PhD Position

“Local Balance in Neuronal Networks”

Biomicrotechnology Lab – Prof. Ulrich Egert

Neuronal networks with inhomogeneous connectivity have been suggested to be more robust against saturation and excessive synchronization in high input regimes. This strongly depends on the specific type of balance of excitation and inhibition as well as the role and effectiveness or long range connectivity. Locally unbalanced networks could contribute to an optimal representation of information in wide range of input regimes, or conversely to pathological network dynamics. In this context, we are interested in the role of inhibition/excitation balance beyond the statistical mean. We expect that local variability, the extent of connectivity and the specific properties of inhibitory/excitatory balance influence the activity structure and robustness of neuronal networks. We test this in synthetic networks of cultured cortical neurons using electrophysiological, optogenetic and computational techniques. This project explores the control of neuronal network states via optogenetic modulation of the excitation/inhibition interaction.

We invite applications to join the lab for a 3-4 year PhD project in neurophysiology within the PhD program “BrainDisC” at the Bernstein Center Freiburg. The project is financed by a fellowship of the DAAD that can only be awarded to non-German applicants that have not been staying in Germany for more than 15 months at the time of their application.

The successful applicant has some prior training in experimental neurophysiology, excellent command of the English language, high motivation for independent work, knowledge of some programming language, ideally Matlab or Python, and willingness to contribute to an international team. Experience with cell cultures, network modeling or intracellular recording would be a plus.

The Bernstein Center Freiburg concentrates research in Computational Neuroscience and Neurotechnology at the University of Freiburg, Germany. The projects are highly interdisciplinary and span across mathematical-theoretical approaches on the function and dynamics of neuronal networks, neuroanatomy, experimentally driven neurophysiology and the development of technologies for medical application.

Please apply using our online form at https://yoda.bcf.uni-freiburg.de/ and indicate ”Egert" as preferred project. The deadline for applications is January 31, 2017.

Further details on:
www.bcf.uni-freiburg.de/jobs

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