

## LA Story

It won't be Hollywood's latest blockbuster film that will be showcased this March in Los Angeles, but rather the most recent developments in the world of applied and industrial physics. The APS Forum on Industrial and Applied Physics (FIAP) will sponsor a series of invited, contributed, and focused sessions at the 1998 March APS Meeting, to be held in Los Angeles, California, during March 16-19.

### Technical sessions

There will be six invited technical sessions on emerging technologies:

The Physics and Applications of Microelectromechanical Systems (MEMS). The role of MEMS is becoming more and more important as the scale of technological systems decreases and their requirements become more complex, as in MEMS-based "smart materials." This session will look at both the physics and applications of MEMS, including MEMS below the scale of micron and beyond very high frequency (VHF); ferroelectric MEMS; MEMS for measuring very small forces; micro fluid dynamics; and, in another topic, the application of MEMS in space exploration.

Potential Industrial Applications for Cryogenic Particle Detectors. This session will examine the versatility of low-temperature particle detectors, which can be used in a wide variety of industrial applications. Topics for discussion include the use of microcalorimeters for X-ray microanalysis; high-resolution, superconducting tunnel junction, X-ray detectors for X-ray fluorescence; single-photon superconducting X-ray detectors for spatial imaging and spectral resolution; cryogenic detectors for mass spectrometry of ultrahigh-mass biomolecules; and, finally, cryogenic systems for low-temperature detectors.

Magnetic Materials for Technology. This session will be conducted jointly with the Division of Materials Physics (DMP), and will cover different aspects of magnetic materials, such as ultrahigh-density magnetic recording; magnetostrictive composites used for sensors; properties of submicron magnetic elements; spin-dependent electronics for

memory and sensors; and interfacial uncompensated antiferromagnetic (AF) spins and their role in exchange biasing.

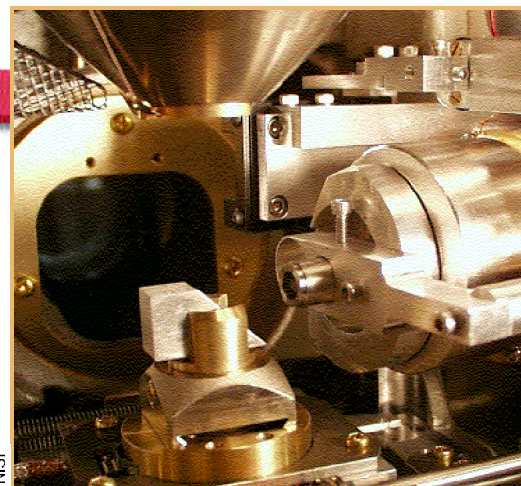
The Dynamics of Silicon Etching and Oxidation. As the thickness of industrial gate oxides decreases, nearing 10 angstroms, the nature of the interface between silicon and its oxide,  $\text{SiO}_2$ , plays an increasingly important role. This session will explore the properties and fabrication of ultrathin silicon oxides, including various wet chemical cleans and oxide growth. Topics for discussion include spectroscopic studies of the initial oxidation of silicon and ultrathin oxides; experimental and theoretical studies of atomic-scale processes during oxidation and at  $\text{SiO}_2$  interfaces; and imaging and diffraction studies of oxidation and  $\text{Si/SiO}_2$  interfaces, and the effect of annealing on the interfaces.

The Magnetocaloric Effect. This session covers the recent progress in the field of magnetocalorics, or magnetic refrigeration, which occurs when a ferromagnet is cooled near a phase transition while a magnetic field is removed. The product is a solid refrigerant, which offers both technological and environmental advantages over fluid refrigerants. This session covers the latest progress in the design and construction of magnetic refrigerators, new advances in materials with a larger magnetocaloric effect, and thermodynamic analyses of composite materials used as magnetic refrigerants.

Finding Faults and Failures in Future ICs. The detection of faults and failures in integrated circuits (ICs) plays a key role in the semiconductor industry. This session looks at both the future of this field and various types of fault and failure detection methodologies, such as defect-based testing on CMOS ICs, picosecond imaging for circuit analysis, and infrared astronomy arrays.

### Professional sessions

The George E. Pake Prize for Original Research Combined with Leadership in the Management of R&D in Industry. During this session, John P. McTague, vice president for technical affairs at Ford Motor Co., will receive the Pake Prize for his contributions to



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the understanding of 2-D phase transitions and orientation epitaxy (the Novaco-McTague effect); his work as a manager and administrator in government national laboratories and industry; and his support for new collaborative methods, such as the Partnership for Next Generation Vehicles. He will give a talk entitled "R&D at the Speed of Light." In addition, Paul Fleury of the University of New Mexico will speak on university science research and education in the next millennium, and Kathleen Taylor of the General Motors R&D Center will discuss new power sources for automobiles for the upcoming century.

Beyond the Ivory Tower: Preparing Physicists for Careers in Government and Industrial Labs. In recent years, many physicists have come to recognize the importance of learning job-search and other similar career-related skills. This session, sponsored by FIAP with the Committee on the Status of Women in Physics (CSWP), is going to include talks entitled "Preparing for Life in the Faster, Better, Cheaper Lane," "Networks and Pathways in Preparing for Careers in Industrial R&D," "IBM and the Physics of Storage," and "Preparing Physics Students for R&D in Industry."

Take Physics Local: Linking Physics to Student and Societal Needs. This session examines the modern-day deterioration of the pact between physics and society, and the impact this has had on the long-term health of the physics profession. The deterioration has occurred, ironically, while technology-based (and physics-based) industries are creating the bulk of the nation's jobs. Given this situation, physics departments need to "Take Physics Local" in order to reestablish and revitalize the relationship between physics and society. The session explores this problem and describes several successful efforts on the part of U.S. physics departments to connect with their communities.

## Focused sessions

Applications of Raman Spectroscopy in Materials Characterization. New and improved Raman instruments are emerging that incorporate such developments as Fourier-transform capabilities, near-infrared and ultraviolet sources, charge-coupled device (CCD) array detectors, holographic optics, fiber optics, and confocal microscopy. These advances have brought Raman studies out of the domain of the specialist and into the mainstream of routine materials characterization. Raman scattering is now being successfully applied to a wide range of practical problems. There was sufficient interest in the subject to warrant two full sessions: the first focusing primarily on semiconductors, polymers, and hard coatings, and the second on a variety of oxides with applications including high-temperature superconductors, catalysts, and sensors.

Chemical and Physical Sensor Technolo-

gies. Industry is becoming increasingly aware of the important future role that sensor technologies will play in monitoring, controlling, and characterizing various critical systems. Current sensing technologies are based on a variety of physical and chemical principles, including optics, acoustics, electrochemistry, and thermodynamics. This session examines sensor technology—its principles, materials, fabrication, and many applications.

Fundamentals of Silicon Etching and Oxidation. This is a focused session that contains contributed papers on the same topic as the earlier invited session.

## Other meetings

On Sunday morning, March 15, FIAP will hold a tutorial on career choices and the role of physicists in industrial and applied physics. This tutorial is recommended for students, postdoctoral students, educators, academics, and anyone interested in learn-

ing more about the careers in this area. At a final contributed session, thermoelectrics and skutterudites will be discussed. [Q](#)

## B I O G R A P H Y

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The Forum department is initiated by the American Physical Society's Forum on Industrial Applications in Physics (FIAP). For further information on FIAP, contact the chairperson, I. Craig Davis, MD3028 SLR, Ford Motor Co., Dearborn, MI 48121-2053; e-mail: [ldavis7@ford.com](mailto:ldavis7@ford.com); phone 313-322-7044.