**Moreau Quentin,**

**3rd Year PhD Progress Report**

**PhD program in “Psychology and Social Neuroscience”**

**Curriculum in "Cognitive Social and Affective Neuroscience -CoSAN-"**

**Supervisor: Professor Salvatore M. Aglioti and Matteo Candidi**

1. **DATE** September 2017 to December 2017

**ACTIVITY: Data Collection and Data Analysis**

During these months, I collected data for a new EEG experiment. The experimental project was done under with the supervision of Dr. Matteo Candidi (Assistant Professor). We aimed at characterizing the functional role of the occipito-temporal Theta-band in the processing of body-part stimuli. Therefore, we recorded EEG data in 24 participants who were engaged in an identification task (Match-to-Sample) of hand and non-body control images (i.e. leaves). Besides confirming that occipito-temporal electrodes show a larger N190 for hand images compared to control stimuli, cluster-based analysis revealed a right occipito-temporal cluster showing an increased Theta power when hands (compared to leaves) were presented.

1. **DATE** December 2017 to February 2018

**ACTIVITY: Data Collection and Data Analysis**

During these months, I collected data EEG data. We aimed to explore whether the passive visual perception of pictures depicting different kind of hands’ movements would elicit different electrophysiological neural responses. Therefore, we recorded EEG data in 23 participants. Our hypothesis is that the visual perception of hands conveying social cues would generate a different EEG signatures than hands not providing any socially-relevant information. This was done under the supervision of Dr. Matteo Candidi, and in collaboration with Dr. Vanessa Era (post doc).

1. **DATE** December 2017 to February 2018

**ACTIVITY: Data Collection and Data Analysis**

During these months, I collected data for an EEG-Virtual reality experiment. With Dr. Gaetano Tieri (post doc), Dr. Vanessa Era (post doc), Dr. Matteo Candidi (associate professor) and Professor Aglioti, we designed a new Virtual reality paradigm in order to target what kind of cues do one use to understand others’ behavior. In order to do this, we developed an interactive Avatar which whom participants had to interact. We recorded the behavior and the EEG of 20 participants.

1. **DATE** October 2017 to July 2018

**ACTIVITY: Supervision of a Master student**

During these months, I trained and supervised Eleonora Parrotta for both EEG recording, preprocessing and analysis. She helped in recording and analysis two EEG experiments this year, as well as in the writing of two scientific articles. At the end of her training period, Eleonora got accepted to a PhD program in Plymouth (U.K).

1. **DATE** May 2018 to August 2018

**ACTIVITY: Writing and submitting manuscript**

Since the data from the experiment about Joint actions from my first two years showed interesting results, we started writing a manuscript in order to publish them on an international scientific journal.
On the 28th of August, we sent the manuscript to the preprint server BioRxiv. Since, the manuscript has been reviewed and rejected by PNAS and is about to be resubmitted to Journal of Neuroscience.

“Frontal and occipito-temporal Theta activity as marker of error monitoring in Human-Avatar joint performance.” Quentin Moreau\*, Matteo Candidi\*, Vanessa Era, Gaetano Tieri, Salvatore Maria Aglioti. *BioRxiv*

1. **ACTIVITY: POSTER PRESENTATION**
* **Moreau Q.,** Era, V Tieri G., Candidi M. *Prediction errors during interpersonal*

*motor interactions reveal frontal and occipito-temporal theta.* MeeTo. 25-27th May 2018. Turin.

* **Moreau Q.,** Era, V Tieri G., Candidi M. *Prediction errors during interpersonal*

*motor interactions reveal frontal and occipito-temporal theta.* CuttingEEG. 2-5 July 2018. Paris.

1. **ACTIVITY: since 1st of September 2018 : PERIOD ABROAD**

Since September 1st, I joined the Lab of Dr. Guillaume Dumas in Pasteur Institute. Guillaume Dumas is a young researcher who is interested in EEG neuromarker of Autism during social interaction. Dumas also is part of a team of Genetic and Cognitive Function of Autism under the Direction of Dr. Thomas Bourgeron. My goal here is to learn new ways of analyzing the EEG signal and work with Machine Learning statistics, in order to extract a maximum of information from the neuroelectrical signal. This will improve my computing and analyzing skills as well as enlarge my global vision of the field of social neuroscience.

**Moreau Quentin,**

**2nd Year PhD Progress Report**

**PhD program in “Psychology and Social Neuroscience”**

**Curriculum in "Cognitive Social and Affective Neuroscience -CoSAN-"**

**Supervisor: Professor Salvatore M. Aglioti and Matteo Candidi**

1. **DATE** November 2016 to April 2017

**ACTIVITY: Data Collection and Data Analysis**

During these months, I collected data for an experiment. The experimental project was done in collaboration with Dr. Enea Pavone (PhD) under with the supervision of Dr. Matteo Candidi (Assistant Professor) and Prof. S.M. Aglioti. We investigated motor interactions in real life contexts by recording simultaneously the action kinematics of participants engaged in cooperative tasks with a virtual avatar and their brains’ electrical activity with a Electroencephalography (EEG) system. Our experimental choices to couple EEG and kinematics recordings offers a great opportunity to study the dynamics of social neuromarkers at the body and brain level.

