

## **PhD Scholarship – Plant Molecular Biology**

### ***Plant stress adaptation: The role of the membrane-associated NAC transcription factors***

We seek a PhD candidate to join a 3-year research program based at the University of Canterbury (UC) to investigate the role of membrane associated NAC transcription factors in plant stress adaptation. Funding for this research has been made available from the UC College of Science Doctoral Scholarship for the research in the group of Dr Claudia Meisrimler.

#### **The person**

We seek a PhD candidate with a demonstrated a high level of academic achievement at the undergraduate and postgraduate level. They will be required to have a B.Sc. (Hons) or equivalent to enroll as a PhD candidate at the University of Canterbury.

The candidate will require a background in plant molecular biology and biochemistry. Some background in cell biology and bioinformatics and/or plant phenotyping would be an advantage. The PhD candidate will be required to undertake lab-based investigations in the course of their research.

The stipend will be for three years at NZD21,000 p.a. (tax free) plus payment of tuition fees at the domestic rate. The candidate will also have the opportunity to conduct part of their research with the research team of Dr Vanessa Morris at University of Canterbury.

#### **The project**

Understanding how plants respond to abiotic and biotic stresses is key to mitigating the growing threats of climate changes and pathogens. Key to plant stress response are proteins called intracellular membrane-associated NAC transcription factors (maNAC TFs). These plant specific TFs have been shown to perceive and transduce stress signals, leading to adaptation by gene regulation. maNAC TF have many potential regulation possibilities at the protein level, which allows for a high level of fine-tuning. The importance of membrane-associated TF regulation has been established for the mammalian system, but knowledge for comparable systems in plants is very limited. While implicated in fast abiotic stress adaptation, the molecular role that maNAC TFs play in stress signal coordination in plants remains unelucidated. This research proposes that maNAC TFs play a key role in multi-stress signal coordination, inevitably affecting plant health and performance in response to environmental stress and microbial pathogen attack.

The project will aim to answer the major question, how different maNAC TFs signaling pathways are regulated and contribute to stress adaptation. To elucidate the maNAC TF signal transduction pathways, we will use cutting edge technology to dissect the

molecular events leading to translocation of these proteins from their membrane to the nucleus, where they activate gene expression. We will use immuno-based techniques and targeted point mutation, combined with mass spectrometry analysis to identify and quantify protein modification events.

We have shown, that pathogens use effector proteins to interfere with maNAC translocation, but the mechanism remains unknown. Previously identified proteins will be used in targeted protein-protein interaction assays to identify the interaction site(s) and to determine the level of conservation. Using protein expression and purification, followed by NMR we aim to gain more information on the details of effector-maNAC interaction and how we possible could interfere with the interaction.

Elucidation of the maNAC signalling pathways will significantly increase our understanding of plant adaptation to single and multi-stress events. This knowledge will provide a broad foundation for future studies, potentially leading to new insights on stress physiology as an ecological driving force and crops with improved tolerance towards both predicted climate change events and to pathogens.

The proposed start date for the research is in the second half of 2019, depending on the availability of appropriate candidates.

### **Applications + Contact**

For more information please contact:

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If you are interested, please send a motivation letter, your CV, copies of your diplomas, MSc transcript with grades, and the contact details of at least two references to the above e-mail by the **21<sup>st</sup> of June, 2019**. However, the position will remain open until a qualified candidate is found.