# David Wu

Curriculum Vitae

## Personal Details


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| *Nationality* | New Zealand |
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## Work Experience

**Research Fellow** March 2023 - Present

*Dept. Econometrics and Business Statistics, Monash University, Full-time*

Modelling the surveillance and control of hospital-acquired infections in the Victorian healthcare system using stochastic simulation and network analysis methods. Additionally, organised seminars for the NUMBAT group, and tutored for courses in the department on reproducible data practices.

**Research Assistant** July 2020 - Feb 2023

*Te Pūnaha Matatini / Covid Modelling Aotearoa, Casual*

Development of stochastic epidemic simulations on networks in Python to assist with New Zealand Government response to COVID-19. Implementation of a novel non-Markovian event-driven simulation method for a system with over 5 million agents using hig-performance computing. Statistical analysis and reporting.

**Teaching Assistant** Feb 2019 - June 2022

*Dept. Engineering Science, University of Auckland, Part-time*

Content development, tutoring, and administration of undergraduate laboratory sessions on numerical methods, software development practice, and computer systems in Python, MatLab, and C.

**Software Engineer** Jan 2018 - Nov 2018

*Orion Health, Full-time*

Site reliability engineering. Automated deployment and maintenance of Elasticsearch and Rhapsody (electronic health record interoperability platform) in AWS. Designed and executed migration plans for Ansible Tower and Elasticsearch instances.

## Education

**PhD Engineering** Nov 2018 - Sept 2022

*Dept. Engineering Science, University of Auckland*

Thesis Topic: *Computational Methods in Epidemic Simulation, Inference and Uncertainty Quantification*

Mathematical modelling of epidemics. Stochastic simulation of large, complex systems on networks. Practical prediction and inference methods for misspecified models in mathematical epidemiology. Model inference approaches with surrogate models.

**BE(Hons) Engineering Science** Class of 2017

*University of Auckland*

GPA: 8.55/9.00 (A/A+ average)

Thesis Topic: *Mechanistic Modelling of the Immune System's Impact on Health*

Computational and mathematical modelling methods for physical systems. Continuum solid and fluid mechanics. Optimisation methods and data analysis. Engineering decision making, operations research, and project management.

## Papers

1. D. Wu, H. Petousis-Harris, J. Paynter, V. Suresh, O. J. Maclaren, "Likelihood-based estimation and prediction for a measles outbreak in Samoa" in Infectious Disease Modelling (doi: 10.1016/j.idm.2023.01.007)
2. Assortment of non-peer-reviewed reports for the New Zealand Government on COVID-19 in New Zealand, archived at `https://www.covid19modelling.ac.nz/reports/`

## Conferences

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| **ANZIAM** | 2024 | Contributed talk: "Temporal trends of hospital transfer networks in Victoria for controlling the spread of antibiotic resistance" |
| **Epidemics 9** | 2023 | Contributed poster: "Estimation of Network Epidemic Models using Surrogate Correction" |
| **ECMTB** | 2022 | Contributed poster: "Sneaking non-Markovian dynamics into Gillespie's direct method for epidemic simulation" |
| **NZWUQIP** | 2021 | Contributed talk: "Likelihood-based estimation and prediction for misspecified epidemic models: an application to measles in Samoa" |
| **ANZIAM** | 2020 | Contributed talk: "Infectious disease outbreaks: inference and prediction under model misspecification and partially observed data" |
| **MINZ** | 2019 | Student Moderator, Challenge 4: "How can Mercury improve the generation efficiency of the Waikato hydro scheme?" |
| **SMB** | 2018 | Contributed talk: "A dynamical system model of host-pathogen interaction illustrates the role of the immune system in resilience to infection" |

## Software

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| hospinet | Python port of HospitalNetwork R package that cleans a patient admission database and generates a temporal network of patient transfers. |

## Awards and Honours

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| 2023 | 2nd Place, UN Datathon (Down Under Data Wizards team) |
| 2020 | New Zealand Prime Minister's Science Prize (Te Pūnaha Matatini COVID-19 group) |
| 2018 | University of Auckland Doctoral Scholarship |
| 2015-2017 | University of Auckland Faculty of Engineering Dean's Honours List |