Department of Biomedical Engineering

Seminar Series

Probing Solution Dynamics and Microstructures with Magnetic Resonance

Prof. William S. Price

Nanoscale Group, Western Sydney University, Australia

Date:	June 10, 2019 (Monday)
Time:	10:30am - 11:30am
Venue:	Rm B6619 BME/MNE/SEEM Conference Room, 6/F, Yeung Kin Man Academic Building

Abstract

Magnetic resonance (MR) provides a suite of versatile information rich and non-invasive techniques of which magnetic resonance imaging (MRI), Magnetic Resonance Spectroscopy (MRS) and Nuclear Magnetic Resonance (NMR) spectroscopy are the best known. These techniques have enormous applications across the sciences (e.g., inorganic and organic chemistry) but increasingly to medicine (e.g., to cancer diagnosis and treatment). The Nanoscale Group at Western Sydney University develop and apply many of these magnetic resonance techniques to a diverse array of projects ranging from radiation oncology and lizard brain neuroanatomy to MRI contrast agent development and NMR studies of solution structure in ionic liquids. A common theme in many of these projects is being able to non-invasively measure translational diffusion

('diffusion'). As well as being the most fundamental form of molecular transport, diffusion is a natural probe of solution interactions including molecular association (e.g., protein self-association), since it is directly linked to the size and shape of the diffusing species. Further, if diffusion occurs within a porous medium (e.g., biological cell, vesicle, rock pore …) and the timescale of the diffusion measurement, D, is such that the diffusing molecules have time to interact with any boundaries, then the measurement will provide information on the size and shape of the boundaries. This talk will cover some of the recent developments and applications from my group.

Biography

William (Bill) S. Price received his BSc(Hons), PhD and DSc degrees from the University of Sydney in 1986, 1990, and 2012, respectively. He held postdoctoral positions at the Institute of Atomic and Molecular Science, Academia Sinica, Taipei, Taiwan with Prof. Lian-Pin Hwang and later at the National Institute of Material and Chemical Research in Tsukuba, Japan with Prof. Kikuko Hayamizu. In 1995 he joined the Water Research Institute in Tsukuba, Japan with Prof Yoji Arata. In 2000 he spent a year at the Royal Institute of Technology (KTH), Sweden. In 2001 he returned to Japan as Professor of Chemistry at Tokyo Metropolitan University. At the end of 2003 he joined Western Sydney University where he is now Professor of Medical Imaging Physics.

Bill's research interests span many areas of science including biophysics, magnetic resonance and medical physics. He is known for his work on developing magnetic resonance techniques and developing the theoretical analysis for measuring molecular dynamics (esp. translational diffusion) in biological and chemical systems. He has published 1 book ('NMR Studies of Translational Motion', Cambridge University Press,

2009), 26 book chapters and 160 journal publications. His research has resulted in him being awarded numerous awards such as the RACI's Rennie Medal.

He is Editor-in-Chief of the (UK) Royal Society of Chemistry's "New Developments in NMR" book series (http://rsc.li/nmr). He is a Fellow of the Royal Society of Chemistry (RSC), the Royal Australian Chemical Institute (RACI) and the Australian Institute of Physics (AIP). He is currently Chair of the Board of Directors, Australian and New Zealand Society for Magnetic Resonance (ANZMAG).

Enquiry: 3442 8420

All are Welcome!

BME Seminar 2018-2019/013