## BIG energy seminar series

## Addressing the scale and complexity of the global energy challenge.



**New Perspectives of Energy Storage Materials** 

Dr. Shirley Meng University of California San Diego Department of Nano Engineering Thursday, November 8<sup>th</sup>, 2012 **3:30 p.m. in ECCR 200 (Engineering Center)** 

**Summary:** Energy storage in the electrochemical form is attractive because of its high efficiency and fast response time. New and improved materials for

energy storage are urgently required to make more efficient use of our finite supply of fossil fuels, and to enable the effective use of renewable energy sources. In this seminar, I will discuss a few new perspectives for energy storage materials including new Li intercalation compounds, new Na intercalation compounds and new Metal-Organic-Framework (MOF) compounds. I will demonstrate how to combine knowledge-guided synthesis/characterization and first principles computation to develop and optimize new higher energy/power density electrode materials for lithium ion and sodium ion batteries. We are able to explore intrinsic ionic mobility and phase transformations in electrode materials, and develop an approach to map out the structureproperties relations in functional oxide materials for energy storage and conversion.

## Shirley Meng, Ph.D.

Dr. Shirley Meng received her Ph.D. in Advance Materials for Micro & Nano Systems from the Singapore-MIT Alliance in 2005, after which she worked as a postdoc research fellow and became a research scientist in Massachusetts Institute of Technology before joining University of Florida, Department of Materials Science & Engineering as a junior faculty member. She is currently a faculty member in the Department of NanoEngineering, University of California San Diego (UCSD). Meng's research focuses on the direct integration of experimental techniques with first principles computation modeling for developing new materials for electrochemical energy storage and conversion. She won the Materials Research Society Graduate Student Award in 2003 for her pioneering work on designing new high energy electrode materials for lithium ion batteries from first principles. She recently received the National Science Foundation (NSF) CAREER award and her research group - Laboratory for Energy Storage and Conversion (LESC) focuses on functional nano-structured materials for energy storage and conversion. Recent programs include the design, synthesis, processing, and in situ characterization of mixed transition metal oxides as high energy density electrode materials in advanced lithium ion batteries; new intercalation materials for sodium ion batteries and advanced soluble lead flow batteries for grids large scale storage.

Campus Map for the Engineering Center: <u>http://www.colorado.edu/campusmap/map.html?bldg=EC&x=17&y=13</u>

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