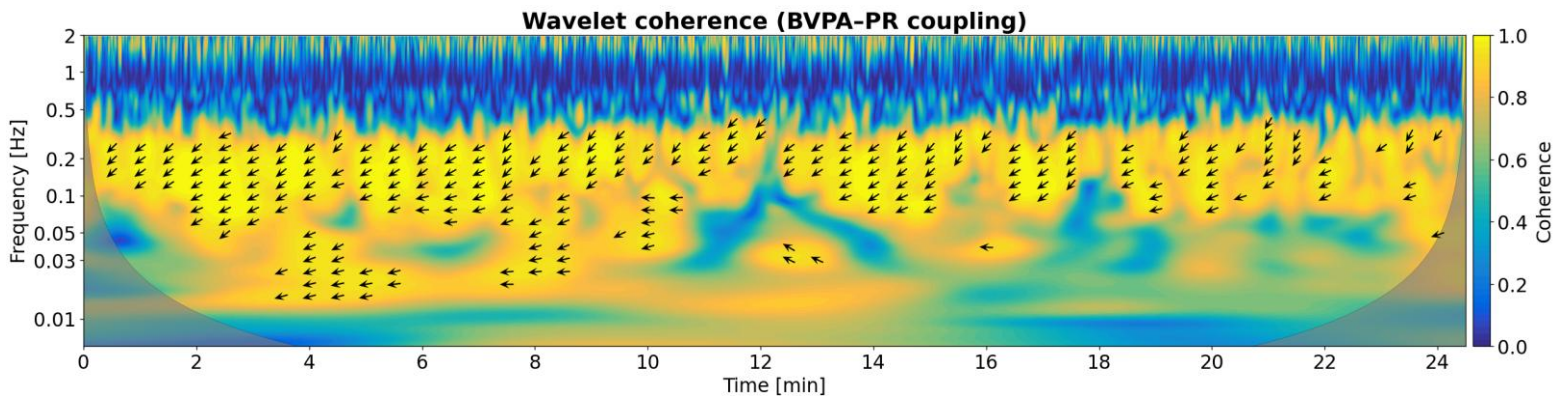


# Unlock hidden Physiology in functional Near InfraRed Spectroscopy

**Project type:** MSc thesis

**Goal:** Our goal is to empower researchers and clinicians to access information on brain vascularity and systemic physiology by providing a straightforward measurement setup. This will open up **new diagnostic possibilities**, address the **challenges posed by ageing societies**, improve our **understanding of brain physiology**, and **make neurovascular imaging more accessible**.



**Description:** functional Near InfraRed Spectroscopy (fNIRS) is a non-invasive technique that measures brain activity indirectly by tracking changes in hemoglobin concentration. Beyond reflecting neuronal activation, the fNIRS signal contains rich oscillatory components driven by cardiovascular and systemic physiology, many of which are still not fully understood.

This project aims to unlock this hidden physiological information. We will develop a signal-processing framework to extract cerebrovascular parameters (e.g., arterial oxygenation, compliance, and pulse pressure) from fNIRS signals. The study includes recordings from 100 healthy adults with simultaneous monitoring of multiple physiological signals.

**Keywords:** functional brain imaging; Neurophotonics; Bio signal processing; Brain vascular system

**Qualification:**

- Good self-organization
- Interest in (brain) physiology, basic biophysical knowledge and basic coding skills (Python, Matlab)

**Earliest start:** 20.04.2026

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[Link to a Drive folder containing details](#)