Faculty of Agriculture and Life Sciences
Summer Scholarships
2024/2025

LINCOLN UNIVERSITY
TE WHARE WĀNAKA O AORAKI

Scholarship Information

The Faculty of Agriculture and Life Sciences will be offering a number of research scholarships over the 2024 summer vacation to capable students who are continuing their university studies in 2025. All scholarships are valued at $9,000 each (tax free), commencing after the end of the semester two, for a period of 10 weeks (may include research during 3 weeks University Christmas close down period).

The scholarships are an opportunity for students to experience a research environment, to get a feel for what is involved in postgraduate research, and to gain valuable research skills. Many of the students who have previously been awarded summer scholarships have gone on to complete postgraduate degrees and establish successful careers.

This booklet outlines the summer scholarship projects received to date. Please consult the Lincoln University website for others that may have been added subsequently.

https://www.lincoln.ac.nz/study/scholarships/
Browse **Search Scholarships**
Select **Agriculture & Life Sciences Summer Scholarships**

Applications close on **Monday 30 September 2024,** and should be emailed to:

Robyn.Wilson@lincoln.ac.nz
Robyn Wilson
Faculty of Agriculture and Life Sciences
PO Box 85084
Lincoln University
Lincoln 7647
Christchurch

Phone: (64) (3) 423 0652
Science South - Room 45

Eligibility

Applicants must be students intending to undertake full-time study in 2025.

You may be continuing your Bachelors degree, or planning to begin an Honours, Masters, or PhD degree in 2025. Priority will be given to those students who are undertaking their studies at Lincoln University.

Current Masters and PhD students are not eligible to apply for this scholarship.

All applicants for this scholarship need to be currently residing in New Zealand. This is a tax-free scholarship and applicants must not be employed elsewhere for more than 10 hours per week whilst receiving a scholarship.

Applications

(Note: there is no official application form)
Please provide the following information:

- Name, student ID, address and contact details (include email address)
- Faculty and current degree being studied for
- Intended qualification to study for in 2025
- Project(s) you would like to work on (include the project number)
- Copy of your Academic Record
- GPA of 5 or greater
- Relevant previous work and/or research experience

An application for a maximum of 3 or 4 projects is considered appropriate. Please list in order of preference.

NOTE: All applicants must contact the lead supervisor listed at the bottom of each project prior to submission of their application.

Financial information

- Scholarship payments will be made fortnightly, with a final payment made on receipt of confirmation from your supervisor that the project has been satisfactorily completed, at the completion of the 10 working weeks. (Please note some external funders may require a report at the end of the project).
- **For taxation purposes applicants must be intending to undertake full-time study in 2025.** (You may be continuing your Bachelors degree, or planning to begin an Honours, Masters, or PhD degree in 2025.)
- Students who receive Study Link funding should contact Study Link directly, prior to applying, as there may be implications for their funding.

Timetable

Monday 30 September 2024	Deadline for applications
Friday 11 October 2024	Successful applicants notified
Monday 11 November or	Scholarship research period begins
or Monday 18 November 2024	
Friday 14 February 2025	All scholarships to be completed and confirmation from supervisor of satisfactory competition of project

Scholarship conditions

Students are expected to complete research activities to the satisfaction of the supervisors .
From time to time you may be required to do research outside of normal research hours. If any deviation to the original plan is made, then this **must** be approved by the Faculty Postgraduate Research Committee.

All projects must be completed before Friday 14 February 2025 before Semester 1, 2025 starts.

This is a tax free scholarship and applicants must not be employed elsewhere for more than 10 hours per week whilst receiving a scholarship.

Criteria for awarding these scholarships

The criteria for awarding these scholarships take the following attributes of applicants into consideration:

Academic achievement
- Overall Grade Point Average (CUM GPA 5 or greater)
- Last Semester GPA

Applicant's background
- Suitable subjects covered during study
- Suitable work/research experience

Intentions for future study
- Continuing within Bachelors degree
- Bachelors degree to be followed by Honours, Masters, or PhD

Scholarships will be awarded based on academic merit. The Faculty Postgraduate Research Committee reserves the right to award the number of scholarships for which it believes it has suitable candidates and funding.

