University at Buffalo
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RENEW Distinguished Lecture Series in Energy, Environment & Water Sustainability

Title of Lecture: *The Future of Energy Storage*

When: 3:00pm–5:00pm, March 16th, 2017 (presentation followed by a discussion)

Where: Davis 101, North Campus, University at Buffalo

Featuring: Prof. Yet-Ming Chiang

Biosketch:

Dr. Yet-Ming Chiang, Kyocera Professor of Materials Science and Engineering at MIT, is a world-renowned, clean energy scientist and technologist focusing on electrical storage for transportation, renewables, and grid-scale applications. He has co-founded 5 companies to commercialize research from his laboratory including two battery companies - A123 Systems and a new company 24M, which reinvents the Li-ion battery, and aims to dramatically reduce costs towards realizing a clean and sustainable energy future. He has been a faculty member in the Department of Materials Science and Engineering at MIT since 1985. He has received The Economist's Innovation Award (Energy and the Environment category), the Electrochemical Society's Battery Division's Battery Technology Award, the Materials Research Society's Plenary Lecturer, an R&D 100 and R&D100 Editor's Choice Award, and the American Ceramic Society's Corporate Achievement, Ross Coffin Purdy, R.M. Fulrath, and F.H. Norton Awards. Chiang has published about 250 scientific papers and holds about 60 patents. Chiang is a a Fellow of the Materials Research Society, the American Ceramic Society and is a member of the U.S. National Academy of Engineering.

Abstract: It is increasingly evident that efficient, low-cost energy storage is critically needed to enable the continued deployment of renewable energy. The cost of renewable electricity generation is now competitive, or nearly so, with fossil fuel generation. However, the intermittency of renewable power limits its widespread use as a reliable, dispatchable power source. In the near term, lithium-ion batteries will be the mostly widely deployed technology for both transportation and stationary storage. Along with the development of higher performance/lower cost cathodes, anodes, electrolytes or other cell components, efficient cell designs and low cost/highly scalable manufacturing techniques are needed. This talk wil discuss a "clean sheet" redesign of the lithium-ion design and manufacturing paradigm, based on a new semi-solid electrode form that enables manufacturing of high performance Li-ion cells using a radically simpler and lower-cost method than is practiced today.

Looking forward to a world with high renewables penetration, highly scalable storage of still lower cost will be needed. Today, pumped hydroelectric storage (PHS) and underground compressed air energy storage (CAES) have the lowest cost of storage (~100 US$/kWh installed cost), but each faces geographical and environmental constraints that limit further deployment in the U.S., even while new PHS installations are developed elsewhere in the world. Electrochemical storage that is cost-competitive with PHS and underground CAES has not heretofore been available. Towards this goal, sulfur is an attractive reactant due to its exceptionally low cost, high natural abundance, and high specific and volumetric capacity owing to its two-electron reaction. In fact, measure as cost-per-capacity (e.g., US$/Ah), sulfur has the lowest cost of known electrode-active compounds except for water and air. Recent work on an ambient-temperature aqueous flow battery that has the potential to provide large-scale electrochemical storage at the price of PHS and CAES will be discussed.

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About the RENEW Distinguished Lectures: The RENEW Distinguished Lecture Series seeks to promote dialogue and interaction with UB's faculty & staff, students and the local community with renowned leaders in science, technology and policy in academia, industry and government.

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