

# HAWKESBURY INSTITUTE FOR THE ENVIRONMENT



## UWS Research Scholarship

### TOOLS OF CONTROL: CHARACTERISING THE PROTEINS UTILISED BY ROOT PATHOGENIC AND MUTUALISTIC FUNGI TO NEGOTIATE SYMBIOSIS WITH EUCALYPT ROOTS

The Hawkesbury Institute for the Environment (HIE) at the University of Western Sydney is seeking a highly motivated and dynamic PhD candidate for a project in the field of plant-microbe interactions. The PhD candidate is anticipated to commence in 2015.

A mechanistic understanding of how soil-borne microbes interact with the roots of plants is of critical importance for understanding ecosystem function and sustainability.

The PhD candidate's work will form a complementary research stream to an exciting new ARC-supported project: "Understanding fungal effector-based biology to inform plant:fungal pairing to maximise agro-forestry productivity and sustainability".

Massive efforts are underway to understand the mechanisms by which pathogenic and mutualistic microbes successfully integrate themselves within plant tissues during symbiotic interactions. A developing area within this field is trying to understand how microbes from both lifestyles use small secreted proteins called effectors to communicate with, and control, their host plants.

Using the model tree species *Eucalyptus grandis*, the student will work to compare and contrast the modes of action of the most highly expressed effectors of a common root pathogen to those effectors deployed by mutualistic arbuscular mycorrhizal fungi during symbiosis.

This research will be a major advance in our understanding of how fungi evolved the ability to form symbiotic relationships. A strong knowledge of molecular biology and plant-microbe interactions, an enthusiastic attitude and self-motivation are required.

The student will learn techniques in gene cloning, the creation of transgenic plants and use techniques such as yeast two hybrid analysis, RNA sequencing and confocal microscopy.

The student will be advised by Dr Jonathan Plett and work in collaboration with other colleagues at UWS and with collaborators at INRA-Nancy, in France.

#### WHAT DOES THE SCHOLARSHIP PROVIDE?

- » Domestic students will receive a tax free stipend of \$30,392 per annum and a funded place in the doctoral degree.
- » International students will receive a tax free stipend of \$30,392 per annum. Those with a strong track record may receive a fee waiver.
- » Funding is available for project costs and conference travel.

#### CRITERIA

The successful applicant should:

- » demonstrate excellent academic performance related to the research proposed
- » hold qualifications and experience equal to an Australian First Class Bachelor Honours degree or equivalent overseas qualifications
- » be enthusiastic and highly motivated to undertake further study at an advanced level
- » possess a background in plant and/or fungal molecular biology and have an interest in plant:microbe interactions.
- » International applicants must also demonstrate a high level of proficiency in the English language. Please refer to the English language requirements at [www.uws.edu.au/international/admissions/english\\_language\\_requirement](http://www.uws.edu.au/international/admissions/english_language_requirement)

#### HOW TO APPLY

- » Applicants should discuss their eligibility and interests with Dr Jonathan Plett on [j.plett@uws.edu.au](mailto:j.plett@uws.edu.au) or on (02) 4570 1097.
- » Contact the Office of Research Services to discuss enrolment and scholarships at [hdrschoalrships@uws.edu.au](mailto:hdrschoalrships@uws.edu.au)
- » Please submit an application form, CV, names and contact information of two referees, and a one-page research proposal that aligns with this project's aims.

#### Closing date 31 March 2015.

- » The application form can be downloaded from the web: [Download application: www.uws.edu.au/research/scholarships](http://www.uws.edu.au/research/scholarships)