Resource Summary Report

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Neurogrid

RRID:SCR_005024
Type: Tool

Proper Citation

Neurogrid (RRID:SCR_005024)

Resource Information

URL: http://www.stanford.edu/group/brainsinsilicon/neurogrid.html

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Description: A specialized hardware platform that will perform cortex-scale emulations while offering software-like flexibility. With sixteen 12x14 sq-mm chips (Neurocores) assembled on a 6.5x7.5 sq-in circuit board that can model a slab of cortex with up to 16x256x256 neurons - over a million! The chips are interconnected in a binary tree by 80M spike/sec links. An on-chip RAM (in each Neurocore) and an off-chip RAM (on a daughterboard, not shown) softwire vertical and horizontcal cortical connections, respectively. It provides an affordable option for brain simulations that uses analog computation to emulate ion-channel activity and uses digital communication to softwire synaptic connections. These technologies impose different constraints, because they operate in parallel and in serial, respectively. Analog computation constrains the number of distinct ion-channel populations that can be simulatedunlike digital computation, which simply takes longer to run bigger simulations. Digital communication constrains the number of synaptic connections that can be activated per secondunlike analog communication, which simply sums additional inputs onto the same wire. Working within these constraints, Neurogrid achieves its goal of simulating multiple cortical areas in real-time by making judicious choices.

Abbreviations: Neurogrid

Resource Type: instrument resource

Defining Citation: PMID:17959490

Keywords: simulation, neuron, cortex, synapse, analog vlsi, instrument, equipment, hardware

Funding: NSF ;
NIH

Resource Name: Neurogrid

Resource ID: SCR_005024

Alternate IDs: nlx_97879

Record Creation Time: 20220129T080228+0000

Record Last Update: 20250420T014242+0000

Ratings and Alerts

No rating or validation information has been found for Neurogrid.

No alerts have been found for Neurogrid.

Data and Source Information

Source: SciCrunch Registry

Usage and Citation Metrics

We found 13 mentions in open access literature.

Listed below are recent publications. The full list is available at FDI Lab - SciCrunch.org.

Gonzales DL, et al. (2025) Touch-evoked traveling waves establish a translaminar spacetime code. Science advances, 11(5), eadr4038.

Zhao Z, et al. (2024) Formation of Anisotropic Conducting Interlayer for High-Resolution Epidermal Electromyography Using Mixed-Conducting Particulate Composite. Advanced science (Weinheim, Baden-Wurttemberg, Germany), 11(27), e2308014.

Ma D, et al. (2024) Darwin3: a large-scale neuromorphic chip with a novel ISA and on-chip learning. National science review, 11(5), nwae102.

Dahal P, et al. (2023) Hippocampal-cortical coupling differentiates long-term memory processes. Proceedings of the National Academy of Sciences of the United States of America, 120(7), e2207909120.

Pouliopoulos AN, et al. (2022) Non-invasive optogenetics with ultrasound-mediated gene delivery and red-light excitation. Brain stimulation, 15(4), 927.

Hassan AR, et al. (2022) Translational Organic Neural Interface Devices at Single Neuron Resolution. Advanced science (Weinheim, Baden-Wurttemberg, Germany), 9(27), e2202306.

Domínguez S, et al. (2021) A transient postnatal quiescent period precedes emergence of mature cortical dynamics. eLife, 10.

Shore AN, et al. (2020) Reduced GABAergic Neuron Excitability, Altered Synaptic Connectivity, and Seizures in a KCNT1 Gain-of-Function Mouse Model of Childhood Epilepsy. Cell reports, 33(4), 108303.

Jastrzebska-Perfect P, et al. (2020) Mixed-conducting particulate composites for soft electronics. Science advances, 6(17), eaaz6767.

Fonseca Guerra GA, et al. (2017) Using Stochastic Spiking Neural Networks on SpiNNaker to Solve Constraint Satisfaction Problems. Frontiers in neuroscience, 11, 714.

Khodagholy D, et al. (2016) Organic electronics for high-resolution electrocorticography of the human brain. Science advances, 2(11), e1601027.

Liu Q, et al. (2016) Benchmarking Spike-Based Visual Recognition: A Dataset and Evaluation. Frontiers in neuroscience, 10, 496.

Bekolay T, et al. (2015) Benchmarking neuromorphic systems with Nengo. Frontiers in neuroscience, 9, 380.