

# Nanoscale Organisation and Dynamics Group

University of Western Sydney



## Molecular imaging developments by NMR theory

Dennis W. Hwang

Department of Chemistry and Biochemistry, National Chung Cheng University, Taiwan

### Abstract

MR molecular imaging is non-invasive and enables the visualisation of molecular process in living organisms. There are several ways to improve contrast enhancement in MR molecular imaging: (1) the application of contrast agents and (2) molecular dynamics, and (3) pulse sequence modification. We have been focusing on the development of  $T_1$  and  $T_2$  dual-modality contrast agents and relaxation enhancement in cellular environments. The first goal is to design new contrast agents that provide novel contrast in biological environments. The second goal is to understand the molecular dynamics to enable the diagnosis of clinical diseases such as liver fibrosis. We have assessed the feasibility of using the wash-out slope of dynamic contrast-enhanced magnetic resonance imaging (DCE-MRI) as a non-invasive marker to assess changes in intrahepatic vascular resistance and fenestration during liver fibrosis. The last goal is to utilize our new frequency lock-in suppression technique to develop “coloured” images, which results in an image with frequency information. In the end, our ultimate goal is to combine all methods, in conjunction with the frequency lock-in suppression technique to enhance the contrast in DCE-MRI. This will allow clinical MRI to be conducted with lower contrast agent dosages as well as making MRI a more powerful diagnostic tool.

### Profile

Dr Dennis Hwang completed his BSc and PhD at National Taiwan University in Taiwan where he worked under Prof. Lian-Pin Hwang. He undertook post-doctoral studies for two years at UCLA (USA) under the supervision of Prof Yung-Ya Lin in Los Angeles (USA). He then returned to Taiwan where he was appointed as an assistant professor at National Chung Cheng University (CCU) in 2009. He was promoted to associate professor in 2015. His interests span all areas of NMR relaxation theory and MRI methodology.

**Staff and students at all levels are welcome to attend.**

### Venue and Time:

This talk will be held on Tuesday August 4 at 2 pm at the Campbelltown Campus in Building 21, Lecture Theatre 6 CA-21.G.18).

### Enquiries:

Prof. William S. Price

Ext. 3336

e-mail: [w.price@uws.edu.au](mailto:w.price@uws.edu.au)