PhD opportunities in plant ecology and ecophysiology in the ARC Centre of Excellence for Plant Success in Nature & Agriculture

Hawkesbury Institute for the Environment, Western Sydney University

Join us for your PhD researching the success of Australian native species in challenging environments to address global food security.

In the Australian Research Council Centre of Excellence for Plant Success in Nature and Agriculture, you’ll be supported by senior and emerging scientists working together to understand the adaptations of Australian native plants and build pathways towards next-generation crops which can thrive under future climates. Australia is home to hundreds of wild relatives of the world’s most important crop plants (e.g. rice, soy, sorghum) and their ecological adaptations to hot and dry environments are a critical resource. Our PhD programs will see you researching adaptations to temperature and water stress in Australian plant species, in the field, glasshouse or lab using your background in ecology, physiology or botany (Hons or Masters level) and scientific writing. At the new WSU node of the Centre, we’re recruiting postdocs and PhD students to drive research into groups such as eucalypts and native grasses.

What to expect

The Centre for Plant Success
You’ll join a vibrant, cross-disciplinary research community with a commitment to growing the careers of young scientists through dedicated initiatives and funding streams. Centre researchers include world leaders in plant ecology, physiology, developmental biology and genetics; in mathematical representation of genetic architectures and evolutionary processes; and in translating new knowledge into crop improvement. Opportunities for collaboration are embedded in the COE’s seven-year program, funded by the ARC.

The Hawkesbury Institute for the Environment (HIE), Western Sydney University
HIE hosts a node of the Centre for Plant Success. At the Institute we conduct world-leading fundamental and applied research in ecology, physiology, genetics and global change biology. With a unique suite of research facilities, Institute researchers collaborate widely with Australian and international institutions to craft scientific research of the highest calibre.
The supervision team
You’ll be mentored by Distinguished Professor [Ian Wright](mailto:ian.wright@uni.edu) (plant functional traits) and Associate Professors [Rachael Gallagher](mailto:rachael.gallagher@uni.edu) (plant biogeography & conservation) and [Brendan Choat](mailto:brendan.choat@uni.edu) (plant hydraulics, drought mortality). We work collaboratively to understand plant adaptations and are passionate about developing young scientists. There will also be potential co-supervision and collaboration with other [HIE researchers](mailto:hie.researchers@uni.edu) and researchers from other Centre nodes (UQ, UTas, QUT, Monash) and partners.

Currently, we have the opportunity to recruit [domestic PhD students](mailto:domestic.phd.students@uni.edu) for projects beginning in the first-half of 2022. Positions for international students will be advertised in coming months.

Potential projects include:
1. Adaptations to temperature and water stress in Eucalyptus. Depending on your strengths and interests this project could include investigating biogeographic and even evolutionary trends in this iconic plant group, and trait characterisation (and coordination) in the field, common garden or glasshouse. Target properties potentially include gas exchange, hydraulics, biomass allocation, canopy architecture and reproductive traits.

2. Anatomy and physiology of the leaf cuticle – the crucial barrier to desiccation. We’re interested in the dual roles of the leaf cuticle in providing physical support to leaves and in preventing water loss. We want to investigate cuticle properties using a combination of approaches, e.g. biomechanical tests, anatomical investigations, chemical characterisation and quantifying permeability to water loss. Making links to the genetic basis of key traits could also be considered. Target clades for this work could include eucalypts, native grasses or Solanaceae.

3. Adaptations to heat and drought in Australian Andropogoneae grasses. In this project, we’ll investigate adaptations to heat and drought in this fascinating clade of tropical grasses that include many Australian species as well as the agricultural crops sorghum, maize and sugarcane. Trait characterisation could include measurements made in the field, common garden and glasshouse, perhaps teamed with experimental manipulations of heat/drought. Again, making links to the genetic basis of key traits would be possible for candidates with those skills and interests.

4. Climatic predictability as a driver of inter- and intraspecific variation in leaf and root traits. In this project, we will look at how predictability in the timing of rainfall at local, regional and continental scales affects the expression of root and leaf traits, and how these are integrated to create whole plant function. Work may involve being in the field, in the lab or in the glasshouses at HIE.
The scholarship
A tax-free stipend of $30,000(AUD) per annum for up to 3 years to support living costs, supported by the Research Training Program (RTP) Fee Offset. Substantial support for conference attendance, fieldwork and lab costs will also be provided.

Essential criteria
1. Demonstrated ability to conduct high quality, independent research as part of a completed Honours or Masters-level research degree with a substantial thesis component.
2. Clear record of academic excellence as an undergraduate.
3. Excellent verbal and written communication skills.

The successful applicants should be willing to learn sampling and data analysis methods applicable to plant ecology and ecophysiology and be enthusiastic and motivated to undertake further study at an advanced level.

Eligibility
To be eligible you must be currently residing in Australia (whether citizen, permanent resident, or holding a current Work Permit); or an Australian resident overseas but able to return.

Diversity and Inclusion
Both the Centre and the Institute recognise and value equity and diversity, and encourage applications from any person who meets the requirements of this position irrespective of gender, sexuality, race, ethnicity, religion, age or other protected attributes. We strive to provide an inclusive working environment and are committed to supporting staff with family and caring responsibilities.

Position Enquiries
Please contact Ian Wright ian.j.wright@westernsydney.edu.au, or Rachael Gallagher rachael.gallagher@westernsydney.edu.au.