

UROP Student Perspective – **Xiao Yuan Wang (Summer 2018), Chemical Engineering**

I started searching for a UROP in the October preceding the summer, noting down the research groups in my department whose themes particularly interested me. Professor Andrew Livingston agreed to offer me a placement following a discussion in December and with his help, I was also awarded an EPSRC vacation bursary via the College's UROP bursary scheme.

As a chemical engineering undergraduate going into the third year, I was particularly keen to learn how the theory taught in lectures was put into practice in the research environment. The UROP placement offered the perfect opportunity to do just that, as well as exploring the possibility of pursuing further research after graduation.

The objective of my 8-week placement was to investigate into the impact of corrosion on oligonucleotide drug synthesis by conducting static and dynamic corrosion tests, which took place in the main synthesis laboratory. Once the sufficient preparation was completed, I collected the samples, which were in turn tested in the analytical laboratory.

Whilst working through the tests, the process made me really appreciate the importance of thorough preparation, as it makes way for a generally much smoother experimentation process. Before even stepping inside the laboratory, it was essential that I completed the necessary background material, pass the Risk Assessment Foundation Training course, plan my experiments and compose the activity and chemical risk assessments. Deceptively simple activities such as weighing out solids, measuring out the correct volume of liquid to use and extracting samples with a syringe proved to be delicate procedures requiring much finesse and patience. As a result, as I progressed through my UROP, personal efficiency in performing such tasks improved considerably. It was also wonderful to have the chance to use new facilities and apply new forms of complex analytical techniques, as well as analysing and processing the data afterwards.

In addition, initiating active inter-departmental communication proved to be invaluable in furthering my progress in research alongside working through the reading list. It was imperative that I communicated regularly with my day-to-day supervisor, Jack Cordrey, and others who also worked in the laboratory, especially when I was unfamiliar with the experimentation process or struggling with the theoretical analysis. This really helped me to push my research into exciting new areas within a secure environment.

Alongside my project, I was also involved in conducting a Hazard and Operability (HAZOP) study on a Piping and Instrumentation (P&ID) diagram of the oligonucleotide drug synthesis rig. This involved breaking down the P&ID into sections, identifying the potential hazards of each section and suggesting methods to mitigate them. Conducting HAZOP has instilled within me a great breadth of skills via a series of complex tasks. This included evaluating all the possible problems that could occur on a chemical plant, the initiative to think outside of the box, and my problem-solving skills were further developed; I had to research the functions of various process equipment and valve types independently before making judgements as to how they could possibly mitigate the hazards identified. I also had the privilege to communicate my findings via a technical report upon the conclusion of my UROP, delivering a presentation summarising my experience to the whole research group.

Despite the challenges and struggles that came up now and then, the UROP has been an incredibly rewarding and an amazing learning experience overall. Alongside the development of valuable personal skills such as time management and communication, my perspective on real, potentially life-impacting research has changed considerably - the patience and intellectual tenacity required to successfully see through the complex experiment preparation and procedures have been humbling and inspiring, and the experience will stay with me regardless of what I choose to concentrate on career wise in the future.

On a final note, I would like to give my profound thanks to Professor Livingston for offering me the chance to integrate with and work in the research group, to Jack Cordrey for his constant time and patience throughout the entirety of the project and to the whole research group for their ceaseless enthusiastic and warm support