

## 2019 PhD Proposal – CSC – NCD CRCC Joint Funding Programme

Information to be published on NZ-CFPN CRCC website if proposal is selected	
<b>Project title</b>	<b>Characterisation and interference of biofilm formation among pathogenic <i>Vibrio</i> species: towards novel biocontrols</b>
<b>Supervisor title and name</b>	Associate Professor Stephen On Professor Shuze Tang Graham Fletcher
<b>Department</b>	Wine, Food and Molecular Biosciences
<b>University</b>	Lincoln University Jinan University Plant and Food Research
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<b>Link to supervisor's research page</b>	<a href="https://www.researchgate.net/profile/Stephen_On">https://www.researchgate.net/profile/Stephen_On</a>
<b>Project outline</b>	<p>The incidence of pathogenic <i>Vibrio</i> species in shellfish in New Zealand and China, and in shellfish-mediated vibriosis, has been increasing in recent years. Clearly new approaches to eliminate or reduce the carriage of <i>Vibrio</i> in shellfish are desirable.</p> <p>This project will compare the biofilm-forming potential of various strains of <i>Vibrio parahaemolyticus</i> and <i>V. vulnificus</i> in abiotic – and shellfish model systems. Interstrain colonisation differences will be further explored using two complementary approaches.</p> <p>Firstly, a detailed interrogation of the bacterial cell surface will be made using Elastic Light Scatter analysis. This novel technology has been applied to identify various foodborne pathogens including <i>Vibrio</i> species and our studies suggest these observations may extend to surface-related virulence factors. Strain differences in biofilm-forming and/or scatter pattern analysis will be correlated with whole-genome analyses to better understand the relationship between phenotype and genotype, and provide useful information regarding critical mechanisms for attachment and propagation.</p> <p>Furthermore, the establishment of model systems will enable the assessment of novel approaches to inhibit or eliminate the attachment of <i>Vibrio</i> spp. to shellfish, potentially resulting in a novel control approach to enhance the microbiological safety of this important high-value food.</p>
<b>References for further reading (optional)</b>	1: Huff K, Aroonnu A, Littlejohn AE, Rajwa B, Bae E, Banada PP, Patsekina V, Hirleman ED, Robinson JP, Richards GP, Bhunia AK. Light-



	<p>scattering sensor for real-time identification of <i>Vibrio parahaemolyticus</i>, <i>Vibrio vulnificus</i> and <i>Vibrio cholerae</i> colonies on solid agar plate. Microb Biotechnol. 2012 5 (5):607-20.</p> <p>2: Chen X, Zhu Q, Yu F, Zhang W, Wang R, Ye X, Jin L, Liu Y, Li S, Chen Y. Serology, virulence and molecular characteristics of <i>Vibrio parahaemolyticus</i> isolated from seafood in Zhejiang province. PLoS One. 2018 4; 13(10):e0204892.</p> <p>3: Hubbard TP, Chao MC, Abel S, Blondel CJ, Abel Zur Wiesch P, Zhou X, Davis BM, Waldor MK. Genetic analysis of <i>Vibrio parahaemolyticus</i> intestinal colonization. Proc Natl Acad Sci U S A. 2016 31;113(22):6283-8.</p>
<b>Additional information to be used in proposal selection process</b>	
<b>NZCFPN CRCC Priority area to which proposal is aligned (see list below)</b>	<ul style="list-style-type: none"> <li>• Risk assessment and mitigation</li> <li>• Advanced diagnostic tools &amp; analytics</li> <li>• Genomics and related technologies</li> </ul>
<b>Brief outline of Supervisor's current research links with China or interest in developing them</b>	<p>Lincoln University has extensive links with various Universities in China as is evidenced by a strong cohort of students from the region.</p> <p>Stephen On has a long history of research in the food safety area and was formerly a Pillar Leader in the NZFSSRC until moving to Lincoln University. He has been invited to Jinan University by Professor Tang to begin to develop a collaborative relationship and this presents an opportunity to work even more closely. A talented PhD candidate from China has already been identified to undertake this exciting project.</p>