MONASH University

2023 MIPS Seminar Program

16 Aug 2023 | 12:00 to 1:00 pm | LT3

NEW TECHNOLOGIES FOR THE SYNTHESIS, SEMI-SYNTHESIS AND BIOSYNTHESIS OF BIOACTIVE PEPTIDES AND PROTEINS

Professor Richard J. Payne

Richard J. Payne FAA graduated with 1st class honours in 2002. In 2003, he was awarded a Gates Scholarship to undertake his PhD at the University of Cambridge under the supervision of the late Professor Chris Abell FRS FMedSci. After his PhD, Richard moved to The Scripps Research Institute under the auspices of a Lindemann Postdoctoral Fellowship where he worked in the laboratory of Professor Chi-Huey Wong. In 2008, he was recruited to the University of Sydney as a Lecturer of Organic within the School of Chemistry. Since 2015 he has held the position as Professor of Organic Chemistry and Chemical Biology and since 2020 has been NHMRC Leadership Fellow and Deputy Director of the ARC Centre of Excellence for Innovations in Peptide and Protein Science.

Prof. Payne's research focuses on the design and synthesis of complex biomolecules with a view to addressing important problems in biology and medicine. His lab is recognized for pioneering a number of technologies for the assembly of large polypeptides and proteins by chemical synthesis. These methods have underpinned the discovery of modified peptide and protein drug leads for a range of diseases including anti-inflammatories, anti-thrombotics and anti-infectives. His research has been recognized by a number of awards including the Prime Minister's Prize for Physical Scientist of the Year, HG Smith Medal and the AJ Birch Medal. In May this year he was elected as a Fellow of the Australian Academy of Science.

About this seminar:

The renaissance in the use of peptides and proteins as therapeutic agents has led to significant demand for new technologies to rapidly and efficiently access these biomolecules, especially those bearing tailor-made modifications to maximize specificity and activity, or to probe biological function (e.g. through incorporation of post-translational modifications, fluorophores and/or imaging reagents). We have recently developed a number of synthetic and semi-synthetic technologies that enable efficient production of peptides and proteins with homogeneous post-translational modifications at pre-determined sites. This talk will highlight the utility of these technologies for: (1) generating APIs and peptide drug leads under continuous flow conditions, and (2) generating proteins with site-specific and homogeneous post-translational modifications. The talk will also highlight our recent efforts to employ peptide display methods with genetic reprogramming to generate high affinity cyclic peptides for a range of therapeutic targets.