



TEXAS TECH UNIVERSITY

Edward E. Whitacre Jr.  
College of Engineering

*Mechanical Engineering Department: Faculty Candidates Seminar Series*

**Friday, February 21<sup>th</sup> 1:00-2:00 ME Conference Room – ME 106**

## **Nanotechnology for the Next Generation of Batteries, Supercapacitors, and Solar Cells**

**Dr. Shan Hu**

**PhD, University of Minnesota, Twin Cities**

**Abstract:** Nanostructured materials with unusual properties not found in bulk materials can provide exceptional performances not achievable by traditional devices. The first part of this seminar will talk about how the unique properties of carbon nanotubes (CNTs) are explored to develop essential components for a solar-powered active noise control window system, including an invisible speaker, flexible supercapacitors, and transparent solar cells. Scalability and high production cost, the two major drawbacks of many nanomaterial-based devices, were overcome in this research by making the CNTs solution-processable. The impact of the developed energy generation/storage components on other real world applications will also be discussed.

The second part of the seminar will discuss the opportunities that exist for nanomaterials and nanotechnology to reduce the “Price per Watt” of current sustainable energy generation and energy storage systems. Examples include (i) the use of nanotubes and nanowires as electrode materials for next generation of high-capacity Lithium-ion batteries, and (ii) the strategies to boost up the energy conversion efficiency of the low-cost dye-sensitized solar cells.

**Background/Vita:** Ms. Shan Hu is a Ph.D. candidate in the Department of Mechanical Engineering at the University of Minnesota Twin Cities. She received her M.S. degree from the University of Minnesota Duluth in 2009 and her B.E. degree from the Harbin Institute of Technology, Harbin, China in 2007. She was awarded the Doctoral Dissertation Fellowship from the University of Minnesota’s Graduate School to complete her Ph.D. research, which uses carbon nanomaterials to develop the next generation devices for energy and biomedical applications. Her work on carbon nanotube-based paper supercapacitors was featured in Applied Physics Letters’ 50th Anniversary Collection and chosen as the “Most Read APL Articles in 2012”.

