Placement at the Structure & Motion Laboratory by Jennifer Bramley

I graduated with a Mechanical Engineering degree from the University of Bath, in 2013, and am currently in the final year of the Scientist Training Programme (STP) working towards becoming a Clinical Engineer. I am based at Swansea Rehabilitation Engineering Unit (REU) studying for my MSc in Clinical Engineering and working mainly in specialist seating, medical engineering design and gait analysis for my specialist training. As part of the STP an elective placement can be carried out to gain a wider understanding and experience of healthcare science and research. For this I spent one month working in the Structure & Motion Laboratory at the Royal Veterinary College (RVC).

While on placement I observed the manufacture of tracking collars that are used in the LOCATE project, and learnt all about their operation. This project is researching the locomotion, hunting and habitat of large African carnivores and their prey. Unmanned Air Vehicles (UAVs) are flown above hunts taking photographs at regular intervals in a process called surveying. I helped PhD student Richard Harvey input photographs of hunts onto software to combine them all together and create a 3D model of the terrain and environment in which the hunt took place.

My main project was the design of a device to weigh mice, with Dr Ben Smith. Research into the effects of ageing using mice in a centrifuge (an increased gravity environment) is being carried out and it is important to be able to monitor the weight of the mice while in the centrifuge. I first tested the feasibility of an initial concept Ben had already begun exploring; a tube attached to a potentiometer so that when the mouse entered the tube, the resistance of the potentiometer would be adjusted by an amount relative to the weight of the mouse. This idea was found not to be feasible due to friction of the potentiometer and the weight of the tube not enabling a suitable resolution of weight measurement or a return mechanism. A second concept, utilising a load cell from miniature scales, was developed by programming an Olimexino STM-32 development board so that on identification of a mouse, using radio frequency identification, a signal would be sent from the load cell and converted into a weight. Parts were designed on Computer Aided Design (CAD) software and manufactured using a 3D printer.

Left: Initial Concept, Middle Left: CAD hardware, Middle Right: 3D printed parts, Right: Completed parts and electronic components

I thoroughly enjoyed my placement at the Structure & Motion Laboratory. I found the work interesting and relished the challenges and excellent opportunities to try something completely different that I have not yet had much experience of. I learnt numerous new skills including electronics, programming of development boards and 3D printing. I was able to gain a feel for how research projects are carried out from talks on “Science Mondays” about a large variety of subjects including how chickens feed, how to publish journals and giraffe gait. There are so many different projects being carried out and the people at RVC were very accommodating and keen to answer questions and share their research. Socialising was also a big factor with ultimate frisbee sessions and board game evenings.

This experience will support me moving forward in my training by helping me to think outside the box and has also enabled me to gain confidence in tackling new projects. It has also inspired me to purchase an Arduino development board for home projects and use in my MSc project. I hope to be able to utilise my new skills and knowledge to aid projects and research during the remainder of my Clinical Scientist training and future career. Thank you to everyone at the Structure and Motion Laboratory for making my placement really enjoyable. Particular thanks goes to Chris Buse and Steve Amos for lots of help with programming and electronics, Dr Ben Smith for help with the mouse weight measurement project and Dr Oliver Dewhirst and Richard Harvey for explaining all about the LOCATE project and how data is obtained, processed and analysed.

Me working at the Structure & Motion Laboratory