



**Antarctica
New Zealand**

Antarctic Science Platform

RESEARCH FELLOW 1

Regional climate modeller: Near-surface climate provides an essential boundary condition for most physical and biological systems, and its accurate simulation is fundamental to future projections of Antarctic environments. We seek to appoint a research fellow with skills in atmospheric modelling at high spatial and temporal resolutions in order to provide inputs to ice sheet and ocean models, terrestrial geo-statistical models, glacial surface energy balance models and terrestrial hydrological routing models. The role is intended to fill the niche between global-scale general circulation models and local scale atmospheric (esp. mesoscale to microscale) models. The regional approach will allow continental-scale feedbacks to be investigated in a realistic manner, and will allow more robust future projections of ice sheet change and contribution to sea level, as well as regional coastal and terrestrial climate variability.

Required Skills

- Excellent computing and coding skills
- PhD with emphasis in high-latitude climatology, numerical simulations, and/or atmospheric dynamics
- Experience with regional climate model code (COSMO, RegCM4, other)
- Familiarity with numerical tools and data formats (e.g. Matlab, IDL, python, NetCDF)
- Demonstrated ability/willingness to produce research papers

Desirable Skills

- Evidence of working in teams
- Experience in an interdisciplinary research environment
- Ability to communicate across traditional disciplinary boundaries.
- Willingness to connect with Vision Mātauranga and Kaupapa Māori research principles
<https://www.mbie.govt.nz/science-and-technology/science-and-innovation/agencies-policies-and-budget-initiatives/vision-matauranga-policy/>

RESEARCH FELLOW 2

Process-scale ice shelf cavity modeller: Ocean processes drive significant changes in ice shelf evolution over hourly (tidal) to decadal or longer timescales. Process understanding is fundamental to making accurate future projections. This role will use simulations of ice-ocean interactions at ice shelf cavity scales. The ocean-ice modelling project seeks to capture details of cavity circulation and explore the roles of (i) under ice basal processes (parameterisations, role of basal topography), (ii) internal processes (double diffusion, internal waves at high latitude), and (iii) non-hydrostatic processes (ie grounding-line, ice shelf front). The project will work towards coupling the modelling with glaciological and GCM modelling required to explore ice sheet evolution arising from interactions with a changing ocean.

Required Skills

- Excellent computing and coding skills
- PhD with publications in computational oceanography, glaciology, other GFD or a closely related subject
- Experience with either MITgcm or ROMS (or similar code)
- Strong track record with numerical tools and formats (e.g. Matlab, IDL, python, NetCDF)
- Demonstrated ability/willingness to produce research papers

Desirable Skills

- Evidence of working in teams
- Experience in an interdisciplinary research environment
- Ability to communicate across traditional disciplinary boundaries.
- Willingness to connect with Vision Mātauranga and Kaupapa Māori research principles
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RESEARCH FELLOW 3

Biogeochemical modeller: By underpinning all life on Earth, biogeochemical aspects of the global climate system are a fundamental part of Earth system modelling. We seek expertise in biogeochemical modelling under past and present conditions, as well as those anticipated for the future. This position will focus on carbon cycle and biogeochemical modelling at the regional scale, with emphasis on specific species and processes relevant to high-latitude Southern Ocean ecosystems. This position will investigate changes to phytoplankton ecosystems and impacts on the marine carbon cycle under future warming scenarios, including feedbacks between changes in physical systems (ocean and atmospheric circulation, sea ice, meltwater, etc) and biogeochemical components.

Required Skills

- Familiarity with biogeochemical modelling from plankton to carbonate system
- Familiarity with numerical and technical aspects of models from climate to regional scale in terms of both analysis and in setting up novel model runs
- Familiarity with numerical tools and data formats (e.g. Matlab, IDL, python, NetCDF)
- Ability to translate in-situ biogeochemical process understanding to model representations
- Appreciation of potential for downscaling physics and biology under future climate scenarios
- Appreciation of links between higher trophic levels and carbon budgets
- Demonstrated ability/willingness to produce research papers

Desirable Skills

- Evidence of working in teams
- Experience in an interdisciplinary research environment
- Ability to communicate across traditional disciplinary boundaries.
- Willingness to connect with Vision Mātauranga and Kaupapa Māori research principles
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RESEARCH FELLOW 4

Data scientist or statistical modeller: Much of the observational and numerical simulation work undertaken through the research strands of the NZ Antarctic Science Platform as a whole will generate large datasets. Novel insights can be gleaned from 'Big Data' when statistical approaches are applied. This role will provide a data-driven multidisciplinary perspective on the data generated from the platform. Our aspiration for this role would be to utilise techniques such as Bayesian networks, statistical emulation, or machine learning to provide additional approaches for the generation of policy-relevant information. This role could also contribute specifically to more statistically- (rather than process-) based research questions, such as future projections of species distribution and population change.

Required Skills

- Excellent computing and coding skills
- High-level understanding of big data problems and how they can be addressed
- Experience with Bayesian Networks, statistical emulators, or machine learning algorithms
- Familiarity with numerical tools and data analysis languages (e.g. R, Matlab, IDL, Python), shell programming (e.g. Bash, HPC, GDAL/OGR) and data formats (e.g. NetCDF, HDF, GeoTIFF)
- Demonstrated ability/willingness to produce research papers

Desirable Skills

- Evidence of working in teams
- Experience in an interdisciplinary research environment
- Ability to communicate across traditional disciplinary boundaries.
- Willingness to connect with Vision Mātauranga and Kaupapa Māori research principles
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