University of Nottingham
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Precision Imaging Beacon of Excellence
Studentship Form

Supervisor	**Professor Penny Gowland** (40%) School of Physics and Astronomy **Professor Ian Hall** (20%) **Dr Mike Barlow** (20%) **Dr Andrew Prayle** (20%) School of Medicine		
Start date	September 2018	**Duration**	3 years
Project	**Developing a multi-modal MRI approach to precision medicine of lung disease**		
Abstract	There is a pressing need to be able to detect changes in lung structure and function with increased sensitivity compared to standard methods, in particular CT imaging. This will allow precision medicine: earlier diagnosis and monitoring of response to treatment at an individual level. Nottingham has unique infrastructure that can allow novel, simultaneous assessments of pulmonary function and structure. Function: state of the art conventional MRI scanners with UTE, OE-MRI and elastography capabilities, 129Xe and 83Kr hyperpolarization technologies, and the first upright MRI system with the potential for multinuclear capability. Upright MRI provides a unique opportunity to study participants in different positions which is essential for fully exploring pulmonary mechanics, but its technical capabilities are somewhat limited compared to conventional MR scanners. Therefore a first priority will be to define the technical limits of the upright scanner and thereby develop protocols to exploit its capacity to explore pulmonary function. A further goal will be to implement multinuclear capabilities on that scanner. The impact of posture upon lung structure and function is yet to be studied with MRI. After protocol development, this project will compare structural and functional lung imaging modalities in different positions (upright vs lying down) in healthy volunteers and specific patient cohorts. This project will involve a new multi-disciplinary collaboration between of clinicians and physicists to establish a comprehensive protocol for studying airway, parenchymal lung pathology and respiratory muscle disorders. This PhD will suit a physicist, biomedical scientist or computer scientist, and depending on the interests and skills of the successful applicant, it will involve developing MRI protocols and capabilities, and performing studies in volunteer and patient cohorts. The project is significantly aligned to the Beacon in Precision Imaging as it will develop and evaluate new imaging biomarkers for lung disease. For the longer term, this project will build capacity in use of the Paramed system, MRI sequence development and lung imaging. For a PhD student, this multidisciplinary project will provide training in development of a range of MRI measurements and running clinical trials with clinical teams in a critical care environment. **We seek a student in the Physical or Biomedical sciences with a first or 2 (i) for study for a PhD on a new project to develop multi-modal MRI techniques for imaging the lungs.** You will be joining a multi-disciplinary team of clinicians and physicists developing this unique MRI system that will enable clinicians to study lung function in a range of patient cohorts as a function of patient orientation and the effects of posture on lung mechanics.		

	You will develop novel MRI techniques and analysis approaches and interface with the various clinical teams. You will gain skills and experience in working at the cutting edge of MRI and clinical research projects. The project will give the student unique assess to a broad range of physical and clinical sciences and exposure to working in a clinical environment.
Queries	Please contact **PI-Beacon@nottingham.ac.uk**
To apply	Please apply online via **the University of Nottingham application page**