

NEST Simulator

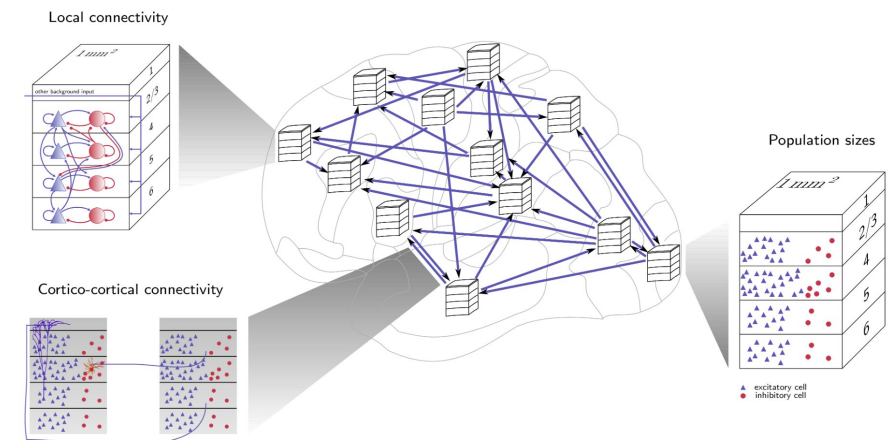
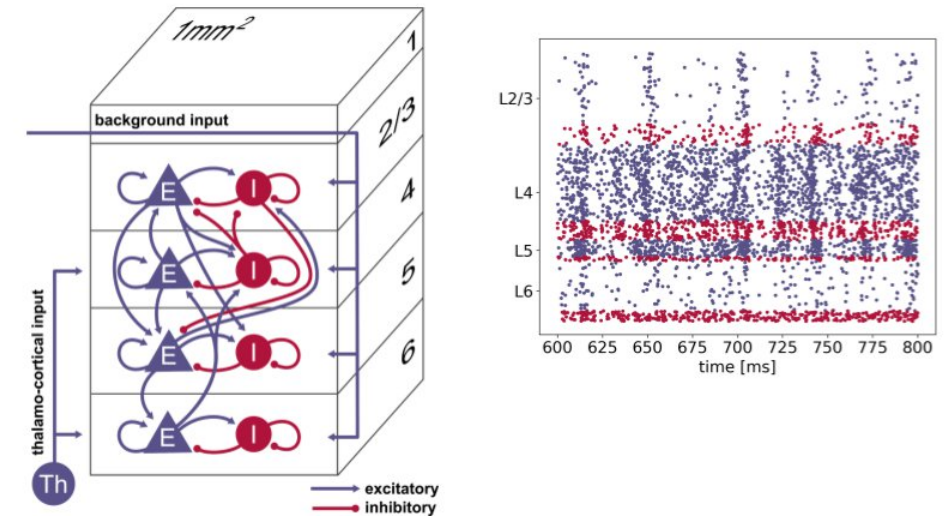
NEST – Introduction

NEST is a simulator for spiking neural network models that focuses on the dynamics, size and structure of neural systems rather than on the exact morphology of individual neurons.

Input: Neuron-, Synapse- and Network model(s)

Output: Neural activity data

- Models of **information processing** e.g. in the visual or auditory cortex of mammals,
- Models of **network activity dynamics**, e.g. laminar cortical networks or balanced random networks,
- Models of **learning and plasticity**.



NEST – Fact sheet

Languages and programming paradigms

- C++17 kernel ~ Python \geq 3.8 API
- hybrid OpenMP/MPI
- ~160 kLOC
- Architecture independent
- Model independent
- Part in larger software ecosystem (NESTML, NEST-Desktop, PyNN, ..., EBRAINS)

inital version	1994
contributor community	58
workshops, tutorials	>100
articles on the code itself	20
articles using the code	369
authors of peer-reviewed scientific articles citing NEST	1061
authors publishing with NEST (2017-2021)	667
articles in 2021 citing peer-reviewed publications produced with NEST	1116

data from 13 Jan 2022

NEST – State of the community

- ~25 active contributors in all parts of the code
- Regular open VC
- Hackathons
- Workshops, tutorials, and meet-ups at conferences
- Highly interlinked with communities of related tools (NEST* tools, PyNN, NRP)



NEST – RSE topics

- SPDX-License-identifier: GPL-v2.0-or-later
- Webpage: <https://nest-simulator.org>, ebrains.eu, readthedocs, ...
- Repository: <https://github.com/nest/nest-simulator>
- DOI: [10.5281/zenodo.6368024](https://doi.org/10.5281/zenodo.6368024) (v3.3)
- RRID: SCR_002963
- Key paper: “Gewaltig MO and Diesmann M (2007) NEST:NEural Simulation Tool. Scholarpedia(2):1430”
- Documentation interleaved within the code, with examples, tutorials and links to related projects...
- CI: yes, on all levels in the code on various systems (→ see poster), benchmarking being current work-in-progress
- OpenSSF, Core-Infrastructure Best Practices: <https://bestpractices.coreinfrastructure.org/en/projects/2218#all>
- Experience that SE \neq RSE in broader contexts