

Lachlan Webb, BSc (Hons)

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Profile

I am an early career biostatistician who is near completion of a PhD in mathematical modelling and computational neuroscience. I have developed strong statistical skills in my position in a statistical consulting unit at QIMR Berghofer, where I have had the opportunity to apply them to medical research, in particular in clinical trials and human malaria research. I routinely work in a cross-disciplinary approach of statistical analysis with large mathematical elements. My skills in computation, data management, and analysis allow me to be a valued member of collaborations with medical researchers.

Education:

2020- ongoing **PhD**

Institute: QIMR Berghofer Medical Research Institute and University of Queensland
Topic: Modelling Infant Sleep Brain Activity
Supervisors: Dr. James Roberts and Dr. Nathan Stevenson

2016-2017 **Bachelor of Science (Honours) (Applied Mathematics and Statistics)**

Institute: University of Southern Queensland
Awarded 2017 – First Class Honours, University Medal
Thesis topic: Applying the tau-leaping method to create an efficient Reaction-Diffusion simulation program
Supervisors: Dr. Trevor Langlands
Achievement: University Medal

2013-2015 **Bachelor of Science (Mathematics and Statistics)**

Institute: University of Southern Queensland
Awarded 2016 – Graduated with Distinction,
Achievement: Faculty Medal and Valedictorian

Employment History

November 2016 – present

Biostatistician

Statistics Unit, QIMR Berghofer Medical Research Institute, Herston, QLD

Working with a team of biostatisticians to provide statistical consultation and service to researchers and clinicians at QIMR Berghofer (QIMR-B) and Metro North Hospital and Health Service (MNHHS). Involved in studies in multiple areas including malaria, anaesthesia, women's health and maternal foetal medicine, and mental health. I had a major role with The Human Malaria Modelling Unit (HMMU) in QIMR-B where I was involved with clinical trial design and analysis, and other exploratory research associated with the elimination of malaria. I have been involved in the development, organising, and presenting of many educational workshops for QIMR-B researchers and hospital clients. Content from those workshops can be found on QIMR Berghofer's YouTube channel, and on GitHub alongside a

simple R package I developed with a colleague. Recently I have been involved in a number of mental health clinical trials, testing the effectiveness novel therapies for Obsessive-Compulsive Disorder (OCD) and Tourette's Syndrome.

Major Projects:

Calculating parasite clearance (Clinical Trial role):

Managing data and performing a published method to analyse the malaria parasite clearance post anti-malarial treatment. Producing a report to regulatory standard for inclusion in the clinical trial results. Work published in a number of clinical trial papers.

Modelling Kinetics of Plasmodium biomarkers (Research project):

Involved in updating a published model of PfHRP2 kinetics. Roles included collating data, writing code for the new model, and updating the final report. I have presented and shown work to different audiences. I led the analysis of a cohort of subjects for model validation. Worked as part of a team extending this work to other biomarkers and *Plasmodium* species. Published in Marquart et al (2022).

Modelling parasite growth in humans (Research project):

My role in this project included: assisting in the analysis of malaria parasite growth rates from clinical trial data, assisting in the meta-analysis of other studies, creating databases, performing extensive sensitivity analysis on models, and writing and reviewing the manuscript. Published in Wockner et al (2020).

Typical consulting project:

Consulting with a client typically involves reviewing a project proposal, a face-to-face or online consultation with the client, establishing an analysis plan, data cleaning, analysis, and writing a report. Consultations continue until the project is finished, which frequently includes the writing and review of a peer-reviewed publication.

February 2022 – November 2022

University Lecturer, Tutor, and Marker

School of Maths, Physics and Computing, University of Southern Queensland

Provided in lectures and tutorials, both in person and online, for first year mathematics and statistics subjects. Teaching to a variety of students, including: science, health, business and computing students. Marked assignments, and fulfilled course coordinator role.

PhD

My PhD work investigates the ways brain activity, specifically sleep activity, changes during the early years of life, to understand how that links with development. I have utilised existing physiologically based mathematical models of adult sleep regulation, and adapted them to empirical infant and child sleep data, to understand how the subcortical process change with age and development.

During my studies, I have also developed and published an EEG artefact detector specifically for use on neonatal EEG using residual neural networks. Published in Webb et al (2021).

Skills

– Personal and Professional

I have developed leadership, teamwork and communication skills throughout a variety of positions, including supervisory and teaching roles at UniSQ. I have learnt cross-disciplinary communication skills through my current position at QIMR-B. I understand what it is to be a professional representative of where I work, and to reflect the values of the workplace in my actions.

– Industry

I have developed a variety of quantitative skills in my undergraduate studies, work at QIMR-B and my PhD studies, including: statistical analysis, data cleaning and management, research design, computational mathematics and simulation, mathematical modelling, machine learning, and Bayesian analysis. I have experience in the health research industry, specifically with clinical researchers and larger clinical trial stake holders, from my current position in the Statistics Unit of QIMR-B.

