

2008 AINSE Research Fellowships

The 2008 AINSE Research Fellowships were awarded to Dr Helen McGregor of the University of Wollongong and Dr Lizhong He of the University of Queensland.



Dr Helen McGregor has taken up her appointment at the Geoquest Research Centre to continue her work in tropical paleoclimatology, reconstructing a near-continuous record of variation in the frequency and magnitude of El Niño – Southern Oscillation (ENSO) events 5000 – 1500 years ago through analysis of fossil corals. Dr McGregor carried out her doctoral work at the Australian National University focussing on the application of stable isotope analysis to study the history of climate change in the Indo-Pacific warm pool – the warmest body of ocean water on the planet and the heat engine of Earth’s climate system. McGregor extended her work while at the University of Bremen, Germany, researching patterns of climate variability in the North Atlantic.

At the University of Wollongong, Dr McGregor is pioneering the application of accelerator mass spectrometer radiocarbon analyses on sub-annual bands in fossil corals, linking this work with measurements of seasonal oxygen isotope ratios which reflect the changes in ocean temperature and salinity, parameters that define ENSO events, to establish the pattern of past ocean climate across the Australasian region.

Dr Lizhong He completed his BSc in Applied Chemistry and his Master of Engineering in Biochemical Engineering at Tianjin University, China. In 2002 he finished his PhD at GKSS Research Centre, Germany. Dr He carried out postdoctoral work at the Max-Planck-Institute for Polymer Research in Mainz before he joined the Centre for Biomolecular Engineering, Australian Institute for Bioengineering and Nanotechnology at The University of Queensland in 2004.

Dr He’s research interests include the development of new vaccines and pharmaceutical proteins by combining biomolecular design and nanotechnology, and the application of neutron and x-ray scattering for studying biomolecules.



Neutron scattering plays a key role in Dr He’s research, informing the design of bio-inspired products via linking their physical state to the designed function. The structure of pharmaceutical proteins and their conjugates with polymers can be revealed in detail by contrast variation using small angle neutron scattering (SANS), guiding the design of modern protein-based pharmaceuticals. Interaction of rationally-designed peptides with surfactants and lipids at interfaces is being investigated by neutron reflectometry, providing fundamental design knowledge for their application as new materials and new drugs. Combined, these studies will advance understanding at the frontier of multidisciplinary physical and biomolecular science, underpinned by the state-of-art SANS and neutron reflectometry facilities at ANSTO.