# 2017/18 Vacation Scholarships

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| **Job Title:** | CSIRO Undergraduate Vacation Scholarships – **Land & Water** |
| **Reference No:** | 43702 |
| **Classification:** | CSOF1.1 |
| **Stipend:** | $1462.77 per fortnight (before tax) |
| **Location:** | Please refer to the list of ***Projects*** at the end of this document |
| **Tenure:** | 8 to 12 weeks from November 2017 to February 2018 |
| **Role Purpose:** | The 2017/18 Vacation Scholarship Program is designed to provide students with the opportunity to work on real-world problems in a leading R&D organisation.  Participation in the Vacation Scholarship Program has influenced previous scholarship holders in their choice of further study and future career options. Many have gone on to pursue a PhD in CSIRO or to build a successful research career within CSIRO, a university or industry. |
| **Project Description:** | Please refer to the list of ***Projects*** at the end of this document.  *If you require more information please contact the person listed for the project.* |
| **Eligibility/**  **Pre-Requisites:** | To be eligible to apply you must be an Australian/New Zealand Citizen, Australian Permanent Resident, or an international student who has full work rights for the 8 to 12 weeks duration (does not require visa sponsorship).  Vacation scholarships are for students who:   * are currently enrolled at an Australian university; * have completed at least three years of a full-time undergraduate course (however exceptional second year students may be considered); * have a strong academic record (credit average or higher); and * intend to go on to honours and/or postgraduate study. |
| **How to Apply:** | Please apply online at [www.csiro.au/careers](http://www.csiro.au/careers). **You will be required to:**   1. select your **top 2 preferred research projects** in order of preference; 2. submit a **resume/cover letter** (as one document) which includes:  * the reasons why the research project/s you have selected are of interest to you; and how your previous skills/knowledge and experience meets the project requirements; * an outline of your longer-term career aspirations and detail how this program will help you achieve them; and * using the project numbers listed below, list in order of preference, **all of the projects** you are interested in.  1. upload your **academic results** in the ‘***Requested Information’*** field.   **Referees:** If you would like to include referees (either work or university lecturers/ tutors)in your application, please add their name and contact details into your resume**.**  If you experience difficulties applying online call 1300 984 220 and someone will be able to assist you. Outside business hours please email: [csiro-careers@csiro.au](mailto:csiro-careers@csiro.au). |

There are **7** projects available in **Land & Water:**

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| **Project No.** | **Location** | **Project Title (see the following pages for more information)** |
| [**Land & Water 1**](#_Land_&_Water) | Black Mountain, ACT | Waterbird chick allometry and survival – how much food is required? |
| [**Land & Water 2**](#_Land_&_Water_1) | Black Mountain, ACT | Food-web effects of sudden changes in fish abundance and mortality |
| [**Land & Water 3**](#_Land_&_Water_2) | Black Mountain, ACT | Developing an ecological trajectories architecture for use in the Murray-Darling Basin |
| [**Land & Water 4**](#_Land_&_Water_3) | Hobart or Canberra | Basin Futures Product Development (Scientific Product Development) |
| [**Land & Water 5**](#_Land_&_Water_4) | Black Mountain, ACT | Basin Assessment Case Studies and Product Development (Scientific Product Development) |
| [**Land & Water 6**](#_Land_&_Water_5) | Black Mountain, ACT | Comparative Study of Australia and South Asian Southeast Asian Countries' Commitment to SDGs Goal 5: Gender Equality and Goal 6: Clean Water and Sanitation |
| [**Land & Water 7**](#_Project_Number) | Black Mountain, ACT | Understanding South Asia hydroclimate |

Select the **Project Numbers** above to take you directly to the project details (which are on the following pages). This includes relevant fields of study, Project Duties/Tasks and Locations for these projects.

Pease read though these and decide **which 2 projects are your preferred choices** as you will need to enter these into your application. If you require more information please contact the person listed for each project.

Note: CSIRO are advertising vacation scholarships by the different business units we have. You can apply for projects in more than one CSIRO business unit, but your application for **Land & Water** should only refer to Land & Water projects, such as ***Land & Water 1***, ***Land & Water 2***, etc.

