

COMPUTER SCIENCE COLLOQUIUM

“Battery Health Monitoring and Prognostics”

Professor Michael Pecht
University of Maryland

**In conjunction with the Dallas Chapter of the IEEE Reliability Society
Student Outreach, Fall 2013**

Abstract

Over the past year, Boeing’s 787 Dreamliners have experienced a number of technical issues including electrical arcing in the aircraft’s main power panel and catastrophic failure of the batteries used to run the aircraft’s auxiliary power unit. These and many other in-flight failures in the 787, suggest that the traditional reliability approaches of product design, test, and risk assessment that Boeing and their suppliers implemented are flawed. Considering the severity of the failures experienced, Boeing is fortunate that serious injuries or death did not occur as a result. It remains to be seen how the failures will affect Boeing’s public image in the long run, and whether customers will be lining up for Dreamliner flights as the airplanes are being cleared for flight again. At the same time, similar problems have occurred in electric cars, computers and smart phones.

In this presentation, the use of prognostics and systems health management is discussed for battery management to forecast battery life and safety. Batteries represent complex electrochemical structures with complex failure mechanisms. The prognostics and systems health management approach incorporates both physics-of-failure techniques to understand the mechanisms that precede failure and data-driven concepts to provide anomaly detection and prognosis before an actual failure event occurs. It serves as a model for how companies should not only conduct reliability assessments and qualification, but also real-time safety and health monitoring. The presentation will be laced with a variety of real-world examples.

Biography

Prof. Michael Pecht is a world renowned expert in strategic planning, design, test, IP and risk assessment of electronic products and systems. In 2010 he received the IEEE Exceptional Technical Achievement Award for his innovations in the area of prognostics and systems health management. In 2008, he was awarded the highest reliability honor, the IEEE Reliability Society’s Lifetime Achievement Award. Prof. Pecht has an MS in Electrical Engineering and an MS and PhD in Engineering Mechanics from the University of Wisconsin at Madison. He is a Professional Engineer, an IEEE Fellow, an ASME Fellow, an SAE Fellow and an IMAPS Fellow. He has previously received the European Micro and Nano-Reliability Award for outstanding contributions to reliability research, 3M Research Award for electronics packaging, and the IMAPS William D. Ashman Memorial Achievement Award for his contributions in electronics analysis. He is the editor-in-chief of IEEE Access, and served as chief editor of the IEEE Transactions on Reliability for nine years, chief editor for Microelectronics Reliability for sixteen years, an associate editor for the IEEE Transactions on Components and Packaging Technology, and on the advisory board of IEEE Spectrum. He is the founder and Director of CALCE (Center for Advanced Life Cycle Engineering) at the University of Maryland, which is funded by over 150 of the world’s leading electronics companies at more than US\$6M/year. The CALCE Center received the NSF Innovation Award in 2009. He is currently a Chair Professor in Mechanical Engineering and a Professor in Applied Mathematics at the University of Maryland. He has written more than twenty books on product reliability, development, use and supply chain management and over 600 technical articles. He has also written a series of books of the electronics industry in China, Korea, Japan and India. He consults for 22 international companies.

The colloquium is open to the general public

Date: Friday, September 20, 2013
Time: 4:00 – 5:00 pm
Location: Room: ECS South 2.201
Host: Professor Eric Wong
(Refreshments will be served at 3:45 pm)

The University of Texas at Dallas
ENGINEERING/COMPUTER SCIENCE BLDG. EC
31, P.O. BOX 830688, RICHARDSON, TEXAS
75083-0688 (972) 883-2190