

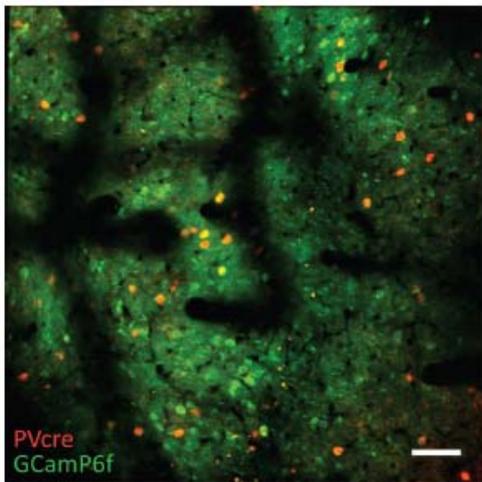
Master Theses in Neurobiology

In vivo two-photon imaging of acute genetic perturbation of individual neurons in the brain

Research group of Dr. Sidney Cambridge
(Department of Functional Neuroanatomy, Prof. Dr. Thomas Kuner)

We are looking for a highly motivated and well trained student (f/m) for a Masters research project in cellular neurophysiology. The project is funded by Deutsche Forschungsgemeinschaft (DFG).

In our group, we have developed a new method for cell-type specific, rapid genetic manipulation of neurons in living mouse brains (manuscript in submission). We optimized the inducible Tetracycline system (Cambridge et al. 2009, Nature Methods) developed by the group of Bujard (Gossen et al., 1995, Science). Our method pre-identifies those neurons that can be genetically manipulated by the Tet system



In vivo two-photon image of cortical neurons. The manipulated parvalbumin (PV) neurons in red, the calcium indicator GCamP6f in green.

so that we can precisely characterize the targeted cells before *and* after transgene expression. In addition, we use in vivo two-photon microscopy to monitor neuronal activity with GCamP6, a GFP-based calcium indicator. Also, because we can rapidly induce transgene expression by injection of tetracycline, we exactly know when to look for genetic manipulation and where. Together, cell-type specific genetic manipulation and imaging constitute a powerful experimental combination for in vivo neuronal analysis. We now have different constructs available for cellular manipulation including transgenes that change neuronal activity, induce cell death, or possibly reprogram glia cells into neurons. The project will involve genetic manipulation of neuronal activity in a small population and assessing network changes in activity as compensatory homeostatic mechanisms.

Prior to the project, extensive practical lab training is planned to get the successful applicant accustomed to the different research skills necessary for master project.

Start of the project: As soon as possible

Application: Please send a short motivation letter (English) as well as your CV to **Dr. Sidney Cambridge (cambridge@ana.uni-heidelberg.de, 06221-548671)**