Resource Summary Report

Generated by FDI Lab - SciCrunch.org on Mar 31, 2025

NEURON

RRID:SCR_005393
Type: Tool

Proper Citation

NEURON (RRID:SCR_005393)

Resource Information

URL: http://www.neuron.yale.edu

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Description: NEURON is a simulation environment for modeling individual neurons and networks of neurons. It provides tools for conveniently building, managing, and using models in a way that is numerically sound and computationally efficient. It is particularly well-suited to problems that are closely linked to experimental data, especially those that involve cells with complex anatomical and biophysical properties. NEURON has benefited from judicious revision and selective enhancement, guided by feedback from the growing number of neuroscientists who have used it to incorporate empirically-based modeling into their research strategies. NEURON's computational engine employs special algorithms that achieve high efficiency by exploiting the structure of the equations that describe neuronal properties. It has functions that are tailored for conveniently controlling simulations, and presenting the results of real neurophysiological problems graphically in ways that are quickly and intuitively grasped. Instead of forcing users to reformulate their conceptual models to fit the requirements of a general purpose simulator, NEURON is designed to let them deal directly with familiar neuroscience concepts. Consequently, users can think in terms of the biophysical properties of membrane and cytoplasm, the branched architecture of neurons, and the effects of synaptic communication between cells. * helps users focus on important biological issues rather than purely computational concerns * has a convenient user interface * has a user-extendable library of biophysical mechanisms * has many enhancements for efficient network modeling * offers customizable initialization and simulation flow control * is widely used in neuroscience research by experimentalists and theoreticians * is well-documented and actively supported * is free, open source, and runs on (almost) everything

Abbreviations: NEURON

Synonyms: neuron, NEURON for empirically-based simulations of neurons and networks of neurons

Resource Type: simulation software, software application, software resource

Keywords: architecture, dendrites, ion channel, model, simulation, software, network, neuron

Funding:

Resource Name: NEURON

Resource ID: SCR_005393

Alternate IDs: nif-0000-00081

Alternate URLs: http://www.nitrc.org/projects/neuron

Record Creation Time: 20220129T080230+0000

Record Last Update: 20250331T060504+0000

Ratings and Alerts

No rating or validation information has been found for NEURON.

No alerts have been found for NEURON.

Data and Source Information

Source: SciCrunch Registry

Usage and Citation Metrics

We found 6065 mentions in open access literature.

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

Valdes P, et al. (2025) Integrative multiomics reveals common endotypes across PSEN1, PSEN2, and APP mutations in familial Alzheimer's disease. Alzheimer's research & therapy, 17(1), 5.

Aguilar GR, et al. (2025) Functional analysis of conserved C. elegans bHLH family members uncovers lifespan control by a peptidergic hub neuron. PLoS biology, 23(1), e3002979.

Pickering G, et al. (2025) A pain research strategy for Europe: A European survey and

position paper of the European Pain Federation EFIC. European journal of pain (London, England), 29(1), e4767.

Griffin EF, et al. (2025) Dopaminergic neurodegeneration in C. elegans cultivated with Porphorymonas gingivalis. microPublication biology, 2025.

Sha R, et al. (2025) Adolescent mice exposed to TBI developed PD-like pathology in middle age. Translational psychiatry, 15(1), 27.

Kim T, et al. (2025) Electric field stimulation directs target-specific axon regeneration and partial restoration of vision after optic nerve crush injury. PloS one, 20(1), e0315562.

Mermet J, et al. (2025) Multilayer regulation underlies the functional precision and evolvability of the olfactory system. bioRxiv : the preprint server for biology.

Liu Y, et al. (2025) Differential distribution of PINK1 and Parkin in the primate brain implies distinct roles. Neural regeneration research, 20(4), 1124.

Thorpe RV, et al. (2025) Ensemble priming via competitive inhibition: local mechanisms of sensory context storage and deviance detection in the neocortical column. bioRxiv : the preprint server for biology.

Holguera I, et al. (2025) Temporal and Notch identity determine layer targeting and synapse location of medulla neurons. bioRxiv : the preprint server for biology.

Alqahtani B, et al. (2025) From light sensing to adaptive learning: hafnium diselenide reconfigurable memcapacitive devices in neuromorphic computing. Light, science & applications, 14(1), 30.

Doherty DW, et al. (2025) Self-organized and self-sustained ensemble activity patterns in simulation of mouse primary motor cortex. bioRxiv : the preprint server for biology.

Zheng Y, et al. (2025) Biologically Inspired Spatial-Temporal Perceiving Strategies for Spiking Neural Network. Biomimetics (Basel, Switzerland), 10(1).

Tuna T, et al. (2025) Basal forebrain innervation of the amygdala: an anatomical and computational exploration. Brain structure & function, 230(1), 30.

Najafi F, et al. (2025) Unexpected events trigger task-independent signaling in VIP and excitatory neurons of mouse visual cortex. iScience, 28(2), 111728.

Tang X, et al. (2025) Hypoxia-preconditioned bone marrow-derived mesenchymal stem cells protect neurons from cardiac arrest-induced pyroptosis. Neural regeneration research, 20(4), 1103.

Tseng SC, et al. (2025) Primary Neuronal Culture and Transient Transfection. Bio-protocol, 15(2), e5169.

Yousaf I, et al. (2025) The measles virus matrix F50S mutation from a lethal case of

subacute sclerosing panencephalitis promotes receptor-independent neuronal spread. Journal of virology, 99(1), e0175024.

Meissner GW, et al. (2025) A split-GAL4 driver line resource for Drosophila neuron types. eLife, 13.

Kritskaya KA, et al. (2025) Point of No Return-What Is the Threshold of Mitochondria With Permeability Transition in Cells to Trigger Cell Death. Journal of cellular physiology, 240(1), e31521.