List of Projects

No.	Project Title	Supervisor	Email
1.	Regenerative Agriculture Dryland Experiment (RADE) (2 projects)	Dr Alistair Black	Alistair.Black@lincoln.ac.nz
2.	Wheat response to nitrogen	Dr Mariana Andreucci; Prof Derrick Moot	Mariana.Andreucci@lincoln.ac.nz
3.	Lucerne phosphorous experiments	Lauren Jones; Prof Derrick Moot	Lauren.Jones@lincoln.ac.nz Derrick.Moot@lincoln.ac.nz
4.	Collection and curation of entomological specimens for teaching	Assoc. Prof Cor Vink, Jenny Brookes	Cor.Vink@lincoln.ac.nz Jenny.Brookes@lincoln.ac.nz
5.	Effect of breeding and feeding on dairy heifer resilience	Dr Racheal Bryant	Racheal.Bryant@lincoln.ac.nz
6.	Response of hardy perennial legume, Caucasian clover to phosphorus & sulphur fertiliser application: DM yield, botanical composition, nutritive value and growth over summer.	Dr Tom Maxwell; Sonya Olykan; Dick Lucas	Tom.Maxwell@lincoln.ac.nz Sonya.Olykan@lincoln.ac.nz
7.	Pasture Persistence – determining the ecological factors that drive performance of perennial grass cultivars over time	Dr Tom Maxwell & Gerald Cosgrove (AgResearch)	Tom.Maxwell@lincoln.ac.nz
8.	Biodiversity Monitoring Assistant at Ashley Dene Farm and Lincoln University	Elysia Harcombe; Dr Jon Sullivan	Elysia.Harcombe@lincoln.ac.nz Jon.Sullivan@lincoln.ac.nz
9.	Role of calpains in the stress-induced high pH meat	Dr Hannah Lee; Prof. Jim Morton	Hannah.Lee@lincoln.ac.nz Jim.Morton@lincoln.ac.nz
10.	Testing plant interactions with their environment	Prof Rainer Hofmann; Dr Pieter-Willem Hendriks	Rainer.Hofmann@lincoln.ac.nz Pieter-Willem.Hendriks@lincoln.ac.nz
11.	What's the carbon footprint of weeds in braided rivers?	Dr Naomi Wells	Naomi.Wells@lincoln.ac.nz
12.	Does algae help or hinder nitrogen pollution in Canterbury braided rivers?	Dr Naomi Wells	Naomi.Wells@lincoln.ac.nz

