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# Research Highlights

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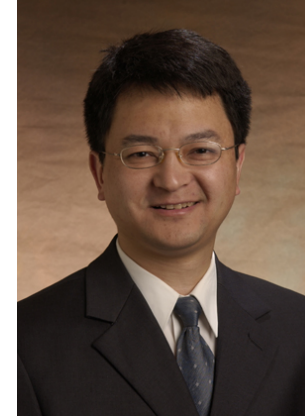
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## • Dr. Haitao Liao, Assistant Professor

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- **Research interests:** Reliability Testing, Maintenance and Spare Part Logistics, Prognostics, Risk Assessment
- **Recent projects**
  - PI: "CAREER: Adaptive Operational Coordination Methodology for Uncertainty Reduction in Product Life Cycle Reliability and Service Logistics", *National Science Foundation*, 2010-2015.
  - PI: "Exploration of a Statistically Accurate and Energy Efficient Accelerated Testing Methodology", *National Science Foundation*, 2010-2013.
  - PI: "Design of Equivalent Accelerated Life Testing Plans Involving Single or Multiple Stresses", *National Science Foundation*, 2006-2009.
- **Recent publications**
  - Mitch, R. and Liao, H. "Joint Production and Spare Part Inventory Control Strategy Driven by Condition Based Maintenance", *IEEE Transactions on Reliability*, accepted, 2010.
  - Liao, H. and Elsayed, E. A., "Equivalent Accelerated Life Testing Plans for Log-Location-Scale Distributions", *Naval Research Logistics*, accepted, 2010
  - Liao, H., "Optimal Design of Accelerated Life Testing Plans for Periodical Replacement with Penalty", *Naval Research Logistics*, 56, 2009.
  - Liao, H. and Elsayed, E., "Reliability Inference for Field Conditions from Accelerated Degradation Testing", *Naval Research Logistics*, 53, 2006.

# Integrated Reliability Maintenance & Service (IRMS) System

Service

Service Logistics

Spare parts management

Maintenance

Preventive maintenance

Decision support

Condition based maintenance

Reliability Testing

Accelerated life testing

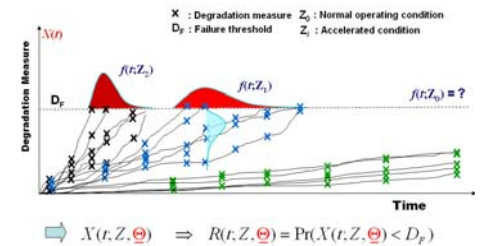
degradation testing

HALT

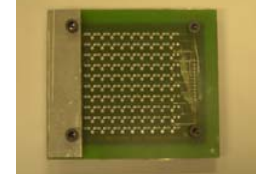
R&D

Environmental testing

Use of short-term reliability testing to predict the long-term reliability of equipment



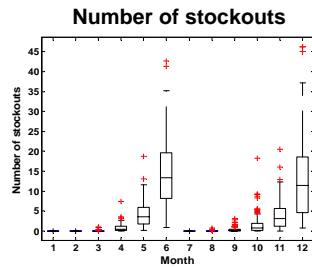
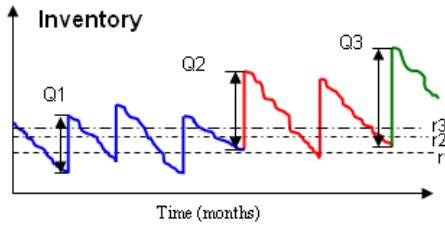
Printed circuit board



