

Stage de master de physique / Physics Master Internship

Proposition de stage/ Internship proposal (1 page max)

Date de la proposition : 19/11/21

Responsable du stage / internship supervisor:	
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Nom du Laboratoire / laboratory name: Institut de la Vision	
Code d'identification : UMRS 968	Organisme : Inserm
Site Internet / web site: http://www.institut-vision.org/en/	
Adresse / address: 17 rue Moreau	
Lieu du stage / internship place: Institut de la Vision, 17 rue Moreau, 75011 , Paris	
Titre du stage / internship title: Development of an optimal two-photon holographic micro-endoscope for the optogenetic imaging and control of neuronal activity in deep brain structures.	
Résumé / summary	
<p>Optogenetics has revolutionised neuroscience by making it possible to control neurons with light. The current technological challenge lies in the field of optics and photonics as advanced techniques to precisely address hundreds of individual neurons in large volumes with high spatial and temporal precision are necessary to decrypt the neuronal code. Today, a major challenge to the use of light in neuroscience is scattering from biological tissues that prevents deep brain structures (deeper than 1 mm) to be studied.</p> <p>To overcome this limitation, in this project the student will work on a new class of optimal two-photon micro-endoscopes for the simultaneous imaging and optogenetic photo-stimulation of many neurons in large volumes in depth.</p> <p>Our group has been one of the main actors in developing advanced optical techniques for the study of neurons and neuronal circuits, mainly based on the wavefront shaping of ultrafast laser pulses and two-photon (2P) effects. This project aims at extend these techniques to the investigation of deep neural circuits. By precisely shaping ultrafast lasers in space and time, we will control light propagation through the micro-endoscope to maximise non linear optical effects at the desired locations in the brain. Proof of principle studies in vitro and in vivo, in collaboration with biologists in the group, will be performed to validate the new technique.</p>	
Ce stage pourra-t-il se prolonger en thèse ? Possibility of a PhD ? : Oui	
Si oui, financement de thèse envisagé/ financial support for the PhD: Fonds propres du laboratoire ou bourse ministérielle	