

Analyzing the human voice production

Abstract:

Everybody is using their voice every day and all day. We are taking our voice for granted as long as it works. However, many people suffer from voice problems, often expressed by hoarseness, due to different reasons, e.g. due to a cold, functional disorders or benign and malign tissue alterations in the larynx where the voice signal is produced.

Our research focuses on the one hand on the fundamental understanding of the laryngeal biomechanics and fluid-structure-acoustic interactions (FSAI) during voice production. Therefore, we are developing and analysing experimental synthetic & ex-vivo models using multi-modal recording techniques as high-speed imaging, high-speed particle-image-velocimetry, microphones and pressure sensors. Parallely, we develop numerical CFD and FSAI models simulating the phonatory process. On the other hand, we focus on new methods to improve clinical diagnostics, therapy control and prediction of potential disorders. Here, we develop new diagnostic hardware, image processing and data analysis approaches to allow for quantitative evaluation of voice quality.