Microelectronics

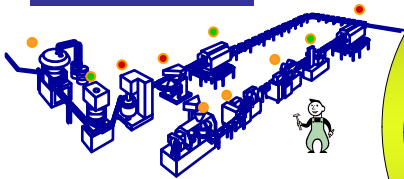


Spare part inventory control system



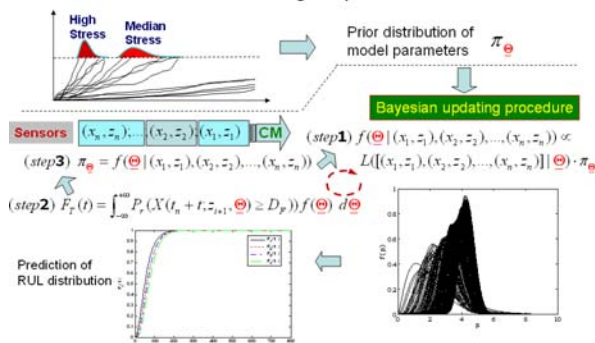
Manufacturing system

- Good condition
- OK condition
- Bad condition

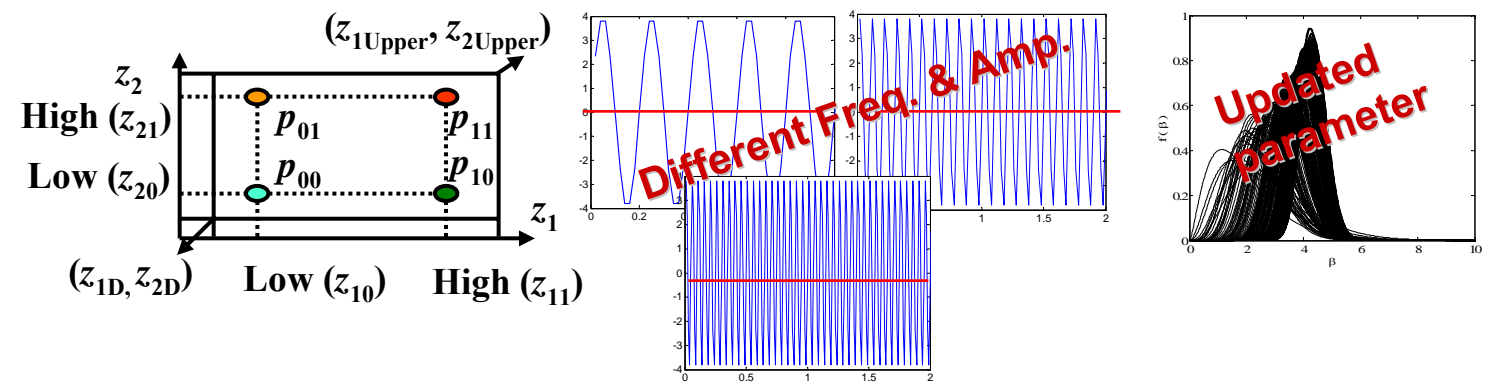
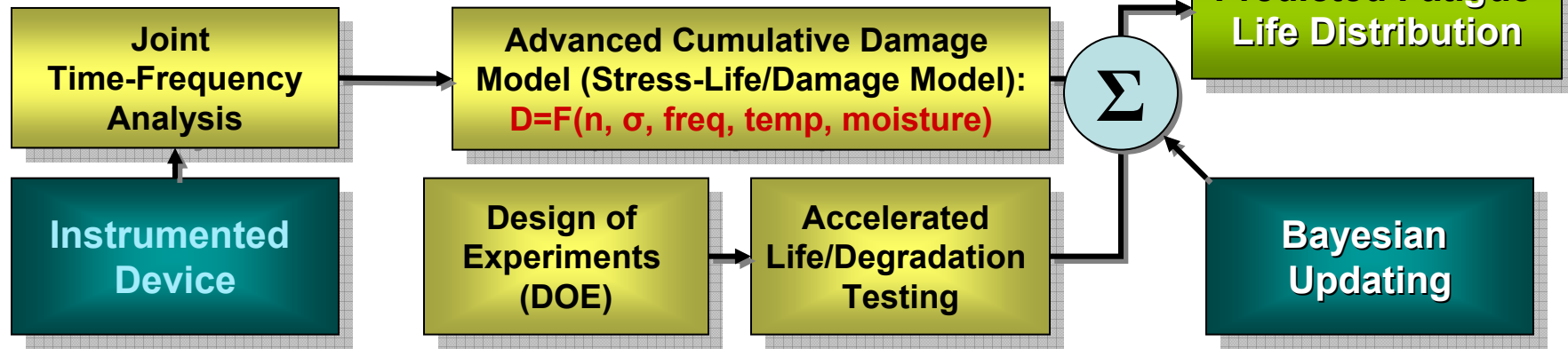
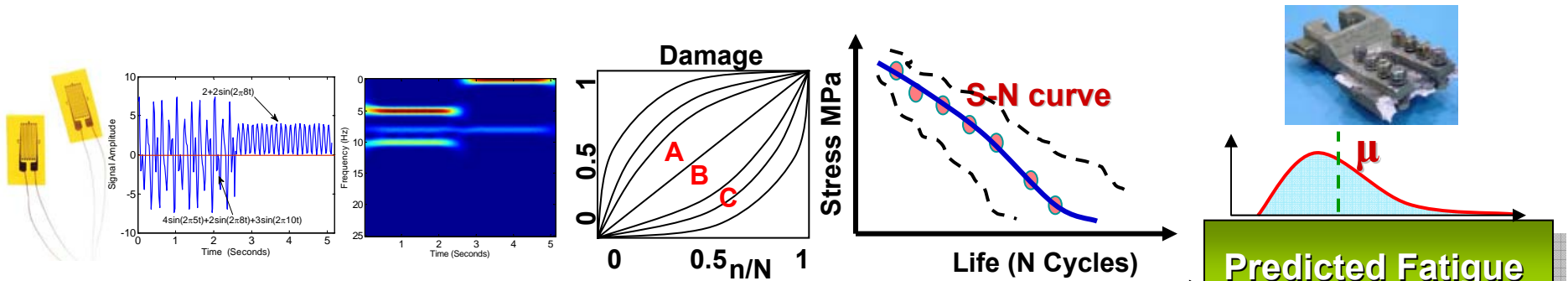