No.	Project Title	Supervisor	Email
13.	How much nitrogen do mosses add to West Coast rainforests?	Dr Naomi Wells	Naomi.Wells@lincoln.ac.nz
14.	Californian thistle biocontrol	Prof Rainer Hofmann; Assoc Prof Clive Kaiser; Wendy Kentjens (MSc)	Rainer.Hofmann@lincoln.ac.nz Clive.Kaiser@lincoln.ac.nz Wendy.Kentjens@lincoln.ac.nz
15.	'Fast food' for Mealybugs?	Assoc Prof Amber Parker; Dr Olaf Schelezki	Amber.Parker@lincoln.ac.nz Olaf.Schelezki@lincoln.ac.nz
16.	Testing plant interactions with their environment	Prof Rainer Hofmann; Dr Pieter-Willem Hendriks	Rainer.Hofmann@lincoln.ac.nz Pieter-Willem.Hendriks@lincoln.ac.nz
17.	Does irrigation management need to consider both soil-water and soil aeration requirements?	Dr Chamindu Deepagoda; Prof Tim Clough; Prof Keith Cameron; Prof Hong Di; Sam Carrick	Chamindu.Deepagoda@lincoln.ac.nz Tim.Cough@lincoln.ac.nz Keith.Cameron@lincoln.ac.nz Hong.Di@lincoln.ac.nz
18.	Carbon dioxide movement in differently saturated soils	Dr Chamindu Deepagoda; Prof Tim Clough; Dr Naomi Wells	Chamindu.Deepagoda@lincoln.ac.nz Tim.Clough@lincoln.ac.nz Naomi.Wells@lincoln.ac.nz
19.	Optimising kūmara growth in cold-climate soils.	Dr Chrystal O'Connor	Chrystal.OConnor@lincoln.ac.nz
20.	Geeky geckos: Using photography and computer software to identify individuals and monitor populations of Woodworthia brunnea, the Canterbury gecko.	Dr Jennifer Gillette	Jennifer.Gillette@lincoln.ac.nz
21.	Testing spraying patterns and effectiveness of an autonomous robot sprayer	Dr Andy Greer; Bernard Newman; Assoc. Prof Amber Parker	Andrew.Greer@lincoln.ac.nz Bernard.Newman@lincoln.ac.nz Amber.Parker@lincoln.ac.nz
22	Soil pH and nutrient dynamics of dryland pasture legume species in high country.	Assoc. Prof. Jim Moir	Jim.Moir@lincoln.ac.nz
23	Aluminium toxicity in high country soils.	Assoc. Prof. Jim Moir	Jim.Moir@lincoln.ac.nz
24	Pests in the spotlight: Assessing NZ media perceptions of biosecurity	Dist. Prof. Philip Hulme	Philip.Hulme@lincoln.ac.nz

Details of each project available are as follows:

1. **Regenerative Agriculture Dryland Experiment (RADE) (2 projects)**

   An 8 ha block of Regenerative versus conventional pastures has been established on site at LU. Two projects are available to assist with animal, pasture and soil measurements to compare the productivity and environmental footprints of these two systems under high and low fertility conditions. The work can contribute to sheep practical work requirements.

   Supervisor: Dr Alistair Black
   Department: Agricultural Sciences

2. **Wheat response to nitrogen**

   This project involves intensive monitoring of the growth and development of an established wheat crop. The data will be used to validate a wheat simulation model that can accurately predict the world record wheat yields produced in Canterbury. This is an ideal project for anybody with an interest in the arable sector

   Supervisor: Dr Mariana Andreucci; Prof Derrick Moot
   Department: Agricultural Sciences

3. **Lucerne phosphorous experiments**

   This work is to understand how lucerne grows under different levels of phosphorous applications and to what depth can lucerne access phosphorous. These will be achieved by running an outdoor pot experiment where lucerne will be grown in tubes with three superphosphate application rates, and three application depths. After establishment plants will be removed from the pots and root and shoot characteristics measured.

   Supervisor: Lauren Jones; Prof Derrick Moot
   Department: Agricultural Sciences

4. **Collection and curation of entomological specimens for teaching**

   Your time will be spent collecting, curating, and cataloguing specimens for use in our own teaching labs. You will be expected to collect a taxonomically diverse range of specimens covering as many different insect orders as possible. These will come from a wide variety of different habitats, including terrestrial, freshwater, and this may require you to master several different collecting methods and curatorial techniques, although some of the specimens will need to be preserved in alcohol. You will also make an up-to-date inventory of all of our preserved specimens and slide collection, including their current physical condition, to assist with ongoing management and maintenance of the collection. You will be expected to organise your own collecting trips, so this will require a high level of independence, reasonable physical fitness, and your own transport. A mark of B+ or better in ENTO304 or equivalent entomology knowledge will be required.

