

# Reflective Diary 8 Week Ogden Internship Placement Summer 2016

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Prior to starting my placement I'd heard of Daresbury labs in passing conversation with my professors at university. They would every so often explain that they had a project running there but to be completely honest, I didn't have a clue what to expect. After speaking with my supervisor Tom over the phone, he arranged me to come visit the lab for a brief tour and to familiarise myself with the bus route from Liverpool City to Daresbury. The lab looked so vast and impressive to me and as a full time student who had never seen equipment to this scale up close, I was completely in awe and very excited to start.

The time passed quickly and before I'd realised, my start date was upon me. As I packed my lunch and set off from my flat I began to feel little apprehensive about the unknown that was to come over the next 8 weeks. Upon arrival at Daresbury Labs I was greeted by Tom and a much needed Costa coffee after my early morning commute. Chatting with Tom about what interested me and what I would most like to get out of my time there over coffee put me at ease. I was shown to the office I would be sharing with my secondary supervisor John. John was based mainly in the lab and by sharing his office I was to be spending the majority of my time working alongside him. I was glad about this as we got on well from the beginning, sharing similar interests and an easy going personality. After spending the majority of my first day gaining access to the online systems at Daresbury I was all set up in my office and ready to get stuck in to my first week.

The Vacuum Support group that I was based within provide vacuum assistance to other groups and their associated vacuum systems on site at Daresbury Laboratory. Part of the support work supplied involves vacuum pumping, leak testing and fault diagnosis of vacuum accelerator systems such as CLARA (a new compact linear accelerator), ELI-NP (a new high powered laser project being constructed at Daresbury Labs for Romania with applications into Nuclear Physics research), VELA (Versatile Linear Accelerator) and ALICE (Accelerators and Lasers in Combined Experiments). Coming from a Physics background myself, I couldn't wait to get some hands on experience with some of these fantastic world leading projects. As luck would have it, there had just been a delivery of Ion Pumps delivered for ELI-NP which needed testing before being shipped to Romania, this would be my first job and there were at least 3 pallets full! I had to unpack each pump and check

that its base pressure reached a threshold level. It was tiring work as these pumps were moderately heavy but I stuck with it and before I knew it I had tested the lot.

My next task was something that I would be spending most of my day to day time doing, processing general hardware through the cleaning process with John and Tom. This was something I found very enjoyable as each job was very different in how it needed to be assembled and which approach needed to be taken. In order to suitably prepare hardware for UHV (Ultra High Vacuum) it needs to be cleaned to remove any surface contaminants. The general process after assembling the components consists of a manual clean with de-ionised water, then an intense vapour clean by a solvent plant, an extended submersion within an Alkaline bath and finally the hardware was to be dried within a drying cabinet to evaporate any excess water. With more durable metals, this process must be followed by a 250 degree bake to properly clean the surface. As the Vacuum Support group must cater for a wide variety of experiments, there were always a wide variety of jobs that required processing so it was easy to keep busy. Another aspect of this work that I found particularly enjoyable was leak chasing. Whenever equipment had been assembled and was to be baked, before being pumped down to a UHV all leaks needed to be eliminated. Leaks may arise from a gasket not sitting correctly or bolts not being tightened completely, but when dealing with an assembly with multiple joining facets these leaks can be notoriously difficult to find. The method which is employed is to spray gaseous Helium onto an exterior joint of the assembly whilst a mass spectrometer is connected in series with the pumped system. If Helium is subsequently detected, then one of the possibly leaks is assumed to be isolated and may be sealed. I spent many hours with John chasing multiple leaks on a few different jobs, many times going around in circles so to speak due to the tricky nature of helium - it was a very entertaining experience.

During the following weeks I had the opportunity to meet and work alongside various people on site at Daresbury Labs. I worked with an Engineer Wyn who built and raced motorbikes from his garage! Everybody that I had the pleasure of meeting was very friendly and welcoming. I felt my work was appreciated and that I was making friends both at work and at the Gym - I also had the chance to meet useful contacts within my area of expertise (Nuclear Physics). A few weeks in, Tom discovered a co-worker Mark that was commuting from Liverpool to Daresbury each day. My 1.5 hour commute by bus was then reduced to a 40 minute car ride. I got to know Mark well and was very appreciative of the assistance he had kindly given me getting to the lab.

During the internship I faced many challenges which required me to act independently and think of creative solutions for unconventional problems. It was an awesome experience and I am hugely grateful to the Ogden trust for providing me the opportunity to work at such a prestigious and world-leading establishment. The placement has reaffirmed my ambition to pursue a career in Physics. As I prepare to start my PhD in Nuclear Physics at The University Of Liverpool in October I am confident that I am on the right track to getting to where I want to be, and hopefully one day I may have the opportunity to return to Daresbury Labs further on in my career.