Master Thesis / Internship Biomedical Engineering

Analysis of Pulse Wave and ECG Recordings in Mice

Mouse models and the analysis of murine biosignals are important tools in preclinical research. They provide important insights in translational research as findings from animal models can help to understand physiological phenomena. They are increasingly employed in the comprehension of cardiovascular diseases. ECG and pulse wave analysis, developed at the AIT, provide several parameters to assess the cardiovascular system.

In this thesis/internship, the focus will be on application of ECG (Fig. 1) and PWA (Fig. 2) approaches to murine signals. Emphasis will be put on approaches already used in cardiovascular research and their implementation.

The thesis/internship will involve the following tasks:

- A thorough analysis and review of the state-of-the-art in mouse models in cardiovascular research focusing on ECG and pulse wave recordings
- Implementation of selected, promising approaches
- Application to murine signals
- Statistical analysis and graphical representation of the results
- Reporting background (state-of-the-art), methods and results in master thesis or final report

Experience in Matlab and interest in data analysis will be advantageous.

Fig. 1: Murine ECG [1]

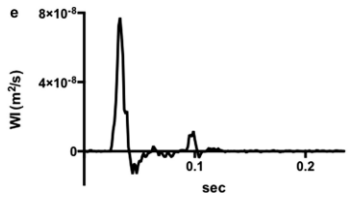

Fig. 2: Wave intensity analysis of a murine pulse wave [2]

The paid thesis/internship (6 months: 01/2018-06/2018; full-time equivalent; flexible working hours; 1.400€ monthly gross salary) will be carried out under supervision of Dr. Christopher Mayer (Biomedical Systems, AIT Austrian Institute of Technology) in collaboration with Ao.Univ.Prof. Dr. Eugenijus Kaniusas (Institute of Electrodynamics, Microwave and Circuit Engineering, Vienna University of Technology). It is financed under the umbrella of “FEMtech Praktika für Studentinnen”, thus only female students can be accepted.

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References:

[1] Speerschneider, T. & Thomsen, M. B Physiology and analysis of the electrocardiographic T wave in mice. Acta Physiologica, Wiley Online Library, 2013, 209, 262-271

[2] Di Lascio, N.; Kusmic, C.; Stea, F. & Faita, F. Wave intensity analysis in mice: age-related changes in WIA peaks and correlation with cardiac indexes. Heart and Vessels, 2017, 32, 474-483