

2019/20 PhD Proposal – CSC-NZ-CFPN CRCC Joint Funding Programme

Information to be published on NZ-CFPN CRCC website if proposal is selected	
Project title	Biofouling management for milk pasteurization processing
Supervisor title and name	Dr Wei Yu, Dr Bing Li and Pro. Brent R Young
Department	Chemical and Materials Engineering
School / Centre	Engineering
University	The University of Auckland
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Link to Supervisor's research page	https://unidirectory.auckland.ac.nz/profile/w-yu
Project outline 150-300 words (approx) describing a possible PhD project, which has a link with an existing or potential research partner in China	<p>Pasteurization is a crucial process for the dairy industry to secure the product hygiene level. Microbial adhesion to surfaces and the consequent biofouling will make it challenging to maintain a proper hygiene level. Although current industrial practices have managed to control biofouling by setting up a fixed operating period before clean-in-place (CIP), the process throughput was significantly reduced while the CIP cost was increased.</p> <p>With the advanced technology in big data analytics and digital twin, smart manufacturing is moving from reactive operation (i.e. constant CIP frequency) to proactive operation (i.e. varying CIP frequency based on operating conditions). In this project, we would like to develop a biofouling model using first principle biofouling mechanism and big data analytics (i.e. artificial neural network). The success of this project will pave the way for the cyber-physical integration of smart manufacturing in the dairy industry, which could not only help to ensure the dairy product quality in both New Zealand and China, but also increase the plant's profit and reduce its environmental impact.</p>
References for further reading (optional)	
Additional information to be used in proposal selection process	
NZCFPN CRCC priority area to which proposal is aligned (see list below)	Advanced diagnostic tools & analytics
Brief outline of Supervisor's current research links with China or interest in developing them	I and my team are currently working with Tsinghua University and Dongguan University of Technology on resource recovery and process modelling. As for this project, I would like to develop further research collaboration with Jiangnan University due to their reputation in food engineering.