Child Health Research CIO

CHILD HEALTH RESEARCH CHARITABLE INCORPORATED ORGANISATION (CHR CIO)
PROGRESS FORM – VACATION STUDENT 2018

Student's name:	**Hiu Ying Agnes Lee**
Primary supervisor:	**Dr. Kiran Seunarine**
Subsidiary supervisor:	**Prof Chris Clark**
Project title(s):	**Modelling error in SEEG electrode placement for surgical planning**

Summary

What are you trying to do in this studentship?

I have applied to this studentship as I wanted to gain some actual research experience and to gain more insight about the field. I have been assisting Dr. Seunarine in his project about modelling error in stereo electroencephalogram (EEG) electrode placement for surgical planning. Stereo EEG is a relatively recent technique developed for epilepsy patients. In this surgical procedure, electrodes are placed into the patient's head, allowing the clinical team to monitor specific brain areas suspected to have caused seizures. Doctors will later determine whether to resect the epileptogenic zone, identified on the basis of the monitored stereo EEG results and other investigations, with the aim of abolition of seizures. The project focuses on analysing the differences between locations of the planned electrode paths and the implanted electrodes, in hope of better quantifying the error in electrode placement.

Why is this research important?

It was found that 90% of epilepsy patients have first time seizures before age 20 years, and 10-20% of them are either unable to receive drug treatment or are refractory to them. As intractable seizures have deleterious effect on development, resection surgeries are particularly helpful and important for epileptic children. Thus, this research focuses on paediatric patients. Another significant point is that children have thinner and softer skulls, which could easily decrease the accuracy and stability of electrode placements, resulting in more variability in the trajectory of implanted electrodes. Understanding more about the error in stereo EEG electrode placement will result in improvements in surgical planning by reducing the risk of electrodes being implanted into blood vessels and other danger areas and potentially giving the surgeon more freedom when planning implantation; hence, the outcome should be more accurate results to be used when carrying out resection surgeries on children.

Value of Your Experience

I found the studentship a very valuable learning experience. I have been able to work in a real research environment, alongside research experts of the field. I got to learn how research actually works, how researchers encounter all kinds of challenges, and have to solve issues one by one in order to continue the task. Throughout the studentship, I adapted to the habit of carefully observing all the obtained data in order to identify an issue and then try to find corresponding solutions. Sometimes it meant trying methods on simplified data sets or numerical phantoms to see if they functioned appropriately. I also familiarised myself with various 3D modelling computer software and basic command lines during the course of working on this project. I even had the opportunity to visit the scanners in the hospital and watch scanning take place.