

ONE BASIN CRC PhD program

Are you looking at developing world-leading skills in helping communities tackle climate change, capitalise on the digital transformation and accelerate rural innovation? Are you interested in receiving training from internationally renowned experts, whilst working with industry partners in the iconic Murray-Darling Basin on real-world problems?

The One Basin Cooperative Research Centre (One Basin CRC) offers attractive PhD packages in a broad range of disciplinary fields and across multiple universities in Australia (Australian National University, Charles Sturt University, Flinders University, The University of Adelaide, The University of Melbourne, The University of Sydney). Our PhD graduates will be the future leaders in basin research and application. Our One Basin PhD program provides unprecedented leadership development opportunities, extensive industry networking, and the chance to establish a deep understanding of your chosen field. Key features of the One Basin CRC PhD Program are:

- A 3.5 year scholarship with the option of a 6 month-funded internship with an industry partner or equivalent part-time employment.
- A flexible funding package including a stipend as much as \$51,300 pa* and generous travel and operational costs, with potential additional income from working part-time with industry partners and further scholarship funding.
- The PhD program seeks to achieve gender balance and attract candidates from all walks of life, with Australians of Indigenous and Torres Strait Islander heritage particularly encouraged to apply.
- Opportunities for travel (including the possibility of international conferences), development and engagement with a strong research network that is being developed through the 10-year CRC.
- Each candidate will spend the majority of their time in one of the following research hubs: Loxton (South Australia), Mildura (Victoria), Griffith (NSW) and Goondiwindi (Queensland) with associated node in Narrabri (NSW).

Our PhD program will give you the professional skills and networks to accelerate your career in research or practice across the water, agriculture or environmental sectors.

** This is dependent on the host university policies, other available co-funding, and candidature experience and background. Candidates will receive a minimum stipend of \$35,000 pa and a further minimum \$20,500 (total) in operational funding. The exact allocation of the funding package between the stipend and support activities (such as conferences, travel to and from regional hubs) will be agreed to by the host university, PhD student and the 1BCRC. Applicants must be intending to apply for, and be highly competitive for, a Research Training Program (RTP) Stipend (or an equivalent scholarship). The student will enter the PhD program in 2024 and enrol on a full-time basis.*

An aerial photograph showing a winding river through a wetland area with green vegetation and brown earth.

Apply via: onebasin.com.au/phd-programs



PhD project ID: 1BPhD23-12

Date advertised: 8 September 2023

PhD project title:

In-season Crop Type Mapping over Irrigated Fields to Assist in Water Demand and Crop Yield Forecast

Description of the topic of PhD project:

Accurate irrigation water demand forecasts are needed to inform river operations. This is especially so in the southern MDB connected systems where diverse irrigated industries exist, water market is highly active, and supply systems are subject to significant delivery constraints. Through an ARC Linkage Project and building on work by ABARES and RMCg, a model has been developed for predicting seasonal water demands from irrigation regions in the southern connected systems. Currently the model is for predictions before the start of an irrigation season, thus crop type maps available during the season will be highly valuable to extend the predictions to the basin scale.

Crop type classification using optical and microwave satellite imagery has evolved rapidly in recent years due to the increasing number of high-resolution satellites and the adoption of machine/deep learning-based algorithms. However, the satellite imagery-based crop type classification is still undertaken post-harvest, limiting the utility of crop information for time-critical decisions for current cropping season by water resources managers and other stakeholders. In addition, strong reliance of crop type classification on the ground-truth data and knowledge on local crop management practices requires active engagement of researchers with growers and agricultural resources managers. The PhD scholar of this project will develop in-season crop type classification algorithm using high-resolution optical satellites (Landsat 8/9 and Sentinel 2A/B) and microwave synthetic aperture radar (SAR) satellites (Sentinel 1) over southern Murray-Darling Basin that includes Murrumbidgee and Coleambally irrigation districts. Random Forest method will be used to the combined optical-SAR datasets. The PhD scholar will be based in Griffith, NSW, interacting closely with the industry partners and growers to have the research output tuned for end-users and stakeholder via co-designing processes.

Primary university supervisor(s):

Professor Dongryeol Ryu (The University of Melbourne)

Co-supervisors:

Prof. QJ Wang (The University of Melbourne); Dr Saman Razavi, Dr Joseph Guillaume (Australian National University)

Requisite qualifications and experience:

Candidates must have a qualification equivalent to an Australian H1 Honours degree (a prior research thesis that was at least six months of full time credit and received an excellent mark, or a first author publication in a peer-reviewed international journal). Candidates with Masters or honours degrees in the following disciplines, or with equivalent research or work experience will be favourably considered: *Remote Sensing, Hydrology, (Physical) Environmental Science/Engineering, Geomatics, Earth System Sciences.*

To determine your eligibility for studying at The University of Melbourne see:

<https://study.unimelb.edu.au/study-with-us/graduate-research>

IBCRC industry partner(s) potentially involved:

Murray Darling Basin Authority, Murrumbidgee Irrigation, Coleambally Irrigation