Equipment remaining useful life prediction

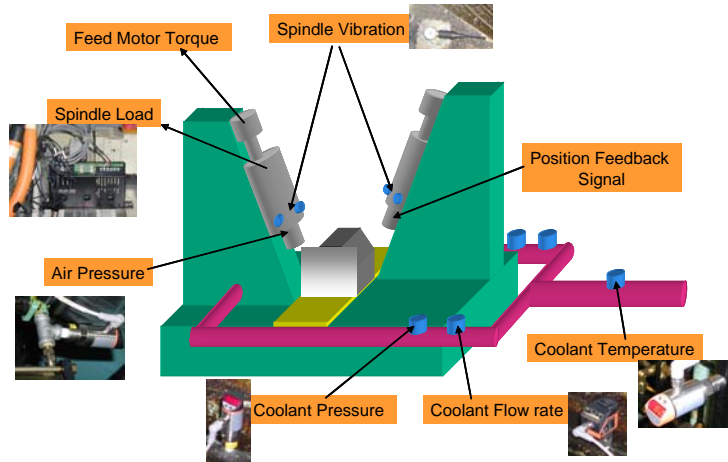
ADT enhanced remaining life prediction tool



# Advanced Life Prediction Tool



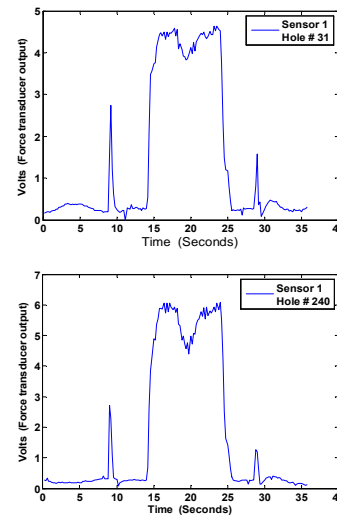
# Maintenance & Spare Part Logistics through Condition Monitoring



Machine

Plant

Spindle load



Spare part & maintenance decision

