

CALCE MEMS Reliability Workshop

October 12th, 2009 • CALCE, University of Maryland, College Park

For more information on this course and others visit www.calce.umd.edu or contact Dr. Ravi Doraiswami at
Email: osterman@calce.umd.edu or ravidsw@calce.umd.edu

What is MEMS Technology?

Micro-electro-mechanical systems (MEMS) is the integration of micro mechanical elements, sensors, actuators, and electronic devices are integrated on a common silicon substrate through microfabrication technology. While the electronic devices are fabricated using integrated circuit process sequences (e.g., CMOS, Bipolar, or BICMOS processes), the micromechanical components are fabricated using compatible “micromachining” processes that selectively etch away parts of the silicon wafer or add new structural layers to form the electromechanical devices. Explore the cutting edge of MEMS reliability with CALCE’s, MEMS Reliability Workshop. In this course you will gain the needed foundation in materials characterization, MEMS fabrication, integration, and reliability testing for the next generation of MEMS sensors in embedded systems. This workshop provides engineers and scientists with an in-depth knowledge in MEMS sensor reliability bridging the gap between MEMS research concepts and commercialization through sequential identification, accelerated lifetime testing, and elimination of MEMS-specific chip-level and package-level failure modes. The course also provides an up-to-date knowledge base in chip scale processes for reliability of RF MEMS, enabling SOP, SIP and SOC systems.

Our one-day workshop connects all facets of MEMS Reliability and its application as sensors. It takes you through the three steps of MEMS reliability testing:

1. Micromechanical systems realization
2. Sensor packages
3. Reliability testing and failure analysis of MEMS sensor packages

Draft Program

Monday, October 12th, 2009

7am– 8 am	Registration and Breakfast
8.00am–8.20 am	Introduction Dr. Michael Osterman
8.20am–10.30 am	Introduction to MEMS reliability, Dr. Ravi Doraiswami - CALCE
10.30am–11.30 am	Biometric MEMS reliability –Dr.Rainer Schmitt - Sonavation Inc.
11.30am–12.30 am	MEMS reliability test and evaluation– Dr.Ravi Doraiswami- CALCE
12.30 am–1.30pm	Lunch
1.30pm–2.30pm	MEMS space applications and reliability – Dr. John Saiz - NASA
2.30pm–3.30pm	RF MEMS Reliability, Dr.Ravi Doraiswami- CALCE
3.30pm–4.15pm	MEMS application – Dr.Michael Gaitan - NIST
4.15pm–5pm	Laboratory Visit - Anshul Sharivastava and Bhanu Sood

About the Speakers

Dr. Ravi Doraiswami has over 25 years of experience in sensor application technologies. He pioneered the setting up to a smart systems lab in Singapore, where he implemented embedded sensor technologies for aircraft structures. Dr. Ravi Doraiswami led a flip chip assembly team at the Packaging Research Center and MEMS Group at the Georgia Institute of Technology for 9 years, to assemble the first highly reliable, totally integrated System on a Package (SOP) and novel BioSensors. He has over 8 yrs of management experience and has also published over 45 research publications in international conferences and reputed technical journals. He has recently co-authored a book titled *NanoBIO Fluidic MEMS Sensors*.

Dr. Rainer Schmitt has over 35 years of experience in the bio-medical industry. He had been Chief Scientist at Cross Match Technologies, Inc., since 2002, where he developed the physical foundations of Sonavation's MEMs-based fingerprint technology. Prior to that, Dr. Schmitt worked for Fraunhofer Gesellschaft, Europe's largest and most prestigious organization for applied research. He managed several research organizations at Fraunhofer for more than 18 years, where he was the Institute Deputy Director at the Fraunhofer Institute for Biomedical Engineering. Dr. Schmitt has also been an Adjunct Professor of Radiology at the University of Michigan since 2004.

Dr. Cha-Mei Tang, has led the research and commercial efforts at Creatv MicroTech since founding the company. She received her B.S., M.S. (EE) and Sc.D. from the Electrical Engineering and Computer Science Department of the Massachusetts Institute of Technology, Cambridge, Ma. Dr. Tang worked at the Naval Research Laboratory (NRL) for 18 years, eight of which were in the capacity of Section Head. Her areas of research included free electron lasers, accelerators, cold field emission cathodes and x-ray generation and applications. She is a Fellow of the American Physical Society and was named the 1992 "Most Outstanding Woman Scientist in the Federal Government" by WISE (Women in Science and Engineering). She has received nine patents and has five patent applications pending. She has published over 150 research papers.

Dr. Michael Gaitan received his Ph.D. in Electrical Engineering in 1988 from the University of Maryland, College Park. He is the Project Leader of the MicroElectroMechanical Systems (MEMS) Project, Semiconductor Electronics Division, Electronics and Electrical Engineering Laboratory, NIST. He directs the MEMS Project's activities in providing industry with standardized MEMS test structures and test methods for characterizing the thermo-electro-mechanical properties of thin-films used in IC and MEMS technologies. He works with IC foundries to improve the accessibility of MEMS manufacturing, and heads the research and development of novel measurement applications of MEMS technology for new programs in BioElectronics and Single Molecule Manipulation and Measurement (SM3).

How You Will Benefit

- Discover how your company/research fits into the big picture of MEMS
- Gain expert case based application experience
- Discover where to focus new research
 - Telecommunication
 - Aerospace
 - Defense
 - Energy harvesting
 - Agriculture and biomedical
 - Transportation
 - Homeland security
 - Environmental and disease identification
- Network with CALCE experts and industry professionals, and develop contacts who can help you in developing products
- Be on the forefront of MEMS reliability research
- Recruit and network with students working on the cutting edge of systems reliability
- Get exposed to CALCE's state-of-the-art research facilities

Who Should Attend

- Scientists and mechanical and electrical engineers in industry and national labs
- Technical managers
- Faculty members who want to stay current in MEMS and engineering
- Post-doctorate researchers
- Graduate students

Registration Fees

Non Members: \$500

CALCE Members: \$400

Course fees include snacks, lunch, dinner and all course materials. You will receive a letter confirming your registration from CALCE. Checks should be made payable to CALCE. VISA, MasterCard, American Express and Discover are accepted. Your credit card will be charged as soon as your registration is received. You should make payment arrangements before the start of the program. Advance payment arrangements guarantee your place in the program.

Cancellations and Refunds

Cancellations must be received in writing (e-mail, fax, or mail) 10 or more business days prior to a course start date for a full refund. If canceled less than 10 business days prior to a course start date, no refund will be issued. Substitutions may be made with written approval from the original registrant. CALCE, University of Maryland, reserves the right to cancel a course for any reason, including insufficient enrollment. If a course is canceled, all registration fees will be refunded or may be transferred to another course.

How to Register

Fax registration page below to 301-314-9269:

Registration Form
MEMS Reliability Workshop
October 12, 2009
University of Maryland, College Park, MD 20742

Fax: (301) 314-9269

Mail: CALCE

Room 1101, Bldg. 89

University of Maryland

College Park, MD 20742

Name: _____

Position: _____

Company name: _____

Address: _____

City: _____ State: _____ Zip: _____:

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Amount Enclosed \$ _____

(Check enclosed payable to University of Maryland)

Charge (circle one): American Express VISA MasterCard Discover

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Cardholder's Name: _____

Cardholder's phone number and email if different:

Signature: _____