UQ Summer Research Project Description

Please use this template to create a description of each research project, eligibility requirements and expected deliverables. Project details can then be uploaded to each faculty, school, institute, and centre webpage prior to the launch of the program.

Project title:	Carbon storage rock reactions
Hours of engagement & delivery mode	For the Summer program, students will be engaged for 6 weeks only. Hours of engagement must be between 20 – 36 hrs per week and must fall within the official program dates (13 Jan – 21 Feb 2025). The project will be offered on-site.
Description:	*Carbon geological storage (CO2 storage) is gaining attention as a new technology in the energy transition. This project involves assessing the underground reactions that may occur with carbon dioxide injection deep into rock formations. Carbonated water leaching experiments will be performed to understand environmental changes if CO2 were to leak into aquifers (underground water resources). Rock and water quality characterisation will also be performed.*
Expected learning outcomes and deliverables:	*Scholars will gain skills in practical geochemistry data collection, rock characterisation (SEM), and data analysis. They will have an opportunity to generate publications from their research. Students will also be asked to produce a report or oral presentation at the end of their project.*
Suitable for:	*This project is open to applications from students with a background in chemistry, geology, or chemical engineering and would suit a 3rd – 4th year student. Experience in SEM-EDS, mineral/rock or water quality analysis is not needed but advantageous.*
Primary Supervisor:	Dr Julie Pearce
Further info:	Contact j.pearce2@uq.edu.au or gas-energy@uq.edu.au

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Project title:	Thermal energy storage and nuclear storage: rock reactions underground with induced heat
Hours of engagement & delivery mode	For the Summer program, students will be engaged for 6 weeks only. Hours of engagement must be between 20 – 36 hrs per week and must fall within the official program dates (13 Jan – 21 Feb 2025). The project will be offered on-site.
Description:	*To understand the safety of new technologies such as underground thermal energy storage or nuclear energy storage, changes to reservoir rocks should be assessed. This project will build an understanding of water-rock reactions for a range of clays and rock types with induced heat that can be present from thermal storage. Water-rock leaching and rock and water changes over time will be characterised.*
Expected learning outcomes and deliverables:	*Scholars will gain skills in practical geochemistry data collection, rock characterisation (SEM), and data analysis. They will have an opportunity to generate publications from their research. Students will also be asked to produce a report or oral presentation at the end of their project.*
Suitable for:	*This project is open to applications from students with a background in chemistry, geology, or chemical engineering and would suit a 3rd – 4th year student. Experience in SEM-EDS, mineral/rock or water quality analysis is not needed but advantageous.*
Primary Supervisor:	Dr Julie Pearce
Further info:	Contact j.pearce2@uq.edu.au or gas-energy@uq.edu.au

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Project title:	Innovating wind and solar PV deployment, to enhance resilience of Australia's energy system
Hours of engagement & delivery mode	For the Summer program, students will be engaged for 6 weeks only. Hours of engagement must be between 20 – 36 hrs per week, and must fall within the official program dates (13 Jan – 21 Feb 2025). The project will be offered on-site, with the student required to work in our offices (St Lucia campus) for the majority of the project.
Description:	*As the Australian electricity system shifts towards greater dependence on wind and solar PV generation, the modelling of transition pathways becomes increasingly sensitive to uncertainty in the assumptions about future wind and solar technology adoption. However, conventional planning studies adopt a static view of future technology evolution, considering little change beyond what is currently considered 'best practice'. This project will explore whether, and which, future innovations in wind and solar PV infrastructure deployment could reduce the overall system cost of VRE implementation, and increase system resilience to the inherent uncertainty associated with future weather variability.*
Expected learning outcomes and deliverables:	The student will gain skills in applied modelling, analysis of electricity generation technologies, and an understanding of long-term energy system challenges. The work scope will include literature review, data synthesis, electricity system modelling and analysis. The student 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, environmental management, or other disciplines with a strong analytical background. This project will suit people with a strong interest in applied analysis and learning about energy system change.
Primary Supervisor:	Dr Joe Lane
Further info:	For further information, please contact Dr Joe Lane (joe.lane@uq.edu.au)

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Please use this template to create a description of each research project, eligibility requirements and expected deliverables. Project details can then be uploaded to each faculty, school, institute, and centre webpage prior to the launch of the program.

Project title:	Using satellite data to estimate temporal variation in methane emissions for Queensland regions
Hours of engagement & delivery mode	For the Summer program, students will be engaged for 6 weeks only. Hours of engagement must be between 20 – 36 hrs per week, primarily in office (St Lucia campus). The project will be offered on-site.
Description:	*The growing prevalence of methane-focussed satellites creates a new opportunity for assessing how sub-regional methane fluxes might be varying over time. This project will collate the available gridded estimates of atmospheric methane concentration for sub-regions of Queensland, comparing them across satellite products. Temporal variability will be assessed on intra-annual and inter-annual timeframes, comparing any trends with our bottom-up estimates of methane emissions for the same regions. This analysis will provide a valuable step towards the ambition to integrate satellite and bottom-up estimates, for improved analysis of regional-scale mitigation of methane emissions.*
Expected learning outcomes and deliverables:	The student will gain skills in data synthesis and analysis, atmospheric analysis using satellite data, and potentially environmental modelling. 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 environmental science, environmental engineering, or other disciplines with a strong computational and statistical background.
Primary Supervisor:	Dr Joe Lane, Dr Sebastian Hoerning
Further info:	For further information, please contact Dr Joe Lane (joe.lane@uq.edu.au)