



應用科學研究中心

Research Center for Applied Sciences



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**Understanding and improving reproducibility of
laboratory experiments in biomedical engineering**

Date: 2017.05.24 (Wed)

Time: 10:00-12:00

**Venue: B106 Auditorium, 1F, IRBST,
Academia Sinica**

跨領域科技研究大樓 1F B106 演講廳

Host: Ji-Yen Cheng 鄭邗言老師

Understanding and improving reproducibility of laboratory experiments in biomedical engineering

Research that cannot be reproduced was one of the most debated topics in science in 2016. With global expenditure in biotechnology and biomedical engineering expected to exceed US\$200 billion in 2016, the financial risk associated with making decisions that are based on irreproducible experimental research is staggering. Understanding and improving reproducibility of cell biology experiments has the potential to revolutionise the way that experiments are performed, interpreted and reported. In this presentation we will discuss the reproducibility of a scratch assay, which is a standard experimental method used to quantify collective cell migration. Collective cell migration is relevant to embryonic development, tissue regeneration and many diseases, such as cancer. Although scratch assays and proliferation are routinely used, there is no standard, widely accepted method for performing, quantifying or interpreting these experiments, and they are widely reported to be irreproducible. By carefully calibrating the solution of typical mathematical models to a suite of data from a series of scratch and proliferation assays, we demonstrate major gaps in our knowledge about the mechanisms that give rise to collective cell migration. This exercise illustrates the potential for relatively simple mathematical models to change the way that we conceptualise collective cell migration, and to change the way that we design and interpret experimental procedures.

Biography: I am an Australian Research Council Future Fellow and Professor of Applied Mathematics at Queensland University of Technology (QUT). In 1998 I completed a Bachelor of Environmental Engineering from the University of Newcastle, and in 2004 I completed a PhD in Environmental Engineering at the University of Western Australia. From 2003-2009 I held positions as a research fellow, and then as an Australian Research Council Postdoctoral Fellow at the University of Melbourne, where I moved into applied mathematics and mathematical biology. I have been at QUT since 2010.

