

Master 2 internship for 6 months

Context: Glycogen plays a crucial role in cardiac metabolism, with fluctuations in its levels directly impacting myocardial function. Glycogen storage disorders, often associated with mutations in metabolic genes, can lead to severe cardiac complications. Notably, glycogen storage cardiomyopathy has been linked to conditions such as atrial fibrillation (AF) and ventricular hypertrophy. Previous studies have highlighted glycogen's significant role in structural changes during AF, suggesting its involvement in arrhythmogenic mechanisms.

Objectives: The GEM-CEST project aims to launch a translational research initiative, bringing together teams specializing in pathophysiology and imaging to investigate cardiac glycogen content using Chemical Exchange Saturation Transfer (CEST) MRI and histology. The primary goal is to develop an innovative CEST MRI technique specifically optimized for detecting cardiac glycogen. This technique will be validated through its application to both fresh and ex-vivo cardiac samples. In parallel, histological and biochemical analyses will measure glycogen levels, establishing correlations between imaging results and actual tissue glycogen content.

Clinical Implications: This project addresses a critical need for non-invasive measurement of glycogen in cardiac muscle. By optimizing CEST technology, it aims to shed light on metabolic activities associated with early symptoms of cardiac arrhythmias, particularly AF. Furthermore, the project intends to use glycogen-based contrast to image the conductive Purkinje fibers within the heart, which are known to be glycogen-rich. This dual approach has the potential to significantly enhance our understanding of cardiac physiology, leading to improved diagnostic and therapeutic strategies in cardiovascular health.

Internship Mission: The candidate will play a key role in developing the post-processing pipeline, with a particular focus on data fitting and modeling. While the primary responsibility will be on post-processing and analyzing imaging data, there are also opportunities for collaborations on MRI scans at Bruker 9.4 T system. Additionally, the candidate may participate in histology work, contributing to the overall research process. The intern will be a member of the imaging team at IHU LIRYC, working alongside researchers and engineers to advance the cardiac MR techniques.

About IHU LIRYC: IHU LIRYC is a leading center dedicated to the study and treatment of cardiac arrhythmia, with a focus on the prevention and diagnosis of cardiac pathologies. On the MRI front, the institute is equipped with advanced imaging technology, including a 9.4 T pre-clinical Bruker and 1.5 T clinical Siemens MR scanners. These resources provide the platform for cutting-edge research in cardiac imaging.

Application Process: Interested candidates are invited to send their CV and a motivation letter to:

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