SUPERVISOR/S: Aaron Wall and Louis Schipper
PROJECT TITLE: Estimating N2O emissions from dairy grazed pastures
FIELD: Soil Science/Environmental Sciences
DIVISION/SCHOOL: HECS - School of Science
PROJECT LOCATION: Hamilton

PROJECT ABSTRACT:
Agricultural greenhouse gases (GHG) account for almost 50% of New Zealand’s net GHG emissions. These emissions are mostly in the form of methane (CH4) and nitrous oxide (N2O), but also the loss of soil carbon as CO2. Considerable research is being undertaken to quantify and reduce these emissions from agricultural systems. One area that we are currently researching is the impact of strip grazing turnips by dairy cows on soil carbon. However, to estimate total GHG emissions, measurements of N2O and CH4 emissions from the soil are also required. This project will work towards developing and undertaking aligned field measurements of N2O emissions during the grazing phase of the turnip crop. Measurements will be made using the manual chamber technique with regular sampling during the grazing period. A second, aligned summer research project will focus on CH4 emissions during the turnip grazing using the same technique, and thus it is planned that the two successful candidates will work together for much of the project. This project will be closely aligned to ongoing research funded by the New Zealand Agricultural Greenhouse Gas Research Centre.

The successful applicant will be involved in developing the sampling strategy, taking samples, analysing the samples for N2O concentration, and finally analysing the data. The project will commence with an initial phase of trial development that includes researching sampling strategies, and testing the sampling method in the field so that once the turnip grazing begins in January a suitable sampling strategy can be employed. The second phase of the project will be intensive field sampling, occurring both during and after grazing.

We are looking for a student who has an interest in any of the following: agriculture, environmental science, greenhouse gas emissions/climate change. Ideally, the student will be someone who enjoys fieldwork, as considerable time will be spent collecting samples at our research site on a nearby working dairy farm. The data analysis will require some knowledge of Microsoft Excel, and/or an interest in learning to use Matlab mathematical computing software. As part of our research team, you will also assist with other projects on an occasional basis, particularly in the form of lab and fieldwork.

STUDENT SKILLS:
- Driver’s license
- Willingness to do field work
- Knowledge of Excel

PROJECT TASKS:
- Review of chamber study literature
- Planning of a field trial
- Field sampling of N2O emissions
- Analysis of the collected gas samples
- Processing of the field data

EXPECTED OUTCOMES:
- Student’s Research Poster (as per clause 6 of the Scholarship regulations)
- Development of a sampling strategy
- Preliminary measurements used to evaluate the sampling strategy
- Analysis of the preliminary data to estimate soil N2O emissions