

Research opportunity:	Honours	X	Masters	PhD
Project title:	Population-dependent control of horizontal gene transfer in bacteria			
Short project description & main objectives:	<p>Rhizobia are soil bacteria capable of forming a beneficial symbiotic interaction with legumes. Bacterial genes essential to the establishment of symbiosis are often encoded on mobile genetic elements. Rhizobia in the genus <i>Mesorhizobium</i> carry symbiosis genes on mobile chromosomal transposon-like elements termed integrative and conjugative elements (ICEs). These elements excise from the chromosome as a single circular entity and can be transferred to other bacteria via conjugation (cell-cell contact) following the formation of a type IV secretion system and mating pilus. Both ICE excision and conjugal transfer are regulated by bacterial quorum-sensing (QS), a cell density dependent form of gene regulation. Using RNA-Sequencing, we have recently discovered that in QS active cells of <i>M. ciceri</i>, the genes required for the formation of the type IV secretion system are upregulated. However, the exact mechanism of regulation remains unclear. In this project you will explore the conjugal transfer regulon in <i>M. ciceri</i> using a range of techniques including site-directed mutagenesis, cloning and DNA sequencing.</p>			
Keywords:	Molecular biology, microbiology, genetics, evolution			
Principal supervisor:	Dr Jason Terpolilli			
Other supervisors:	Dr Graham O'Hara, Dr Joshua Ramsay			
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Closing date for applications:	Open-ended			
Start & finish date of project:	N/A			
Available part-time?	Yes			

Research centre/group:	Centre for Rhizobium Studies
Desired background of applicants:	Completion of BIO246 Microbiology I or equivalent; knowledge of molecular techniques and/or plant biology
Additional funding/scholarship provided:	Successful applicants will be eligible to apply for the ALOSCA Honours Scholarship
Other benefits:	
Extra Comments:	