



## 2019 PhD Proposal – China Scholarships Council and New Zealand – China Water Research Centre Joint PhD Programme Application

Information to be published on NZ – China Water Centre website if proposal is selected	
<b>Project title</b>	The impact of climate change on vineyard water use
<b>Supervisors titles and names</b>	Dr Amber Parker, Dr Junqi Zhu, Dr Hamish Brown, Dr Julian Theobald
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<b>Link to Supervisor's research page</b>	<a href="http://www.lincoln.ac.nz/about-lincoln/staff-profiles/?StaffID=Parker+Amber">http://www.lincoln.ac.nz/about-lincoln/staff-profiles/?StaffID=Parker+Amber</a> <a href="https://www.researchgate.net/profile/Hamish_Brown">https://www.researchgate.net/profile/Hamish_Brown</a> <a href="https://www.researchgate.net/profile/Junqi_Zhu">https://www.researchgate.net/profile/Junqi_Zhu</a> <a href="https://www.researchgate.net/profile/Julian_Theobald2">https://www.researchgate.net/profile/Julian_Theobald2</a>
<b>Project outline</b> Please outline the PhD project in 300 words (approx)	<p>This project is a cross-institutional collaboration between Plant and Food Research Ltd, Lincoln University and the Bragato Research Institute.</p> <p>Grapevine is grown widely throughout the world, with its production making the top agriculture lists in many countries. <i>Vitis vinifera</i> L. cultivation is traditionally non-irrigated and spread widely across dry and semidry ecosystems. However, due to increasing temperature as a result of climate change, irrigation has been suggested as one adaptation strategy to counter the negative effects of heat on berry composition, e.g. anthocyanin and acid degradation. However, the increased water use for irrigation and for cooling grapes through misting or sprinkling, poses a potential threat for water conservation, ecosystem functioning and optimization of landscape suitability. The aim of this project is to understand the interacting effects of temperature and water regimes (stress conditions through to well irrigation systems) on canopy growth (leaf size and branching) and transpiration and the water competition between inter-row and vine-row. These information will inform development of a process-based grapevine model for predicting water use as an adaptation tool for climate change.</p>
<b>References for further reading (optional)</b>	<p>Hannah L, Roehrdanz PR, Ikegami M, Shepard AV, Shaw MR, Tabor G, Zhi L, Marquet Pa, Hijmans RJ. 2013. Climate change, wine, and conservation. Proc Natl Acad Sci U S A. 110(17): 6907-12.</p> <p>Fraga H, Garcia de Cortazar Atauri I, Malheiro AC, Santos JA. 2016. Modelling climate change impacts on viticultural yield, phenology and stress conditions in Europe. Glob Chang Biol. 22(11): 3774-3788.</p>

	<p>Scholasch T, Rienth M. 2019. Review of water deficit mediated changes in vine and berry physiology; Consequences for the optimization of irrigation strategies. <i>Oeno One</i>. 53(3).</p> <p>Ojeda H, Deloire A, Carbonneau A. 2001. Influence of water deficits on grape berry growth. <i>Vitis</i>. 40(3): 141-145</p> <p>Martínez-Lüscher J, Kizildeniz T, Vučetić V, Dai Z, Luedeling E, van Leeuwen C, Gomès E, Pascual I, Irigoyen JJ, Morales F, Delrot S. 2016. Sensitivity of Grapevine Phenology to Water Availability, Temperature and CO<sub>2</sub> Concentration. <i>Frontiers in Environmental Science</i>. 4(July): 1-14.</p> <p>van Leeuwen C, Darriet P. 2016. The Impact of Climate Change on Viticulture and Wine Quality. <i>Journal of Wine Economics</i>. 11(1): 150-167.</p>
<p><b>Please indicate if research operational funding is available to support the project, and if so, the sources of funding.</b></p>	<p>This project will be partly funded by plant and food strategic science investment project: In silico grapevine training systems and partly funded by Bragato Research Institute. The funding by Bragato Research Institute is subject to proposal reviewed by Research Committee.</p>