

Master / PhD Seminar

Neural Coding with Action Potentials

Bernstein Center for Computational Neuroscience Berlin *and*
Freie Universität Berlin

Summary

Over the past decades, different strategies of information coding in biological neural networks have been proposed. The existence of so-called temporal codes is still a big controversy among neuroscientists. This seminar will investigate and discuss theories of temporal coding which assume that each single action potential may carry relevant information and that full information is encoded by coordinated neural ensembles in their precise timing of action potentials. A wealth of model studies have set the conditions for temporal codes in neural networks and outlined hypotheses that have been put to test in experimental studies.

During this two-days seminar, the students will present and, together with the tutors, discuss relevant publications. The focus will be placed on experimental studies that have collected experimental evidence for the existence of temporal coding schemes in biological systems, notably in the mammalian cortex and in the central insect brain. Theoretical studies will provide insight in models and hypothesis on possible mechanisms of encoding and decoding with timed action potentials. The seminar will be organized en bloc at the end of the semester (see dates below) at a remote location outside of Berlin. This atmosphere shall offer the possibility for an intensive inter-disciplinary exchange among students and tutors.

Requirements & Credits

Master or Diplom students will prepare a short report (2-4 pages) and a presentation, typically based on one or two related publications, with help of their tutor. Reports will be collected in a reader which will be available to all participants. We encourage students to write their report and to present in English, but presentations/reports in German are also accepted.

PhD students will prepare their report and presentation independently and in English language. They are expected to review a more comprehensive list of publications.

Credits: Master/PhD (2 CP/ECTS) - Diplom (2 SWS).

Note that acceptance of credit points must be arranged with the respective graduate program. Arrangements exist with Bernstein Programs and Master Programs at the FU Berlin

Date: 2 days (one weekend) at end of semester – **Feb 14th/15th (arrive 13th)**

Location: Bildungsstätte Hirschluch, Storkow, Brandenburg (planned)

Organization: Prof. Dr. Martin Nawrot, Dr. Michael Schmuker

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Info <http://www.biologie.fu-berlin.de/neuroinformatik/teaching>