

IET Travel Award Report 2018

**Research Placement with
Patient Safety Informatics Group,
Centre for Health Informatics,
Australian Institute of Health Innovation**



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I am a final year trainee on the NHS Scientist Training Programme specialising in Clinical Informatics, and working within Medical Physics and Biomedical Engineering at University College London Hospitals (UCLH) NHS Foundation Trust. As part of my training, I undertake a part-time MSc at The University of Liverpool, and have the opportunity to organise a short elective placement. For this placement, I wanted to undertake research that would build on my existing skills, introduce me to new ones, and allow me to bring back new experiences to my work in the UK.

Fortunately, through a collaborator, I was able to approach the Director of the *Centre of Health Informatics (CHI)* at the *Australian Institute of Health Innovation (AIHI)*, *Macquarie University* and subsequently secure a placement as a Visiting Scholar with the *Patient Safety Informatics* group.

Background

My time with CHI built on work being undertaken as part of MSc, so a little bit of background is first needed to set the context for the work. For my MSc project I am working with a Primary Care Safety Researcher/GP at Cardiff University and a Machine Learning researcher at the University of Edinburgh to automatically analyse and classify free-text NHS patient safety reports for attributes such as type and severity.

Patient safety is predicated on understanding why errors occur, and using these insights to redesign care processes in a systematic manner in order to reduce/mitigate future risk to patients. Manual analysis of this data requires expensive, trained analysts who extract the information locked in unstructured free-text fields. This means that these methods cannot easily scale from research institutions to healthcare organisations, so automatic approaches are needed for a robust solution. My MSc work focuses on developing a systems level solution through the application of natural language processing and machine learning techniques. This work is facilitated by a large labelled dataset held by Cardiff University.

Core Placement: Work with CHI

The CHI Patient Safety Informatics (CHI-PSI) group that I worked with had specific prior expertise in developing classifiers to analyse incident report data, but limited access to the labelled data that is so vital for machine learning. There was therefore scope for an international collaboration between the Cardiff University and the Macquarie University groups.

My focus whilst there was to evaluate whether machine learning models developed on Australian data could perform well on NHS data without prior fine tuning, and to identify challenges to working together in the future. Practically this involved integrating with the CHI-PSI team, learning their development processes, understanding how they'd constructed their classification models and how they went about conducting performance analyses. From this I was able to modify their code to run against NHS data (securely on a remote UK server) and generate predictive results that we could look at (e.g. a prediction of what kind of incident occurred). This is now forming the basis for a continuing collaboration between the UK and Australian groups.

It was an interesting and challenging experience having to rapidly get up to speed with someone else's work, and then explain and apply it to my own. I gained substantial knowledge around patient safety informatics, the details of which I can directly apply to my core MSc work. This was in addition to many more technical and non-technical skills.

For example, I found that the classification schemes that the two groups used to describe incident types varied greatly making systematic comparison of results difficult. I also encountered the difficulties in collaborating across such a vast geographical and time difference; and I certainly feel that I learnt a lot about the importance of effective communication and good project management. These things that are always important, but essential when there's an 11 hour lag on communications and only so many weeks for the project.

Other AIHI Activities

Not all my time at the AIHI was spent working on the project; I also made an effort to speak to as many researchers, healthcare professionals, and software engineers that I could, and attended seminars and talks by academics conducting research in a range of health innovation spaces.

This included fields such as health surveillance through social media, assessment of digital symptom checkers, and how to systematically analyse the medical literature. It was eye opening to talk about the impact of technology on the present and future of healthcare with world leaders such as A/Prof. Farah Magrabi and Prof. Enrico Coiera - I am extremely grateful to them for their time and support.

Australian Hospitals & Healthcare Informatics

During my time at the AIHI I found that there was interest in what my role at home as a Trainee Clinical Scientist specialising in Informatics entailed, and how Healthcare Scientists fit into the NHS. This led to me being asked to deliver a presentation to the Centre for Health Informatics on my training and how Clinical Informaticians, Biomedical Engineers, and Medical Physicists are involved. It was interesting to hear that there was no equivalent structured pathway for scientists/engineers in the Australian health systems, and it made me feel very appreciative of the opportunities for STEM in the UK.

In order to better understand the differences and similarities between where I work, and informatics in healthcare in Australia I arranged a couple of visits to informatics departments in hospitals there. Having had conversations with informatics leads at Macquarie University Hospital, Sydney and The Alfred Hospital, Melbourne, it was interesting to see that they're facing similar challenges around how to effectively use hospital data to improve patient outcomes, whilst also considering information governance and data privacy concerns.

Conclusions

I am grateful to The IET for their assistance through the Travel Award, without which it would have been extremely difficult for me to have made such a long trip. The IET's funding allowed me the opportunity to extend the work that I'm undertaking for my MSc project to an international stage, gain knowledge from experts in the field, develop myself professionally and kick-start a joint project between my collaborators in the UK and those in Australia. I also met, worked with, and learnt from so many intelligent and kind people, as well as made friends and contacts who I'm sure to meet again further along my career. The skills that I gained, both technical and professional, are directly relevant to my work back in London, and hope will help me become a better engineer, researcher, and team member.