Zachary Dempsey

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Education

- **University of Western Australia** — Perth, Western Australia
  Bachelor of Philosophy with First Class Honours in Mathematics & Statistics — *Feb 2018–Oct 2022*
  Mathematics & Statistics and Finance
  WAM: 92.481; GPA: 6.963
- **University of Manchester** — Manchester, United Kingdom
  Exchange Programme; GPA: 82.2/First Class — *Aug 2019–Feb 2020*
- **Mount Lawley Senior High School** — Perth, Western Australia
  ATAR: 99.70 — *Nov 2017*

Experience

- **The Kids Research Institute Australia (formerly Telethon Kids Institute)** — Perth, Western Australia
  Biostatistician — *Mar 2023–Present*
  - Provide expert consultation to students, researchers, and teams—both internal and external to the Institute—on study design, data management, and analysis across epidemiological, clinical, health, and laboratory settings.
  - Collaborate with diverse research teams in fields such as neonatal emergency and critical care, dentistry, psychology, population health, and social sciences.
  - Helped establish and contribute to the Institute's biostatistics blog and and Institute "Hacky Hour", helping educate and give one-on-one support to researchers with statistical analysis and data management and cleaning techniques.
  - Extensive experience in cleaning, wrangling and linking large, complex datasets, including government administrative data.
  - Present and communicate complex analytical findings using a reproducible research framework, leveraging Git and Quarto markdown.
  - Creator and maintainer of tailor-made R package for consistent reporting and analytical frameworks for working with multiple analysts across a complex multidisciplinary research project.
- **AssetOwl Technologies** — Perth, Western Australia
  Data Analyst/Research and Development Consultant — *Jul 2021–Jul 2022*
  - Sole R&D consultant focussed on using analytic techniques to expand the Company's product offerings consistent with its growth strategy. Leveraging the visual inspection data collected by the Company's real estate visual inspection tool, I proposed two independent avenues for future expansion. A thorough R&D report was delivered; it detailed the current state of the industry, relevant existing applications in other industries (e.g. engineering) and the mathematical/computational techniques used for analysis.
  - Liaised between management, the engineering and finance teams to identify the unique contributions to the industry's state of knowledge/available commercial products. By concisely communicating each of the novel projects to AusIndustry, the Company was able to apply for the best possible research and development subsidies.
  - Able to communicate research progress, technical details and recommendations accurately and concisely in both verbal and in written report form to managers and the Company's Board of Directors.
- **University of Western Australia** — Perth, Western Australia
  STAT1520 Laboratory Facilitator — *Jun 2021–Nov 2021*
  - Facilitator of laboratories for STAT1520: Economics and Business Statistics for the School of Mathematics and Statistics. Unit establishes a foundational understanding in discrete and continuous random variables, sampling, ANOVA and linear modelling techniques.
  - Coordinated multiple in-person classes each week, coaching students of a non-science background through a range of fundamental and extension questions aimed to develop their skills in fundamental statistical analysis techniques.
  - Marker of assessment items (tests, exams).
- **University of Western Australia** — Perth, Western Australia
  Research Assistant, The Complex Systems Group, Department of Mathematics and Statistics — *Jul 2020–Nov 2020*
  - Investigated how complex network methods can be leveraged for nonlinear time series analysis.
  - Developed methods using Julia for detecting critical transitions in coupled dynamical systems.
  - Learned how to concisely communicate findings and articulate questions to academic staff.
- **UWA Student Managed Investment Fund (SMIF)** — Perth, Western Australia
  Equity Analyst — *Jun 2018–Aug 2020*
  - Conducted qualitative and quantitative research on ASX-listed companies in accordance with the fund's philosophies to prepare and pitch recommendations to professional fund managers at Viburnum Funds.
  - Experience researching within agribusiness, insurance construction, litigation funding and retail industries.
  - Conducted qualitative analysis of competitive landscapes, industries and business, revenue and cost figures, acquisition trends, contractual terms, and regulatory risk.
  - Construct company valuation models (e.g., discounted cash flow, comparable companies/transactions analysis) informed by qualitative findings.

Academic Projects

- **Honours Dissertation** Perth, Western Australia
  Title: Ordinal Partition Network-of-Networks for Paleoclimate Analysis *Feb 2022–Oct 2022*
  - Developed a novel technique for analysing coupled nonlinear systems by combining previously independent concepts from complex systems theory. In doing so, we successfully built a powerful, computationally efficient and robust (with respect to artificially noise-corrupted data) tool for analysing the complex interactions between multidimensional nonlinear time series.
  - Successful in identifying delicate temporal coupling transitions using simulated and real-world systems.
  - All background theory, data structures and results were presented in a 30-minute seminar to a non-specialist mathematical audience.

Publications

- Divakara N, Dempsey Z, Saraswati C, Garssen J, Silva D, Keelan JA, Christophersen CT, Cooper MN, Prescott SL, Palmer DJ, Verhasselt V, Macchiaverni P. (2024) Effect of maternal prebiotic supplementation on human milk immunological composition: Insights from the SYMBA study. *Pediatric Allergy and Immunology* DOI: https://doi.org/10.1111/pai.14226
- [in review] Ong CSY, Rodgers J, Cooper MN, Dempsey Z, Eaton R, Haines K, Kuzminski R, Magiati I, Maybery MT, Uljarević M, Wray J, Whitehouse AJO, Alvares GA. (2024) Targeting Intolerance of Uncertainty in Young Children Diagnosed with Autism: A Randomized Controlled Trial of a Parent-Mediated Group Intervention.

Skills/Interests

- **Programming Languages:** Python, Julia, R
- **Tools:** Matlab, Wolfram Mathematica, RStudio, Rmarkdown, Quarto, Git, Microsoft Office (Word, Powerpoint, Excel)
- **Courses:** Linear programming, calculus of variations, optimal control, numerical analysis, dynamical systems, nonlinear dynamics and chaos, complex systems analysis
- **Interests:** Road cycling, vintage vehicle restoration, data visualisation, biostatistics

Honours and Awards

- Wesfarmers Business Development Prize (Jul 2021)
- Frank Gamblen Scholarship in Mathematics (Sep 2019)
- Nicholas Searcy Prize in Multivariable Calculus (Mar 2019)
- Ronald and Irene Searcy Prize in Mathematical Methods and Theory (Mar 2019)
- Mount Lawley Senior High School WACE Year 12 ATAR DUX (Nov 2017)