Rex Parsons

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Education

PhD (Statistics) - Queensland University of Technology **2020–Feb 2024**
Thesis: High dimensional data for predicting inpatient falls.
Supervisors: A/Prof Susanna Cramb, Prof Steven McPhail and Dr Ahmad Abdel-hafez.

MSc (Medical Statistics) - University of Newcastle **2019–2020**
GPA: 6.88/7.

BSc (Biomedical Science) and Honours (Neuroscience) - University of Queensland **2015–2017**
Thesis: The Role of Melatonin on Hippocampal Rhythmicity.
Supervisors: Dr Oliver Rawashdeh and Dr Prasad Chunduri.

Employment

Data Scientist **Jun 2023–Present**
Health Policy Analysis *Sydney, Australia*
- Shiny app (for interactive mapping and resource forecasting) and R package development.
- Statistical analyses using large datasets for government projects including unmet needs analysis, healthcare funding model development, and healthcare model evaluations.

Senior Research Assistant **Nov 2020–Present**
QUT (Centre for Data Science and Australian Centre for Health Services Innovation) *Brisbane, Australia*
Several roles on a near-continual basis for a range of projects where I performed statistical analyses.
For each appointment, supervisor's name and brief description of work:
- Nicole White; (1) Risk factors associated with COVID-19 with the COVID Critical Research Group.
- Nicole White; (2) Interrupted time series analysis and risk model implementation projects at large hospital network.
- Nicole White; (3) Meta-research on registered clinical prediction model studies.
- Gentry White; Development of (DSSP), an R package for fitting Bayesian spatial models by direct sampling.
- Susanna Cramb; Spatial data analysis and visualisations of access to care with R, presented as a shiny app.
- Sanjeewa Kularatna; Health economic evaluation of policy change by the Department of Veteran Affairs.

Research & Development Scientist **Mar 2020–Aug 2020**
Ellume *Brisbane, Australia*
- Redesigned the algorithm development workflow to improve performance and reduce time for optimisation.
- Algorithm developed was used for FDA application for serological diagnostic and was the best performing diagnostic test approved by FDA at the time of approval.

Healthcare Data Analyst **Jun 2019–Mar 2020**
City Fertility *Brisbane, Australia*
- Dashboard development (shiny) with direct odbc for up-to-date analytics on KPIs.
- Streamlined monthly reporting processes for marketing team using R.
- Data extraction, cleaning and statistical analysis for clinician-led research projects and prediction model development.

Project Coordinator **Mar 2018–Jun 2019**
UnitingCare Medical Imaging *Brisbane, Australia*
- Occupational lung disease and radiology research (data collection and analyses).
- Questionnaire development with Qualtrics.
- Preparation of grant applications and reports for funding bodies.

Research Assistant **Jan 2016–Mar 2018**
Ellume *Brisbane, Australia*
- Worked in a multidisciplinary team to develop immunoassays for diagnostic medical devices.

Technical Skills

Proficient: R, Shiny, Data Analysis and Visualisation, Statistical and Prediction Modelling, Functional Programming
Competent: Python, SQL & duckdb, Git & GitHub

Statistical Software Development

`GLMMcosinor` **CRAN and rOpenSci January 2024**
- An R package to fit a cosinor model to rhythmic data using the glmmTMB framework.
- Extends cosinor modelling to allow for GLMs and mixed models.

`hpa.spatial` **pkg site**
- An R package for accessing and manipulating spatial data, focusing on the Australian (health) context.

`predictNMB` **CRAN and rOpenSci March 2023**
- An R package that allows the user to perform simulations to estimate the cost-effectiveness of using a prediction model to assign a healthcare intervention.
- Can be used to determine whether or when a clinical prediction model or clinical decision support system may be worthwhile before development or implementation.

`DSSP` **CRAN June 2022**
- An R package that allows users to fit Bayesian spatial models with direct sampling (*fast*), optimised with C++.
- Draws samples from the direct sampling spatial prior model which is 100-1000 times faster than MCMC.

`simMetric` **CRAN January 2022**
- An R package that provides functions to calculate useful metrics (and their Monte Carlo standard errors) for the assessment of statistical methods in simulation studies.
- Allows for easy integration with other simulation study frameworks and the tidyverse-style workflow.

`circacompare` **CRAN February 2021**
- An R package that allows users to analyse circadian datasets using nonlinear regression models.
- Documented with a vignette; also available as a shiny app and in python.

Teaching

Queensland University of Technology **Brisbane, Australia**
- PUB358: Digital Health Perspectives (Guest Lecturer) Semester 1, 2023
- PUN108: Clinical Informatics for Intelligent Healthcare (Guest Lecturer) Semester 2, 2021
- SEB113: Quantitative Methods in Science (Sessional Tutor) Semester 2, 2021
- MXN500: Statistical Data Analysis (Sessional Tutor) Semester 1, 2021

Selected Papers

1. *N White,* **R Parsons**, *G Collins, A Barnett* **BMC Med (2023)**
   Evidence of questionable research practices in clinical prediction models.
2. *RD Blythe,* **R Parsons**, *AG Barnett, SM McPhail, NM White* **J Clin Epi (2023)**
   Vital signs-based deterioration prediction model assumptions can lead to losses in prediction performance.
3. **R Parsons**, *RD Blythe, AG Barnett, SM Cramb, SM McPhail* **JOSS (2023)**
   predictNMB: An R package to estimate if or when a clinical prediction model is worthwhile.
4. **R Parsons**, *RD Blythe, SM Cramb, SM McPhail* **JAMIA (2023)**
   Integrating economic considerations into cutpoint selection may help align clinical decision support towards value-based healthcare.
5. **R Parsons**, *R Parsons, N Garner, H Oster, O Rawashdeh* **Bioinformatics (2020)**
   CircaCompare: a method to estimate and statistically support differences in mesor, amplitude and phase, between circadian rhythms.

Funding and Awards

1. Venables Award runner-up for predictNMB R package development. **(2023)**
2. Student travel prize winner at the International Conference on Health Policy Statistics. **(2023)**
3. SuperHERO award winner for outstanding engagement/collaboration. **(2021)**
4. Queensland AI Hub Medical Datathon winning team. **(2020)**
5. Digital Health CRC Industry Scholarship Recipient: $45,000 p.a. for four years during PhD studies. **(2020)**