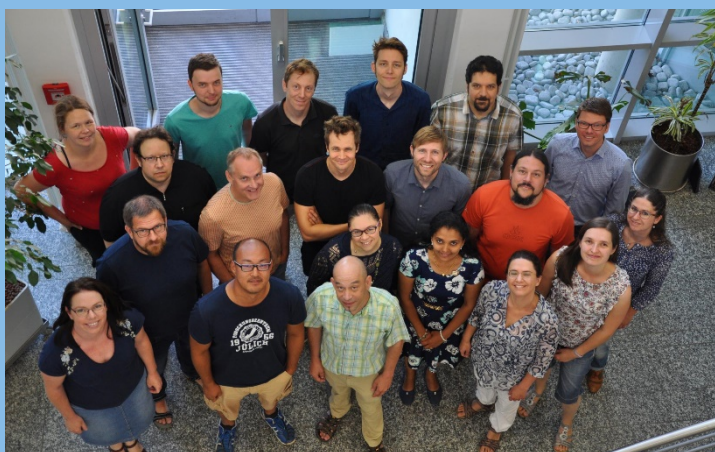


SIMLAB NEUROSCIENCE

BRIDGING NEUROSCIENCE AND HPC

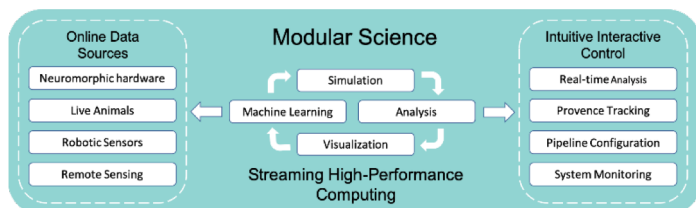


SimLab Neuroscience is an interdisciplinary team of scientists and engineers which:

- Serves the neuroscience community by providing high-level, community-oriented support using HPC and data resources
- Provides in-house research and development of data analytics and simulation technologies
- Ports and optimizes user codes for supercomputers
- Supports the preparation of computing time proposals and preparatory access
- Offers tutorials, courses and workshops

Simulation Engineering & Science

- Arbor: multi-compartment models of neural networks
- NEST: spiking point-neuron simulator (tools and support)
- The Virtual Brain for HPC: neural mass models
- Learning to Learn: machine learning with spiking neural networks
- SpiNNaker: support for simulation and neuromorphic hardware
- JuPeX: parameter optimization framework
- Modular Science: co-simulator framework



Neuroimaging Pipeline

- High-performance image processing on supercomputers
- Optimization of neuroimaging pipelines for HPC
- Machine learning and deep learning for neuroscience
- Structure tensor analysis and quality control tools for 3D-polarized light imaging

Visualization & Analysis

- Visual connectivity generation
- Optimization of analysis tools for HPC
- Interactive steering and visualization of simulations
- Interactive graph analysis and visualization



Infrastructure Development

- Requirements specification, validation and user support for the Human Brain Project research infrastructure



Supporting Software

- Data and workflow management support
- Software refactoring
- Software installation and maintenance on HPC systems
- Porting and support for evolving HPC architectures, Graphics Processing Units (GPUs) and accelerators

External Collaboration Partners

Helmholtz Zentrum München (D), AMU (FR), BSC (ES), BU Wuppertal (D), CEA (FR), Charité (D), Cineca (IT), CNR (IT), CNRS (FR), DLR (D), CSCS (CH), FH Bielefeld (D), KIT (D), KTH (SE), NMBU (NO), RWTH Aachen (D), TU Darmstadt (D), TU Graz (AT), UC San Diego (US), U Frankfurt (D), U Oslo (NO), UPM (ES), URJC (ES), U Manchester (UK), U Trier (D)

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Mitglied der Helmholtz-Gemeinschaft