

PhD Degree position in basin analysis and geostorage of hydrogen, Taranaki Basin, New Zealand

Geostorage of hydrogen is an essential technology for storing surplus renewable energy that can be rapidly accessed as demand requires. We have an opening for a motivated PhD student to work on the Pūhiko Nukutū research programme, examining hydrogen geostorage in depleted oil and gas fields in Taranaki Basin as a way to help achieve the New Zealand Government's target of a net-zero carbon economy by 2050. The PhD candidate will be part of a larger international team investigating potential geostorage hazards (including leakage, chemical reactions, and seismicity) to design systems for subsurface monitoring and risk mitigation, and integrating with mauri-based enviro-cultural-economic indicator sets to build Māori decision-making capacity in hydrogen energy.

The PhD project will investigate the control sedimentary facies play in the distribution of hydrogen-reactive coaly organic material and diagenetic pyrite. The student will look at the variability of carbonaceous lithologies in Kapuni Group sedimentary facies across transgressive facies changes from fluvial coastal plain to estuarine marginal marine. Increasing marine influence is likely to affect not just the distribution of organic material, but its preservation and type. It will also have some control on the composition of early diagenetic minerals, in particular pyrite which is highly reactive with H₂. The study will include outcrop analogues, borehole data (core, cuttings, wireline logs, image logs) and seismic analysis, to investigate stacking patterns and facies variations with a goal to mitigate the risk of highly reactive materials in any chosen H₂ geostorage site.

The candidate will be supervised by Kari Bassett at the University of Canterbury with Karen Higgs (Geological Consultant), Dominic Strogon (GNS Science) and Catherine Reid (UC). The PhD will be supported by the New Zealand Government via the "Pūhiko Nukutū: a green hydrogen geostorage battery in Taranaki" MBIE research programme. We are offering a 3-year position based at the University of Canterbury in Christchurch New Zealand. The position includes a PhD stipend of NZ\$35,000/yr, full cover of tuition fees, student Services Levy and health insurance for three years.

Direct all initial enquiries to Kari Bassett (University of Canterbury, kari.bassett@canterbury.ac.nz). A curriculum vitae, cover letter, and contact details of at least two referees should be emailed to Kari by 1 July 2024. The chosen PhD candidate will be expected to start early in 2025.



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