

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**: Top of 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 7, 2024

SELECTED HONOURS & AWARDS

- Senior scholar award (top of graduating engineering class) 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 (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 (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 (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 (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

<i>Programming</i>	Python, Julia, MATLAB, R, SQL, C++, C.
<i>Tools</i>	Jupyter Notebook, L ^A T _E X, Git, Excel, PowerBI.