

Project Title	Lowering costs of super-resolution imaging by developing expansion microscopy
Supervisor	Dr Julien Vermot
Theme(s)	Molecular and Cellular Bioengineering Regenerative Medicine and Biomaterials
Project Type	Lab based
Project Description	<p>Primary cilia are essential cellular organelles involved in cardiovascular development and cardiovascular diseases. Primary cilia ultrastructure remains difficult to assess even though it is clear that pathological cilia function stem from abnormal organisation. Super resolution imaging is a key method for imaging primary cilia ultrastructure. Nevertheless, it requires complex labelling methods and expensive microscopes.</p> <p>Expansion microscopy (ExM) is a recent and innovative imaging method based on the physical expansion of biological samples, with the aim to reach super-resolution precision with conventional light-microscopes available in most biology laboratories. The principle is that the specimen of interest (isolated organelles, cells, pieces of tissue, etc.) is embedded in a swellable hydrogel that will physically expand upon water addition. The physical expansion therefore increases the distance between molecules physiologically close to each other, that cannot be distinguished with regular light microscopes.</p>