

Titre du stage: Decoding cortical activity evoked by artificial retinal implants

Durée: 6 mois

Dates envisagées: 01-03-14 au 31-08-14

Descriptif (15 lignes max): Recent advances in research opens up the possibility of partially restoring vision to blind patients using retinal prostheses. However, the way an electric stimulation activates the visual cortex is still poorly understood. The inViBE team has shown that a local electric stimulation of the retina evokes a cortical activity up to 10 times larger than what is expected based on the activity evoked by visual stimuli. This observed spread of evoked cortical activity is presumably due to 4 effects: (i) an electric diffusion at the interface made by the complex electrode-retinal tissue; (ii) a spread of electric activity induced by the direct activation of retinal cells axons away from their somata; (iii) an electric diffusion in the visual cortex; (iv) the optical diffusion of the signal registered by optical imaging. The goal of the internship is to analyse the data already obtained at Invibe team in order to quantify these effects and especially to analyse the role played by the retina's network in the spread of activity. The first step of the internship will be to construct a model of the diffusion induced by (i), (iii), (iv) and to compare the expected results with experiments. A next step will then be to propose a neuronal network model characterizing the effect (ii).

Compétences requises: Strong background in programming and skills in mathematics or physics. Great interest in the field of visual neuroscience, both for fundamental aspects of visual processing and clinical research.

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Contexte: The team inViBE at the Institut des Neurosciences de la Timone (INT-CNRS) combines multiple expertises involving behavioral studies in both humans and monkeys, ophthalmologic clinical approaches, electrophysiological and real-time optical imaging studies in behaving monkeys and Bayesian modeling approaches. The team Neuromathcomp at INRIA Sophia-Antipolis focuses on the exploration of the brain from the mathematical and computational perspectives.

Gratification : ce stage donnera lieu à une gratification au niveau du standard légal.

Merci d'envoyer CV + lettre de motivation à frederic.chavane@univ-amu.fr bruno.cessac@inria.fr