



Open PhD Position in Biogeochemistry / Earth Science / Soil Science

Title: Soil organics matter: exploring abiotic pathways to mitigation of agricultural nitrous oxide emissions

Chief Supervisor

Dr Dorisel Torres-Rojas (University of Waikato – Hamilton)

Collaborators:

A/Prof Thea Whitman (University of Wisconsin - Madison)

A/Prof Rachel Hestrin (Lawrence Livermore National Laboratory)

Description

Most studies addressing the nitrous oxide emissions from soils focus on intercepting or slowing the biological pathway leading to N₂O generation. However, little attention has been paid to the important N₂O-precursor, ammonia (NH₃), and its potential to be retained in organic soil horizons. Following recent work by our group on NH₃-bonding to charcoal under ambient conditions, this research programme will explore a neglected pathway toward N retention in soil with potential to mitigate N₂O emission to the atmosphere.

We are looking for a rigorous and passionate scientist to join the newly-formed Torres-Rojas laboratory at the University of Waikato, New Zealand. With a broad interest in chemistry, biology and environmental sciences, you will be just as enthusiastic as we are about understanding the intricate reaction pathways involved in the SOM-NH₃ bonding. This project draws heavily on quantitative ¹⁵N-NMR and synchrotron x-ray absorption spectroscopy (XANES). We are therefore searching for a budding researcher who gets a kick out of advanced analytical techniques and approaching science from a fundamental, mechanistic perspective.

This PhD project aims to study the abiotic interaction between ammonia and soil organic matter, working across an environmental gradient of drained peats in New Zealand's North Island. As part of this project, the PhD student will execute a combination of field work in the Waikato region of New Zealand, experimental adsorption studies, and advanced analytical techniques with a well-rounded and internationally-connected supervisory team of early-career scientists. Work for this project will be carried out in collaboration with the Lawrence Livermore National Laboratory, the University of Wisconsin Madison and the Australian Synchrotron. For the right candidate, there is scope to lead the way in shaping the bulk of the thesis and to form strong international collaborations.

Prior experience

Prior experience in any of the following fields: biogeochemistry, isotope (or other) geochemistry, analytical chemistry, soil science, or a related field is highly valued.

As part of your application package, kindly include:

1. CV (including 2-3 referee information)
2. Cover Letter (this can include: a description of why you want to undertake a PhD; how your previous experiences have prepared you for the research project that you are applying for; what your passions are within or outside of academia)

Applications will be accepted until the position is filled.



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Kindly email your application to: dorit@waikato.ac.nz