Report for NENS training stay in the Clinical Imaging Sciences Centre of the Brighton and Sussex Medical School

Supervisor: Professor Hugo Critchley

After having obtained a NENS training stay stipend in 2008, I spent one month in Hugo Critchley’s laboratory in the Clinical Imaging Sciences Centre (CISC) at the Brighton and Sussex Medical School in April 2009. The aim of this internship was to design and pilot a study combining psychophysiological measurements and functional magnetic resonance imaging (fMRI) in the scope of my PhD. The main focus of my PhD is on aversive conditioning, and Professor Critchley has a great interest in the influence of the cardiac cycle on emotion perception. We therefore planned a study on the influence of the cardiac cycle on emotional learning processes such as aversive conditioning.

The CISC includes a 1.5 T scanner equipped with MRI compatible eyetracker, skin conductance, pulse oximetry and electrocardiogram (ECG) recording devices, as well as a behavioral laboratory allowing measurements of skin conductance, ECG, pulse oximetry and blood pressure outside the scanner. Furthermore, Professor Critchley and his team have a strong background in combining functional brain imaging with the monitoring of autonomic activity. All of this makes the CISC an optimal environment for this kind of multimodal studies.

Early during my stay, I acquainted myself with the relevant literature and discussed with lab members about possible paradigms to test effect of the cardiac cycle on aversive conditioning learning. After having developed a paradigm, I programmed it using Cogent. This was done with the help of two postdoctoral fellows, Marcus Gray and Ludovico Minati, allowing me to familiarize myself with this frequently used Matlab toolbox. Again with the help of Marcus Gray and Ludovico Minati, I learned how to use the devices in the behavioural lab for ECG, skin conductance and pulse oximetry recordings and how to synchronize stimulus presentation with precise moments in the cardiac cycle of an individual. I piloted the study on four volunteers, and analyzed the psychophysiological results adapting routines written in Matlab by the other lab members. The final step of my stay was to adapt this paradigm to an fMRI environment with the help of Marcus Gray. We scanned two volunteers on the last day of my stay.

This internship was a very valuable experience. I was able to integrate into a new laboratory and interaction with Professor Hugo Critchley and his team was highly stimulating. I also learned a great deal about ECG recording and analysis, a psychophysiological signal I had never worked with before. I also had the opportunity to attend several symposia in Brighton and Sussex University and to participate in a two-day meeting at the Royal Society of London with several world-recognized scientists.

In summary, this stay was a very fruitful experience during which I acquired important new skills and had the opportunity to interact with experts in multimodal imaging. It also led to an ongoing collaboration between Professor Critchley’s team and our lab here in Geneva as we are further pursuing the study that was developed during my stay in Brighton.