UQ Winter Research Project Description

Project title:	Sources of contamination in groundwater
Hours of engagement & delivery mode	Students will be engaged for 4 weeks. Hours of engagement must be between 20 – 36 hrs per week. Initially onsite, subsequently can be a hybrid arrangement.
Description:	Sources of contamination of gases into drinking water aquifers can include gas reservoirs or deep storage reservoirs. However bacteria can also naturally produce gases in aquifers. This project involves assessing and interpreting field data on groundwater chemistry and gas stable isotopes, to understand gas sources in aquifers.
Expected outcomes and deliverables:	Scholars may gain skills in data collation and interpretation, be involved in some excel calculations and plotting data on diagrams to interpret results. Students will have an opportunity to generate publications from their research. Students will be asked to produce a report (and oral presentation) at the end of their project.
Suitable for:	This project is open to applications from students with a background in chemistry, (hydro)geology, environmental science or similar.
Primary Supervisor:	*Dr Julie Pearce*
Further info:	j.pearce2@uq.edu.au

UQ Winter Research Project Description

Project title:	Understanding the relationship between temperature and gas demand
Hours of engagement & delivery mode	Onsite work is preferred and will be required initially. The option for remote work will be considered, depending on the candidate.
Description:	Planning for Australia's energy transition is complex, with multiple future uncertainties creating a major challenge for policy makers and stakeholders in the energy industry. Numerous studies have identified that future weather uncertainty will be critical to understanding future energy system risks, with the relationship between weather and gas demand being critical to infrastructure planning for both the gas and electricity systems. This project will develop a quantitative understanding of the historical relationship between temperature and Australian gas demand, contributing to a project team that is exploring how future electrification and climate change will influence the volatility of future gas demand.
Expected outcomes and deliverables:	The student will gain skills in statistical analysis, data handling and programming. They will gain an understanding of the challenges associated with predicting future energy demand. The student will support others to incorporate this work into a broader project on energy transition analysis. They will be asked to provide a written report and oral presentation, outlining, and critiquing the key conclusions from their work.
Suitable for:	This project is open to applications from students with a background in engineering, maths, or computer science, with experience in statistical techniques and an interest in the analysis of applied problems.
Primary Supervisor:	Dr Joe Lane
Further info:	For further information, please contact Dr Joe Lane (joe.lane@uq.edu.au) or Iain Rodger (i.rodger@uq.edu.au)

UQ Winter Research Project Description

Project title:	Machine Learning to improve wind power uncertainty analysis
Hours of engagement & delivery mode	Onsite work is preferred and will be required initially. The option for remote work will be considered, depending on the candidate.
Description:	Planning for Australia's energy transition is complex, with multiple future uncertainties creating a major challenge for policy makers and stakeholders in the energy industry. Numerous studies have identified that the estimation of long-term future wind power generation potential is one of those critical uncertainties, requiring more careful consideration in research studies. Scenarios for uncertainty analysis on future wind power variability are typically developed from long-term gridded estimates of historical wind speed, however that modelling process typically does not calibrate well with observed generation data for Australia's wind farm fleets. This project will build on prior analysis by the UQ project team, trialling Machine Learning techniques to improve the calibration of wind power models to various sources of benchmark data.
Expected outcomes and deliverables:	The student will gain skills in the application of machine learning in an applied analytical context, experience in data collation, data analysis and the use of high performance computing systems. The student will support others to incorporate this work into a broader project on energy transition analysis. They will be asked to provide a written report and oral presentation, outlining and critiquing the key conclusions from their work.
Suitable for:	This project is open to applications from students with a background in computer science, maths or engineering; with a demonstrated understanding of machine learning techniques through COMP4072 or similar courses. Hands-on experience with building machine learning applications would be valuable, though is not necessary.
Primary Supervisor:	Dr Joe Lane
Further info:	For further information, please contact Dr Joe Lane (joe.lane@uq.edu.au) or Dr Vektor Dewanto (vektor.dewanto@uq.edu.au)