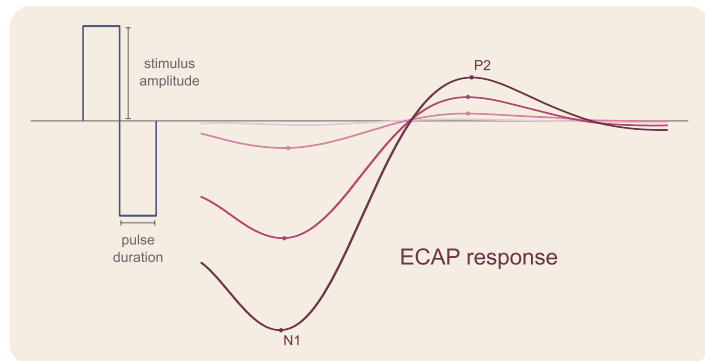


# Master's Thesis: Characterization and Application of Telemetry Measurements for Fitting and Monitoring of Hearing Implants



## Background and aim

Cochlear implants (CIs) are implantable neuroprostheses capable of restoring hearing in deafened individuals. Such devices work by directly stimulating the auditory nerve via electrical pulses generated with a small-scale electrode array placed inside the cochlea, the human hearing organ. Although the majority of patients profit substantially from the CI, there's still a large variability in performance outcomes yet to be explained in objective and reproducible terms.

In the scope of our research, we aim to find objective biomarkers for neural health from telemetry measurements, i.e., electrical biosignals recorded with the implant itself. For this purpose, we develop electrical and mathematical models to describe the inner ear and validate our assumptions with telemetry data. In addition, we also focus on the development of telemetry-based algorithms to adjust the parameters of the audio processor. This is a small device worn behind the ear that captures sound and translates them into an electrical signal, and its precise adjustment to each patient's needs is crucial for optimal performance.

We are looking for a motivated engineering student with a passion for biomedical engineering to embark in our projects. The scope and main focus of the thesis will be defined according the research topics above and to your interests and background.

## Your tasks

- Literature research on applications of telemetry data
- Development of bio-inspired models (electrical models, math models, computer models) to describe the cochlear function
- Exploration of different algorithms to predict optimal audio processor configuration from telemetry signals
- Hypothesis validation using real-world data

## Your profile

- Master's student in the field of biomedical engineering, electrical engineering or a similar area
- Good knowledge of signal processing
- Programming skills (Python or Matlab)
- Independent and determined way of working with good communication and teamwork skills
- Strong motivation and scientific curiosity

**We offer**

- Opportunity to contribute with your own ideas and set your own research goals
- Participation in a young, welcoming and interdisciplinary research group
- Continuous supervision and mentorship on site for the whole duration of the project
- Workspace at the Klinikum rechts der Isar at Max-Weber-Platz with good accessibility by public transportation

**Application**

If you're interested in our research, don't hesitate to send us an email with your application documents (e.g., CV and transcript of records) and a short introduction of yourself. We are looking forward to receiving your application!

**Julia Veloso de Oliveira**

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[www.exa-lab.org](http://www.exa-lab.org)

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