

RUSSELL JARVIS, PhD

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EDUCATION

- 2020** **Doctor of Philosophy, Interdisciplinary Neuroscience, Arizona State University, Tempe, USA**
Focus: Neuroinformatics, Computational Neuroscience, HPC
Title: [Towards Neuronal Deep Fakes: Data Driven Optimization of Reduced Neuronal Models](#)
- 2015** **Masters of Biomedical Engineering, La Trobe University, Melbourne, Australia**
Focus: Embedded Programming, Scientific Programming, Model Simulation
Thesis: Information Flow in a Digitally Reconstructed Neural Network
- 2014** **Bachelor of Electronic Engineering, La Trobe University, Melbourne, Australia**
Focus: Analog electronics, Digital Electronics, Embedded Programming, Circuit Simulation
Thesis: A CA1 Hippocampal Micro Circuit

SUMMARY

I recently completed a PhD in Interdisciplinary Neuroscience and I am looking for postdoctoral employment. I am especially interested in working on projects relating to Neuromorphic Hardware, where I can use my skills in High Performance Computing, data visualization, and dashboard application development. Ultimately, I hope to become an established research scientist at an Australian university.

RELEVANT WORK EXPERIENCE

- 2021-June** **Software consultancy**
Software consultancy I made interactive visualisations of odor2action academic social network data using python tools streamlit plotly and holoviews.
- 2016-2020** **Research Assistant, Arizona State University, Tempe, USA**
 In this role, I developed a parallel genetic algorithm interface to the research software NeuronUnit. I also developed, and continue to maintain, a simulator backend for NeuroUnit.
- 2016** **Research Internship, IBM Research, Melbourne, Australia**
 I performed scientific programming, simulation, and parallel model optimization. Specifically, I developed a genetic algorithm to find unknown neural conductance values using NEURON+Python in single compartment neuronal models.
- 2015** **Research Internship, Okinawa Institute of Science and Technology, Okinawa, Japan**
 For this project, I developed software for neuron model description language NineML. I designed and implemented a Kinetics extension for NineML. I also ported scripts for automated parameter fitting of neuronal models to run on a new HPC cluster at OIST.

TEACHING EXPERIENCE

2012 **Laboratory Instructor Neuro Engineering, La Trobe University, Melbourne, Australia**
In this role I assisted students with programming and quantitative neuron physiology problems using the NEURON simulator.

SPECIFIC SKILLS

- Scientific Programming in Languages: Python, Julia.
- Strong mathematics and statistical skills: mathematical neuroscience (e.g. differential equations, partial differential equations); statistical machine learning statistical modeling.
- Fast Numeric Simulation using LLVM technologies Python Numba JIT, Julia and CUDA.
- Natural Language Processing, numerical simulation, genetic algorithm optimization.
- Interactive and static Data Visualization embedded inside interactive dashboard applications.
- LaTeX typesetting

OTHER TRAINING

2015 University of Melbourne Research Bazaar
Short intensive Workshop on D3/Java Script Data Visualization

2011 Erasmus Student Exchange Program, Linkoping University, Sweden
Medical Imaging Informatics and Data Compression

PUBLICATIONS

Peer Reviewed Publications

Gerkin, R. C., Jarvis, R. J., & Crook, S. M. (2018). Towards systematic, data-driven validation of a collaborative, multi-scale model of *Caenorhabditis elegans*. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 373(1758), 20170381.

Final Stages of Preparation:

Jarvis, R.J. & McGurrian P. (2021) Interactive Exploration in the Readability of Research Authors. *Journal of Open Source Software*

Gerkin, R. C., Birgiolas, J., Jarvis, R. J., Omar, C., & Crook, S. M. (2019). NeuronUnit: A package for data-driven validation of neuron models using SciUnit. *bioRxiv*, 665331. Prepared for *Nature*

Conference Abstracts:

Jarvis, R. J., Gerkin, R. C., & Crook, S. M. (2017). Parallel model optimization against experimental neuron physiology data with DEAP and NeuronUnit. *Frontiers in Neuroinformatics Conference Abstract: 10th INCF Congress of Neuroinformatics*.

Gerkin, R. C., Jarvis, R. J., & Crook, S. M. (2018) Multiscale model validation with SciUnit. *BMC Neuroscience*.

Birgiolas, J., Haynes, V., Jarvis, R.J., Gerkin, R., Crook, S.M. (2019), NeuroML-DB: A model sharing resource that promotes rapid selection and reuse. *International Neuroinformatics Coordinating Facility Congress*

DATA DRIVEN DASHBOARD APPLICATIONS

I have worked on a number of projects that involved the development of data driven dashboard applications. The following are two examples:

A Coauthor Network Visualizer builds and display networks for arbitrary research authors.

<https://share.streamlit.io/mcgurgurr/scienceaccess/app.py>

An application that queries and displays the readability of any chosen author of interest against the readability of many pre-established science publications.

PRESENTATIONS

Jarvis, R.J., *A better file format for representing neuron morphology*, 2015, Okinawa Institute of Science and Technology Seminar, Okinawa, Japan

Jarvis, R., Crook, S.M., Gerkin, R.C., *Parallel Model Optimization against Experimental Data with NeuronUnit*, 2017 INCF Neuroinformatics Congress, Kuala Lumpur, Malaysia

Jarvis, R., Crook, S.M., Gerkin, R.C., *Model validation and optimization*, Mathematical Biology Seminar, School of Mathematical and Statistical Sciences, Arizona State University, 2018.

MACHINE LEARNING EXPERIENCE

Besides my PhD thesis which was about using Parallel Genetic Algorithms to solve multi-objective optimisation. I have undertaken the following recent machine learning training units at Arizona State University: Statistical Machine Learning STP 598, Mathematical Neuroscience APM 531, Data Analysis in Neuroscience NEU 591.

REFERENCES

PhD

Professor James Abbas
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School of Biological and Health Systems Engineering
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Professor Yi Zhou
Director, Laboratory of Auditory Computation and Neurophysiology
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Private Consulting Work: Data Visualization and Application Developer

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