

Student Elective Report

Name	Waheed-UI-Rahman Ahmed
Medical School	Year Three Medical Student, University Of Exeter
Email (optional)	

Country visited	United Kingdom
City or town	Oxford
Hospital/unit/clinic	University of Oxford, Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences (NDORMS) Nuffield Orthopaedic Centre, Oxford University Hospitals
Dates visited	Wednesday 27 th June 2018- Saturday 1 st September 2018 (9 ½ weeks)
Supervising doctor	Professor Dominic Furniss Mr Akira Wiberg
Contact details of your host:	University of Oxford, NDORMS

Please give an overview of what you saw / did	<p>For my summer research placement, I visited the Furniss Group, based at NDORMS at Oxford University. This is the largest musculoskeletal (MSK) research centre in Europe, which brings together surgeons and basic scientists to undertake basic and translational research into MSK diseases. Within NDORMS, the Furniss Group principally investigate the genetics and epidemiology of common hand conditions.</p> <p>During my time with the group, my main project was focussing on investigating the genetic basis of varicose-veins (VV). This is part of a larger study looking to establish the shared genetic architecture between carpal tunnel syndrome (CTS) and other diseases of elastic tissue such as VV and hernias. To date, the genetic aetiology of VV is poorly described. My primary role was carrying out a genome-wide association study (GWAS) of VV using UK Biobank data to delineate common genetic variants that predispose patients to VV. I learned fundamental skills in computational bioinformatics - such as basic programming in UNIX to enable me to navigate and manipulate a large dataset (>400,000 individuals), as well as tabulating summary GWAS statistics in a spreadsheet and studying different loci in depth. I learned various concepts and statistical methodologies used in genetics - such as quality control (QC), how to perform conditional regression analysis, functional mapping and annotation of GWAS results using a variety of computational tools. We discovered dozens of novel risk loci for VV, and are in the process of preparing a manuscript to submit to a journal.</p> <p>I was also involved in a genotype-phenotype correlation study of a CTS cohort. For this project, I extracted DNA from over 150 patient blood samples collected as part of the PiNS study (Pain in Neuropathy Study, REC No. 10/H07056/35), and we submitted these for genome-wide</p>
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	<p>genotyping on an Illumina array. In my original project proposal, the genotype-phenotype correlation was supposed to be my principal project, however, the project had not reached the stage where all the genotypes for the cohort were available. I learned valuable generic laboratory skills, and after leaving Oxford, I will help with the data analysis of this project, such as correlating genotype with phenotypic data such as electrophysiology and symptom severity scores.</p> <p>I was also involved with a subsidiary arm of the PiNS study to collect surgical tissue samples from hand surgery patients. I helped in the recruitment of participants and processing of tissue specimens for RNA extraction and histological staining. Thus, I got to experience the full spectrum of clinical research, from interacting with patients at the bedside, to processing their tissues at the laboratory bench. My previous GCP training was put to good use, and I learned about the importance of compliance with approved study protocols and HTA regulations.</p>
What were the best things about the visit?	<p>The highlight of my visit was experiencing what life as a full-time researcher is really like. As a medical student it is often difficult to get dedicated time to focus on a single project, to see it through from start to finish. This dedicated period of time in Oxford has been fundamental in teaching me what I can expect from a career in academic plastic surgery. I learned the importance of patience - nothing comes fast and results can take months! I learned how a research group works and how team work is central to this. I thoroughly enjoyed working with some truly lovely people, and I will continue working with the group remotely once I have gone back to Exeter University. I have obtained an honorary research assistant contract to allow me to do this.</p>
What problems did you encounter?	<p>Running a GWAS is very complicated with multiple elaborate steps. I had to learn very quickly to go from essentially knowing very little about genetics to being able to get my head around complex genetics language and concepts. My biggest hurdle was using UNIX operating system, as I had no previous programming experience. Since my project was almost entirely computational, it was a steep learning curve as I had to very quickly pick up basic commands to enable me to manipulate large data sets. In addition to the teaching that I received, I watched YouTube tutorials and read programming forums in my spare time, which allowed me to eventually run and manipulate more complex scripts and graphically visualise data.</p>
What accommodation was provided?	<p>I arranged private accommodation as University accommodation was very expensive.</p>
Would you recommend this to someone else? (explain if necessary)	<p>Yes. Small projects at medical school are not representative of what a full-time researcher actually does. Dedicated time to do research is necessary to enable students to understand whether research is for them. I feel this experience has confirmed to me that I particularly enjoy research. Working with fellow researchers in a team to solve difficult problems is highly rewarding.</p>
Are you more likely to choose a career in plastic surgery as a result of this experience?	<p>Absolutely. I particularly enjoyed the chance to work with academic plastic surgeons to experience what academic research in the field is all about. This experience has shown me that I want to pursue a career in research, and I hope to carry out a DPhil in the near future.</p>