation with the aerodynamic institute of RWTH, a hydrodynamical model of the vocal folds has been developed, and fluiddynamical and acoustical investigations of the vortex shedding and noise generation at the glottis have been performed.

In cooperation with the Chair of Statics and Dynamics/RWTH, ENSTA/Paris and TU Prague a fluid-structure interaction FE model of the vocal folds is currently developed.