Ph.D. Graduate Student Opportunity in Geochemistry and Aquatic Ecology

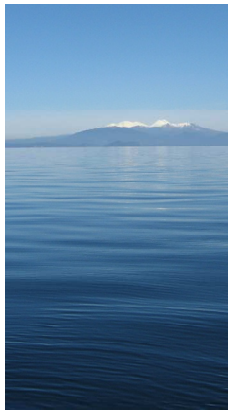
Trace Metal Limitation of Phytoplankton Growth

We are seeking an enthusiastic and highly motivated student to undertake a fully-funded PhD project investigating trace metal nutrient limitation of phytoplankton growth in New Zealand lakes. The project will involve working with a team of lake and geochemical scientists from the University of Otago, the National Institute of Water & Atmospheric Research (NIWA), and Cawthron Institute, New Zealand.

Supervisory Team

Principal Supervisor:	Associate Professor Claudine Stirling - Department of Chemistry, University of Otago, Dunedin, New Zealand
Co-supervisors:	Dr Piet Verburg - NIWA, Hamilton, New Zealand
	Dr Susie Wood – Cawthron Institute, Nelson, New Zealand

Context for the project



There is growing concern about blooms of cyanobacteria that produce toxic compounds and degrade lake water quality. All phytoplankton species need trace metals to grow, particularly cyanobacteria, which require them to access dissolved nitrogen gas in water. Trace metals may allow cyanobacteria to countermand nitrogen load reduction to limit phytoplankton growth in lakes, by fixing atmospheric nitrogen. However, in lakes in the Taupo Volcanic Zone (TVZ), which covers the central North Island of New Zealand, trace metal concentrations may be low as a result of the trace metal poor volcanic soils. The project combines trace metal concentration measurements of the TVZ lakes with laboratory-controlled phytoplankton growth experiments to determine whether trace metal concentrations limit phytoplankton growth and nitrogen fixation by cyanobacteria.

The student will play a key role in the project coordinating the various aspects of the research, and addressing the following key research questions:

1) What are the concentrations of key trace metals in lakes in the TVZ and is there seasonal variation in the bioavailability of and demand for trace metals?
2) Are trace metals limiting growth of phytoplankton and in particular of cyanobacteria?
3) What are the rates of nitrogen fixation by cyanobacteria and are they affected by trace metal availability?
4) Is phytoplankton species composition affected by availability of trace metals and other nutrients?

The project involves clean room chemistry, water pre-concentration methods, and sector field inductively coupled plasma mass spectrometry (SF-ICPMS) for the quantification of trace metals in TVZ lake waters and phytoplankton culture experiments. A moderate amount of fieldwork for lake water sampling will be required.

Details of scholarship

Applicants with a strong background in the geosciences, chemistry, ecology or a related quantitative discipline, and with demonstrated academic and research excellence at the Bachelor (Honours) or Masters level, are encouraged to apply. The successful candidate must be able to work both independently and in a team, and be prepared to travel as part of the project. The successful applicant should be eligible to register for doctoral studies at the University of Otago, but will spent time off-campus at partner institutions for periods of the studentship. The selected candidate will be awarded a PhD Scholarship comprising a 3-year stipend of NZ$ 25,000 per year (tax free and includes a fee waiver) and project costs. Both New Zealand and

international students are encouraged to apply. This PhD project forms part of a multi-disciplinary research programme funded by the NZ *Ministry of Business, Innovation and Employment* (MBIE).

Applicants should submit a cover letter with a statement of research interests and experience, a complete CV (including academic transcripts), and the names and contact information of at least two referees in a single pdf file, as well as a copy of their postgraduate thesis, by e-mail to Dr Claudine Stirling (E: cstirling@chemistry.otago.ac.nz).

Applications received on or before 30 November, 2017 will be considered for this position.

Contact Dr Piet Verburg (T: +64 (07) 867 1787; E: piet.verburg@niwa.co.nz) or Dr Claudine Stirling for further information about the project. Additional information about the Department of Chemistry at the University of Otago, NIWA and Cawthron Institute can be found at http://neon.otago.ac.nz/chemistry, https://www.niwa.co.nz/ and http://www.cawthron.org.nz