Mantid - Data Analysis and Visualization Package for Neutron Scattering Experiments

Abstract: Neutron scattering, based on the interaction between neutrons and nucleus, is a unique technique to determine the structure and dynamics of materials and can be accessed through either conventional research reactors or recent pulsed spallation neutron sources. Pulsed spallation sources have a time structure to the neutron production, enabling the event mode data acquisition technique that was very recently developed at SNS. This technique records every single detected neutron, allowing the full flexibility to data reconstruction. Along with the use of new detectors with millions of pixels, event mode acquisition therefore often results in large data sets, imposing significant challenges in data reduction and analysis. The Mantid framework that we are currently developing is a software solution to this challenge. This project offers an extensible framework (through Python) for data manipulation, analysis and visualization. It is currently the major data handling software in use at multiple neutron facilities worldwide. In my talk, I will focus on introducing the Mantid projects, including both its recent significant success and future directions. Several specific examples will be given to demonstrate the power of Mantid for materials science.

Wenduo Zhou, Ph.D.

Wenduo Zhou is a software scientist in Scientific Data Analysis Group, Neutron Data Analysis and Visualization Division, Oak Ridge National Laboratory. He is a developer for the Mantid project, handling data processing for neutron diffractometers. Wenduo received a B.S. degree in Applied Physics from Shanghai Jiaotong University (1996), Master of Computer Science (2004) and Ph.D. of Physics (2006) from University of Georgia. His research interests include development of data reduction, analysis and visualization software for neutron and X-ray diffraction experiments, Monte Carlo simulation for 2D Hubbard model and development of workflow software for data analysis and modeling.