Robert Gowers

Contact Information

Address	Institute for Theoretical Biology, Humboldt-Universität zu Berlin Philippstraße 13, Haus 4, 10115 Berlin, Germany
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Work Experience

January 2020 — Present
Humboldt University of Berlin, Germany
Postdoctoral Researcher
Researcher in computational neurophysiology in the Institute of Theoretical Biology. Modelling how neuronal morphology affects the spiking type and resulting synchronisation state via mathematical analysis and simulations of nonlinear systems. Simulations often involved reading data of previously imaged neuronal morphologies or from model files. Results shown in *Gowers and Schreiber* (2022) and have been presented at various conferences from 2020 onwards. Sample code used in the mathematical analysis shown in the NeuronBifurcate.jl repository.

Education

Period	**September 2015 — November 2019**
Degrees	**Doctor of Philosophy**, Mathematics of Systems **Master of Science (MSc)**, **Distinction**
University	**University of Warwick**, UK
Description	Modelling how neuronal structure filters stochastic synaptic drive, results published in *Gowers et al* (2020). Also performed analysis on electrophysiological data, as used in *Hill et al* (2021).

Period	**2014 — 2015**
University	**University of Southampton**, UK
Description	Research in electrical materials for resistive memory and teaching in the engineering department. Experimental data used in the papers *Morgan et al* (2016) and *García-Redondo et al* (2016).

Period	**2010 — 2014**
Degree	**Master of Engineering (MEng) Merit**
University	**University of Cambridge**, UK
Description	Electrical and Electronic Engineering. Exchange year 2012-2013 at Massachusetts Institute of Technology (US) in which I conducted experiments in flexible semiconductors, *Smith et al* 2015.

Skills

Programming	Python, Julia, R, C++, Mathematica, LaTeX, MATLAB, Git
Mathematical	Stochastic processes, partial differential equations, network analysis, convex optimisation, dynamical systems analysis, data analysis, machine learning
Other	Intermediate Level German (B1), Basic Japanese

Software Projects

GitHub	rpgowers
Julia	NoisyNeuron.jl, calculation and simulation of spatial stochastic drive NeuronBifurcate.jl, calculation of bifurcations in spiking neuron models Introduction to Computing notebooks for MathSys CDT
Python	Communications examples in convex optimisation library cvxpy: https://www.cvxpy.org/examples/index.html Explanation of the examples given in the article *Gowers et al* (2018)

Conferences and Workshops

Poster Presentations	EMBO Dendrites Conference (**2022**)
	Bernstein Computational Neuroscience Conference (**2019-2022**)
	ICMNS (**2021-2022**)
	Computational Neuroscience Meeting (CNS*) (**2019**)
	JuliaCon (**2018**)
Contributed Talks	ICMNS (**2020**)
Workshops	CapoCaccia Workshop for Neuromorphic Intelligence (**2022**)
	OIST Computational Neuroscience Course (**2017**)

Teaching Experience

Period	**2016 — 2019**
University	**University of Warwick**
Modules	Introduction to Computing (MathSys CDT), Tutorials
	Electronics Lab, Practical Demonstrations
	Data Analysis (MA934), Teaching Assistant
	Analysis I (MA137), Supervisions
	Introduction to Theoretical Neuroscience (MA4G4), Teaching Assistant

Period	**2014 — 2015**
University	**University of Southampton**
Modules	Mechanics, Structures and Materials (FEEG1002), Teaching Assistant, Practical Demonstrations
	Electrical and Electronics Systems (FEEG1004), Practical Demonstrations

Scientific Publications

2022	How neuronal morphology affects neuronal excitability type, RP Gowers, S Schreiber, *bioRxiv*
2021	α-synuclein aggregates increase the conductance of substantia nigra dopamine neurons, an effect partly reversed by the KATP channel inhibitor glibenclamide, E Hill, RP Gowers, MJE Richardson, MJ Wall, *eNeuro 8.1*
2020	Low-rate firing limit for neurons with axon, soma and dendrites driven by spatially distributed stochastic synapses, RP Gowers, Y Timofeeva, MJE Richardson, *PLoS Computational Biology, 16, (4) e1007175*
2018	Communicating with convexity, RP Gowers, SC Al-Izzi, TM Pollington, RJW Hill, K Briggs, *Mathematics Today, 2018, 168*
2016	Switching kinetics of SiC resistive memory for harsh environments, KA Morgan, J Fan, R Huang, L Zhong, RP Gowers, L Jiang, CH de Groot, *AIP Advances 5 (7), 077121*
2016	SPICE compact modeling of bipolar/unipolar memristor switching governed by electrical thresholds, F García-Redondo, RP Gowers, A Crespo-Yepes, M López-Vallejo, L Jiang, CH de Groot, *IEEE Transactions on Circuits and Systems I: Regular Papers*
2015	High-Voltage Organic Thin-Film Transistors on Flexible and Curved Surfaces, MA Smith, RP Gowers, A Shih, AI Akinwande, *IEEE Transactions on Electron Devices 62 (12), 4213-4219*

Referees

Susanne Schreiber	Head of Research Group, s.schreiber@hu-berlin.de
Magnus Richardson	PhD Supervisor, magnus.richardson@warwick.ac.uk
Yulia Timofeeva	PhD Supervisor, y.timofeeva@warwick.ac.uk