

Rachael Stentiford

@rachael.stentiford@uni-wuerzburg.de

0000-0002-8530-7209

rachael-stentiford

EDUCATION

UNIVERSITY OF BRISTOL

WELLCOME TRUST NEURAL DYNAMICS PHD PROGRAMME

Sept 2016 - Sept 2020

Thesis: Contributions of the motor cortex and cerebellum during skilled and adapted forelimb reaching

UNIVERSITY OF EDINBURGH

M.Sc. INTEGRATIVE NEUROSCIENCE

Sept 2015 - Sept 2016

Thesis: The influence of head direction, environment complexity and experience on place field repetition in rats

UNIVERSITY OF BIRMINGHAM

B.Sc. (HONS) NATURAL SCIENCES (COMPUTER SCIENCE AND BIOLOGICAL SCIENCES) FIRST

Sept 2012 - June 2015

Computer Science School Committee (2014) and Staff Student Committee (2013-2015)

ADDITIONAL

COURSERA DEEP LEARNING SPECIALISATION

October 2023 | Online intensive course

AMGEN SCHOLAR | LUDWIG

MAXIMILIANS UNIVERSITÄT (LMU)

Jul 2014-Sept 2014 | Munich, Germany

- Hodgkin Huxley modelling of gerbil auditory system (MATLAB)

REFEREES

PROF ANDREW STRAW

Albert-Ludwigs-Universität Freiburg

@straw@bio.uni-freiburg.de

PROF ANDY PHILIPPIDES

University of Sussex

@andrewop@sussex.ac.uk

PROF PAUL GRAHAM

University of Sussex

@p.r.graham@sussex.ac.uk

DR MARTIN PEARSON

Bristol Robotics Laboratory

@martin.pearson@brl.ac.uk

EXPERIENCE

POSTDOCTORAL RESEARCHER | UNIVERSITÄT WÜRZBURG

Feb 2026 - present | Würzburg, Germany

- Investigating neural mechanisms underlying spatial memory in honeybees.
- Tetrode recordings in tethered flying bees while they acquire and retrieve spatial memory in a flight simulator.

POSTDOCTORAL RESEARCHER | UNIVERSITÄT FREIBURG

Jan 2025 - Dec 2025 | Freiburg, Germany

- High-resolution drone based 3D tracking of long-range flight characteristics in honeybees.

RESEARCH FELLOW IN BIOINSPIRED AI | UNIVERSITY OF SUSSEX

Jan 2023 - present | Brighton, UK

- Developed GENN spiking neural network model of the insect central complex to track heading direction anchored to natural visual scenes
- Designed and built bespoke robotics hardware for data collection
- Established insect vision cross-departmental reading group

POSTDOCTORAL RESEARCH ASSOCIATE IN NEUROROBOTICS | BRISTOL ROBOTICS LABORATORY

Sept 2020 - May 2022 | Bristol, UK

- Developed pyNEST spiking neural network model of the mammalian head direction system combined with biologically plausible machine learning as part of the Human Brain Project

PHD RESEARCHER | UNIVERSITY OF BRISTOL

Sept 2016 - Sept 2020 | Bristol, UK

- Designed novel behavioural task to explore motor adaptation in rodents, including apparatus and control systems
- Developed new micro-drive designs for dual region electrophysiology recordings using CAD and rapid prototyping

MSC RESEARCHER | UNIVERSITY OF EDINBURGH

Sept 2015 - Sept 2016 | Edinburgh, UK

- In vivo electrophysiology of spatial cell types in freely behaving rats

RELEVANT PUBLICATIONS

Stentiford R, Harrap MJM, Titov VV, Lochner S, Straw AD. Precise, individualized foraging flights in honeybees revealed by multicopter drone-based tracking (2026). *Current Biology*.

Stentiford R, Knight JC, Nowotny T, Philippides A, Graham P. Estimating orientation in Natural scenes: A Spiking Neural Network Model of the Insect Central Complex (2024). *PLoS Comp. Bio.*

Stentiford R, Knowles TC, Morin FO, Feldoto B, Ergene D, Pearson MJ. Integrating Spiking Neural Networks and Deep Learning Algorithms on the Neurorobotics Platform (2022). *Living Machines*.

Stentiford R, Knowles TC, Pearson MJ. A Spiking Neural Network Model of Rodent Head Direction calibrated with Landmark Free Learning (2022). *Front. Neurobot.*

Harland B, Grieves RM, Bett D, Stentiford R, Wood ER, Dudchenko PA. Lesions of the Head Direction Cell System Increase Hippocampal Place Field Repetition (2017). *Curr Biol.* 27(17):2706-2712.e2.

COMMUNITY

ALIFE 2023 PEER REVIEW

x10 articles

COMMITTEE INVOLVEMENT

- Research Staff Rep Group
- Engineering and Informatics School Research Committee
- Research IT Committee

AWARDS

WELLCOME TRUST NEURAL DYNAMICS PHD STUDENTSHIP
University of Bristol 2016-2020

UK/EU MASTERS SCHOLARSHIP
University of Edinburgh 2015

AMGEN SCHOLARSHIP (3 MONTH)
LMU 2015

COMPUTER SCIENCE RESEARCH COMMITTEE PRIZE
University of Birmingham 2015

NATURAL SCIENCES DISSERTATION PRIZE
University of Birmingham 2015

IBM TEAM CHALLENGE PRIZE
University of Birmingham 2014

INVITED TALKS AND PRESENTATIONS

CONFERENCE TALKS

- 'Variability of landscape-scale honeybee flight.' (Sept 2025) NIBAI-2025: *Nature of Intelligence, Bridging Animal and Artificial Intelligence*. Sheffield, UK
- 'Variability of landscape-scale honeybee flight.' (Aug 2025) *The Future of Bee and Fly Neuroethology, Modeling, and Robotics*. Berlin, Germany
- 'Insect visual navigation in natural scenes: Maintaining head direction estimates with a spiking neural network model of the central complex and active behavioural strategies.' (July 2024) *CNS 2024. Workshop: From Computational Neuroscience to Biomimetic Embodied AI*. Natal, Brazil.
- 'Insect visual navigation in natural environments: lessons from small-brained cognition' (May 2024). *ICRA 2024. Workshop: Cognition across species: from nature to robotic application*. Yokohama, Japan.
- 'Using robots to explore insect visual navigation' (March 2024). *ARCANI meeting*. Macquarie University, Sydney, Australia.

POSTER PRESENTATIONS

- ICN2024. Berlin, Germany. 2024.
- Sussex AI Launch, Brighton, UK. 2024.
- NEST conference, Virtual. 2021
- 12th FENS Forum of Neuroscience, Virtual. 2020.
- UK Sensory Motor Conference, London, UK. 2019.
- Cerebellum UK, London, UK. 2018.