

# Nanoscale Organisation and Dynamics Group

University of Western Sydney



## Solid-state NMR spectroscopy for heterogeneous catalysis

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### Abstract

Catalysis is essential for chemical industry and contributes to 90 percent of current chemical processes. For cleaner and more efficient chemical processes, the catalysis engineering is focused on a micro-level design of active sites, nanostructure reaction pathways, and kinetics, for which solid-state NMR spectroscopic techniques are required. Based on an understanding of catalytically active species and their functions as solid catalysts by NMR techniques, it is possible to design and control the catalytic properties of catalysts at the nanoscale level. This more strategic approach will promote catalyst development and provide an alternative to the classical trial-and-error approach, with prospects for viable pre-design. In addition, in-situ solid-state NMR spectroscopic techniques can provide specific information about working catalysts, reaction pathways, and kinetics, offering the essential parameters for reactor and process design and modulation. It bridges the gap between fundamental molecular-scale studies and realistic chemical processes, and will realise chemical engineering design from atomic level to macro level.

### Profile

Research in Jun Huang's group involves clean fuel production, CO<sub>2</sub> capture and conversion, waste-to-chemical, biorefining, nano-catalysts, and solid-state NMR Spectroscopy. They are particularly interested in the development of emerging catalytic technologies for more attractive, practical, and cleaner processes using solid-state NMR spectroscopy, coupled with new catalyst design and innovative reaction engineering.

He received his PhD from University of Stuttgart, Germany in 2008 and worked as a postdoctoral fellow at Georgia Institute of Technology, USA and ETH Zürich, Switzerland, respectively. He was appointed as a Lecturer at the University of Sydney in 2010 and promoted to Senior Lecturer in 2012. He has published more than 60 papers in high-rank journals such as *Science*, *JACS*, and *AngewChem*.

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

### Venue and Time:

This talk will be held on 22<sup>nd</sup> May 2015 at 2:00 pm at the Campbelltown Campus in Building 21, Lecture Theatre 6 (CA-21.G.18 (LT06)).

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