Four PhD scholarships on developing new technologies for treatment of rural community wastewater, New Zealand

The National Institute of Water and Atmospheric Research (NIWA) and the University of Waikato (UoW) through the joint Institute for Freshwater Management (Te Waiora) have established a new research programme to develop novel approaches for treatment of wastewater in rural communities. As part of this programme of research we have funding for four PhD students based at UoW.

Brief descriptions (key contacts listed at end for further details):

1. **Intensified Multi-layered Wetland Filters (IMWF) for Marae and papakāinga (up to 10 houses) wastewater treatment**
   This PhD will develop IMWF to remove N, P and faecal indicator bacteria from septic tank effluent prior to land disposal in infiltration trenches. IMWF will be made smaller and more effective than current vertical flow treatment wetlands through variation of inflow dosing rate and incorporation of active filter layers of locally available media (e.g., sands, allophanic soils, woodchips, zeolite) with native wetland plants. Performance will be assessed in terms of improved effluent discharge water quality without causing pollution swapping. Please contact: Dr Chris Tanner chris.tanner@niwa.co.nz and Dr Graeme Glasgow graeme.glasgow@waikato.ac.nz.

2. **High Rate Filamentous Algae Ponds.**
   This PhD will help develop High Rate Filamentous Algae Ponds as an efficient, cost-effective and culturally appropriate wastewater treatment technology for rural towns in New Zealand. It will investigate the ability of suspended filamentous algae to remove both N and P from wastewater using open raceway ponds. Performance will be assessed in terms of effluent discharge water quality (nutrients, organic matter and faecal indicator bacteria), filamentous algal production and harvestability, as well as potential culturally acceptable uses of the algal biomass. Please contact: Dr Rupert Craggs rupert.craggs@niwa.co.nz and Dr Rebecca Lawton rebecca.lawton@waikato.ac.nz.

3. **Removal of emerging contaminants (including Oestrogen) by Ecocultural wastewater treatment technologies (ECWT).**
   This PhD will compare different pond and wetland ECWT for removal of emerging contaminants (including Oestrogen) and how concentrations in treated wastewater and sludge vary with operating conditions and season. ECWT systems will include IMWF, HRFAP, Accumulating Volume Sludge Digesters and Sludge Treatment Wetlands. Please contact: Dr Rupert Craggs rupert.craggs@niwa.co.nz and Dr Mark Lay mark.lay@waikato.ac.nz.
4. **Novel bioproducts from Ecocultural Wastewater Treatment (ECWT) biomass.** This PhD will screen samples of wastewater treatment wetland plant and filamentous algae biomass for novel bioproducts. Either new cellulose-based materials (e.g. fibres, films, and composites), or production of biostimulants (ferments and chemical extracts) to enhance New Zealand crop production. The variation in biomass production and concentrations of bioproducts will be determined for specific changes in operation and with season. Please contact: Dr Marie Magnusson marie.magnusson@waikato.ac.nz and Dr Rupert Craggs rupert.craggs@niwa.co.nz

Applicants will be independent and highly motivated with:
- An Honours or MSc degree in a relevant subject (e.g., environmental (bio)geochemistry, environmental engineering, chemistry, aquatic ecology)
- Experience with relevant lab and/or field experiments
- Sound skills in analysing data
- Excellent communication skills in English (spoken and written)

Annual stipend for 3 years: $35,000 (includes payment of $6,500 annual fees)

**Closing date 12th April 2020.** The positions will start between June and September 2020.

Applicants, please send a letter of motivation and CV (including contact information for 2 referees) to the relevant contact(s) above. Your letter of motivation should describe why you are interested in the specific nominated PhD scholarship.