Master Thesis Proposal

Reliability of post-implantation studies on Thin-Film Neural Devices: the influence of Chemical Fixation on Sample Preservation

Background:

Advances in µECoG array technology aim to reduce the gap between performance and invasiveness. Assessment of the stability of the brain-electrode system is possible after implantation by various imaging techniques such as light and electron microscopy, most of which require numerous preparation steps, including chemical fixation, which could ultimately compromise the structure of the tissue, electrode and polymer substrate. As science advances, it is important to focus not only on developing new techniques, but also on understanding where current failures are coming from. The **aim** of this work is to investigate the effect of available sample fixation methodologies on neural implants in order to limit potential misinterpretation of scientific results.

Scientific objective:

Employing and adapting available aging techniques to evaluate the material degradation at the ECoG array level.

Major goals:

- Literature research
- Accelerated aging of different ECoG characteristic materials such as polyimide and platinum under a personalized aging protocol that aims to mimic the reactions occurring during sample processing prior to light and electron microscopy
- Understanding surface modifications using Atomic Force Microscopy and ToF-SIMS

Ideal profile:

- You are interested in the field of medical engineering and neural devices
- You are familiar with biology and chemistry
- You are creative and can adapt easily to challenges
- Eager to expand knowledge of research methods

Location: Institute for Machine-Brain Interfacing Technology (IMBIT)
Earliest starting date: Januar 2024 (can be discussed)
Maximum length of the thesis: 6 months

Contact:
M. Sc. Ioana-Georgiana Vasilaş
Laboratory for Biomedical Microtechnology
Department of Microsystems Engineering (IMTEK)

IMBIT - NeuroProbes
Albert-Ludwigs-Universität Freiburg
Georges-Köhler-Allee 201 (Raum 01.027)
79110 Freiburg

E-Mail: ioana-georgiana.vasilas@blbt.uni-freiburg.de
URL: www.imtek.de/bmt

IMBIT // BrainLinks BrainTools
acting thoughts