

Michael Pecht - Professional Engineer

Ph.D. Engineering Mechanics, December 1982, University of Wisconsin, Madison
M.S. Engineering Mechanics, May 1979 and M.S. Electrical Engineering, August 1978
B.S. Acoustics, May 1976

Current Employment: Full Professor and George E. Dieter Chair Professor at the University of Maryland; USA.

Founder and Director of the CALCE Electronic Products and Systems Centre, a \$5M a year centre sponsored by over 100 international companies and organisations from all sectors of the electronics industry. The Centre is now recognised as the driving force behind the development and implementation of physics-of-failure approaches to reliability and life cycle prediction, as well as a world leader in accelerated testing, failure analysis, and electronic parts selection and management.

Chief Editor: Microelectronics Reliability, Elsevier

Honours and Awards

IEEE Fellow, “for effectiveness in leadership in the development and realization of an exemplary program and successful efforts to raise the level of engineering excellence and practice within and without the organization.”

ASME Fellow, “for promoting the art, science, and practice of mechanical engineering.”

The Royal Society, United Kingdom, Kan Tong Po Electrical Engineering Visiting Professorship Award at City University in Hong Kong (2002).

IEEE Standards Award for chairing and developing IEEE Standard Methodology for Reliability Prediction and Assessment for Electronic Systems and Equipment #1413 (2000).

IEEE Standards Award for chairing and developing IEEE Reliability Program Standard #1332 (2000).

3M Research Award for “research work in the electronics reliability area that has made significant contributions to the scientific understanding of material properties and their complex behavior” (1999).

ASME Electrical and Electronic Packaging Division (EPPD) Award “for outstanding contributions to the field of application of engineering mechanics to electronic packaging” (1999).

IEEE Undergraduate Teaching Award, “for the development and realization of a cross disciplinary educational program in Computer Aided Life Cycle Engineering (CALCE)” (1999).

IMAPS: William D. Ashman Memorial Achievement Award (1997), “for his numerous contributions to academia and the electronics packaging industry.”

IEEE Reliability Society’s Annual Reliability Award (1996), “for his contributions to the IEEE Transactions on Reliability, his work with CALCE Center and his work on Reliability Standards.”

Faculty Achievement Award (April, 1996), “in recognition of outstanding contributions to industrial research enabled by the Technology Initiatives Program.”

American Society for Quality Control: Reliability Division, Austin Bonis Award for the Advancement of Reliability Education (1996) for outstanding achievement in the advancement of reliability education.

Institute of Environmental Sciences Reliability Test and Evaluation Award (1996), “for vital contribution to the development and promotion of physics-of-failure modeling and analysis as a valuable reliability design and test process in the government, commercial and academic communities.”

National Aeronautics Space Agency (NASA) certificate of “recognition of your significant contributions in the preparation and execution of the successful Second U.S. Microgravity Payload (USMP-2) Mission, launched on March 4, 1994.”

Int’l Electronic Packaging Society (IEPS) Educational Award “for excellence in research and education at the University of Maryland CALCE Center (1990)”



Mirce Academy

**2005
ANNUAL LECTURE**

**PROGNOSTICS
and
HEALTH MONITORING
by
Professor Michael Pecht**

**Wednesday 30th November 2005
Greg Norman Hall, Woodbury Park, Exeter, UK**

18.30 Welcome Reception

19.00 The Annual Lecture

ALL WELCOME – ADMISSION FREE*

**** Please ring to book a place***

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Mirce Akademy

President: *Ježdimir Knezevic, BEng, MSc, PhD, FRSS*

Director of Operations: *Clive Nicholas, BA, MPhil, PGCE*

Director of Research: *Professor Christopher Brookes, PhD, FIM, CEng*

Director of Education: *Anthony Vallis, Eur Ing, BSc, PhD*

The Mirce Akademy is a private and independent research institution, established in 1999 by Dr J.Knezevic, to systematically study the motion of functionability through system life and to develop science-based laws and methods that enable accurate predictions to be made, under the umbrella name of the System Operational Science.

The motion of functionability through time is defined by the sequence of operational events resulting from the interaction of processes that take place in the life of the system, governed by the physical and the natural world on hand and the economical, political and commercial world on the other.

Scientific understanding of cause-effect relationships, between system operational processes and system operational events through time, required the research performed at the Akademy to be placed within a physical scale ranging from 10^{-10} metre (Atomic System – to deal with vacancies, fatigue, corrosion, etc.) to 10^{10} metre (Solar System – to deal with humidity, wind, ice, radiation, etc.).

Given that the prediction of the motion of the functionability through time is made, the accurate calculations of the future: productivity, reliability, availability, risk, revenue, performance, cost, profit, readiness and similar, measures are possible with a probabilistic regularity based on the system design, operation, maintenance and support decisions

Grand Fellows of Mirce Akademy:

- *Nigel Mansell OBE, 1992 F1 World and 1993 Indy Champion*
- *Polly Vacher MBE, the first person in the history of aviation to fly solo around the world via all seven continents*
- *Prof. Arie Dubi, creator of Monte Carlo based SPAR methodology*

Prognostics and Health Monitoring

Sometimes products fail too early. When they do, we hope that the failure does not affect our mission, prevent us from accomplishing a task or compromise our safety.

Product health monitoring and prognostics is a way to determine if a product is likely to fail prematurely. These methods are analogous to patients getting feedback from their physicians about their own health. For products, this feedback includes identification of how the product is degrading and the prediction of the remaining useful “life” of the product.

There has been a growing interest in monitoring the ongoing “health” of products and systems in order to receive an early warning to avoid catastrophic failure and to be able to schedule preventative maintenance. In this presentation, various prognostic methods to assess the health, as well as the remaining life, of products will be explained. These methods involve sensing and interpretation of the product’s operating parameters and environment to continuously assess the amount of a product’s degradation. Examples of prognostics and health monitoring being used in aircrafts, bridges, machine-tools, engines, and turbines will be discussed.

A case study to estimate the remaining life of a printed circuit board assembly in an automobile under-hood environment will be presented. Studies to assess the electronics in the NASA space shuttle arm and booster rockets will also be discussed. Some additional examples of in-situ semiconductor health monitors and MEMS sensors for health monitoring will then be given, along with concepts for future research development.

For further information about Professor Pecht or CALCE-EPSC please go to www.calce.umd.edu

On the 1st of December 2005 Professor Pecht will be awarded the Grand Fellowship of the Mirce Akademy, the highest award that it can bestow upon an individual in recognition of their unique contribution to the understanding and/or predicting of the motion of functionability through system life, at the global level of significance.