

BCCN Freiburg

Dynamics are an outstanding feature of brain activity at each level of observation, from the activity in single neurons and synapses, over processes in neural networks, to the interactions within and between entire brain areas.

The BCCN Freiburg aims to:

- understand these dynamics regarding their underlying mechanisms, inter-relations and functional role,
- apply new insights gained and techniques developed to key questions in biomedicine and neurotechnology.

Research at the BCCN Freiburg focuses on:

- analyzing and modeling the dynamic processes associated with brain activity across levels of resolution,
- understanding constraints from the anatomical substrate and the structural and functional changes associated with development, learning and adaptation,
- exploring biological function in a dynamic setting: real-time decoding and controlling of brain dynamics.

This multi-disciplinary endeavor is pursued in a collaborative effort of labs from four faculties at Freiburg University, the University Clinical Center, and two industrial partners: MultiChannel Systems, Honda Research Institute.

The BCCN Freiburg works in close collaboration:

- in Freiburg, with the Spemann Graduate School, the Center for Neurosciences, SFB780, and GRK843,
- in the region, with the trinational network Neurex,
- in Germany, with the Bernstein Network,
- internationally, with many sister centers abroad.

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BFNT Freiburg-Tübingen

Neurotechnology is a rapidly growing field of research, thriving to develop and utilize technical means to repair, replace or support physical functions affected by nervous system diseases.

Under the project title 'Hybrid Brain', we exploit electrical and chemical signals recorded in the brain to control external or implanted devices. The BFNT-FT efforts are organized in a range of projects on fundamental neurotechnological research, the development of new techniques, clinical testing and neuroethical considerations.

Our technical goals are to improve recording and interpretation of neuronal signals, stabilize them for long-term implants, and maximize information retrieval and develop control algorithms for neuroprosthetic devices.

Neural prostheses will be constructed to reinstate voluntary movement based on the activity recorded via brain-machine-interfaces (BMI). Electrical stimuli or drugs will be delivered depending on the need determined from brain activity, for example to intervene with epileptic seizures or migraine episodes.

The BFNT-FT is an initiative of the Universities of Freiburg and Tübingen, their neurological and neurosurgical University Clinical Centers, the MPI for Biological Cybernetics Tübingen, the Natural and Medical Sciences Institute Reutlingen. In addition, several industrial partners contribute to the BFNT-FT: MultiChannel Systems, Inomed, Honda Research Institute.

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Postdoc Program

The Postdoctoral Training Program provides superb research opportunities in the multi-disciplinary, international teams organized in the Bernstein Center Freiburg. The program is open to Postdocs with a background in theoretical or experimental neuroscience, or in a related field.

Candidates apply with a concise proposal for a research project related to the Center's research goals. Postdocs are mentored by senior scientists. Participation in international conferences is expected. Supplementary training opportunities are offered in scientific topics and in secondary skills such as career development, scientific writing and grant application.

Contact: Dr. Janina Kirsch, Teaching&Training Coord.
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International Exchange

The Bernstein Center Freiburg seeks and encourages collaborations and contacts with other centers, with the aim to facilitate international exchanges of PhD-students, Postdocs and Faculty. To this end, we established cooperations with sister centers in Israel, Japan, Norway, UK, and the USA.

Bernstein Seminar & Visiting Scientists

Research stays of senior researchers and postdocs from Germany and abroad are supported by the Bernstein Seminar and Visiting Scientists programs.



PhD Program

The PhD program offers comprehensive teaching and training in the new multidisciplinary areas of computational neuroscience and neurotechnology. It is open to students holding an MSc degree or Diploma in the natural or technical sciences.

The program provides students with theoretical and practical expertise in the neurosciences, physics and mathematics, computer science, systems technology, biomedicine and neurotechnology.

It is organized in a core program which defines a common basis, and an advanced program in which students can strengthen their expertise in selected areas. Teaching units comprise lectures, seminars, theoretical and practical courses. Participation in international conferences and in advanced courses and summer schools is encouraged.

In addition, the PhD program offers excellent research opportunities in interdisciplinary, international teams. All PhD projects are intensely and continuously supervised by 2-3 advisors. The Teaching and Training Coordinator provides advice and support in all scientific and organizational matters of the program. The program is complemented by a dedicated secondary skills training. For international students we offer special support in issues concerning bureaucracy, finding housing, and living in Germany. We accept applications throughout the year.

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BCF Freiburg



The Bernstein Center Freiburg is the home of the Bernstein Network Activities in Freiburg:

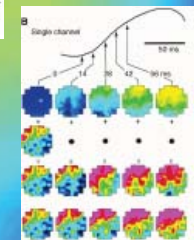
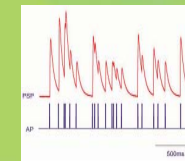
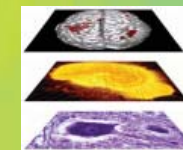
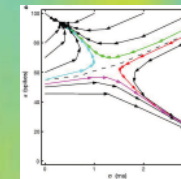
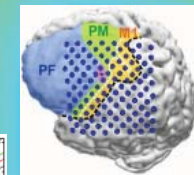
- the Bernstein Center for Computational Neuroscience
- the Bernstein Focus Neurotechnology
- the Bernstein Partner Projects, and
- the various Bernstein-associated projects.

The BCF also hosts the Bernstein Coordination Site of the Bernstein Network Computational Neuroscience, Germany.

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...towards understanding and utilizing brain dynamics



Participating Institutions:



Funded by:

