Project Title	Speedy Spectroscopy - investigating new ways to speed up vibrational spectroscopy
Supervisor	Dr Christopher Rowlands
Theme(s)	Biomedical Sensing Diagnostics and Imaging
Project Type	Lab based
Project Description	Raman spectroscopy is an analytical technique which provides a wealth of information about a sample, allowing identification of molecules and even diagnosis of diseases (especially cancer). It requires no labelling of the sample, is extremely specific, and applicable to almost any compound imaginable. Given these virtues, it is fair to ask why it is not more ubiquitous in medical diagnosis, and the answer is that it is painfully slow. Spontaneous Raman microscopy takes around a second to collect even a low-quality spectrum, and this is simply too slow as a tool for mapping tissue, or screening cells. Finding a way to speed the process up would be ideal. In this project you will be exploring techniques to speed up Raman microscopy, for example by using parallel excitation, light-sheet imaging, electron-multiplying CCDs, high-power lasers or high-performance signal-processing methods. Some useful skills might include programming hardware devices / signal processing algorithms, optical alignment or precision machining, but these are not required, and the requisite skills can be taught.