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

Open PhD Position in Biogeochemistry / Earth Science / Soil Science

This fully funded three-year PhD studentship based at Te Aka Mātuatua – School of Science, Waikato University in Hamilton, New Zealand. As part of a Marsden Fund fast-start research project, the successful candidate will be an integral part of laboratory and fieldwork in the North Island of New Zealand. A mid-year 2022 start is anticipated; with flexibility in responding to COVID-19 related travel restrictions.

Chief Supervisor Dr. Dorisel Torres-Rojas (University of Waikato – Hamilton)
Collaborators: A/Prof Thea Whitman (University of Wisconsin - Madison)
Dr. Rachel Hestrin (University of Massachusetts - Amherst)
Dr. Jordan Goodrich (University of Waikato-Hamilton)

Description: Most studies addressing nitrous oxide emissions from soils focus on intercepting or slowing the biological pathway leading to N_2O generation. However, little attention has been paid to the important N_2O-precursor, ammonia (NH_3), and its potential to be retained in organic soil horizons. Following recent work by our group on NH_3-bonding to charcoal under ambient conditions, this research programme will explore a neglected pathway toward N retention in soil with the potential to mitigate N_2O emissions 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 SOM-NH_3 bonding. This project draws heavily on quantitative ^{15}N-NMR and Synchrotron X-ray Absorption Spectroscopy. Therefore, we are searching for a budding researcher who gets a kick out of advanced analytical techniques and approaches science from a fundamental, mechanistic perspective.

This Ph.D. project investigates 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 Ph.D. student will execute a combination of fieldwork 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. This project is in collaboration with the University of Massachusetts Amherst, the University of Wisconsin-Madison, and the Australian Synchrotron. There is scope for the right candidate to lead the way in shaping the bulk of the thesis and forming 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 Ph.D.; 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.
Contact and email address for applications: **doriselt@waikato.ac.nz**