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 often with results that are hard to interpret and unintuitive. I aim to increase the transparency of complex models - making them 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, Julia and SQL. I enjoy theoretical work, and I always want to apply theoretical methods to overcome real world challenges. Aside from research, I practice relational database design, data integration, software engineering, and I teach various courses in both statistics and computer science. I currently serve as a council member and Communications Officer 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 | Communications Officer — *2020–Current*

Dimension Reduction and Meta Analysis Research Group — *Melbourne, VIC, AU*

Member | Website Maintainer — *2017–Current*

Australian & New Zealand Journal of Statistics — *Melbourne, Victoria, AU*

Peer Reviewer (1 article) — *2020–2020*

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, 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, D 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 — *Astrophysics Source Code Library, ascl:* 2020

rcosmo: Cosmic Microwave Background data analysis

D Fryer, I Strümke, H Nguyen — *Frontiers in Applied Mathematics and Statistics* 2020

Shapley Value Confidence Intervals for Attributing Variance Explained

D Fryer, H Nguyen, P Castellazzi — 2020

k-means on Positive Definite Matrices, and an Application to Clustering in Radar Image Sequences

D Fryer, A Olenko — *Research School on Statistics and Data Science* 2019

Spherical Data Handling and Analysis with R package rcosmo

D Fryer, H Nguyen, P Orban — *Journal of Open Source Software* 2019

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

Presentations and events

IEEE Symposium Series on Computational Intelligence — *Brisbane* 2020

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

- Talk and conference publication

Statistical Society of Australia — *Melbourne* 2020

Early Career Industry Showcase, Chief Event Organiser

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

Victorian Research Students Meeting in Probability and Statistics — *Melbourne* 2020

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

- Building the Melbourne research student community

UQ Research Video Pitch — *St Lucia* 2020

Forecasting Psychiatric Symptoms with Digital Phenotyping

- First prize. youtu.be/h-m8QwLq29Y

UQ Three Minute Thesis Presentation — *St Lucia* 2020

Machine Learning: The Big Black Box

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

RSSDS2019 Poster Presentation — *Melbourne* 2019

Spherical Data Handling and Analysis with R package rcosmo

- Poster and Springer book chapter

UseR!2018 Conference — *Brisbane* 2018

Cosmic Microwave Background data analysis with R

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

Australian Mathematical Sciences Institute Summer Research School — *Melbourne* 2017

Functionals of long-range dependent fields and Hermite distributions

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

UNSW Statistical Challenges in Astronomy — *Sydney* 2017

Lighting talk: a new R package for cosmology

- Fostering new collaborations in statistics and astronomy