   Supervisor: Assoc. Prof Cor Vink, Jenny Brookes
   Department: Pest-Management and Conservation

5. **Effect of breeding and feeding on dairy heifer resilience**

In this project the student will be conducting behavioural and performance measurements of heifers which have either been bred for improved heat tolerance (SLICK) or reared with their dam pre weaning to determine heat stress response and milk yield compared to control group of heifers

Supervisor: Dr Racheal Bryant
Department: Agricultural Sciences

6. **Response of hardy perennial legume, Caucasian clover to phosphorus & sulphur fertiliser application: DM yield, botanical composition, nutritive value and growth over summer.**

Responses of Trifolium repens and T. ambiguum to five rates of superphosphate when applied to a Wakanui silt loam soil with an Olsen P test of 10 in Iversen Field number 4. The pasture in paddock Iv4 has nine year old Caucasian clover and resident white clover growing with a range of non-legume species. Clover vigour, leaf size, and analyses of leaf laminae for macro and micro nutrients will be used to compare the responses of the two clover species over the five rates of superphosphate (P + S) application.

Supervisor: Dr Tom Maxwell; Sonya Olykan; Dick Lucas
Department: Agricultural Sciences

7. **Pasture Persistence – determining the ecological factors that drive performance of perennial grass cultivars over time**

Unravelling the complex interacting biotic and abiotic factors that drive pasture community change is important to develop the appropriate pasture management to improve persistence. Identifying primary driving factors (soil type, summer rainfall, plant N status, population survival mechanisms) and secondary driving factors (invertebrate pest pressure, diseases, weed ingress and high intensity grazing) which act and/or interact to determine productive sown pasture longevity are critical to understanding and therefore managing for pasture persistence. To address this need, and provide the DairyNZ Forage Value Index with persistence trait data for perennial pasture grass species, a long-term pasture persistence trial, consisting of repeated annual sowings, commenced in Canterbury in 2015 and is planned to continue until 2025. This project measures pasture persistence traits of DM yield, botanical composition, grass morphology and density of ten grass cultivars from pasture plots continuously stocked with sheep. The trial site is located at the Ashley Dene Research and Development Station.

Supervisor: Dr Tom Maxwell & Gerald Cosgrove (AgResearch)
Department: Agricultural Sciences

8. **Biodiversity Monitoring Assistant at Ashley Dene Farm and Lincoln University**

Over the summer, you will survey biodiversity on the Integral health Dairy Farm (IHDF) located at Lincoln University's Ashley Dene Research Development Station located in Springston. The IHDF is a developmental research farm designed from complex adaptive design theory to enhance the health of farm system components (soil, plant, animal, consumer, business, and ecosystem). Sites of woody vegetation are currently being established on farm comprising 4% of the available grazing area. Biodiversity is a key indicator of ecosystem health and monitoring of this outcome will be important to understand outcomes of this development. As part of this work, they need a biodiversity monitoring assistant to assess the current state of biodiversity at Ashley Dene, including in highly diverse pasture, where native vegetation is planted and at the site of a planned wetland restoration project. The data collected over the summer will form a crucial baseline biodiversity assessment that will allow Ashely Dene to compare on-farm practices to gains in species diversity.
Additionally, you will help us to prepare Lincoln University's first report on the state of our biodiversity, summarizing what flora, fauna, and fungi are found throughout campus, and describing what species are doing well and which are declining. You will use existing data collected across campus to outline spatial patterns in biodiversity and highlight the important rare and problematic species. The report you produce will be used to track changes in campus biodiversity through time, and be a guide for assessing the effectiveness of future management and sustainability practices on campus.

Applicants must have familiarity with New Zealand's biodiversity and experience using monitoring techniques for both flora and fauna. A full driver's licence is also beneficial.