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| Project Number | **Vacation Scholarships Project Details** |
| Land & Water 1 | **Project Title**  Waterbird chick allometry and survival – how much food is required?  **Project Description**  Environmental water management in the Murray-Darling Basin is frequently targeted at supporting completion of colonial-nesting waterbird breeding events, in particular preventing egg or chick abandonment due to falling water levels. While knowledge exists regarding the management needed for nesting sites, there is limited knowledge about foraging habitat requirements or food/energy requirements to prevent chick starvation and maximise recruitment into the broader population. This project will assist in filling this knowledge gap, through a) a literature review; b) fieldwork, including waterbird chick allometry measurements in wetlands; c) nest monitoring camera image analyses; and d) analysis of the resulting database(s).  If the applicant is keen, there may be opportunity to draft a scientific journal paper in collaboration with other members of the team.  The data from this vacation scholarship project will be used as part of a broader research program to develop an energy requirements model for Australian colonial-nesting waterbirds. This may then be used to inform water and land management to facilitate maximum bird survival during and after breeding events.  **Project Duties/Tasks**   * Review of scientific literature, extracting data describing the allometry, feeding frequency and energy requirements of waterbirds, focusing on species similar to Australian ibises and spoonbills. * Field measurements of straw-necked ibis and/or spoonbill chick weight, bill length, head-bill length, tarsus length, wing length, and tail length at two age stages. This involves at least two field trips with a scientific team to major wetlands of the Murray-Darling Basin, most likely during December 2017 and January 2018. This fieldwork is physically strenuous, including long periods of wading in mud and water; therefore participants must be reasonably fit and strong. * Nest monitoring camera image analysis to provide supporting data, where applicable. * Management and statistical analysis of the resulting database(s).   **Relevant Fields of Study**   * Ecology * Biology * Environmental Science * Natural Resource Management   **Location:** Black Mountain, ACT  **Contact:** For more details please contact Heather McGinness by phone on (02) 6246 4136 or email [Heather.McGinness@csiro.au](mailto:Heather.McGinness@csiro.au) |

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| Project Number | **Vacation Scholarships Project Details** |
| Land & Water 2 | **Project Title**  Food-web effects of sudden changes in fish abundance and mortality: How do fish-eaters and other water-dependent fauna respond?  **Project Description**  Many species depend on fish for food or are dependent on a healthy aquatic environment/food-web. This includes waterbirds, raptors, kingfishers, riparian bushbirds, platypus, rakali, frogs, crayfish and other crustaceans and molluscs, invertebrates and a range of other species of concern to the public and managers, including federally listed species and groups. How do we pro-actively manage and minimise the knock-on effects of sudden changes in fish abundance or mortality in both the short-term and the long-term for these species? This project will conduct a literature review to investigate the potential food web effects of sudden changes in fish abundance and mortality, describing how fish-eaters and other water-dependent fauna respond. This information will then be used to inform proactive and adaptive land and water management to minimise impacts short-term and long-term, and from local to catchment scales.  If the applicant is keen, there may be opportunity to draft a scientific journal paper in collaboration with other members of the team.  **Project Duties/Tasks**   * Review of the literature to identify responses of fish-eaters and other water-dependent fauna to sudden changes in fish abundance and mortality, including creation of a database of responses and identification of important case studies * Sourcing, collation and analysis of relevant existing datasets for sites at which fish, vegetation and birds and/or animals have been surveyed concurrently, exploring relationships between variables * Building on the above, assistance with development of recommendations describing proactive and adaptive land and water management actions to manage risks and minimise impacts   There may also be opportunities to assist with fieldwork for related projects in major wetlands of the Murray-Darling Basin, most likely during December 2017 and January 2018. This fieldwork is physically strenuous, including long periods of wading in mud and water; therefore participants must be reasonably fit and strong.  **Relevant Fields of Study**   * Ecology * Biology * Environmental Science * Natural Resource Management   **Location:** Black Mountain, ACT  **Contact:** For more details please contact Heather McGinness by phone on (02) 6246 4136 or email [Heather.McGinness@csiro.au](mailto:Heather.McGinness@csiro.au) |

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| Project Number | **Vacation Scholarships Project Details** |
| Land & Water 3 | **Project Title**  Developing an ecological trajectories architecture for use in the Murray-Darling Basin  **Project Description**  This project is a collaboration project between the Murray-Darling Basin Authority and CSIRO. For the purposes of this project, we seek to develop methods that can forecast plausible environmental trajectories of environmental assets in the Basin.  This project seeks to develop a method in a modelling environment that can predict trajectories of ecological change as a result of water management, natural variability in the flow regime and climate change. To do this, the method needs to consider antecedent condition, the water requirements or environmental state, how the condition changes and the probability of future different environmental conditions.  The outcome of this project is an architecture that will provide MDBA with the capacity to model plausible futures of ecological response as outcomes of flow regimes. The predictive model will allow Basin Plan objectives to be considered against hydrological scenarios. This can be used to inform potential refinements of annual environmental watering priorities and revisions of the Basin wide environmental watering strategy.  **Project Duties/Tasks**   * Undertake review of literature for the purpose of developing an understanding of water requirements and responses for different functional groups * Under supervision, develop code for the modelling of environmental response to environmental conditions * Undertake modelling activities in a software environment (e.g. Jupyter/R) for the purpose of code and model testing * Analysis of model outputs   **Relevant Fields of Study**   * Environmental sciences * Eco-hydrology * Environmental modelling * Software engineering   **Location:** Black Mountain, ACT  **Contact:** For more details please contact Danial Stratford by phone on (02) 6246 5993 or email [Danial.Stratford@csiro.au](mailto:Danial.Stratford@csiro.au) |

