



## 4th AONSA Neutron School 2011

The 4<sup>th</sup> Asia-Oceania Neutron Scattering Association (AONSA) Neutron School was held from November 12 to 17, 2011 at the Australian Nuclear Science and Technology Organisation (ANSTO) in Sydney, Australia. This School brought together 32 PhD students and early-career researchers from Australia, China, India, Indonesia, Japan, Korea, Malaysia and Taiwan.

Following the disaster of the Great East Japan Earthquake in March 2011, the two major neutron scattering facilities in Japan, the JRR-3M research nuclear reactor and J-PARC spallation neutron source were disabled for some time. As a consequence of this event, the Japanese neutron-scattering facilities did not have the capacity to train students of AONSA member nations using local facilities. The 2011 AONSA Neutron School, which was scheduled to occur at these facilities in Tokai, Japan 13 to 18 November, was thus re-located to the neutron scattering facilities of the Bragg Institute at the OPAL 20 MW research reactor.

Over five days, the School program consisted of twenty-three scientific talks that provided an introduction to the theory of neutron scattering and its applications to the materials sciences, and four days of neutron scattering beamtime with hands-on experience and data analysis on the instruments at the Bragg Institute.

Lectures on the first day provided a general introduction to neutron scattering with John Stride and Clemens Ulrich (University of New South Wales) covering the basic theory, applications and available facilities world-wide, followed by more specific talks by Wen-Hsien Li (National Central University, Taiwan) on elastic neutron scattering techniques, by Je-Geun Park (Seoul National University, Korea) on inelastic scattering, and by Richard Mole (ANSTO) on quasi-elastic neutron scattering techniques. Vanessa Peterson (ANSTO) then discussed the role of neutrons as a probe for sustainable-energy materials.

On Monday, Duncan McGillivray (University of Auckland, New Zealand) presented applications of Small-Angle Neutron Scattering, and Mike James (ANSTO) presented applications of Neutron Reflectometry before students split up into groups based on their instrument selection to hear instrument-specific talks and begin their overnight data collection.

Students were divided into five groups, each group participating in an experiment designed to complement the lectures and to focus on particular skills for

preparing and setting-up a neutron scattering experiment, and whose data could be readily analysed in the timeframe of the school. These experiments included Lithium battery studies using the powder diffractometers Echidna and Wombat; analysis of residual stresses and texture using the Kowari diffractometer; analysis of bio-functional plasma coatings using X-ray and neutron reflectometry (Platypus); a Small-Angle Neutron Scattering study of sodium dodecyl sulfate micellar growth driven by addition of a hydrotropic salt; and the study of yttria-stabilised zirconia using the Taipan three-axis spectrometer.

In addition to the formal program, the participants were provided with guidance on applying for beamtime, experienced an educational Australian wine tasting, a Sydney harbour cruise and tour of the Sydney CBD, as well as an early morning bushwalk where wild kangaroos and some of Australia's beautiful native flowers were seen.

Overall, the 4<sup>th</sup> AONSA Neutron School has helped those attending early-career researchers build expertise and confidence in the application of neutron scattering techniques. We hope that one day these researchers are similarly educating future generations. ANSTO has received very positive feedback following the school from participants, their supervisors and the attending lecturers for which we are grateful.

We wish to thank the speakers and instrument scientists for their fine efforts in stimulating the interests of the participants; as well as AONSA, AINSE, IAEA and the Australian Prime Minister's Education Assistance Program (EAP) for Japan for their financial assistance provided to attending students.



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