



Hawkesbury Institute
for the Environment

BOOSTING DIAGNOSTICS FOR PLANT PRODUCTION INDUSTRIES: USING *XANTHOMONAS* AS A MODEL ORGANISM FOR INCREASING BACTERIAL DIAGNOSTIC CAPACITY.

ABOUT THE PROJECT

Identifying sources of bacterial infection is essential to the maintenance of a safe food supply and the protection of Australia's food sources from exotic disease incursions. In recent years, the use of genomics has revolutionised source identification during outbreaks of pathogenic bacteria. Comparison of bacterial genomes with phylogenetic approaches can provide high-quality evidence that two or more infections from different locations are linked by a common source, however, the analysis required for this is time-consuming and not user-friendly. Furthermore, the incorporation of new data often requires a complete reanalysis, which is highly undesirable in outbreak situations where samples are processed in small batches over an extended time-period. An alternative to phylogenetics is the use of defined multilocus sequence typing (MLST) schemes based on thousands of gene sequences identified from whole genomes. MLST-based methods are rapid, comparable to phylogenetics in accuracy, and importantly, allow the incorporation of new data without complete reanalysis of the entire dataset.

This project will construct genome-wide MLST schemes for important bacterial pathogens of the genus *Xanthomonas*, which cause diseases that reduce the quantity and quality of many fruit, vegetable, grain and fibre crops and are a significant risk to agriculture in Australia. The student will construct, validate and compare these schemes to phylogenetic methods with real-world datasets and work closely with molecular epidemiologists and bacteriologists at the NSW Department of Primary Industries to further analyse the genome sequences of several significant *Xanthomonas* species. The student will aim to improve the understanding of *Xanthomonas* strains and types, and correlate relationships identified by genome sequencing with classical epidemiological, genotypical and phenotypical data. This project is part of a larger project funded through the GRDC as part of the Rural R&D for profit program. The results of this work will have real world implications for farmers, scientists and our countries biosecurity and will train a Higher Degree Research student at the forefront of research relevant to plant health and biosecurity.

WHAT DOES THE SCHOLARSHIP PROVIDE?

- Domestic students will receive a tax free stipend of \$30,000 per annum for 3.5 years and a funded place in the doctoral degree.
- International students will receive a tax free stipend of \$30,000 per annum for 3.5 years. Those with a strong track record will receive a fee waiver.
- All International students are required to hold an Overseas Student Health Care (OSHC) policy covering the duration of their studies in Australia. The HIE will provide funding for a single Overseas Student Health Cover policy.
- The project will also provide substantial benefits in terms of additional operational funding for project fieldwork and data collection, and travel and conference attendance.

ELIGIBILITY CRITERIA

We welcome applicants from a range of backgrounds who are keen to apply their skills to the project topic. The successful applicant should:

- hold qualifications and experience equal to one of the following (i) an Australian Bachelor Honours degree, (ii) a coursework Masters with at least a 25% research component, (iii) a Master of research degree or (iv) equivalent overseas qualifications.
- demonstrate strong academic performance in microbiology, plant pathology and/or molecular biology.
- have proven skills in biological sequence data analysis.
- be enthusiastic and highly motivated to undertake further study at an advanced level.
- possess excellent written and verbal communication skills.
- international applicants must demonstrate [English language proficiency](#).
- due to current travel restrictions this scholarship opportunity is preferentially available for Australian domestic students or international students already in Australia or New Zealand or have means to arrive in Australia for a start in the first half of 2021.

HOW TO APPLY

1. Contact A/Prof Markus Riegler (m.riegler@westernsydney.edu.au), Dr Toni Chapman (toni.chapman@dpi.nsw.gov.au) or Dr Daniel Bogema (daniel.bogema@dpi.nsw.gov.au) to discuss your eligibility, the project requirements and your intention to apply.
2. Follow the step-by-step instructions on the [how to apply for a project scholarship](#).
3. Compile your CV, contact information for two referees and a one-page statement describing how your background and training and research interests align with the project aims.
4. All attached documents must be submitted as PDF and documentation certified according to [Western Sydney University requirements](#).
5. Submit to grs.scholarships@westernsydney.edu.au
 - In the body of your email, include your full name, your student ID (if you are a current or previous Western Sydney University student) and the full title of the scholarship.
 - Incomplete applications or applications that do not conform to the above requirements will not be considered.
 - For questions and advice about the application process, please contact the Graduate Research School: grs.scholarships@westernsydney.edu.au

Closing date: 31 January 2021

*Applications close at 11.59pm Australian Eastern Standard Time (AEST).