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*
- R package and client-facing shiny app development.
- Statistical analyses using large datasets for policy-oriented projects including unmet needs analysis, healthcare funding model development, and healthcare model evaluations.

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; (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

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)**

Grants

1. **Emergency Medicine Foundation** **$37,667 (2022)**
   (Associate Investigator) Applications of a novel neurosurgical service accessibility index to improve emergency care of people sustaining a road trauma-related traumatic brain injury in Queensland.
2. **ACARP** and **DNRME** **$315,770 (2019)**
   A Clinical, Radiological and Occupational Review of Coal Mine Dust Lung Disease in Queensland.

Outreach and community involvement

- Statistics Society of Australia - QLD Branch Council member & student representative. **2022–Present**
- Conference chair and organising committee member of SSA and NZSA ECSS Miniconference. **2022**
- Peer facilitator for Peers & Pizza: a regular HDR mental health and wellbeing event. **2020–2022**
- Member of AusHSI HDR working group. **2020–2022**
- Student respresentative on AusHSI management committee. **2020–2022**

Published Papers

1. *N White*, **R Parsons**, *D Borg, G Collins, A Barnett* **J Clin Epi (2024)**
   Planned but ever published? A retrospective analysis of clinical prediction model studies registered on clinicaltrials.gov since 2000.
2. *L De Assis, L Harder, J Lacerda*, **R Parsons**, *M Kaehler, I Cascorbi, I Nagel,* **Sci Rep (2024)**
   O Rawashdeh, J Mittag, H Oster
   Tuning of liver circadian transcriptome rhythms by thyroid hormone state in male mice.
3. *N White*, **R Parsons**, *G Collins, A Barnett* **BMC Med (2023)**
   Evidence of questionable research practices in clinical prediction models.
4. *B Abell, S Naicker, D Rodwell, T Donovan, A Tariq, M Baysari*, **R Parsons**, **Implement Sci (2023)**
   R Blythe, SM McPhail
   Identifying barriers and facilitators to successful implementation of computerized clinical decision support systems in hospitals: a NASSS framework-informed scoping review.
5. *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.
6. **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.
7. **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.
8. *O Durunna, JA Carroll, JW Dailey, D Damiran, KA Larson, E Timsit*, **R Parsons**, **Front Genet (2023)**
   G Manafiazar, HA Lardner
   Phenotypic and genetic parameters of circadian rhythms from core body temperature profiles and their relationships with beef steers' production efficiency profiles during successive winter feeding periods.
9. *J-F Harmsen, M van Weeghel*, **R Parsons**, *GE Janssens, J Wefers, D van Moorsel,* **Cell Rep (2022)**
   J Hansen, J Hoeks, MKC Hesselink, RH Houtkooper, P Schrauwen
   Divergent remodeling of the skeletal muscle metabolome over 24h between young, healthy men and older, metabolically compromised men.
10. *S Cramb, A Rolley, CR Gibbs*, **R Parsons**, *C Hayden, A Woodley,* **QUT ePrints (2022)**
    K Vallmuur, J Warren
    Injury Treatment and Rehabilitation Accessibility Queensland Index (iTRAQI) Pilot for Moderate-to-Severe Traumatic Brain Injury: Technical report.
11. **R Parsons**, *RD Blythe, SM Cramb, SM McPhail* **Gerontology (2022)**
    Inpatient Fall Prediction Models: A Scoping Review.
12. *R Blythe*, **Parsons R**, *NM White, D Cook, SM McPhail* **BMJ Qual Saf (2022)**
    A scoping review of real-time automated clinical deterioration alerts and evidence of impacts on hospitalised patient outcomes.
13. *LVM de Assis, L Harder, JT Lacerda*, **R Parsons**, *M Kaehler, I Cascorbi, I Nagel,* **eLife (2022)**
    O Rawashdeh, J Mittag, H Oster
    Rewiring of liver diurnal transcriptome rhythms by triiodothyronine (T3) supplementation.
14. **R Parsons**, *SM Cramb, SM McPhail* **BMJ Open (2021)**
    Clinical prediction models for hospital falls: a scoping review protocol.
15. *Bassi GL, JY Suen, N White, HJ Dalton, J Fanning, A Corley, S Shrapnel,* **Crit Care Explor (2021)**
    S Hinton, S Forsyth, **R Parsons**, *JG Laffey, E Fan, R Bartlett, D Brodie, A Burrell, D Chiumello, A Elhazmi, G Grasselli, C Hodgson, S Ichiba, C Luna, E Marwali, L Merson, S Murthy, A Nichol, M Panigada, P Pelosi, A Torres, PY Ng, M Ogino, Fraser JF*
    Assessment of 28-Day In-Hospital Mortality in Mechanically Ventilated Patients With Coronavirus Disease 2019: An International Cohort Study.
16. *GH Goh, PJ Mark, D Blache, D Binks*, **R Parsons**, *O Rawashdeh, SK Maloney* **J Therm Biol (2021)**
    Diet-altered body temperature rhythms are associated with altered rhythms of clock gene expression in peripheral tissues in vivo.
17. **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.

18. **R Parsons**, *K Newbigin, D Deller, R Edwards, R McBean* **Respirology (2019)**
Stonemasons with silicosis: Preliminary findings and a warning message from Australia.
19. *C Haran, R McBean,* **R Parsons**, *D Wong* **J Med Imaging Radiat Oncol (2019)**
Five-year trends of bone scan and prostate-specific membrane antigen positron emission tomography utilization in prostate cancer: A retrospective review in a private centre.
20. *R McBean, B O'Kane,* **R Parsons**, *D Wong* **J Med Imaging Radiat Oncol (2019)**
Lu177-PSMA therapy for men with advanced prostate cancer: Initial 18 months experience at a single Australian tertiary institution.
21. **Wesley Dust Disease Research Centre.** **ACARP (2019)**
A Clinical, Radiological and Occupational Review of Coal Mine Dust Lung Disease in Queensland.
22. *O Rawashdeh,* **R Parsons**, *E Maronde* **Neural Plast (2018)**
Clocking in time to gate memory processes: The circadian clock is part of the ins and outs of memory.

Conferences

1. **R Medicine (Virtual)** **1-hour Demo (2023)**
predictNMB: An R Package To Estimate if or When a Clinical Prediction Model Is Worthwhile.
2. **International Conference on Health Policy Statistics (Scottsdale (AZ), USA)** **Poster (2023)**
Integrating economic considerations into clinical decision support systems to facilitate value-based care.
3. **SAFETY (Adelaide, Australia)** **Speaker (2022)**
Development and validation of inpatient fall prediction models using digital hospital systems.
4. **Digital Health Summit (Sydney, Australia)** **Poster (2022)**
predictNMB: An R package to estimate whether or when developing your prediction model is worthwhile.
5. **Impact Makers (Brisbane, Australia)** **Speaker (2021)**
Inpatient fall prediction models: a scoping review.
6. **Pacific Society for Reproductive Medicine (Pattaya, Thailand)** **Poster (2019)**
A machine learning approach to embryo selection in the context of In Vitro Fertilisation (IVF).
7. **Australasian Chronobiology Society (Brisbane, Australia)** **Speaker (2018)**
A method to statistically validate observed differences between circadian rhythms.