





EUROPHOTONICS-POESII MASTER COURSE

PROPOSAL FOR A MASTER THESIS

Dates: April 1st, 2016 – September 30th, 2016

Laboratory : ICFO-Medical Optics Group City, Country : Castelldefels, Spain

Title of the master thesis : "How hard is your brain working?"

Name of the tutor of the master thesis : Turgut Durduran

Email address : Phone number : Mail address :

Summary of the subject (maximum 1 page) :

Functional near-infrared diffuse optical spectroscopy (fNIRS) and tomography allow for noninvasive measurement of cerebral oxygen saturation and blood volume which is a surrogate of brain function. In this project, the student will work postdoctoral fellows in the group to develop a prototype system based open-source and off-the-shelf opto-electronics, microcontrollers and embedded PCs. This will be coupled with a real-time, user-friendly display as well as descriptive materials. In the second phase of the thesis work, the student will demonstrate that the system is usable on measurements from volunteers using a protocol that he will develop in order to stimulate the frontal cortex of the brain. The student will prepare step-by-step instructions for construction and usage of this prototype alongside basic audio-visuals.

The research goals of this project will be: (1) to explore the utility of "maker culture components" for optical measurements of brain function, (2) to develop the basis of a system suitable for distribution to the masses for at-home use to develop a database.

This project is also educational. The educational goals are: (1) to provide the student with a solid background of diffuse optics and its utility in functional monitoring of the brain, (2) to develop educational materials that will be published online and on educational journals to disseminate this knowledge.

Keywords : functional brain imaging; medical optics; outreach & education.

Additional information :

* Required skills :

Numerical programming, hardware control experience, electronics experience.

* Miscellaneous :

This position is particularly suitable for students interested in pursuing academic or educational carreer in biomedical optics.