Supervisor: Elysia Harcombe; Dr Jon Sullivan
Department: Pest-Management and Conservation

9. **Role of calpains in the stress-induced high pH meat**

High pH meat is frequently associated with poor shelf-life and eating quality, and pH is a commonly used marker for meat quality. Calpain I and II are calcium-dependent cysteine proteases, which are also associated with the tenderisation process of post-mortem from muscle to meat. This project will investigate the role of calpains in the stress-related high pH lamb meat. The student will learn and explore both enzymatic and biochemical features in the selected meat samples that can be related to high pH lamb meat, using analytical assessment tools such as a FPLC (purifying calpains from sheep lung), calpain specific catalytic activity assay, casein zymography and the immune-detection (western-blotting technique) in the protein biochemistry lab (the Department of wine, food, and molecular biosciences). In future, biomarkers of high pH in the meat could be used for enhancing animal welfare and confirm the relationship between minimising pre-slaughter stress and improving the consistency of meat quality.

Supervisor: Dr Hannah Lee; Prof. Jim Morton
Department: Wine, Food and Molecular Biosciences

10. **Testing plant interactions with their environment**

Plants interact with a wide spectrum of environmental variables in nature. This includes abiotic (e.g. availability of water or nutrients, temperature) and biotic factors (e.g. pests and diseases). Examinations of the interactions of these environmental factors with plants provide exciting new research opportunities in plant science. This summer project studies such environmental interactions and how they affect plants. The project will enable the student to learn key skills in plant physiology and provides novel insights for the understanding of plant performance and resilience in a changing environment.

Supervisor: Prof Rainer Hofmann; Dr Pieter-Willem Hendriks
Department: Wine, Food and Molecular Biosciences

11. **What's the carbon footprint of weeds in braided rivers?**

Braided rivers are a globally rare freshwater ecosystem that consist of a mix of fast-flowing channels and disconnected ponds. But dry gravel bars, which are largely ignored by water-focused scientists, actually form the largest proportion of the river area. The character of these gravel bars is changing as weeds, particularly woody species with deep roots, encroach. These weeds may be changing more than just the look of the river: by stabilising gravels and accumulating organic matter they affect how energy (carbon) moves across the landscape. The student will carry out field work and data analysis to figure out how much carbon is emitted from braided river beds with and without weeds. The student will gain skills in greenhouse gas measurement techniques, data processing in R, and drone imaging.

Supervisor: Dr Naomi Wells
Department: Soil and Physical Sciences

12. **Does algae help or hinder nitrogen pollution in Canterbury braided rivers?**

Nitrogen pollution in Canterbury is linked to increasingly 'green', i.e., algae-filled, rivers. However, it isn't clear if the algal growth is caused by nitrogen directly or by other climate-linked changes like decreasing flows and increasing temperatures. This is because algae has a complicated relationship with nitrogen: they can remove it from the water column and lower nutrient levels, but also fix new nitrogen from the atmosphere and add to the nutrient pollution problem.

The student will help test whether algae in lowland rivers is consuming or produce nitrogen. The project will involve working with a team to carry out a mixture of field sampling, flume tests, and laboratory assays. The student will gain skills in freshwater science techniques and laboratory analyses.

Supervisor: Dr Naomi Wells
Department: Soil and Physical Sciences

13. **How much nitrogen do mosses add to West Coast rainforests?**

We recently discovered that some New Zealand moss species form a symbiosis with cyanobacteria and fix large quantities of atmospheric nitrogen. This suggests that the abundant and diverse mosses in West Coast rainforests could actually be fertilising the forests. But we don't know how changing environmental conditions might increase or decrease the amount of bioavailable nitrogen mosses contribute to the forests. The student will help carry out tests to figure out how temperature affects nitrogen fixation rates by New Zealand mosses. Work will involve collecting moss samples in the field and carrying out laboratory measurements. The student will gain experience in field research design, biogeochemical measurement techniques, and greenhouse gas sampling.

