**University of Leicester**

British Heart Foundation Centre of Research Excellence

PhD studentship

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**Section 2 – *Project Information***

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| **Project Title** | Machine-learning directed plasma proteomics to develop a novel blood test for the diagnosis of spontaneous coronary artery dissection (SCAD) |
| **Project Summary** | |
| SCAD is an increasingly recognised cause of non-atherosclerotic AMI, predominantly afflicting young women with few conventional atherosclerotic risk factors. In this multidisciplinary cardiovascular sciences studentship, we propose to use machine learning tools in collaboration with the school of computing and mathematical sciences, to conduct a hypothesis independent approach to the identification of a diagnostic biomarker panel for SCAD, derived from a deep exploration of the human plasma proteome data from the University Van Geest multiomics facility at the Hodgkin building. For this biomarker-development phase we will use existing biobanked cohorts of SCAD, age-gender matched healthy volunteers and non-SCAD ACS (UK SCAD, *Swiss SCAD and InterSCAD SPUM-ACS*). We will using high-definition mass spec instruments with ion mobility   e.g.  Waters G2S, Bruker timsTOF and thermo Orbitraps which give up to 6000 proteins per run, using different matrices which are non-overlapping. These can identify half the known proteome quite easily (not including post translational modifications). These will be analysed with state-of-the art machine learning strategies. Candidate biomarker(s) identified using these omics strategies will be taken forward for prospective validation in patients recruited to the APT-SCAD clinical trial and relevant controls.  The student will develop interdisciplinary skills in laboratory science, clinical science and machine learning.  The student will benefit from support from existing funds (BeatSCAD) to support additional proteomics consumables above the standard available studentship funds and from support from our BHF Special Project Grant funded academic partnership (Adlam, Webb, Nelson, Ng) and associated funded post-doctoral ECR scientists with relevant experience (McVey, Saxby, Solomon).  Our research will continue to be conducted in close partnership with our patients both in the UK (<http://beatscad.org.uk/>) and Europe (https://www.rareconnect.org/en/community/spontaneous-coronary-artery-dissection). | |
| **References** | |
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