RUSSELL JARVIS, PhD

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Developer Portfolio https://russelljjarvis.github.io/home

EDUCATION

2021 **Julia Flux, machine learning course, Julia Academy, online (certificate).**
Focus: Machine learning, GPU, Multi-processing.

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

Last year, I completed a PhD in Computational Neuroscience. Currently, I am looking for employment in machine learning and data engineering disciplines to use my skills in data processing and machine Learning, besides my PhD thesis, which was about using Parallel Genetic Algorithms to solve multi-objective optimisation. I have undertaken the following machine learning training units at Arizona State University: Statistical Machine Learning STP 598, Data Analysis in Neuroscience NEU 591; currently, I am also studying a certificate course in machine learning in the language Julia.

RELEVANT WORK EXPERIENCE

2021-June **Freelance 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.

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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 the Languages: Python, Julia, R.
- Natural Language Processing in Python NLTK
- Fast Numeric data manipultation using LLVM technologies Python: Dask ,Numba JIT and the language Julia.
- Genetic algorithm optimization.
- Interactive and static Data Visualization embedded inside interactive dashboard applications.
- Strong mathematics and statistical skills: Numerical simulation (e.g. differential equations, partial differential equations).

VOLUNTEER WORK

2019 **Night of the Open Door, ASU science outreach program**
Leading up to this science outreach evening, I convinced my laboratory to visualize 3D neuron cell structure in virtual reality. Since our lab was a theoretical/computational lab having a virtual reality product to show people greatly assisted with our labs capacity to communicate abstract knowledge.

2010 **Tutor Chess Ideas**
Volunteering at chess ideas involved teaching chess to children. Volunteering at Chess ideas was interesting and challenging.

2001-2004 **Friends of the Earth, Cooperative Cafe**
At friends of the Earth Bookstore and Cafe Smith st Collingwood, I was involved with food preparation, managing stock for bulk food, and customer service.

2000–2005 **Willing Workers On Organic Farms**
Applying permaculture principles to create long term food gardens on a small to medium scale.

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. & McGurrin 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*

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.

REFERENCES

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