Supervisor: Dr Naomi Wells
Department: Soil and Physical Sciences

14. **Californian thistle biocontrol**

Californian thistle is a major weed in cropping as well as pasture systems. In high country pasture systems, this weed is difficult to control as the normal control methods of herbicide spraying and repeatedly mowing are unpractical in this environment. This project aims to improve biocontrol of Californian thistle as current biocontrol options have inconsistent performance. One of these biocontrol options is the host-specific rust fungus Puccinia punctiformis. This fungus is of interest as it has the potential to infect the large root system of Californian thistle and self-perpetuates in the field, and thus could provide long-term control. This project will test several substances in conjunction with the biocontrol fungus Puccinia punctiformis to determine if these can improve the performance of the fungus.

In this project, the student will learn to make spray and spore solutions. The student will also perform pot trials and evaluate plants for disease symptoms.

Supervisor: Prof Rainer Hofmann; Assoc Prof Clive Kaiser; Wendy Kentjens (MSc)
Department: Wine, Food and Molecular Biosciences

15. **'Fast food' for Mealybugs?**

Can we make mealybugs eat 'fast food'? Citrophilus mealybugs (Pseudococcus calceolariae) are significant pests in vineyards, as they spread grapevine leafroll disease caused by the virus GLRaV-3. Mealybugs feed by extracting sap from plant phloem tissue, and in doing so spread the virus.

Our previous research has shown that not all grapevines are equally attractive for mealybugs to feed on. We have found a group of naturally occurring chemicals in some grapevines that are associated with deterring mealybug feeding. To evaluate the impact of these compounds on mealybug feeding behaviour, you will develop methods to grow mealybugs on an artificial diet, i.e. 'fast food' for the mealybugs. If we can demonstrate that the mealybugs behave differently in response to these compounds on the artificial diet, then we will be able to better understand the role of these compounds as mealybug deterrents in grapevines in the vineyard.

The project is a collaboration between Lincoln University and Plant and Food Research, a New Zealand Crown Research Institute. This collaboration provides a unique chance to learn about an economically important pest to the New Zealand wine industry, well as, engaging with scientists from both organisations.

Supervisor: Assoc Prof Amber Parker; Dr Olaf Schelezki

Department: Wine, Food and Molecular Biosciences

16. **Testing plant interactions with their environment**

Plants interact with a wide spectrum of environmental variables in nature. This includes abiotic (e.g. availability of water or nutrients, temperature) and biotic factors (e.g. pests and diseases). Examinations of the interactions of these environmental factors with plants provide exciting new research opportunities in plant science. This summer project studies such environmental interactions and how they affect plants. The project will enable the student to learn key skills in plant physiology and provides novel insights for the understanding of plant performance and resilience in a changing environment.

Supervisor: Prof Rainer Hofmann; Dr Pieter-Willem Hendriks
Department: Wine, Food and Molecular Biosciences

17. **Does irrigation management need to consider both soil-water and soil aeration requirements?**

Characterized by relatively dry climate and low annual rainfall, Canterbury region includes over 70% of irrigated agricultural lands in New Zealand. Irrigation management in agricultural systems often ensures the soil-water requirements through sensor-based soil moisture measurements, without due consideration of soil aeration as an essential corequisite.

Based on measured soil-water characteristic data in agricultural lands in Canterbury region, this study will examine plant-available water in widely different soil profiles. Using reliable predictive models and measured soil physical properties, the soil-gas diffusivity in different soils will be examined. Both plant-available soil water and diffusion-controlled aeration will be combined to investigate how the corequisites are met as the soils progressively drain upon irrigation. The effects of soil texture and soil structure on the co-requirements will also be investigated.

Supervisor: Dr Chamindu Deepagoda; Prof Tim Clough; Prof Keith Cameron; Prof Hong Di; Sam Carrick
Department: Soil and Physical Sciences

18. **Carbon dioxide movement in differently saturated soils**

Microbial respiration and decomposition of soil organic matter leads to production of carbon dioxide (CO2) in plant rhizosphere. Accumulation of CO2 in rhizosphere will inhibit replenishment of oxygen from the atmosphere, potentially creating a p hypoxic (low-oxygen) condition affecting continuing microbial and root respiration. The CO2 migration in soil and its emission across soil-atmosphere continuum is primarily controlled by diffusion, and is affected by soil physical conditions such as soil type and soil moisture conditions.