General:

- Database set-up and management
- Data cleaning
- Understanding client's research questions
- Reporting and interpreting results to clients and external stakeholders
- Writing manuscripts with collaborators
- Creating material for, organising and presenting workshops

Statistical:

- Descriptive statistics
- Analysis of variance
- General linear mixed models
- Experimental design
- Mixed-effect models
- Piecewise segmented regression
- General estimating equations
- Meta-analysis
- Data visualisation

Computational skills:

- Strong experience in the statistical software R and SPSS
- Strong experience with numerical computing in MATLAB
- Intermediate experience with the software Stata,
- Experience with the spreadsheet programs Microsoft Excel and Oracle.
- Beginner knowledge of Python.
- Considerable experience with Microsoft Word and LaTeX.

Committees and other roles

- Chair of the Mathematics and Statistics Industry Advisory Board (UniSQ) 2022-current (member since 2021)
- Student Representative on the Higher Degree by Research Committee at QIMR Berghofer 2020-2021
- Organizer and Co-chair of the QIMR Berghofer Student Symposium 2020-2021
- Research Integrity Adviser, QIMR Berghofer 2022-current
- Member of the Advisory Board for Study Area of Sciences Committee (UniSQ), 2014-2017

Research Publications

Selection of journal publications (in order of recency)

See my Google Scholar for details on other publications [LachlanWebb-GoogleScholar-link](#)

Mosley, P. E., Webb, L., Suraev, A., Hingston, L., Turnbull, T., Foster, K., Ballard, E., Gomes, L., Mohan, A., Sachdev, P.S., Kevin, R., Gordon, R., Benson, M., McGregor, I. S. (2023) Tetrahydrocannabinol and Cannabidiol in Tourette Syndrome. *NEJM Evidence*, doi:10.1056/EVIDoa2300012, online

McCarthy, J.S., Yalkinoglu, O., Odedra, A., Webster, R., Oeuvray, C., Tappert, A., Bezuidenhout, D., Giddins, M.J., Dhingra, S.K., Fidock, D.A., Marquart, L., **Webb, L.**, Xiaoyan, Y., Khandelwal, A., Bagchus, W.M. (2021). Safety, pharmacokinetics, and antimalarial activity of the novel plasmodium eukaryotic translation elongation factor 2 inhibitor M5717: a first-in-human, randomised, placebo-controlled, double-blind, single ascending dose study and volunteer infection study. *The Lancet Infectious Diseases*, 21 (12), 1713-1724

Webb, L., Kauppila, M., Roberts, J.A., Vanhatalo, S., Stevenson, N. (2021) Automated detection of artefacts in neonatal EEG with residual neural networks. *Computer Methods and Programs in Biomedicine*, 208, 106194

Odedra, A., **Webb, L.**, Marquart, L., Britton, L. J., Chalon, S., Moehrle, J. J., Anstey, N. M., William, T., Grigg, M. J., Laloo, D. G., Barber, B. E., McCarthy, J. S. (2020). Liver Function Test Abnormalities in Experimental and Clinical Plasmodium vivax Infection. *The American Journal of Tropical Medicine and Hygiene*, 103 (5), 1910-1917

Watts, R.E., Odedra, A., Marquart, L., **Webb, L.**, Abd-Rahman, A.N., Cascales, L., Chalon, S., Rebelo, M., Pava, Z., Collins, K.A., Pasay, C., Chen, N., Peatey, C.L., Möhrle, J.J., McCarthy, J.S. (2020) Safety and parasite clearance of artemisinin-resistant Plasmodium falciparum infection: A pilot and a randomised volunteer infection study in Australia. *PLoS medicine*, 17 (8)

Vijay, R., Guthmiller, J. J., Sturtz, A. J., Surette, F. A., Rogers, K. J., Sompallae, R. R., Li, F., Pope, R. L., Chan, J., Rivera, F. L., Andrew, D., **Webb, L.**, Maury, W. J. , Xue, H., Engwerda, C. R., McCarthy, J. S., Boyle, M. J., Butler, N. S. (2020) Infection-induced plasmablasts are a nutrient sink that impairs humoral immunity to malaria. *Nature Immunology*, 21, 790-801

Wockner, L. F., Hoffmann, I., **Webb, L.**, Mordmüller, B., Murphy, S. C., Kublin, J. G., O'Rourke, P., McCarthy, J. S., Marquart, L. (2020) Growth Rate of Plasmodium falciparum: Analysis of Parasite Growth Data From Malaria Volunteer Infection Studies. *The Journal of Infectious Diseases*, 221 (6), 963-972.