MASTER OF SCIENCES – BIOMEDICAL ENGINEERING

MASTER – THESIS PROPOSAL

UNIVERSITÄT BERN

ARTORG CENTER
BIOMEDICAL ENGINEERING RESEARCH

Artificial Hearing Research Group

MEASUREMENT INSIDE THE INNER EAR

Laser Doppler Vibrometry measurement (*fig. 1*) is today the state of the art in research on middle ear mechanics and for the development of implantable hearing systems. This method has limitations when performing measurements in the inner of the cochlea. In our current research on new transducers for implantable hearing systems such inner ear measurements showed to be very important in order to understand sound propagation from the skull to the inner ear as well as for the characterization of transducers.

In a first step a clinical evaluation of an inner ear pressure sensor was already done. The resulting concept should now be redefined and developed further.

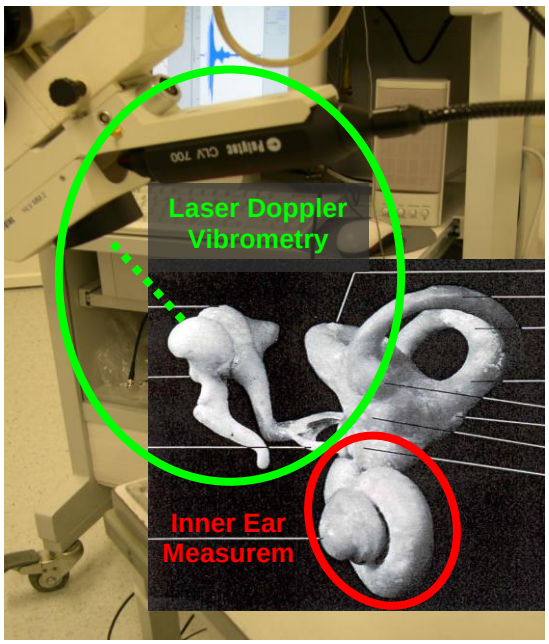

Fig. 1: *Setup of Laser Doppler Vibrometer which performs measurements in middle ear structures. The red circle shows the cochlea where inner ear measurements shall be performed.*

The goal of this master thesis is to develop a method for inner ear measurements including:

- Integration of an audio-analyzer to avoid a time consuming manual setting of the stimulation signal.
- Integration of previously evaluated sensor concepts and prototype.
- Refining of a functional prototype system for the inner ear measurement.
- Analysis of excitation signals.
- Validation of the prototype in mechanical model and on human temporal bones.

Nature of the Thesis

Conceptual work: 30%, Experimental: 40%, Hardware/Software/Signal processing: 30%

Specific Requirements

Interest in experimental work
Basic knowledge in mechanics
Basic knowledge in signal processing

First examiner

Prof. Dr. Ch. Stieger

Supervisors

Prof. D. Debrunner, BFH, Division of Micro- and Medicaltechnology, BFH Biel

Contact

Prof. Dr. Christof Stieger, Artificial Hearing Research, Department of ENT, Head and Neck Surgery, Inselspital, christof.stieger@artorg.unibe.ch, 031 632 87 89