

PhD Scholarship, University of Tasmania

Project Title: Identification of elite *Eucalyptus nitens* genetic material and molecular markers for risk traits

Australian Research Council Training Centre for Forest Value
Discipline of Biological Sciences
School of Natural Sciences
College of Science and Engineering
University of Tasmania

Closing date: 30 November 2021

The Project

Ensuring a future forest estate under changing climates is essential and vulnerability assessments indicate that climate change may have large consequences for sections of the future industry. There are opportunities to complement tools in the breeding of material to minimise threats.

This project aims to understand the genomic architecture of quantitative traits in *E. nitens*. The project will focus on traits affecting resistance to drought, heat, diseases, and pests - stressors that are expected to increasingly impact forests under climate change. Novel approaches to large-scale phenotyping will be explored, including stress indicators and other traits derived from hand-held and drone-based sensors, through collaboration with concurrent projects. We will use two genome-wide association approaches. The first will be the common strategy where trees are both phenotyped and genotyped (using the high coverage single nucleotide polymorphism (SNP) array that Tree Breeding Australia (TBA) is using). The second approach will exploit pre-existing genotype data from the selections in our partners' breeding programs and phenotype their descendants (open-pollinated seed collected from each selection), an approach successfully used in *E. globulus*. This will require planting multiple field trials with this genetic material, including potentially marginal sites.

This research will allow breeders to rank trees (including the selections in the breeding programs) for novel and previously unmeasured traits. It will be able to provide molecular markers for these traits and also information on the correlated effects of these markers on other selection traits (e.g. growth, basic density and pulp yield). It will also provide phenotypic information that can feed into the genetic evaluation system used for this species.

Research Environment

Candidates will work in the ARC Training Centre for Forest Value within the Discipline of Biological Sciences at the University of Tasmania. The Centre for Forest Value is a research centre focused on forests and forest industries research, working across native, restored and plantation forests and across the full forest industries supply chain. Students in the Centre for Forest Value work closely with external stakeholders including industry partners and not-for-profit organisations to conduct collaborative research with real-world impact. Biological Sciences provides a stimulating academic environment, conducting world class research and teaching and learning in Plant Biology, Zoology, Ecology and Evolutionary Biology – all areas that scored the highest rating in the most recent Excellence in Research for Australia submission – Australia's national research evaluation framework. Biological Sciences has a vibrant and fun postgraduate community with events organised by the Postgraduate Society for Biological Sciences to connect individuals and research groups within the Discipline.

This project is funded by the University of Tasmania in collaboration with the Growers Research Advisory Committee of Forest and Wood Products Australia and will have strong links with industry collaborators. Candidates will be expected to spend a proportion of their candidature working closely with industry.

Primary Supervisor: Professor René Vaillancourt (rene.vaillancourt@utas.edu.au)

Funding

The successful applicant will receive a scholarship which provides:

- a living allowance stipend of \$28,597 per annum (2021 rate, indexed annually) for 3.5 years;
- a relocation allowance of up to \$2,000;
- \$10,000 per annum support for project costs for 3 years; and
- a tuition fees offset covering the cost of tuition fees for up to 4 years (domestic applicants only)

International applicants may receive a University of Tasmania Fees Offset for up to four years.

The scholarship supporting this project is funded by the University of Tasmania, Forest and Wood Products Australia Limited and the Australian Government through the Research Training Program.

Eligibility

The project is open to domestic (Australia and New Zealand) and international applicants who are already in Australia (onshore) at the time of submitting their application.

Due to current Australian COVID-19 travel restrictions the University cannot accept applications from International applicants who are currently overseas (apart from applicants from New Zealand as noted above).

Applicants should review the Higher Degree by Research [minimum entry requirements](#) and the following additional eligibility criteria specific to this project/scholarship:

- ability to meet minimum English requirements (international applicants)
- A minimum of a First Class Honours Degree, Masters by Research or equivalent

Selection Criteria

The project is competitively assessed and awarded. Selection is based on academic merit and suitability to the project as determined by the College.

Application Process

There is a three-step application process:

1. Select your project, and check you meet the eligibility and selection criteria;
2. Contact the Primary Supervisor, Professor René Vaillancourt (rene.vaillancourt@utas.edu.au) to discuss the project before submitting an application; and
3. Click [here](#) to submit an application by the closing date listed above.
 - Copy and paste the title of the project from this advertisement into your application.
 - As part of your application you will be required to submit a covering letter, a CV including 2 x referees and your project research proposal, after discussion with the primary supervisor.

Following the application closing date applications will be assessed within the College. Applicants should expect to receive notification of the outcome by email.