



Phd Thesis at INRIA Sophia Antipolis

on

“Modeling, Planning & Evaluation of Cochlear Implants”

Phd Topic: The cochlea is the main organ of the inner ear responsible for transforming acoustic waves into brain stimulation. Patients suffering from deep hearing loss are commonly equipped with cochlear implants following a surgical procedure. The amount of hearing restoration largely depends on the cochlea implant insertion procedure and more precisely on the positioning of the implant inside the cochlea.

The goal of the thesis is to reconstruct both the shape of cochlea and the electrodes of the implant from pre-operative and post-operative CT scan images of the patient. Uncertainty quantification of the reconstruction will be performed in order to assess objectively the implant localisation. The quality of electrodes positioning will also be correlated with clinical hearing measurements in order to provide some guidance to improve the patient hearing recovery.

This work will be based on a large imaging databases acquired at the radiology department of the University Hospital of Nice with strong interaction with ear, nose, and throat surgeons. The research will also be strongly supported by Oticon Medical, a world leader in cochlea implant design.

Localization: This thesis will take place within the [Asclepios team](#) at Inria Sophia Antipolis in close collaboration with the University Hospital in Nice and Oticon Medical in Sophia Antipolis, France.

Required Skills

- Master degree with strong competences in mathematical modeling, statistical learning as well as some knowledge in medical imaging, signal and image processing (Master 2 level).
- Solid programming and IT skills are necessary (Python and C++, bash scripting, version control systems).
- Strong communication abilities
- Fluent English (written and spoken)

Contact Persons:

Please send a resume and motivation letter to the following persons:

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