**UQ Summer or Winter 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:** | Breaching Dynamics of Bribie Island using Physical Modelling |
| **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.Onsite at UQ and remotely as needed.  |
| **Description:** | Barrier islands are crucial natural buffers that protect coastal communities and ecosystems from the impacts of severe storms, wave action, and rising sea levels. Their dynamic nature means they continuously evolve in response to environmental conditions, making it vital to understand the processes that contribute to significant morphological changes such as breaching. Bribie Island, situated in South-East Queensland, Australia, has recently experienced considerable morphological transformations, notably major breaches driven by tropical cyclones and storm-induced wave overtopping events. These breaches have reshaped local coastal habitats and altered sediment transport pathways, underscoring the urgent need for improved understanding and predictive capability.This research project will focus on experimentally examining how different back-barrier gradients and variations in initial dune conditions impact barrier island breaching dynamics. Students will use physical laboratory models to create scaled representations of barrier island profiles. These models will feature a range of back-barrier slopes designed to mimic realistic geomorphic scenarios found on Bribie Island. Additionally, each model will incorporate either a pre-existing breach or a strategically positioned area with slightly lowered dune elevation to simulate natural vulnerability points. The models will then be exposed to controlled wave conditions representative of storm scenarios, enabling systematic observation and measurement of morphological responses. Students will analyse breach evolution, quantify overwash sediment transport, and assess erosion and deposition patterns to draw insights into barrier island resilience and management strategies. |
| **Expected outcomes and deliverables:** | Participants in this project will:* Gain hands-on experience with coastal physical modelling methods, including wave-flume operation and experimental design.
* Develop skills in sediment transport analysis and interpretation of morphodynamic changes.

Deliverables expected from participants include:* Successful completion and thorough documentation of physical modelling experiments.
* A final report summarizing the key outcomes, providing insights into factors influencing barrier breaching, and recommendations for further research.

Work will be conducted with Ph.D. student Elysia Andrews and under their supervision in addition to the Primary supervisor. |
| **Suitable for:** | Applicants should have basic data analysis skills using software such as Python, or R. Previous experience in physical modelling or coastal studies is helpful but not essential.  |
| **Primary Supervisor:** | *Prof. Tom Baldock* |
| **Further info:** | t.baldock@uq.edu.au |