

UROP: Undergraduate Research Opportunities Programme

A Personal Perspective by Bruce Weaver

Bruce had just completed the second year of an undergraduate degree in physics, and embarked on an UROP research experience in the summer of 2015 in the Department of Earth Science and Engineering.

Placement Title: Design, Build and Test Measurement Instrumentation in a Three Phase System

This summer I undertook a UROP project designing, building and calibrating a piezoelectric strain sensor for measuring fluid velocity fluctuations in a flotation tank. The project was carried out in the Rio Tinto Centre for Advanced Mineral Recovery, part of the Department of Earth Science and Engineering.

I decided I wanted to do UROP at the start of second term and applied to a number of placements within the physics department with little success. Around this time a friend of mine who was doing a PhD in the Rio Tinto Centre mentioned that he and his colleague were looking for a UROP student who could work with electronics. As I had done electronics in first year I sent them my CV and they accepted me in late February.

A week before the project started I was given a safety induction and an outline of my objectives. I was also given several papers and a PhD thesis to read, which formed the basis for my project.

My project had two main elements, writing the software to acquire and process data from the sensor and the calibration of the sensor. The software writing involved learning to program in LabVIEW and implement signal processing techniques such as Fast Fourier Transforms. The calibration require the design and construction of a mechanical device, which I designed in CAD and manufactured using a laser cutter and 3D printer. Designing and modifying the calibration device presented me with a completely new set of challenges as, being a physics student, I had not been required to design anything in my degree.

I enjoyed the project a great deal, it was challenging and very different to what I have done in my degree. I found scientific research, while at times frustrating, to be interesting and rewarding. I particularly enjoyed being part of a group which employed both theoretical and experimental techniques to solve real world problem, and I will definitely be looking into working in applied physics and engineering in the future.