Daniel Fryer

PhD Candidate | Sessional Lecturer | Research Software Engineer

School of Mathematics and Physics, The University of Queensland

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Complex data analyses are used in every industry and scientific field, but so many of the results are unintuitive and difficult to interpret. My aim is to make complex models more transparent, understandable and explainable, through research at the forefront of explainable AI, as well as through teaching and communication in general. I enjoy writing code (including software packages and libraries) in R, Python and Julia. I'm comfortable working theoretically, but I always want to apply theoretical methods to important real world problems. Aside from research, I teach various courses, and serve as a council member and Early Career and Student Statisticians' Representative at the Statistical Society of Australia.

Education

The University of Queensland · *Saint Lucia, QLD, AU*
PhD | Statistics and Mathematics · *2019–Current*
- Explaining, exploring and clustering with non-linear and complex data

La Trobe University · *Melbourne, VIC, AU*
Bachelor of Science | Mathematics and Statistics with First Class Honours (Weighted Average Mark: 97) · *2014–2018*
- Random fields: Long memory, and R for cosmology

Experience

Monash University · *Melbourne, Victoria, AU*
Research Assistant · *2020–Current*
- Politics & International Relations

The University of Queensland · *Saint Lucia, QLD, AU*
Casual Instructor | Department of Mathematics and Physics · *2020–Current*
- Master's of Data Science project support

University of Auckland · *Auckland, Auckland Region, NZ*
Course Instructor | New Zealand Social Statistics Network · *2018–Current*
- Introduction to SQL for academics and professionals

La Trobe University · *Melbourne, VIC, AU*
Sessional Lecturer | Department of Mathematics and Statistics · *2018–Current*
- Master's level meta-analysis | Master's level database fundamentals

The University of Queensland · *Saint Lucia, QLD, AU*
Research Assistant | Department of Mathematics and Physics · *2019–2019*
- Digital phenotyping for transdiagnostic clustering and psychiatric prognosis

La Trobe University · *Melbourne, VIC, AU*
Research Software Developer | Department of Mathematics and Physics · *2018–2019*
- Spherical data analysis in R on the HEALPix grid

Service

Statistical Society of Australia · *Melbourne, VIC, AU*
Council Member | Early Career and Student Statisticians' Representative · *2020–Current*

Dimension Reduction and Meta Analysis Research Group · *Melbourne, VIC, AU*
Member | Website Maintainer · *2017–Current*

Campus Consultancy · *Melbourne, VIC, AU*
Senior Mentor and Founding Member · *2017–2019*

Research School on Statistics and Data Science · *Melbourne, VIC, AU*
Peer Reviewer (3 articles) · *2019–2019*

Journal of Open Source Software	*Melbourne, VIC, AU*
Peer Reviewer (1 article)	*2019–2019*
Victorian State Emergency Services	*Melbourne, VIC, AU*
Emergency First Responder	*2017–2018*
La Trobe University Mathematics and Statistics Society	*Melbourne, VIC, AU*
Vice President	Newsletter Editor	*2016–2016*
In2Science	*Melbourne, VIC, AU*
Mentor	Mathematics School Outreach	*2015–2015*