In this study, a controlled laboratory column experiment will be conducted to investigate CO2 transport in differently textured and variably saturated soils. CO2 production will be simulated by a point diffusive source located at the bottom of the soil column, and CO2 concentration profiles will be examined at different depths over time at unsteady and steady-state conditions using real-time sensor-based CO2 measurements for different soil types and saturation conditions

Supervisor: Dr Chamindu Deepagoda; Prof Tim Clough; Dr Naomi Wells
Department: Soil and Physical Sciences

19. **Optimising kūmara growth in cold-climate soils.**

Kūmara is frost-sensitive, yet Māori have developed innovative techniques to grow it in the colder regions of the South Island. One method involved enriching the soil with ash from tīkouka (cabbage trees) to support kūmara growth. Plants are continuously influenced by various environmental factors, including abiotic elements like temperature, soil nutrients, and water availability. By carefully controlling these factors through targeted research, we can identify optimal conditions for kūmara cultivation in cold climates. This summer project will investigate how kūmara can thrive in challenging environments by focusing on soil mineral composition and nutrient availability. Through studying these environmental interactions, the student will develop key skills in plant physiology while gaining insights into mātauranga and techniques for enhancing kūmara production and resilience in colder climates.

Supervisor: Dr Chrystal O'Connor
Department: Wine, Food and Molecular Biosciences

20. **Geeky geckos: Using photography and computer software to identify individuals and monitor populations of Woodworthia brunnea, the Canterbury gecko.**

Understanding basic life-history parameters of a population and obtaining accurate estimates of population size are essential to making evidenced-based decisions regarding conservation strategies. Estimating population size and characterizing life-history parameters such as survivorship can be done effectively using mark-recapture studies, which require the ability to identify individual animals. One current best-practice technique for identifying individuals is through use of photography. Over the last two summers, we developed techniques for using photography and a computer programme called I3S to identify individuals of the Canterbury gecko as part of our ongoing lizard monitoring project on Banks Peninsula. We have captured over 200 geckos which are now part of our photographic database.

For the summer of 2024-2025, we will continue this project. The project will include 2-3 bouts of field work on Banks Peninsula, checking lizard lodges at 16 sites and collecting data on all lizards found (skinks and geckos) plus taking pictures of all geckos. Tracking tunnels at each site may also be monitored. Field work hours can be long, and a reasonable degree of fitness and willingness to work in most weather conditions is important. One bout of field work can take anywhere from 4-8 days. In between bouts of field work, the student will curate the gecko database. This includes careful editing of photographs using the protocols in I3S and analysing the photographs to determine whether individuals have been previously captured. Finally, the student will use the database at the end of the project to answer some basic questions about the geckos. The student may also assist with fieldwork for other summer lizard projects, which may include a collaborative project with the Christchurch City Council or fieldwork involving green geckos (Naultinus). The student needs to be comfortable handling geckos, though no experience is necessary; photography skills and a reasonable ability in working with computer programmes would be useful but not essential. This will be a fun opportunity for someone interested in herpetology and will develop skills that are useful in behavioural, population and conservation ecology.

Supervisor: Dr Jennifer Gillette
Department: Pest-Management and Conservation

21. **Testing spraying patterns and effectiveness of an autonomous robot sprayer**

Automation in agriculture, horticulture and viticulture has rapidly improved and offers opportunities to provide more effective and safer use of people and machinery. Lincoln University has recently purchased a state-of-the art autonomous RTK-GPS guided robot sprayer capable of extreme precision. The immediate application for this vehicle is to autonomously spray viticulture and horticulture crops. This project will focus on the use of this autonomous vehicle, and test the spraying patterns and effectiveness in a range of viticulture, horticulture and agricultural environments which leads developing protocols for its safe and effective use. In this project you will become familiar with RTK-GPS, which is capable of accuracies of 1 mm, learn how to program and use this autonomous vehicle and test tests its effectiveness as a future tool for precision agriculture, horticulture and viticulture.

