

Project 2A/B: Automated control of stage movement and image capture on a 3D printed Raspberry Pi based microscope with a PS3 Controller.

Supervisors: [Ilan](#) / [Douglas](#) / [Ian](#) / [Mick](#) / [David](#).

Project description: Modifying and developing functionality in Python on our Raspberry PI (RPI) based automated 3D-printed microscopy (Microscopi). The setup has a “mobile phone” type CMOS camera for HD still and video capture and stepper motor focusing and stage movement, using hobbyist equipment that is highly affordable.

Goals: In the project you will be tasked with modifying a stepper motor controller for automated focusing of a 160mm microscope using a raspberry PI (or an arduino as an alternative). Identify problems associated with the inaccuracy of the motor, including skipping steps and lack of feedback control. Propose and if possible begin to implement a method to overcome the inaccuracy. Furthermore, time permitting, you will design and implement a stitching algorithm initially in 1D to make a tiled larger image from individual overlapping image, eventually taking into account motion errors.

Skill Set: Python programming; Image analysis (in Python); integration of hardware and software; control of hardware components (motors).

Day-to-day supervision:

[Ilan Davis](#) / [Ian Dobbie](#) for Hardware. [Douglas Russell](#) for Software.

[Advice from David Pinto on Image analysis algorithms.](#)

Friday Demo: Driving OMX with python (Micron) [Ilan/Mick/Douglas](#)

Presentation Goals:

Describe the existing system and characterize its errors and limitations

Describe the characteristics of a system you would aspire to build finally using similar hardware

Describe the goals of the project achieved and how they were achieved

Describe a vision for how you would build a better system in the future with improved performance including the kind of budgets required.