

Brain Dynamics Toolbox

Version 2020b

The [Brain Dynamics Toolbox](#) is open software for simulating dynamical systems in neuroscience.

The official guide to the **Brain Dynamics Toolbox**

Stewart Heitmann
Michael Breakspear

The *Brain Dynamics Toolbox* is open software for simulating non-linear dynamical systems in Matlab. It is aimed at students and researchers in computational neuroscience but can be applied to any domain. It specifically solves initial-value problems in systems of Ordinary Differential Equations (ODEs), Delay Differential Equations (DDEs) and Stochastic Differential Equations (SDEs). Each of which may be extended to a system of Partial Differential Equations (PDEs).

The graphical interface allows new models to be rapidly prototyped and explored without graphical programming. Its hub-and-spoke software architecture allows unlimited combinations of solvers and plotting tools to be applied with no additional programming effort. Large-scale simulations can be run in user-defined scripts. The code for the finished model can be published independently of the toolbox.

Dr Stewart Heitmann is a Senior Staff Scientist at the Victor Chang Cardiac Research Institute and Visiting Scientist at QIMR Berghofer Medical Research Institute. He combines Software Engineering with Computational and Mathematical Neuroscience.

Professor Michael Breakspear is Head of the Systems Neuroscience Group at the University of Newcastle, Australia. He studies the principles of adaptive large-scale brain dynamics in health, and the impact of their disturbance in brain disorders.

HEITMANN & BREAKSPEAR • BRAIN DYNAMICS TOOLBOX • 2020

SIAM DYNAMICAL SYSTEMS SOFTWARE PRIZE WINNER 2018

**Handbook for the
Brain Dynamics
Toolbox**
Version 2020

“A fantastic (and open) resource for all interested in simulating dynamical systems in neuroscience”
— Olaf Sporns, Indiana University

Computational Neuroscience
bdtoolbox.org

Download

The source code and online training courses are available from <https://bdtoolbox.org>.

BSD License

This software is distributed under the [2-clause BSD license](#).