Resource Summary Report

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Conical: The Computational Neuroscience Class Library

RRID:SCR_008318
Type: Tool

Proper Citation

Conical: The Computational Neuroscience Class Library (RRID:SCR_008318)

Resource Information

URL: http://www.strout.net/conical/

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Description: CONICAL is a C++ class library for building simulations common in computational neuroscience. Currently its focus is on compartmental modeling, with capabilities similar to GENESIS and NEURON. Future classes may support reaction-diffusion kinetics and more. A key feature of CONICAL is its cross-platform compatibility; it has been fully co-developed and tested under Unix, DOS, and Mac OS. Any C++ compiler which adheres to the emerging ANSI standard should be able to compile the CONICAL classes without modification. It is intended to encourage the rapid development of simulator software, especially on non-Unix systems where such software is sorely lacking. The present focus of the CONICAL library of C++ classes is compartmental modeling. A model neuron is built out of compartments, usually with a cylindrical shape. When small enough, these open-ended cylinders can approximate nearly any geometry, just as the stack of cylinders approximates a cone in the logo above. While any compartment has passive electrical properties (like a simple resistor-capacitor circuit), more interesting properties require the use of active ion channels whose conductance varies as a function of the time or membrane voltage. A standard Hodgkin-Huxley ion channel is included as one of the built-in CONICAL object types. Most of the voltage-gated ion channels in the literature can be directly implemented merely by setting the parameters of this class. For extensibility, this class is derived from several layers of more general classes. Connections between neurons can be implemented in several ways. For a gap junction (i.e., simple electrical connection), a passive current (or pair of currents, one in each direction) can be used. Synapses are more complex objects, but used in a similar fashion. The Alpha-function synapse is a very popular model of synaptic transmission, and is a basic CONICAL class. More complex (and realistic) synapses can be built using the Markov-model synapse. (A Markov model can be used on its own for other purposes as well.) In addition to classes directly related to neural modeling, CONICAL contains several other useful object types. These include a current injector, and a column-oriented output stream for storing data in table form.

Synonyms: Conical

Resource Type: software resource

Keywords: c++, computational, diffusion, kinetic, modeling, neural, neuron, neuroscience, reaction, simulation, model, compartmental model

Resource Name: Conical: The Computational Neuroscience Class Library

Resource ID: SCR_008318

Alternate IDs: nif-0000-24684

Record Creation Time: 20220129T080246+0000

Record Last Update: 20260801T190329+0000

Ratings and Alerts

No rating or validation information has been found for Conical: The Computational Neuroscience Class Library.

No alerts have been found for Conical: The Computational Neuroscience Class Library.

Data and Source Information

Source: SciCrunch Registry

Usage and Citation Metrics

We found 9 mentions in open access literature.

Listed below are recent publications. The full list is available at T1D .

Mancinelli-Lyle D, et al. (2025) Efficacy of a water flosser compared to an interdental brush on gingival bleeding and gingival abrasion: A 4 week randomized controlled trial. International journal of dental hygiene, 23(1), 176.

Cheng H, et al. (2024) Mycobacterium tuberculosis produces D-serine under hypoxia to limit CD8+ T cell-dependent immunity in mice. Nature microbiology, 9(7), 1856.

Gezahegn T, et al. (2024) Analysis of nutrient loads, heavy metals and physicochemical properties of wastewater, wetland grass, and papaya samples: Gondar Malt factory, Ethiopia with global implication. Toxicology reports, 12, 520.

Cutti AG, et al. (2024) Accuracy, Repeatability, and Reproducibility of a Hand-Held Structured-Light 3D Scanner across Multi-Site Settings in Lower Limb Prosthetics. Sensors (Basel, Switzerland), 24(7).

Kahhal P, et al. (2022) A multi-objective optimization using response surface model coupled with particle swarm algorithm on FSW process parameters. Scientific reports, 12(1), 2837.

Bell SF, et al. (2020) Incidence of postpartum haemorrhage defined by quantitative blood loss measurement: a national cohort. BMC pregnancy and childbirth, 20(1), 271.

Rivera F, et al. (2020) Conical coupling angular stable plate fixation: a retrospective study. Acta bio-medica : Atenei Parmensis, 91(14-S), e2020002.

Vangala P, et al. (2020) High-Resolution Mapping of Multiway Enhancer-Promoter Interactions Regulating Pathogen Detection. Molecular cell, 80(2), 359.

Gingrich CD, et al. (2017) Demand and willingness-to-pay for bed nets in Tanzania: results from a choice experiment. Malaria journal, 16(1), 285.