



MRS Symposium Tutorial Program

Available Only to Meeting Attendees

- All topics concentrate on new, rapidly breaking areas of research.
- Format facilitates exchange of information by meeting attendees during the symposium.
- All tutorials are integrated into a related symposium program.

Symposium A

Monday, April 13, 8:30 a.m.-4:30 p.m. • Salon 11/12

STA: Amorphous Silicon Materials and Devices for Large-Area Electronics

Hydrogenated amorphous silicon (a-Si:H) is an important technological material for large-area electronics, with applications to solar cells, liquid-crystal displays, optical scanners, and radiation imaging. The course describes the growth, material properties, device physics and large-area-array technology of amorphous silicon. The relation between material properties and device performance of a-Si:H is emphasized.

Instructors: **Robert A. Street**, Xerox Palo Alto Research Center
Michael Hack, dpiX, A Xerox Company

Symposia B/C

Monday, April 13, 1:30-5:00 p.m. • Nob Hill B/C

STB/C: Flat Panel Display Materials and Large-Area Processing

This course will provide an overview of the Flat Panel Display (FPD) market and detailed discussion of dominant and emerging FPD technologies. Topics include display-market trends, thin-film transistor technologies for Active-Matrix Liquid-Crystal Displays (AMLCD), reflective LCD technologies, Organic Light-Emitting Device (OLED) technology, phosphor materials and Field Emission Display (FED) technologies, and plasma display technology. It is intended to serve as an introductory course for entry-level engineers and also to provide a survey of recent developments in FPD technologies for display industry professionals.

Instructors: **Tsu-Jae King**, University of California-Berkeley
Bruce Gnade, DARPA

Symposium D

Wednesday, April 15, 1:30-5:00 p.m. • Golden Gate B2

STD: Defects/Impurities and Gettering in Silicon Science and Technology

The tutorial will begin with an overview of defect identification and classification in the context of the various structural, chemical and electrical detection schemes in general use for defect control and gettering in silicon IC processing. A framework for describing impurity/defect interactions and the role of point defects, diffusion and oxygen precipitation in silicon will then be presented. In conclusion, gettering challenges associated with the SIA Roadmap and enabling diagnostic techniques for crystal growth, epitaxy and advanced devices on SOI and MeV Implantation platforms will be discussed.

Instructor: **George Rozgonyi**, North Carolina State University

Symposium E

Sunday, April 12, 1:00-5:00 p.m. • Pacific H

STG: Organic Light-Emitting Diodes

Organic light-emitting diode (OLED) devices promise a new and exciting form of emissive-display technology. Unlike many of the existing display technologies, OLEDs offer a path to low cost, large-area emissive displays by virtue of their simple fabrication techniques. This tutorial will be an introductory review to the field of OLEDs with emphasis on the organic materials used in this technology. Both types of materials systems, small molecules and polymers, will be covered. The first session of the tutorial will provide a historical overview of OLEDs followed by the development of small-molecule OLEDs, and the second session will be dedicated to polymer LEDs.

Instructors: **Tetsuo Tsutsui**, Kyushu University
Bing R. Hsieh, Xerox Corporation

Symposium I

Sunday, April 12, 1:30-4:30 p.m. • Pacific I

STL: Physics and Materials for Ultrahigh-Density Recording

This course will introduce various forms of magnetic recording heads and media and how they function together during the magnetic-recording and read-back processes. The design and fabrication of thin-film media and metal-in-gap, thin-film, magnetoresistive and giant magnetoresistive heads for high-density recording will be described. Their operation together in magnetic disk and tape-recording systems during both the record and read-back processes will be discussed. Emphasis will be placed on how recent advances in materials for media, heads and head-media interface are expected to affect the performance of advanced recording systems.

Instructor: **Mark H. Kryder**, Carnegie Mellon University

Symposium S

Monday, April 13, 8:00 a.m.-4:00 p.m. • Salon 5/6

STS: Basic Principles and Applications of Scanning Probe Microscopy

Nanometer-scale surface characterization by Scanning Probe Microscopy (SPM) is providing new understanding to researchers in diverse areas of materials science, semiconductor technology, biophysics and mesoscopic systems. SPM techniques have been developed to measure almost every physical surface property on a 10-nanometer scale. This tutorial will provide a brief overview of the general principles of Scanning Probe Microscopy, followed by a detailed description of specific SPM techniques for measuring topographic, optical, thermal and electric properties on a nanometer scale. The basic tip/surface interaction for each technique will be discussed. Spatial resolution, topographic coupling, sensitivity and SPM artifacts will be examined. Local spectroscopies associated with the techniques will also be described. The applications of these probes to materials and devices will be detailed and illustrated with examples.

Instructors: **Joseph E. Griffith**, Bell Laboratories, Lucent Technologies
Hans Hallen, North Carolina State University
Arun Majumdar, University of California-Berkeley
Clayton C. Williams, University of Utah

Symposium T

Sunday, April 12, 1:00-5:00 p.m. • Pacific J

STT: Measuring Mechanical Properties in the Nanometer Regime

In this tutorial, an overview of mechanical property measurements using both nanoindentation and scanning force microscopy methods will be presented. Current trends in experimentation and data analysis models will be reviewed, and similarities and differences between the two approaches will be discussed and clarified. Emphasis will be placed on recent developments in the study of tribological phenomena. Attendees of Symposium T will find in this tutorial suitable background material for active participation in, and understanding of, the symposium.

Instructors: **Shefford P. Baker**, Cornell University
Nancy Burnham, Ecole Polytechnique Federale de Lausanne



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