**IMPROVING COMPETENCES**

* Use of scientific software to record and analyze EEG, kinematics and behavioral data.
* Statistical analysis
1. **DATE** April – June 2017

**ACTIVITY: Writing and submitting manuscript**

Since the data from the experiment about Body Perception from my first year showed interesting results–we started writing a manuscript in order to publish them on an international scientific journal.
For this purpose, I went deeper in the literature on the topic of body perception, searching for and reading scientific articles through the online scientific database. On the 29th of June, we submitted the manuscript to European Journal of Neuroscience on the Special Issue “Neural Oscillations”.

**IMPROVING COMPETENCES**

* Write scientific manuscripts
* Going through the submission process for an international scientific journal.

**Reference. Moreau Q.,** Pavone EF., Aglioti SM., Candidi M.Early theta synchronization over occipito-temporal cortices during visual perception of body parts**.** *In review*

1. **DATE** July-September 2017

**ACTIVITY: PROJECT PREPARATION**

In these months, in collaboration with Dr. Matteo Candidi and Eleonora Perrotta (Master student), we designed a new experiment based on the results of the submitted paper. In the next experiment, we want the subjects to be involved in a match-to-sample task with 2 alternatives forced choice. The stimuli will be hands, arms, clusters of leaf or branch, and masking filters will be applied to the visual stimuli, in order to have erroneously perceived trials. This paradigm will allow us to compare EEG activity in correct and non-correct trials. The data collection will start in the first weeks of October 2017.

1. **DATE** July 2017

**ACTIVITY: EVENT ORGANIZATION**

I organized the “Joint Action and Social Coordination workshop” in Sapienza University, inviting Dr. Giacomo Novembre, Dr. Lucia Sacheli and Dr. Vanessa Era.

1. **DATE** July 2017

**ACTIVITY: TALK**

I gave a 40-minute talk about the data collected from November 2016 to April 2017 at the “Joint Action and Social Coordination workshop”.

1. **DATE** July 2017

**ACTIVITY: POSTER PRESENTATION**

* **Moreau Q.,** Pavone EF., Boukaras S., Tieri G., Candidi M. *Theta Synchronization as a marker of Joint action.* Joint Action Meeting 22-25 July 2017. London.
* **Moreau Q.,** Pavone EF., Candidi M. *Occipito-temporal Theta synchonization during Body-part perception.* SAMBA meeting 11-14 July 2017. Salzburg.

**ACTIVITY: CONFERENCE**

* Joint Action Meeting (JAM 2017) in the Royal Holloway University – London, England.
* Salzburg Mind-Brain Annual Meeting (SAMBA 2017) in the University of Salzburg, Austria.
1. **DATE** 14-18 June 2017

**ACTIVITY: Gerace Meeting, Gerace (Italy).**Multidisciplinary talks were presented during the conference. From body representation disorder (Xenomelia) to the relationship between odor disgust sensitivity and political orientation.
**IMPROVING COMPETENCES**

* Knowledge on body representation disorder
* Knowledge on olfactory mechanisms
1. **DATE** 26 May 2017

**ACTIVITY: Neuroscience goes Social Workshop, La Sapienza University of Rome**One day workshop with talks on social neuroscience held by important scientists of the field, such as Klaus Lamm, Giorgia Silani and Raffaella Rumiati.
**IMPROVING COMPETENCES**

* Knowledge of new perspectives on Social Neuroscience
1. **DATE** from November to October 2017

**ACTIVTY:** Lab meetings organization

During the whole academic year, I was in charge (with Vanessa Era) of organizing the lab meetings every months, inviting people from the lab and outside the lab to present their projects and data. I was also in charge of being the chairman during the presentations and leading the debates.

