

University of Maryland Reliability Engineering Curriculum: Structure and Philosophy



Mohammad Modarres Director, Reliability Engineering Program Department of Mechanical Engineering

Presented at the RAMS-2014 Symposium Colorado Springs, Colorado, 28 January 2014

THE A. JAMES CLARK SCHOOL of ENGINEERING



Reliability Engineering Graduate Program



- Comprehensive education and research activities in risk, reliability, and safety of engineered systems and processes
- Offering MS, PhD, and Graduate Certificate in Reliability Engineering
- Over 20 Graduate Courses in diverse areas of risk, reliability and safety
- 30 years of existence, 25 years of which as a formal degree offering discipline in the A.J.
 Clark School of Engineering

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Major Courses Offered



CORE AND INTERMEDIATE COURSES

- Fundamentals of Failure Mechanisms
- Reliability Analysis
- Fundamentals of Reliability Engineering
- Mathematical Techniques of Reliability Engineering
- Probabilistic Physics of Failure and Accelerated Testing
- Advanced Methods in Reliability Modeling

Research Courses

- Independent Studies in Reliability Engineering
- Master Thesis
- Ph.D. Thesis

TECHNICAL ELECTIVES

- Collection and Analysis of Reliability Data
- Reliability Engineering Management
- Microelectronics Device Reliability
- Probabilistic Risk Assessment
- Risk Management for Engineers
- Software Reliability and Integrity
- Information Security
- Other Interdisciplinary elective tracks meet needs of engineering community (i.e. take electives in Systems Engineering, Project Management, etc.)

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Faculty



Current Core Faculty (ME)

Professor Aris Christou Associate Professor Michel Cukier Minta Martin Professor Mohammad Modarres

Nicole J. Kim Professor Ali Mosleh Associate Professor Jeffrey Herrmann Assistant Professor Monifa Vaughn-Cooke

Professor of the Practice Jeong Kim

Emeritus Professors

Professor Marvin Roush Professor Vincent Brannigan (FPE)

Affiliate Faculty

Professor Shapour Azarm (ME) Professor Neil Goldsman (ECE) Professor Bilal Ayyub (CEE) Professor Gregory Beacher (CEE) Professor Peter Sandborn (ME) Associate Professor Linda Schmidt (ME) Professor Peter Sandborn (ME) Professor Carol Smidts (ME, OSU) Professor Joseph Bernstein (ECE, Israel)

Adjunct Faculty and Lecturers

Dr. Stuart Katzke (NIST) Dr. Nathan Siu (NRC) Dr. Norman Eisenberg (Independent Consultant) Dr. Mark Kaminiskiy (CRR-CEE) Dr. Roy Schuyler (Independent Consultant)

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Centre for Risk and Reliability (CRR)



An umbrella organization for many of the risk and reliability research and development activities in the A.J. Clark School of Engineering 23 Full Time, Adjunct, and Affiliate Faculty



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CRR Research Laboratories

- Hybrid Systems Reliability Laboratory
- Human Reliability Laboratory
- Probabilistic Physics of Failure and Fracture Mechanics Laboratory







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- Complex Systems Reliability
- PHM and applications to Structural Integrity
- Probabilistic Physics of Failure
- Microelectronics Reliability
- Data Analysis and Predictive Models
- Human Reliability
- Cyber Security

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CRR Research Partnerships



- US NRC
- US Navy
- NASA
- EC Halden Research Center, Norway
- EEC Joint Research Center, Italy
- ETH Center for System Safety, Switzerland
- Norwegian Institute of Technology
- Paul Scherrer Research Institute, Switzerland

Partnership with the industry:

- ManTech
- Reliability Information Analysis Center RIAC Partnership

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Reliability Engineering for Professionals and Distance Education



UNIVERSITY OF MARYLAND

Degree Seeking:

- Professional Master of Engineering Program (requires the completion of 10 courses with NO thesis, scholarly paper, or comprehensive exam)
- Graduate Certificate in Engineering Program (requires the completion of 4 courses, highly focused, either as stand-alone or as stepping-stone to a master's)

Non-Degree Seeking:

- Taking Courses Ad Hoc (as relevant or needed for individual)

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Distance Education Technology & Services (DETS)



- On Campus Technology Enhanced Classrooms
- Classes Webcasted
- Courses Delivered Synchronously to Regional Remote Sites
- 100% Online Course Delivery
- Video Chat, Threaded Discussions, Posting Sites for Collaboration, Virtual Team Projects



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UPCOMING 25th ANNIVERSARY SYMPOSIUM AS A FORMAL RELAIBILITY ENGINEERING PROGRAM—APRIL 2, 2014





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