KIT

(PART 2) ELECTIVE REPORT BY VIVIENNE KIT (HA09124@QMUL.AC.UK)

ADAPTIVE OPTICS RETINAL IMAGING AND SCANNING LASER OPHTHALMOSCOPY

INSTITUTE OF OPHTHALMOLOGY / MOORFIELDS EYE HOSPITAL (LONDON, UK)

Elective dates: 6th May – 30th May 2014

Supervisors: Dr Adam Dubis & Mr Michel Michaelides

Supervisor contact: a.dubis@ucl.ac.uk / Michel.michaelides@ucl.ac.uk

Learning Objective: Explore Ophthalmology Research as a future career

Having spent the first part of my elective placement in a clinical setting at Keio University in Tokyo, I was looking forward to experiencing a research themed elective component back in London, at the Institute of Ophthalmology and Moorfields Eye Hospital. In view of the fact that I have not been involved in research for a number of years, and nor have I ever heard of adaptive optics, this was an exciting experience!

Adaptive optics was first used in astronomical telescopes; however owing to its ability to improve the performance of optical systems through reducing the effect of wavefront distortions, it has been implemented into retinal imaging systems. In conjunction with scanning laser ophthalmoscopy, together they form an important method of assessing the retinal microvasculature, retinal pigment epithelium, blood flow, and of significance to my elective placement, its ability to detect photoreceptors.

Prior to its use, the means of assessing the viability of the individual photoreceptor cells of the eye, was performed post mortem or post enucleation; requiring the eye to be fixed in formaldehyde and

examined by microscope. The new development of adaptive optics has enabled high resolution images of the single rods and cones in the living human eye to be resolved and captured.

This was a fantastic elective placement, as not only did I have the opportunity to learn how to montage a retinal image, but I was soon also involved in the imaging and assessments of patients with a number of genetic eye conditions, such as Stargadt disease and Retinitis Pigmentosa.

Having learnt about, and seen images and scans from OCT, microperimetry and the OCTOPUS whilst at medical school, I was enthusiastic to learn how to operate these machines. During my placement, my supervisor trained me on how to operate these imaging systems, and gave me the opportunity to perform these on patients; along with assessing visual acuity, contrast sensitivity and chromaticity in patients, with the use of a snellen chart, pelli-robson chart, and an isochromatic test respectively. Furthermore, I also learnt to use the adaptive optics imaging system, and even had a first-hand experience of being imaged.

This was not only a steep learning curve, as the entire concept of adaptive optics was entirely novel to me, but it was also interesting to experience research, and observe the level of planning, work distribution and team work required to form a cohesive working research environment. Additionally, having never been in an ophthalmic research setting, I was rather unaware of the literature available in this area. However my supervisor soon shared interesting papers, and taught me how to critically analyse such papers. In honesty, I find critical analysis of journal publications rather difficult, but through our group discussions, I appreciated its necessity, and feel that to develop myself further, it is important to actively critique journal publications.

To this day, as I am writing this reflective report on my experience, I am still continuing to learn new techniques and concepts on a daily basis; this truly reflects on the rapidly expanding field of adaptive optics, and really has captivated a new found passion of mine, to explore this field as a possible future career.

I am really grateful to be taught a number of techniques, and to be accepted onto the team. It has been a great learning experience, not only in how to image patients and how to process these images, but most importantly and in keeping with me learning objective for this elective placement, I learnt how to be a scientist. Having spent the last 5 years at medical school, clinical medicine has been the basis of my education, and I think it is safe to say, that this elective placement has thrown me into the deep end, and has given me a whirlwind experience of research in ophthalmology. I have truly enjoyed this placement, and have made some good friends, and hope to continue my research experience with the team beyond my elective placement.