Supervisor: Dr Andy Greer; Bernard Newman; Assoc. Prof Amber Parker
Department: Wine, Food and Molecular Biosciences

22. **Soil pH and nutrient dynamics of dryland pasture legume species in high country**

The productivity of South Island high country is typified by a short, often soil moisture limited growing season, and acid soils (pH < 5.5). Traditionally, white clover has been sown as the key pasture legume, but fails to persist. The use of alternative pasture species, such as deep rooting Lucerne, has been suggested to improve dryland pasture production. However, lucerne is known to be intolerant of acid soil conditions, and related aluminium (Al) toxicity issues. Nutrient and trace element availability is also strongly influenced by soil pH. To offset increased soil acidity, lime must be applied, and where this cannot be done, soils may be too acidic for legumes and productivity declines sharply. This scholarship project will examine a suite of novel pasture legume species grown in acidic /

high aluminium soil conditions under field and glasshouse conditions. Fieldwork will be conducted in Central Otago.

Supervisor: Assoc. Prof. Jim Moir
Department: Soil and Physical Sciences

23. **Aluminium toxicity in high country soils**

Soil acidification is a critical issue, which limits grassland and crop production globally. In some soils acidification enhances the mobilization of toxic metals including aluminium (Al), particularly at a pH<5.5. Pastoral high and hill country farmers in New Zealand often face challenges maximising the productivity of their system due to acidic and low nitrogen (N), phosphorus (P) and sulphur (S) fertility soils. Aluminium toxicity is found extensively throughout New Zealand and is an issue associated with acidic soils. Some soil orders are more susceptible to Al toxicity due to higher concentrations of extractable Al ($CaCl_2$), which can severely restrict the establishment and growth of legume species. The rooting depth of legumes can be severely affected by subsoil Al toxicity, which occurs in many high and hill country soils. However, the exact nature and drivers of aluminium toxicity in soil are still poorly understood. This scholarship involves fieldwork sampling acid soils in high country, in combination with experimentation on the LU campus examining the nature of these soils. On-farm field sites in central Otago will be visited and sampled, including soils and pasture legumes. Glasshouse and laboratory experiments will be conducted over the summer, involving plant growth measurements.

Supervisor: Assoc. Prof. Jim Moir
Department: Soil and Physical Sciences

24. **Pests in the spotlight: Assessing NZ media perceptions of biosecurity**

Few issues are as critical to safeguarding the environmental heritage and economic growth of New Zealand as biosecurity. The future of biosecurity requires a step change in how pathogen, pest, and weed incursions are managed. Yet to achieve this goal requires us to understand how such threats are perceived by the public. Biosecurity issues are frequently raised in the general news media of New Zealand, often in relation to an incursion or suspected threat. This project aims to be the first to explore these media articles to assess how they portray biosecurity. It will address this challenge by looking at how biosecurity is reported in the NZ media to examine any biases towards certain types of organisms, sectors, or ecosystems; if the overall sentiment of headlines is positive or negative, and how these aspects vary depending on the specific media outlet. Training will be provided in relation to database searching, creation and management of databases, sentiment analysis, and statistical analysis. This project provides an outstanding opportunity to upskill in media analysis and biosecurity research and would be an excellent background for anyone wishing to pursue a career in science communication, journalism, or postgraduate research in a biosecurity themed project. Although the project is run from Lincoln University, the successful scholar will not be tied to a specific location and can undertake the work from anywhere where there is an internet connection and access to major media databases (most universities and many public libraries) on the condition that regular online meetings are held to discuss progress

Supervisor: Dist. Prof. Philip Hulme
Department: Pest-Management and Conservation