

Antarctic Ecological Genomics PhD Opportunities

- 1) Ecological genomics of the invertebrate response to ocean acidification
- 2) Ecological genomics of the vertebrate/invertebrate response to shifts in food supply

We invite applications from highly-motivated molecular biology and/or biochemistry post-graduate candidates to contribute to a project investigating stress effects on the Antarctic marine ecosystem utilizing genomics-based approaches.

Two PhD projects are on offer, each contributing to an objective of this FRST-funded International Polar Year Project. The Antarctic marine ecosystem is under threat as a result of global climate change combined with other anthropogenic influences (e.g. fishing, tourism). We need to understand ecosystem function as well as predict how the biota present in this and other ecosystems may respond to future environmental change.

Project 1 builds on previous research that has shown that food resource shifts in the Ross Sea result ecologically as spatial variation amongst benthic invertebrate species. However, these ecological shifts must arise as the result of a genomic response to resource variation. To provide a mechanistic understanding of the ecological response, both invertebrate and vertebrate species will be used in ecological genomic studies (e.g. metabolic studies, Q-RT-PCR, differential display, DNA sequencing) to ascertain the effect that changes in food supply have on metabolic function and growth.

Project 2 evaluates the effect that increased ocean acidification (as a result of climate change) may have on organism function. A decrease in ocean pH potentially threatens marine organisms that depend on calcium carbonate for shell generation. High latitude areas like the Southern Ocean are amongst

those most vulnerable due to increased solubility of calcium carbonate in colder waters. There is currently no information available on how Antarctic benthic species will respond to this threat. The research will involve a combination of biochemical studies (metabolic measurements, isolation of key calcification proteins and activity measurements) complemented with transcriptomic studies (Q-RT-PCR) to investigate expression changes across a pH gradient. Results from both experimental approaches will be used to explain whole organism effects of acidification on calcification.

Both PhD projects offered involve an integrative approach, with the results supplementing additional research conducted in the field, at University of Canterbury and at NIWA to generate data and models that provide detailed information on both the organismal and ecosystem response to both of these environmental stressors. This cross-disciplinary research requires the ability to communicate effectively with specialists in a range of fields, and will provide an opportunity for the candidate to acquire personal research skills in a diverse range of disciplines. Due to the nature of this project, applicants must be highly motivated, independent, and organized and able to deliver work in a timely fashion. Applications will only be accepted from those with extensive experience in genetics and biochemistry.

This project involves collaboration between scientists at University of Canterbury and NIWA (Wellington and Hamilton). All working expenses for the project will be covered. PhD stipends are not included at this stage. However, applicants would be encouraged to apply in conjunction with the supervisors of this project for some upcoming Antarctic scholarships:

- Antarctica NZ Postgraduate scholarships: c. March 9th 2008 deadline. Please see <http://www.antarcticanz.govt.nz/research/1027> for more details. Sponsors: New Zealand Post, Kelly Tarlton's Antarctic Encounter and Underwater World, Helicopter's New Zealand and Antarctica NZ.
- Christchurch City Council Antarctic Scholarship administered by Gateway Antarctica (see <http://www.anta.canterbury.ac.nz/schols.shtml>): March 9th 2008 deadline
- In addition, the University of Canterbury offers PhD scholarships (closing date May 15, Oct 15) for national and international students and other scholarships are listed on the UC website.

Further details

on these exciting opportunities can be obtained from:

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