Resource Summary Report

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STEPS

RRID:SCR_008742 Type: Tool

Proper Citation

STEPS (RRID:SCR_008742)

Resource Information

URL: http://steps.sourceforge.net/STEPS/default.php

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Description: STEPS is a package for exact stochastic simulation of reaction-diffusion systems in realistic, complex 3D geometries. Our core simulation algorithm is an efficient implementation of a variation on Gillespie''s SSA, extended to deal with diffusion of molecules over the elements of a 3D tetrahedral mesh. While it was mainly developed for simulating detailed models of neuronal signaling pathways in dendrites and around synapses, it is a general tool and can be used for studying any biochemical pathway in which spatial gradients and morphology are thought to play a role. We have implemented STEPS as a set of Python modules, which means STEPS users can use Python scripts to control all aspects of setting up the model, generating a mesh, controlling the simulation and generating and analyzing output. The core computational routines are still implemented as C/C++ extension modules for maximal speed of execution.

Abbreviations: STEPS

Synonyms: STochastic Engine For Pathway Simulation

Resource Type: software resource, software application, simulation software

Keywords: reaction-diffusion, stochastic, signaling, molecular, python, software, simulator, reaction kinetics, 3d diffusion, signaling pathway, scripting, bio.tools

Funding: GOA ; UA Belgium ; Human Frontier Science Program ; Okinawa Institute of Science and Technology

Resource Name: STEPS

Resource ID: SCR_008742

Alternate IDs: biotools:steps, nlx_143852

Alternate URLs: https://bio.tools/steps

Old URLs: http://steps.sourceforge.net/STEPS/Home.html

Record Creation Time: 20220129T080249+0000

Record Last Update: 20250519T203550+0000

Ratings and Alerts

No rating or validation information has been found for STEPS.

No alerts have been found for STEPS.

Data and Source Information

Source: SciCrunch Registry

Usage and Citation Metrics

We found 296 mentions in open access literature.

Listed below are recent publications. The full list is available at <u>dkNET</u>.

Craig AT, et al. (2025) Integrating post-validation surveillance of lymphatic filariasis with the WHO STEPwise approach to non-communicable disease risk factor surveillance in Niue, a study protocol. PloS one, 20(1), e0315625.

Masengere P, et al. (2025) Additive interaction of conjoint tobacco smoking and heavy drinking on hypertension prevalence in rural Uganda: a community-based cross-sectional study. BMC public health, 25(1), 201.

Chimoriya R, et al. (2025) The Association of Physical Activity With Overweight/Obesity and Type 2 Diabetes in Nepalese Adults: Evidence From a Nationwide Non-Communicable Disease Risk Factor Survey. Obesity science & practice, 11(1), e70046.

Bejnö H, et al. (2025) Improved readability in written neurodevelopmental reports by five writing rules. Scandinavian journal of psychology, 66(1), 28.

Belete GK, et al. (2025) Prevalence and associated factors of diabetes among adult populations of Hawassa town, southern Ethiopia: A community based cross-sectional study. PloS one, 20(1), e0318081.

Esmaeili F, et al. (2025) Patterns of general and abdominal obesity and their association with hypertension control in the iranian hypertensive population: insights from a nationwide study. BMC public health, 25(1), 241.

George A, et al. (2025) Dietary Sources of Sodium in Nigerian Adults From 3 Geographic Regions: A Population-Based Cross-Sectional Study. Research square.

Walter E, et al. (2024) Cost-effectiveness of teduglutide in adult patients with short bowel syndrome - a European socioeconomic perspective. The American journal of clinical nutrition, 119(5), 1187.

Oyeyemi AL, et al. (2024) Secular trends and sociodemographic disparities in physical activity among adults in eleven African countries: WHO STEPS 2003-2020. The international journal of behavioral nutrition and physical activity, 21(1), 126.

Assefa M, et al. (2024) Body composition-derived abdominal circumference, waist-to-hip ratio, and waist-to-height ratio cut-offs for Ethiopian adults in Northwest Ethiopia, 2023. Journal of health, population, and nutrition, 43(1), 185.

Mohamud Yusuf A, et al. (2024) Acid sphingomyelinase inhibition induces cerebral angiogenesis post-ischemia/reperfusion in an oxidative stress-dependent way and promotes endothelial survival by regulating mitochondrial metabolism. Cell death & disease, 15(9), 650.

Islam ANMS, et al. (2024) The global burden of overweight-obesity and its association with economic status, benefiting from STEPs survey of WHO member states: A meta-analysis. Preventive medicine reports, 46, 102882.

Kay K, et al. (2024) Disentangling signal and noise in neural responses through generative modeling. bioRxiv : the preprint server for biology.

B?l?nescu A, et al. (2024) Exploring the Role of Serum Osteonectin and Hsp27 in Pediatric MAFLD Diagnosis and Cardiometabolic Health. Nutrients, 16(6).

Teiti I, et al. (2024) Towards elimination of chronic viral hepatitis in French Polynesia: results from a national population-based survey. The Lancet regional health. Western Pacific, 45, 101035.

Daneshmand M, et al. (2024) Assessment of Hemoglobin A1c Management and Prescription Cost Due to Polypharmacy Among Patients With Diabetes in Iran Based on the STEPS Iran 2016 Survey and a Prescription Database: A Multi-level, Cross-sectional National Study. Archives of Iranian medicine, 27(1), 1.

Verstraeten R, et al. (2024) No Evidence for an Association of HIV and Antiviral Treatment With Changes in Framingham Cardiovascular Risk Score in the Ndlovu Cohort Study. Journal of the American Heart Association, 13(2), e029637.

Liu Z, et al. (2024) Achievement of Guideline-Recommended Targets for Secondary Prevention of Cardiovascular Disease in 38 Low-Income and Middle-Income Countries. Journal of epidemiology and global health, 14(3), 1022.

Vu LTH, et al. (2024) Temporal Trends in Tobacco Smoking Prevalence During the Period 2010-2020 in Vietnam: A Repeated Cross-Sectional Study. International journal of public health, 69, 1607104.

Hedstrom E, et al. (2024) Process evaluation of a Structured E-parenting Support (STEPS) in the OPTIMA randomised controlled trial: a protocol. BMJ open, 14(5), e081563.