Rex Parsons

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Education

PhD (Statistics) - Queensland University of Technology **2020–Feb 2024**
Thesis: Clinical Prediction Models to Improve Patient Safety and Value of Care.
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

Senior Data Scientist **Jun 2023–Present**
Nous Group (Health Policy Analyses until acquired by Nous in August 2024) *Brisbane, Australia*
- Developed a market reference price and relativities between diagnosis related groups using millions of inpatient claims data for middle eastern country to improve negotiations between healthcare payers and providers.
- Developed a shiny app to visualise unmet need of psychosocial care across Australia by region to better inform geographic need for services.

Senior Research Assistant **Nov 2020–Dec 2023**
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: Several projects relating to clinical trials, meta research and clinical prediction models.
- 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 traumatic brain injury care using 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 database connectivity to report insights relating to 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 (questionnaire development, data collection and analyses).
- 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. *R Blythe*, **R Parsons**, *AG Barnett*, *D Cook*, *SM McPhail*, *NM White* **Crit Care (2024)**
   Prioritising deteriorating patients using time-to-event analysis: prediction model development and internal–external validation.
2. *N White*, **R Parsons**, *G Collins*, *A Barnett* **BMC Med (2023)**
   Evidence of questionable research practices in clinical prediction models.
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.