

PhD scholarship opportunity in Sydney, Australia Macquarie University

A 3-year PhD scholarship is available to study and characterise the binding mechanism of a unique solid-binding peptide.

Project title. Understanding the binding mechanism of a unique solid-binding peptide and its application in nanobiotechnology.

Project summary. Over the past decade, solid-binding peptides (SBPs) have been used increasingly as molecular building blocks in nanobiotechnology. SBPs are short amino acid sequences that display binding affinity for the surfaces of solid materials including metals, metal oxides, metal compounds, magnetic materials, semiconductors, carbon materials, polymers, and minerals. They offer simple and versatile bioconjugation methods that can increase biocompatibility and also direct the immobilisation and orientation of nanoscale entities onto solid supports without impeding their functionality.

One aspect of this project is aimed at understanding the binding mechanism of a unique solid-binding peptide, which display binding affinity to a diverse range of silica-based materials. The study will require the implementation of several techniques including, surface plasmon resonance (SPR) based technology for studying biomolecular interactions in real time, isothermal titration calorimetry (ITC), atomic force microscopy (AFM), *circular dichroism* (CD), *fluorescence microscopy* and other biophysical and biochemical techniques. A second aspect of this project will include the incorporation of the SBP into biomolecules to develop new entities for applications in nanobiotechnology e.g., bioimaging, cell labelling and detection, and flow cytometry.

Further readings:

[Care, Bergquist and Sunna \(2015\) Solid-binding peptides: smart tools for nanobiotechnology. Trends in Biotechnology, 33:259-268.](#)

The suitable candidate will have a background in one of the areas of biochemical chemistry, protein biochemistry or biophysical chemistry. The candidate should have a demonstrated aptitude for undertaking laboratory work and an understanding of the field as well as excellent communication skills. Prospective PhD applicants should have completed the equivalent of Macquarie University's Master of Research (MRes) degree, MPhil or other 2 year Masters degree with a major research component with;

- An outstanding academic record
- A history of scholarships and prizes at the undergraduate level
- Evidence of peer-reviewed research activity, such as publications and/or conference presentations.

Please refer to the University [HDR Entry Criteria](#) for more eligibility information.

Please send your detailed CV to Dr Anwar Sunna (anwar.sunna@mq.edu.au)
Dept. of Chemistry and Biomolecular Sciences, Macquarie University, Sydney.