

# RatSLAM

RatSLAM is a robot navigation system based on models of the rodent brain. On this page you'll find a list of people working on RatSLAM, as well as links to open source RatSLAM code and a list of RatSLAM publications.

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## Video Overviews

An overview of the theoretical background and design of the RatSLAM system.	A video outlining the capabilities of the open source OpenRatSLAM system.
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## Major Publications

There are approximately 40 RatSLAM related publications, here we have highlighted some of the most important ones. Click on the hyperlinks to go to the publication download page.

### Books / Monographs

M. Milford, *Robot Navigation From Nature*, *Springer Tracts in Advanced Robotics*, Volume 41, Springer-Verlag, 2008.

### Journal Papers

D Ball, S Heath, J Wiles, G Wyeth, P Corke and M Milford, "OpenRatSLAM: an open source brain-based SLAM system", *Autonomous Robots*, 2013.

M. J. Milford, G. Wyeth, "Persistent Navigation and Mapping using a Biologically Inspired SLAM System", *International Journal of Robotics Research*, 29 (9), pp. 1131-1153, 2010.

M. J. Milford, G. Wyeth, "Mapping a Suburb with a Single Camera using a Biologically Inspired SLAM System", *IEEE Transactions on Robotics*, 24 (5), pp. 1038-1053, 2008.

M. J. Milford, J. Wiles, G. Wyeth, "Solving Navigational Uncertainty Using Grid Cells on Robots", *PLoS Computational Biology*, 6 (11), Nov 2010.

### Other papers

G. Wyeth, M. J. Milford, "Spatial Cognition for Robots: Robot Navigation from Biological Inspiration", *IEEE Robotics and Automation Magazine*, 16 (3), 2009.

M. Milford and A. Jacobson, "Brain-Inspired Sensor Fusion for Navigating Robots" in *IEEE International Conference on Robotics and Automation*, Karlsruhe, Germany, 2013

M. J. Milford, G. Wyeth, D. Prasser, "RatSLAM: A Hippocampal Model for Simultaneous Localization and Mapping," in proceedings of the *IEEE International Conference on Robotics and Automation*, New Orleans, United States, 2004.

## Core Researchers

Dr Michael Milford (QUT)

Prof Gordon Wyeth (QUT)

Dr David Ball (QUT)

Prof Janet Wiles (UQ)

## PhD Students

Adam Jacobson

Zetao Chen

Scott Heath

Will Maddern

Arren Glover

## RatSLAM Code

We have released two open source versions of RatSLAM that can be used as part of a robot navigation system or to process your own datasets. A good description of how the code works, how to tune the few parameters and the 3 provided datasets is available in the [OpenRat SLAM paper](#). Please cite this paper if you use the code.

- C++ library version with Robot Operating System (ROS) wrapper and an OpenCv wrapper available from the [Google Code](#). This version is fast and designed to work in real time. Each of the RatSLAM components is cleanly separated allowing easy substitution of your own modules.
- MATLAB version available from our [wiki](#). This version uses many of the built in MATLAB functions to simplify the code. We have used the code to control a robot in real time however the code is more suited to easy offline processing of your datasets.

The code is maintained by [Dr David Ball](#).

## RatSLAM datasets

[Datasets](#)

## Funding Acknowledgements

The RatSLAM project has received funding from various funding bodies, as listed here:

- [Microsoft Research Faculty Fellowship](#) 2013-2014, **\$100,000**
- ARC Discovery Project Grant 2012-2014, "Brain-based Sensor Fusion for Navigating Robots", **\$140,000**
- ARC & NHMRC Thinking Systems: Navigating Through Real and Conceptual Spaces 2006-2011, TS0669699, **\$3,300,000**
- ARC Discovery Project Grant 2009-2011, "Talking with Robots: Evolving Grounded Language for Embodied Agents", **\$200,000**
- ARC Discovery Project Grant 2005-2007, "Enhancing Intelligent Robot Navigation with the Evolution of a Robot-Friendly Language", **\$207,000**
- ARC Discovery Project Grant 2003, "Robot Navigation From Nature: Simultaneous Localisation And Mapping Based On Hippocampal Models ", **\$90,000**

## Media Coverage

[RatSLAM on ABC Television Catalyst Program](#):

[RatSLAM in New Scientist magazine](#):



## Collaborators (Past and Present)

<p><b>Boston University, United States</b> Michael Hasselmo and Ugur M. Erdem Center for Memory and Brain and Graduate Program for Neuroscience at Boston University</p>
<p><b>The University of Nottingham, United Kingdom</b> Robert Oates, Graham Kendall and Jonathan M Garibaldi</p>
<p><b>University of Antwerp, Belgium</b> Rafael Berkvens, Herbert Peremans and Maarten Weyn</p>
<p><b>The Australian National University, Australia</b> Robert Mahony and Felix Schill</p>
<p><b>The University of Queensland, Australia</b> Janet Wiles, Allen Cheung, Peter Stratton and Christopher Nolan</p>
<p><b>Commonwealth Scientific and Industrial Research Organisation, Australia</b> Jonathan Roberts and Kane Usher</p>