# Brain Dynamics Toolbox
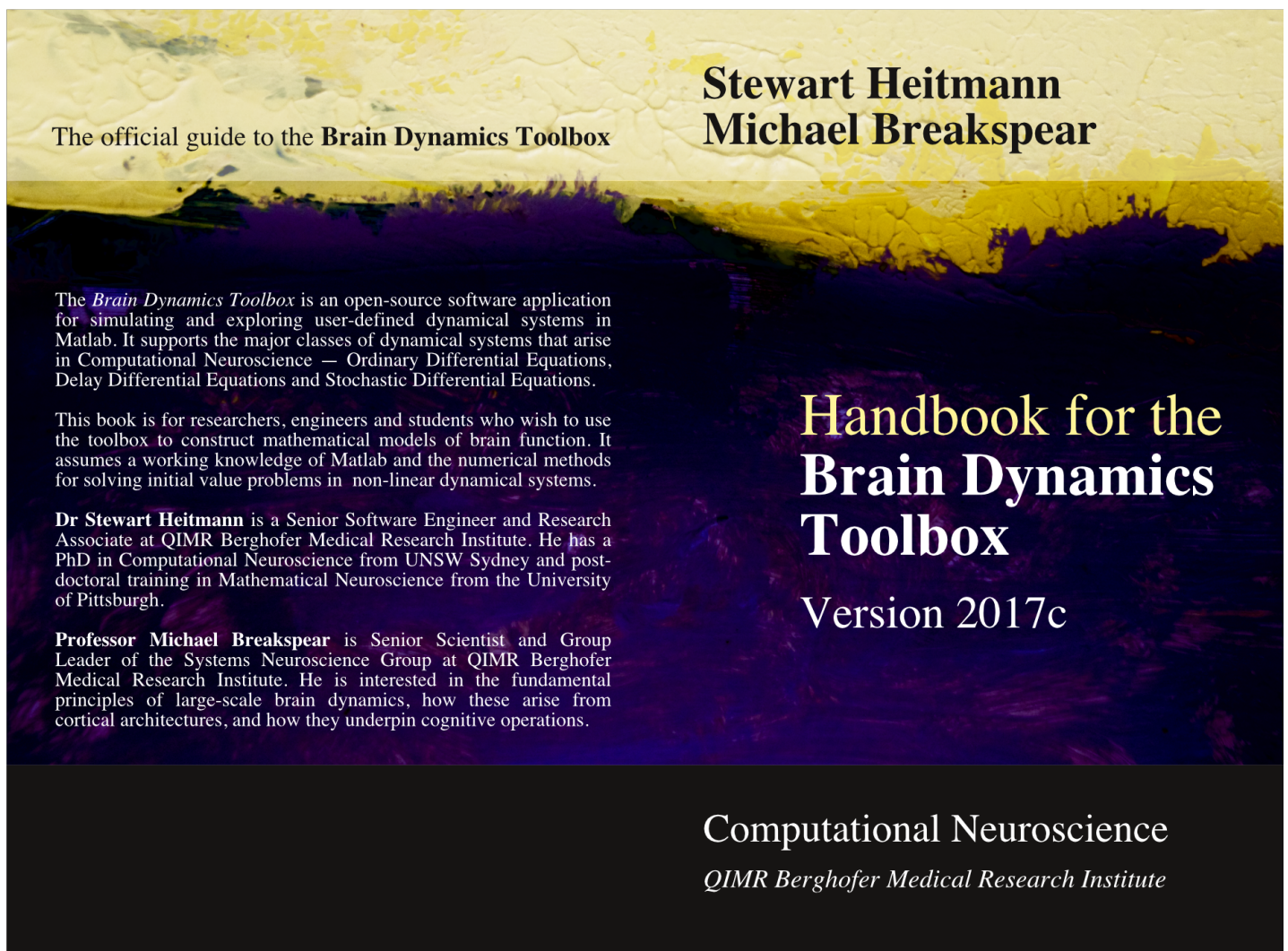
## Version 2018a

Not yet released.

The [Brain Dynamics Toolbox](#) is open-source software for simulating dynamical systems in neuroscience. It is for researchers and students who wish to explore mathematical models of brain function using Matlab. It includes a graphical tool for simulating dynamical systems in real-time as well as command-line tools for scripting large-scale simulations.

The toolbox supports the major classes of dynamical systems that typically arise in computational neuroscience. Specifically Ordinary Differential Equations (ODE), Delay Differential Equations (DDE) and Stochastic Differential Equations (SDE). Nonetheless it can also be applied to dynamical systems from any discipline.



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

**Stewart Heitmann
Michael Breakspear**

The *Brain Dynamics Toolbox* is an open-source software application for simulating and exploring user-defined dynamical systems in Matlab. It supports the major classes of dynamical systems that arise in Computational Neuroscience — Ordinary Differential Equations, Delay Differential Equations and Stochastic Differential Equations.

This book is for researchers, engineers and students who wish to use the toolbox to construct mathematical models of brain function. It assumes a working knowledge of Matlab and the numerical methods for solving initial value problems in non-linear dynamical systems.

**Dr Stewart Heitmann** is a Senior Software Engineer and Research Associate at QIMR Berghofer Medical Research Institute. He has a PhD in Computational Neuroscience from UNSW Sydney and post-doctoral training in Mathematical Neuroscience from the University of Pittsburgh.

**Professor Michael Breakspear** is Senior Scientist and Group Leader of the Systems Neuroscience Group at QIMR Berghofer Medical Research Institute. He is interested in the fundamental principles of large-scale brain dynamics, how these arise from cortical architectures, and how they underpin cognitive operations.

Handbook for the
**Brain Dynamics Toolbox**

Version 2017c

Computational Neuroscience
*QIMR Berghofer Medical Research Institute*

# Getting Started

The toolbox requires MATLAB 2014b or newer. It will not work with Octave. Download the sample chapter of the *Handbook for the Brain Dynamics Toolbox* from http://bdtoolbox.blogspot.com and follow the instructions in the *Getting Started* section.

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