Rex Parsons

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 GitHub: RWParsons LinkedIn: rexwp

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

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. *P Kim, N Garner, A Tatkovic, **R Parsons**, P Chunduri, J Vukovic, M Piper, M Pfeffer, M Weiergräber, H Oster, O Rawashdeh*   **npj Biol Timing Sleep (2024)**
Melatonin's role in the timing of sleep onset is conserved in nocturnal mice.

2. *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.

3. *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.

4. *L De Assis, L Harder, J Lacerda, **R Parsons**, M Kaehler, I Cascorbi, I Nagel, O Rawashdeh, J Mittag, H Oster*   **Sci Rep (2024)**
Tuning of liver circadian transcriptome rhythms by thyroid hormone state in male mice.

5. *N White, **R Parsons**, G Collins, A Barnett*   **BMC Med (2023)**
Evidence of questionable research practices in clinical prediction models.

6. *B Abell, S Naicker, D Rodwell, T Donovan, A Tariq, M Baysari, **R Parsons**, R Blythe, SM McPhail*   **Implement Sci (2023)**
Identifying barriers and facilitators to successful implementation of computerized clinical decision support systems in hospitals: a NASSS framework-informed scoping review.

7. *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.

8. ***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.

9. ***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.

10. *O Durunna, JA Carroll, JW Dailey, D Damiran, KA Larson, E Timsit, **R Parsons**, G Manafiazar, HA Lardner*   **Front Genet (2023)**
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.

11. *J-F Harmsen, M van Weeghel, **R Parsons**, GE Janssens, J Wefers, D van Moorsel, J Hansen, J Hoeks, MKC Hesselink, RH Houtkooper, P Schrauwen*   **Cell Rep (2022)**
Divergent remodeling of the skeletal muscle metabolome over 24h between young, healthy men and older, metabolically compromised men.

12. *S Cramb, A Rolley, CR Gibbs, **R Parsons**, C Hayden, A Woodley, K Vallmuur, J Warren*   **QUT ePrints (2022)**
Injury Treatment and Rehabilitation Accessibility Queensland Index (iTRAQI) Pilot for Moderate-to-Severe Traumatic Brain Injury: Technical report.

13. ***R Parsons**, RD Blythe, SM Cramb, SM McPhail*   **Gerontology (2022)**
Inpatient Fall Prediction Models: A Scoping Review.

14. *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.

15. *LVM de Assis, L Harder, JT Lacerda, **R Parsons**, M Kaehler, I Cascorbi, I Nagel, O Rawashdeh, J Mittag, H Oster*   **eLife (2022)**
Rewiring of liver diurnal transcriptome rhythms by triiodothyronine (T3) supplementation.

16. ***R Parsons**, SM Cramb, SM McPhail*   **BMJ Open (2021)**
Clinical prediction models for hospital falls: a scoping review protocol.

17. *Bassi GL, JY Suen, N White, HJ Dalton, J Fanning, A Corley, S Shrapnel, 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*   **Crit Care Explor (2021)**

Assessment of 28-Day In-Hospital Mortality in Mechanically Ventilated Patients With Coronavirus Disease 2019: An International Cohort Study.

18. *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.

19. **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.

20. **R Parsons**, *K Newbigin, D Deller, R Edwards, R McBean*   **Respirology (2019)**
Stonemasons with silicosis: Preliminary findings and a warning message from Australia.

21. *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.

22. *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.

23. **Wesley Dust Disease Research Centre.**   **ACARP (2019)**
A Clinical, Radiological and Occupational Review of Coal Mine Dust Lung Disease in Queensland.

24. *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.