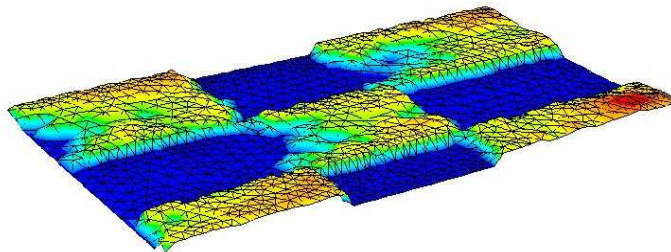


Project 1: Cooling crystallization fouling

Cooling crystallization is one process, which can be used to purify crystals and pharmaceutical products. There has been some recent implementing this process into a falling film cooling crystallizer. The formation of the purified crystals on the surface of the equipments represents a very challenging non-linear system where the growth of the crystal will subsequently affect the hydrodynamics of the liquid feed as well as affecting the cooling effect of the wall on the flowing liquid. This projects aims to develop a Computational Fluid Dynamics (CFD) framework to capture this phenomenon in the process. The aim is to eventually use this modelling framework to optimize the process and the purity (and maybe the shape) of the crystals formed. Some preliminary model development has been undertaken and is shown below, illustrating how the crystals will grow in the simulation domain consisting of a checkered hot-cold surface. A suitable candidate for this project should have (1) strong interest and some basics in C coding and (2) some experience with CFD modelling. The undergraduate student will be working closely with a postgraduate Master student.



Project 2: Camel milk powder

Australia is widely known for the production of cow's milk powder which is widely exported, particularly to the Asian market. In contrast, there is little attention on the humble Camel which has thrived mainly in central Australia. Camels were imported into Australia at the beginning of the century and is now treated as a pest. The consumption of camel milk widely practiced particularly in middle-eastern countries and in certain regions of Africa. Camel's milk is significantly different when compared to that of cow's milk in terms of fat, mineral and sugar content. This will definitely warrant a significantly different spray drying process when compared to the traditional approach for cow's milk. In this project, you will be part of a team to evaluate suitable spray drying designs and operating conditions for camel's milk. This project will require a combination of experimental work and Computational Fluid Dynamics simulations. The experimental part of the work will involve small scale and pilot scale experiments. The undergraduate student will be working closely with a postgraduate Master student.



**About the supervisor:**

Meng Wai Woo is a Senior Lecturer in the Department of Chemical Engineering. His research interest is in Spray Drying and Computational Fluid Dynamics simulation of industrial processes. He has been hosting several projects for exchange postgraduate and undergraduate students from China (Central South University and Sichuan University). He is also an Adjunct Associate Professor in the School of Chemical and Environmental Engineering at Soochow University.

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