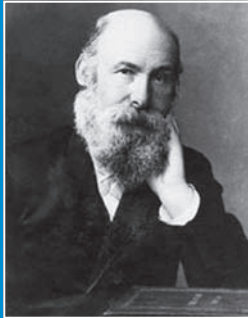




Members of the Bernstein Network

Julius Bernstein
(1839–1917)

The 'membrane theory' of the German physiologist Julius Bernstein provided, in 1902, the first biophysical explanation for how nerve cells transmit and process information through electrical currents.

In honor of this achievement, the BMBF named the 'National Network Computational Neuroscience' after Julius Bernstein.

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Computational Neuroscience

Understanding the brain
and changing the future.

... still remains one of the biggest scientific challenges.

The brain is the seat of all mental functions. At the same time, it is the most complex structure that nature has produced: billions of neurons, linked through trillions of connections, process enormous amounts of information within fractions of seconds by complex, spatio-temporal patterns of electrical activity.

To date, technical systems have not even come close to the swift and robust performance of the human brain.

Dysfunction of the brain causes severe physical and mental impairments, especially during aging, and are among the most frequent medical disorders.

Computational Neuroscience

The new, highly dynamic research discipline of Computational Neuroscience takes up these challenges. It combines biomedical experiments with theoretical models and thereby opens new avenues for scientific insights and technological applications.

Together, mathematicians, physicists, biologists, psychologists, physicians, and engineers identify principles of brain function and translate them into a mathematical representation. Mathematical models of normal or diseased brain function can be tested in computer simulations. Successful theoretical models of brain function can then be applied in newly developed technical systems. The same kind of models can also be used for investigating complex neurological malfunctions.

Exploiting this strategy, Computational Neuroscience offers new avenues for facing the challenges of modern society.

Computational Neuroscience will allow to develop new, more powerful high tech systems that can tackle tasks that were previously technically impossible, by applying efficient functional principles of the brain.

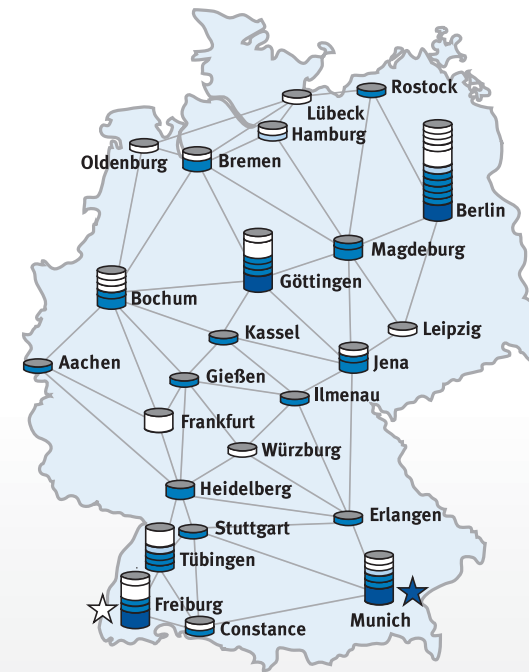
Computational Neuroscience will help to soothe the severe effects of neurological diseases that increasingly occur during aging, by

- developing new approaches for therapies and testing them in computer simulations,
- restoring impaired brain functions by new, intelligent implants and prostheses, and
- developing intelligent technical devices with brain-inspired sensors that take care of complex tasks in a reliable and safe way.

Computational Neuroscience research will change our life. The German Bernstein Network is at the forefront of this endeavour.

Latest research news, ongoing and future events, and updated teaching & training offers of the Bernstein Network can be found on: www.nncn.de

With the National Bernstein Network Computational Neuroscience, the Federal Ministry of Education and Research (BMBF) created an effective funding initiative that focuses, supports and interconnects the scientific expertise in this cutting edge research field.



- Bernstein Award
- Bernstein Collaboration
- Bernstein Group
- Bernstein Center
- Bernstein Focus: Neurotechnology
- Bernstein Focus: Neuronal Basis of Learning
- Bernstein Coordination Site
- National INCF Node

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