Alex de Beer

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EDUCATION

The University of Auckland

ME, Engineering Science (Grade: A+) *2023–24*

- Thesis title: Ensemble methods for geothermal inverse problems.
  Supervisors: Dr. Oliver Maclaren, Dr. Ruanui Nicholson.

BE (Hons), Engineering Science (Honours GPA: 9.00 / 9.00) *2019–22*

- Senior scholar award: Highest honours GPA in graduating engineering class.
- Thesis title: Expansion of electricity distribution networks under uncertainty.
  Supervisors: Prof. Andy Philpott, Dr. Tony Downward.
- Relevant coursework: inverse problems, Bayesian inference, probability theory, stochastic optimisation, machine learning, continuum mechanics.

RESEARCH EXPERIENCE

Auckland Bioengineering Institute

Research Assistant *Mar 2024–Present*

Developing software infrastructure for building digital twins in biomechanical applications.

University of Auckland Geothermal Institute

Research Assistant *Nov 2021–Present*

Developing uncertainty quantification methods and software for geothermal reservoir modelling.

ADDITIONAL WORK EXPERIENCE

The University of Auckland

Teaching Assistant *Feb 2021–Present*

Providing assistance to groups of 30–80 students during labs for the following courses.

- EngSci 233: Computational Techniques and Computer Systems (2024)
- Geotherm 620: Geothermal Engineering (2023)
- EngSci 263: Engineering Science Design I (2023)
- Maths 199: Advancing in Mathematics (2021, 2023)
- EngGen 131: Introduction to Engineering Computation and Software Development (2021)

Part I Assistance Centre Mentor *Feb 2021–June 2021*

Provided individual tutoring to first-year engineering students for core courses.

Ministry of Business, Innovation and Employment

Analytics and Insights Intern *Nov 2022–Feb 2023*

Built a prototype dashboard to communicate the relationships between research funding and outputs in New Zealand.

Xtracta

Data Science Intern *Nov 2020–Feb 2021*

Built machine learning models for product recommendation, document classification and document de-noising.

May 12, 2024

SELECTED HONOURS & AWARDS

- Senior scholar award (awarded to graduates with the highest undergraduate marks) *2022*
- First equal, Faculty of Engineering summer research poster competition *2022*
- First in course awards for 16 / 32 undergraduate courses *2020–22*

PUBLICATIONS

Working Papers

- Ensemble Kalman Inversion for Geothermal Reservoir Modelling
  A de Beer, M Gravatt, R Nicholson, JP O'Sullivan, MJ O'Sullivan, OJ Maclaren.

Conference & Workshop Proceedings

- Ensemble Methods for Geothermal Model Calibration
  A de Beer, M Gravatt, R Nicholson, JP O'Sullivan, MJ O'Sullivan, OJ Maclaren. *Proc. 45th New Zealand Geothermal Workshop (Nov 2023)*.
- Geologically Consistent Priors for Uncertainty Quantification of Geothermal Reservoirs
  A de Beer, MJ Gravatt, T Renaud, R Nicholson, OJ Maclaren, K Dekkers, JP O'Sullivan, A Power, J Popineau, MJ O'Sullivan. *Proc. 48th Workshop on Geothermal Reservoir Engineering (Feb 2023)*.
- Improved Filtering for a New Resource Assessment Method
  A Power, M Gravatt, K Dekkers, OJ Maclaren, R Nicholson, JP O'Sullivan, **A de Beer**, MJ O'Sullivan. *Proc. 48th Workshop on Geothermal Reservoir Engineering (Feb 2023)*.
- Resource Assessment: Estimating the Potential of an African Rift Geothermal Reservoir
  K Dekkers, M Gravatt, T Renaud, **A de Beer**, A Power, OJ Maclaren, R Nicholson, MJ O'Sullivan, J Riffault, JP O'Sullivan. *Proc. 9th African Rift Geothermal Conference (Nov 2022)*.

Theses

- Ensemble Methods for Geothermal Inverse Problems
  Master's Thesis (2024).
- Expansion of Electricity Distribution Networks Under Uncertainty
  Honours Report (2022).

PRESENTATIONS

- Ensemble Methods for Large-Scale Nonlinear Optimal Experimental Design
  SIAM Conference on Uncertainty Quantification, Trieste, Italy (Feb 2024).
- Ensemble Methods for Geothermal Model Calibration
  45th New Zealand Geothermal Workshop, Auckland, NZ (Nov 2023).
- Geologically Consistent Priors for Uncertainty Quantification of Geothermal Reservoirs
  48th Workshop on Geothermal Reservoir Engineering, Stanford, CA (Feb 2023).
- Distribution Network Planning Using JuDGE
  20th EPOC Winter Workshop, Auckland, NZ (Sept 2022).

SKILLS

Programming	Python, Julia, MATLAB, R, SQL, C++, C.
Tools	Jupyter Notebook, LaTeX, Git, Excel, PowerBI.

May 12, 2024