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| Project Number | **Vacation Scholarships Project Details** |
| Land & Water 4 | **Project Title**  Basin Futures Product Development (Scientific Product Development)  **Project Description**  Basin Futures is a web based, scalable platform to support water resource scenario planning. It brings together the three major components of the modelling value chain, data collation, model development and scenario development.  The product supports water, food, energy, environment and economics aspects of a basin with water as the common input.  **Project Duties/Tasks**   * Contribute to an aspect of the development of the product, for example a key feature within data, modelling and/or the scenario planner. * Work with experts from different domains to ensure a good fit with end users and minimising complexity. * Assist with processing and integration of a range of environmental data sources (climate, land, hydrology). * Be a part of the agile development process (sprints). * Software usability and testing.   **Relevant Fields of Study**   * Computer Science (essential) * Environmental focus/interest (beneficial)   **Location:** Hobart or Canberra  **Contact:** For more details please contact Peter Taylor by phone on (03) 6237 5617 or email [peter.taylor@csiro.au](mailto:peter.taylor@csiro.au) |
| Land & Water 5 | **Project Title**  Basin Assessment Case Studies and Product Development (Scientific Product Development)  **Project Description**  Basin Futures is a web based, scalable, cloud based platform to support water resources scenario planning. It brings together the three major components of the modelling value chain, data collation, model development and scenario development.  The product supports water, food, energy, environment and economics aspects of a basin with water as the common input.  **Project Duties/Tasks**   * Development of case studies for 2-3 basins using the product. Specifically focused on trade-off between sectors and impact to the basin economically and environmentally. * Working on building SDG indicators within the product, specifically supporting researchers implement SDG 6 indicators. * Technical documentation for Basin Futures * Software usability and testing.   **Relevant Fields of Study**   * Environmental focused degree (essential) * Water related degree (beneficial) * Interest in modelling (beneficial)   **Location:** Canberra  **Contact:** For more details please contact Carmel Pollino by phone on (02) 6246 4147 or email [carmel.pollino@csiro.au](mailto:carmel.pollino@csiro.au) |
| Project Number | **Vacation Scholarships Project Details** |
| Land & Water 6 | **Project Title**  Comparative Study of Australia and South Asian Southeast Asian Countries' Commitment to SDGs Goal 5: Gender Equality and Goal 6: Clean Water and Sanitation  **Project Description**  Australia is a signatory to the United Nations Sustainable Development Goals. However, the degrees of policy complementarity and/or inherent barriers to implementation between achieving joint goals is not fully understood. This situation is true for two of these SDG's, in particular Goal 5: Gender Equality and Goal 6: Clean Water and Sanitation. Specifically at CSIRO we seek to understand how improvements to decision making in water resource management can improve gender outcomes at national scales. This is particularly in a developing countries context where women make significant contributions to both formal and informal economies, rely on accessing clean water for their daily activities, as well as need for decision-making and leadership role at the water management level.  The proposed research will explore Australia's commitments to these two SDG's from within its legal architecture and frameworks (agreements and conventions) and then contrast this with corresponding frameworks in developing countries in our region (with emphasis on South Asia and Southeast Asia). The student will examine how our Australian frameworks fare in terms of commitments and implementation pathways, compared to approaches in counterpart nations in developing economies. Focus will also include whether countries have, at the national level, follow-ups and reviews which serve as monitoring of the country's progress. In addition, the research will examine if the countries are linking SDGs 5 and 6 with existing international agreements and conventions around gender and water (e.g. Dublin Principle, CEDAW).  **Project Duties/Tasks**   * Review of Australia and up to three other countries' SDGs commitments * Mapping and analysis which will help to inform CSIRO's future gender and water research.   **Relevant Fields of Study**   * Law; * International Studies; * International Development; * Gender Studies; * Political Science)   **Location:** Black Mountain (Canberra), ACT  **Contact:** For more details please contact Joyce Wu by phone on (02) 6246 5617 or email [joyce.wu@csiro.au](mailto:joyce.wu@csiro.au) |

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| Project Number | **Vacation Scholarships Project Details** |
| **Land & Water 7** | **Project Title**  Understanding South Asia hydroclimate  **Project Description**  Aligned with broader work, this project aims to improve the scientific communities understanding the water balance of several Himalayan catchments in South Asia. The project involves review of literature on conceptual hydrology / cryosphere models, computer modelling, and spatial analysis of remotely sensed rainfall and snow products. See <https://publications.csiro.au/rpr/pub?pid=csiro:EP164390>  **Project Duties/Tasks**   * Review of literature on conceptual hydrology / cryosphere models * Conducting and evaluating experiments on Nepal/Pakistan climate data * Preparing results for manuscripts   **Relevant Fields of Study**   * Hydrology * Computer Science * Geoinformatics   **Location:** Black Mountain, Canberra, ACT  **Contact:** Dave Penton via phone on (02) 6246 5822 or email [dave.penton@csiro.au](mailto:dave.penton@csiro.au) |