# Resource Summary Report

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## 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:** software application, simulation software, software resource

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

**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:** 20260815T182305+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 6100 mentions in open access literature.

**Listed below are recent publications.** The full list is available at dkNET .

Belal M, et al. (2026) Cholinergic interneuron control of GABAergic circuits targeting spiny projection neurons is disrupted in parkinsonian models. bioRxiv : the preprint server for biology.

deRosenroll G, et al. (2026) Uncovering the "hidden" synaptic microarchitecture of the retinal direction selective circuit. Cell reports, 45(2), 116833.

Mitra S, et al. (2026) To jump or not to jump: comparing effects of phenotypic plasticity on the visual responses and escape behavior of locusts and grasshoppers. Journal of neurophysiology, 135(1), 312.

Liu Z, et al. (2026) A Dynamic Virtual Channel Approach to Enhance Retinal Prosthetic Precision. Biomimetics (Basel, Switzerland), 11(5).

Doherty DW, et al. (2025) Enhanced beta power emerges from simulated parkinsonian primary motor cortex. NPJ Parkinson's disease, 11(1), 230.

Doherty DW, et al. (2025) Enhanced beta power emerges from simulated parkinsonian primary motor cortex. bioRxiv : the preprint server for biology.

Jamann N, et al. (2025) Layer 5 myelination gates corticothalamic coincidence detection. Nature communications, 16(1), 10922.

Hartveit E, et al. (2025) HCN channels in rod bipolar cells of rat retina: subcellular localization, kinetic properties and functional dynamics. The Journal of physiology.

Veruki ML, et al. (2025) Activation of Dopamine D1 Receptors at the Axon Initial Segment-Like Process of Retinal AII Amacrine Cells Modulates Action Potential Firing. The Journal of neuroscience : the official journal of the Society for Neuroscience, 45(33).

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.

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.

Ye H, et al. (2025) Restore axonal conductance in a locally demyelinated axon with electromagnetic stimulation. Journal of neural engineering, 22(1).

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

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

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.

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

Zhao S, et al. (2025) Chemogenetic activation of microglial Gi signaling decreases microglial surveillance and impairs neuronal synchronization. Science advances, 11(9), eado7829.

Heller DT, et al. (2025) Pre-Sensory Spontaneous Activity Accelerates Coordinated Maturation of Synaptic Partners and Drives Transition to the Mature Physiological Phenotype. bioRxiv : the preprint server for biology.

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