Awards

Vice Chancellor's Sessional Teaching Award	*Melbourne, VIC, AU*
La Trobe University, NA	*2020*
**Three Minute Thesis	People's Choice**	*Saint Lucia, QLD, AU*
The University of Queensland, School of Mathematics and Physics	*2020*
**Pitching Research Competition	Best Written and Oral Pitch University-Wide**	*Saint Lucia, QLD, AU*
The University of Queensland, Business School	*2019*
Pro Vice Chancellor's Commendation (awarded four times)	*Melbourne, VIC, AU*
La Trobe University, University-Wide	*2018*
**Department Prize in Fourth Year Statistics	Best Performing Student**	*Melbourne, VIC, AU*
La Trobe University, Department of Mathematics and Statistics	*2018*
**David Myer's Medallion	La Trobe's most prestigious undergraduate award**	*Melbourne, VIC, AU*
La Trobe University, College of Science, Health and Engineering	*2018*
**Silver Scholarship	Community Involvement and Dedication to Mathematics**	*Melbourne, VIC, AU*
La Trobe University Student Union, University-Wide	*2017*
**Department Prize in Third Year Statistics	Best Performing Student**	*Melbourne, VIC, AU*
La Trobe University, Department of Mathematics and Statistics	*2016*
Prof CJ Eliezer Prize in Second Year Mathematics| Best Performing Student	*Melbourne, VIC, AU*
La Trobe University, Department of Mathematics and Statistics	*2015*
**Prof Jim Morrison Prize in Chemistry	Best Performing Student (awarded twice)**	*Melbourne, VIC, AU*
La Trobe University, School of Molecular Sciences	*2014*
**La Trobe Award in Community Engagement	Volunteer Efforts**	*Melbourne, VIC, AU*
La Trobe University, University-Wide	*2014*

Publications

Pipeline

D Fryer, H Nguyen, P Castellazzi	*arXiv*
k-means on Positive Definite Matrices, and an Application to Clustering in Radar Image Sequences	*2020*
D Fryer, I Strümke, H Nguyen	*arXiv*
Explaining the data or explaining a model? Shapley values that uncover non-linear dependencies	*2020*
M Terrett, D Fryer, T Doody, H Nguyen, P Castellazzi	*arXiv*
SARGDV: Efficient identification of groundwater-dependent vegetation using synthetic aperture radar	*2020*
HD Nguyen, DV Fryer	*arXiv*
A binary-response regression model based on support vector machines	*2020*

Published

D Fryer, M Li, A Olenko	*The R Journal*
rcosmo: R Package for Analysis of Spherical, HEALPix and Cosmological Data	*2020*

D Fryer, M Li, A Olenko

rcosmo: Cosmic Microwave Background data analysis

Astrophysics Source Code Library, ascl:

2020

D Fryer, I Strümke, H Nguyen

Shapley Value Confidence Intervals for Attributing Variance Explained

Frontiers in Applied Mathematics and Statistics

2020

D Fryer, A Olenko

Spherical Data Handling and Analysis with R package rcosmo

Research School on Statistics and Data Science

2019

D Fryer, H Nguyen, P Orban

studentlife: Tidy Handling and Navigation of a Valuable Mobile-Health Dataset

Journal of Open Source Software

2019

Presentations and events

IEEE Symposium Series on Computational Intelligence

k-means on positive definite matrices, and an application to clustering in radar image sequences

Brisbane

2020

- Talk and conference publication

Statistical Society of Australia

Early Career Industry Showcase, Chief Event Organiser

Melbourne

2020

- 6 panelists, 180 attendees https://vimeo.com/ssavic/20200922-showcase

Victorian Research Students Meeting in Probability and Statistics

Explaining, exploring and clustering with non-linear and complex data

Melbourne

2020

- Building the Melbourne research student community

UQ Research Video Pitch

Forecasting Psychiatric Symptoms with Digital Phenotyping

St Lucia

2020

- First prize. youtu.be/h-m8QwLq29Y

UQ Three Minute Thesis Presentation

Machine Learning: The Big Black Box

St Lucia

2020

- People's choice award. vimeo.com/434959101

RSSDS2019 Poster Presentation

Spherical Data Handling and Analysis with R package rcosmo

Melbourne

2019

- Poster and Springer book chapter

UseR!2018 Conference

Cosmic Microwave Background data analysis with R

Brisbane

2018

- R package published on CRAN. https://youtu.be/7KBsguOlEHs

Australian Mathematical Sciences Institute Summer Research School

Functionals of long-range dependent fields and Hermite distributions

Melbourne

2017

- Summer Research Scholarship recipient. vrs.amsi.org.au/daniel-vidali-fryer-2017/

UNSW Statistical Challenges in Astronomy

Lighting talk: a new R package for cosmology

Sydney

2017

- Fostering new collaborations in statistics and astronomy