**IMPROVING COMPETENCES**

* Organizing skills
* Public relations with academics personalities

**Moreau Quentin,**

**1st Year PhD Progress Report**

**PhD program in “Psychology and Social Neuroscience”**

**Curriculum in "Cognitive Social and Affective Neuroscience -CoSAN-"**

**Supervisor: Professor Salvatore M. Aglioti and Matteo Candidi**

1. **DATE** November 2015 to March 2016

**ACTIVITY: Data Collection and Data Analysis**

**SUMMARY** During these months, I collected data for an experiment. The experimental project was done in collaboration with Dr. Enea Pavone (PhD) under with the supervision of Dr. Matteo Candidi (Assistant Professor) and Prof. S.M. Aglioti. The experiment was based on electroencephalogram (EEG) recordings during visual perception of body-parts and full bodies versus plants stimuli. I learned how to record and analyze EEG data in the Time domain and in the Frequency domain. The aim of the project was to investigate in the Frequency domain, the neural correlates of body perception, by focusing on activity in a cluster of electrode over the Extrastriate Body area (EBA) and explore the correlation between data from the event related potentials (ERPs) and event related (de)synchronization (ERD/ERS). I learned how to use the device and the software for the EGG recordings and I started learning how to use Brain Vizion Analyzer and Matlab with the Fieldtrip toolbox specialized for Time-Frequency analysis in order to analyze these data. Furthermore, I had the opportunity to run different statistical analysis and it improved my skills in this area.

**IMPROVING COMPETENCES**

* Use of scientific software to record and analyze EEG
* Statistical analysis
* Construction of a new research project.
1. **DATE** From March to May 2016

**ACTIVITY: Writing of a scientific commentary.**

**SUMMARY**

During these months, with the help of Dr. Matteo Candidi, I wrote and submitted a commentary on a scientific paper published in Frontiers in Psychology. The commented paper was claiming that one their experimental condition was a joint action. However, we thought that their experimental set-ip was not in phase with the scientific literature. We submitted the commentary to the same journal (Frontiers in Psychology) and got through the peer-review process. The commentary was accepted for publication on the 5th of June 2016.

**IMPROVING COMPETENCES**

* Write scientific documents: e.g. (commentary)
* Read and understand scientific papers.
* Develop a critical thinking on published scientific papers
* Learning more about peer-review process, answering to reviewers

**Reference:**

Moreau, Q. & Candidi, M. (2016). Commentary: Hand and Grasp Selection in a Preferential Reaching Task: The Effects of Object Location, Orientation, and Task Intention. *Frontiers in Psychology.* 7:1129. doi: 10.3389/fpsyg.2016.01129

1. **DATE** From May to October 2016

**ACTIVITY: Writing and reading scientific papers – submission of an abstract for a congress**

**SUMMARY** During the last months I started writing a paper and I started learning the processes required to publish scientific data in international peer-reviewed journals. The data and analyses performed from November to March turned out to be interesting and put into light a frequency-specific synchronization that differed between bodies and control (plants). Under the supervision of Matteo Candidi and Enea Pavone, I started writing the Methods section and we discussed together the results in order to organize the data presentation for the article. At the same time, I wrote an abstract and got accepted for a poster presentation of the same data at the XXIV Congresso Nazionale della Società Italiana di Psicofisiologia to be hold in Milan (27-29 October 2016).

**IMPROVING COMPETENCES**

* Write scientific documents (data article, abstract for congress)
* Read and understand scientific papers

**12. DATE** From May to October 2016

**ACTIVITY :** Project preparation

**SUMMARY**

In these months, I also started to prepare the future experiment. The recordings will start within October. The recordings will couple kinematics and EEG recordings, while a subject is interacting with an avatar in a joint grasping task. This project is challenging by its co-recording technique. Therefore, a long preparation is needed, in order to allow all devices to communicate and be synchronous with each other.

**IMPROVING COMPETENCES**

• Finding literature, Reading and understanding scientific papers;

• Planning experimental projects, stating hypothesis, methodology and future implications.

**5. DATE** From November 2015 to October 2016

**ACTIVITY:** Seminars

**SUMMARY**

During the year I attended different seminars organized by La Sapienza University and other Universities.

The disciplinary areas involved were different: Social Psychology, Social Neuroscience, Cognitive Neuroscience and General Psychology.

The Main Seminars were:

• Prof. Michael Hogg seminar

• Prof. Marco Iacoboni seminar

**IMPROVING COMPETENCES**

• Specific knowledge on different topics

• Public relations with other academic personalities

**13. DATE** from November to October 2016

**ACTIVTY:** Lab meetings organization

During the whole academic year, I was in charge (with Vanessa Era) of organizing the lab meetings every months, inviting people from the lab and outside the lab to present their projects and data. I was also in charge of being the chairman during the presentations and leading the debates.

**IMPROVING COMPETENCES**

* Organizing skills
* Public relations with academics personalities

**14. DATE** 12th of October 2016

**ACTIVITY:** Lecture

On this date I was offered to give a three-hour lecture about EEG Time Frequency analysis in the second-year Master course of “Cognitive Neuroimaging” (coordinated by Dr Matteo Candidi and Dr Gaspare Galati). During these three hours, I described the technique of Time Frequency to the students, giving them theoretical background, basic techniques, and illustrated examples from the coherent literature.

**IMPROVING COMPETENCES**

* Public speaking
* Data presentation
* Scientific vulgarization
* Teaching