**University of Leicester**

**MRC AIM Studentship Project 2025-6 entry.**

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**Section 2 – *Project Information***

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| **Project Title** | Investigating regional changes in cardiac electrophysiology in heart failure using panoramic optical mapping |
| **Project Summary** | |
| Sudden Cardiac Death is a major unsolved clinical problem claiming 100,000 lives annually in the UK. The majority of these deaths are due to lethal heart rhythm disturbances called arrhythmias, often driven by abnormal autonomic nervous system function in heart disease patients. However, due to an incomplete understanding of the underlying mechanisms, there is no effective treatment or preventative therapy. A better understanding of autonomic function and cardiac electrophysiology is essential for the progression of clinical interventions.  The aim of this project will be to investigate the changes in cardiac electrophysiology as a result of heart failure and autonomic dysfunction. This will be explored using our new custom-built panoramic optical mapping system, which gives a 360° view of the heart and can record novel 3D data providing exciting new insights into heart failure and arrhythmia risk.  This project will enable the development of invaluable skills such as surgical skills, experience with *in vitro* preparations and advanced optical mapping techniques at the University of Leicester. This project is part of an exciting collaboration with the University of Birmingham with the opportunity to use innovative new software and produce novel data that will support the development of new clinical therapeutics. | |
| **References** | |
| 1. Chauhan, R.A., et al., *Functional selectivity of cardiac preganglionic sympathetic neurones in the rabbit heart.* Int J Cardiol, 2018.  2. O’Shea, C., et al., *ElectroMap: High-throughput open-source software for analysis and mapping of cardiac electrophysiology.* Scientific Reports, 2019. **9**(1): p. 1389.  3. Ng, G.A., K.E. Brack, and J.H. Coote, *Effects of direct sympathetic and vagus nerve stimulation on the physiology of the whole heart--a novel model of isolated Langendorff perfused rabbit heart with intact dual autonomic innervation.* Experimental physiology, 2001. **86**(3): p. 319-329.  4. Ng, G.A., S.M. Cobbe, and G.L. Smith, *Non-uniform prolongation of intracellular Ca2+ transients recorded from the epicardial surface of isolated hearts from rabbits with heart failure.* Cardiovasc Res, 1998. **37**(2): p. 489-502. | |