

Institute for Climate, Energy and Disaster Solutions (ICEDS)

Working with ANU Scientists to Find New Solutions to Stopping Cyclones

Internships Available for Winter/Semester 2, 2023

Climate, energy and disasters are crucial and growing issues for Australia. The [Institute for Climate, Energy and Disaster Solutions](#) (ICEDS) initiates and supports innovative cross-disciplinary research across ANU with the aim of ensuring broad societal impact as well as leading outreach, policy engagement, facilitation and coordination roles.

Current approaches to Tropical Cyclone mitigation and adaptation are not keeping up with climate change. Tropical Cyclone-related losses are doubling every 15 years. In the Australian region, we are expecting more frequent occurrence of the strongest Tropical Cyclones with severe impacts. In addition, Tropical Cyclones fuelled by warming oceans are projected to travel poleward, maintain intensity longer and penetrate much further inland - leading to rapidly increasing risks from damaging winds and heavy rainfall on Australia's east coast. In particular, heightened threats are posed to coastal communities in the Queensland and northern New South Wales.

Traditional solutions for Tropical Cyclone management focused on reducing exposure and vulnerability when cyclones make landfall will not work on their own. We must find transformational solutions to prevent cyclone-associated deaths and destruction by mitigating the cyclone hazard itself. Cutting-edge research on Tropical Cyclone intervention at early stages of cyclone formation is the key.

This is why the ANU Institute for Climate, Energy and Disaster Solutions (ICEDS) has taken on the challenge, and initiated research to investigate Tropical Cyclone initiation and the possibility of defusing cyclogenesis using a complete **Atmosphere – Ocean coupling system**.

An opportunity exists for high-achieving undergraduates and Masters students from ANU to research the following topics and contribute to this initiative.

Can you apply your mathematical, modelling/mapping skills in pre-processing input data and post-processing model simulation outputs to investigate the feasibility of Tropical Cyclone intervention?

1. Synthesise quantitative information relating to historical landfalling tropical cyclones in Australia (damage statistics, re-analysis data, best track records). *Literature review, data collation and data analysis.*

2. Review of available data sets for modelling Tropical Cyclone activity in the Australian region and examine pre-processors to corresponding data sources. Pre-process data to create inputs for model simulations. *Literature review, data collation and data analysis.*

3. Validate the performance of the modelling system in simulating the genesis, intensification, and movement of Tropical Cyclones by comparing the model results to available observational databases over the Australian basin. *Meteorological, mathematical modelling and data analysis.*

4. Post-process model simulation results, analyse meteorological variables related to Tropical Cyclone features to investigate the response of Tropical Cyclone behaviour and impacts of rainfall and winds to intervention methods. *Meteorological, mathematical modelling and data analysis.*

| Internship details | |
|---|--|
| Internship Availability | Winter and Semester 2, 2023 |
| Internship Discipline/s | <ul style="list-style-type: none"> • Mathematical modelling • Meteorology • Atmospheric physics |
| Internship Level | 2 nd and 3 rd year Undergraduate; Postgraduate Coursework |
| Available to International Students | Yes |
| Preferred Project Skills: | <p>There are a number of projects. Each requires different skills, including</p> <ul style="list-style-type: none"> • Excellent written communication • Experience in mathematical modelling • Understanding of climate change and cyclone formation • Mapping skills • Creativity and initiative when problem solving • |
| Clearances Required | No |
| Host Supervisor | Carla Alzamora Program Manager, Disaster Solutions E: carla.alzamorongoncalves@anu.edu.au |
| Location | Coombs Building, ANU |
| Project Opportunities/Benefits for the Intern | <ul style="list-style-type: none"> • Learning about modelling cyclones • Experience in meteorology |

| | |
|--|--|
| | <ul style="list-style-type: none">• Mapping experience |
|--|--|