

Speaker: [Dr Hang Ta](#)

NHMRC-funded Research Fellow
Australian Institute for Bioengineering
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Research Group Leader
School of Pharmacy (PACE)
The University of Queensland



Date: Friday 28 September 2018

Time: 2.00 pm

Venue: QMNC Seminar Room (N74 Room 1.08) Nathan Campus

Title: **Novel bionano-solutions for diagnosis and treatment of cardiovascular disease**

Abstract

The most common form of cardiovascular disease (CVD) and also the leading cause of sudden death is atherosclerosis, a chronic progressive inflammatory disease of the arterial vessels. Unstable, vulnerable atherosclerotic plaques can rupture and cause thrombosis, resulting in myocardial infarction (MI) and stroke. We have developed a novel, gentle, robust, highly reproducible, and site-specific coupling method utilizing the *Staphylococcus aureus* sortase A enzyme to conjugate single-chain antibody (scFv) to nanoparticles and cells for molecular imaging and cell homing in CVD. Magnetic resonance imaging (MRI) has been used as a powerful and indispensable tool in medical research and clinical diagnosis due to its high spatial resolution and non-limited penetration depth. We have developed both targeted negative contrast agents and targeted dual positive/negative contrast agents for molecular imaging of atherothrombosis. The simultaneous use of positive and negative MRI imaging that employs the same contrast agents will significantly improve the detection accuracy. Using these dual contrast agent, both T1- and T2-weighted MRI of thrombosis can be recorded simultaneously which enables self-confirmation of images and leads to a greater diagnostic accuracy. We have also designed and developed smart MRI nano-sensors that can not only detect, but also sense and report the stage or progression of CVD such as thrombosis. The early detection and accurate characterization of life-threatening diseases such as CVD and cancer are critical to the design of treatment. Knowing whether a thrombus in a blood vessel is new/fresh or old/constituted is very important for physicians to decide a treatment protocol. Theranostic nanoparticles based on iron oxide and cerium oxide have also been developed in our group as potential materials for diagnosis and treatment of reactive oxygen species related inflammatory diseases such as CVD.

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Brief Biography

Dr Hang Ta is a NHMRC-funded research fellow and team leader at the University of Queensland (UQ). She holds joint appointments at School of Pharmacy and Australian Institute for Bioengineering and Nanotechnology, UQ. She received her Bachelor degree in Chemical Engineering and Food Technology at Ho Chi Minh City of Technology (Vietnam), MSc in Biotechnology at UQ and a PhD degree in biomaterials for drug delivery at the University of Melbourne. Dr Hang Ta's research addresses solutions for current problems in diagnosis and treatment of diseases. Dr Ta's team has great expertise in the full suite of forefront materials characterization techniques and is skilled in the design of molecular imaging and drug delivery systems based on metal oxide and biocompatible polymers.

Awards and Funding: Dr Hang Ta has been awarded a number of prizes, grants and prestigious fellowships such as National Heart Foundation postdoctoral fellowship and NHMRC ECR fellowship. She has secured over \$1.4 million in competitive grant funding from national funding agencies for both discovery and infrastructure projects. Her recent award of NHMRC funding has enabled her to establish her research group of 9 people to work in the area of nanomaterials for cardiovascular disease.

Research Outputs and Impacts: Dr Ta has published papers in journals with high impact factor such as Nature Protocols (Jif: 11.74), Circulation Research (Jif: 11.861), Biomaterials (Jif: 8.496) and Journal of Controlled Release (Jif: 8.078). Her research on iron oxide nanoparticles for molecular imaging of thrombosis was highlighted on cover page of Circulation Research, a second-ranked journal in the field of cardiovascular research.

Teaching: Dr Hang Ta is a lecturer for CHEE4305 (Biomaterials: Materials in Medicine) at School of Chemical Engineering, University of Queensland and also a guest lecturer for AMME5931 (Nanomaterials in Medicine) at the University of Sydney. She has been a principal supervisor of more than 15 undergraduate and postgraduate students.

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ALL WELCOME