Preview: 1995 MRS Spring Meeting

San Francisco, California
April 17-21, 1995

Meeting Chairs:

Marcia H. Grabow, AT&T Bell Laboratories
George M. Pharr, Rice University
Jeffrey Y. Tsao, Sandia National Laboratories

Discussions of a wide range of interdisciplinary materials research topics, including microelectronics and optoelectronics, magnetic and electrical properties of novel materials, and carbon-and polymer-based materials, will electrify the halls of the San Francisco Marriott during the 1995 MRS Spring Meeting. The meeting offers about 2200 oral and poster presentations in 26 topical symposia.

Materials for Electrochemical Energy Storage and Conversion, Symposium W, will give researchers an opportunity to share findings on fuel cells, batteries, catalytic materials, and other materials for next generation vehicles. Reducing emissions is the theme of Symposium Y, Materials for Environmental Protection and Control of Air Quality. Presentations will address catalytic and separation technologies to reduce release of hydrocarbons, carbon monoxide, nitric oxide, and chlorinated hydrocarbons.

Symposium S, Electronic Packaging Materials Science VIII, is structured around national technology road maps and federal programs for integrated circuits and electronic packaging. Included in this symposium is a presentation Wednesday at noon by Carol M. Browner, the Administrator of the Environmental Protection Agency, on "Environmental Issues in the Electronics Industry."

Modeling and Simulation of Thin-Film Processing, Symposium R, has joint sessions planned with Symposium P, Rapid Thermal and Integrated Processing, and Symposium T, Materials Reliability in Microelectronics. Modeling of temperature and process control will be shown for a variety of deposition techniques. Failure mechanisms modeled include electromigration and stress migration. Other topics covered include film topography and etching, film growth, and silicon processing.

Symposium D, Materials—Fabrication and Patterning at the Nanoscale, will examine the miniaturization limits of current electronic device patterning methods, and the role of proximal probe techniques to leap beyond these limits for circuits with critical dimensions below 100 nm.

Thin Films for Integrated Optics Applications, Symposium U, covers ferroelectric liquid crystals, nonlinear organics, self-assembly, epitaxial oxide waveguides, and Er-doped thin films.

Hard and soft materials will interface in Symposium J, Hard Coatings for Plastic Substrates—Materials, Processes and Properties. Such coatings are sought for wear resistance, corrosion protection, adhesion, and optical properties. Coatings explored include diamondlike composites, amorphous carbon, silicon carbide, and ion-beam modified surfaces.

Medicine is providing a growing niche for materials, as exemplified by Symposium Z, Polymers in Medicine and Pharmacy. Polymers can be used for orthopaedic applications, for reconstructive surgery, or for artificial ligament anchors. As vesicles, polymers can serve to controllably release therapeutics and vaccines, and to deliver proteins and genes. This symposium will also address tissue engineering, biocompatibility, adhesion and erosion, and synthesis and modification processes.

The structure of complex fluids can be dramatically affected by applied electric and magnetic fields, and Symposium M, Electromechanical Phenomena in Complex Fluids, explores these interactions.

A topic of general interest to sports enthusiasts, and of technological and educational value, is Symposium AA, Materials in Sports and Recreational Activities. Bicycles, for instance, have been used as a tool for teaching about materials concepts. Topics ranging from composites research to marketing an invention will be covered. The symposium will conclude with a panel discussion on the applications of new materials and innovative design concepts to bicycling.

Other symposia topics include amorphous silicon, semiconductor defects, epitaxy, light emitters, low-dielectric constant materials, multilayers, fullerenes, superconductors, magnetic films, ultraclean semiconductor processing, rapid thermal processing, energetic beams, reliability, mechanical behavior of diamond, and flat panel displays.

See the session locator matrix on the following pages for all session titles.

Special Features

The plenary presentation Monday evening, April 17, will be given by Robert Langer, Professor of Chemical and Biomedical Engineering at MIT, followed by a reception. Langer's talk, "Biomaterials: New Polymers and Novel Applications," will focus on drug delivery systems and tissue engineering, and how materials scientists can play a major role in medical research by synthesizing materials specifically for medical applications, instead of restricting the medical profession to using only off-the-shelf materials.

Before the plenary presentation, the Outstanding Young Investigator (OYI) Award and the Graduate Student Awards will be presented. A. Paul Alivisatos, the OYI Award recipient, will give a special talk, "Symmetry in the Structure and Spectroscopy of CdSe Nanocrystals," Wednesday, April 19 at 5 pm. (See related article on the OYI recipient elsewhere in this issue.)

Electronic publishing and electronic services, which have been in discussion behind the scenes at MRS, will be opened to broader discussion on Monday and Tuesday. Commercial publishers and technical societies that publish books and journals will have interactive displays and descriptive materials available Monday evening and Tuesday morning to demonstrate current capabilities. A forum on electronic initiatives will follow on Tuesday evening at 7 p.m., during which input will be sought from attendees.

Symposium X, authoritative reviews for nonspecialists, will be presented in a new format. A few presentations will still be given at lunchtime; one will be on the proposed redesign of U.S. currency to reduce counterfeiting and to aid use by the visually impaired, and another on materials in the recording industry. Several other presentations will be woven into the technical program. These include a presentation joint with Symposium B on order and disorder in semiconductors and another, joint with Symposium Z, on polymers for tissue engineering as a first step toward organ regeneration.

The Spring Meeting also will offer short courses and tutorials related to symposia topics, an extensive exhibit, a job placement bulletin board, poster sessions Tuesday through Thursday, a student mixer, and other auxiliary events. For further details about the meeting see the 1995 MRS Spring Meeting Program, which will be mailed to all MRS members. If you need a program or would like to register, contact the MRS Meetings Department, phone (412) 367-3004 x310; fax (412) 367-4373; or e-mail info@mrs.org. MRS

MRS 1995 SPRING MEETING SESSION LOCATOR

Symposium	Location	Monday, April 17			Tuesday, April 18		
		a.m.	p.m.	eve.	a.m.	p.m.	eve.*
A: Amorphous Silicon	Golden Gate B2				A1/V1: Flat Panel Displays A2/V2: FPD/TFT Tech.	A3: Photocarrier Transport & Recombination A4: Depos. & Device Tech.	A5: Posters
B: Semiconductor Defects & Impurities	Presidio	B1: Defects In Bulk Crystals B2: Defects In Thin Films	B2: (Contd.)		B3: Gettering & Related Phenomena	B4: Hydrogen Interact. with Semiconductors	B5/B6/B7/ B8/B9/B10: Posters
C: Strained Layer Epitaxy	Golden Gate C3	C1: General Issues I	C2: General Issues II		C3: Ordering/Low-Dimensional Structures I	C4: Ordering/Low-Dimensional Structures II C5: Characterization I	
D: Nanoscale Fabrication	Marina B						
E: Visible Light Emitters	Marina A/B	E1: Visible LEDs & Diode Lasers	E2: Wide-Bandgap II-VI Matls. & Devices		E3: Wide-Bandgap Nitrides/ Growth	E4: Wide-Bandgap Nitrides/ Process. & Charac.	
F: Low-Dielectric Constant Materials	Marina E	F1: Synthesis and Characterization	F1: (Contd.)		F1: (Contd.)	F2: Process Integration	
G: Multilayered Thin Films	Golden Gate C1	G1: Metallic Multilayers	G2: Char. of Atomic Struc./ Morphology of Interfaces		G3: Processing & Growth	G4: Phase Transform. & Reaction Kinetics	G5: Posters
H: Fullerenes	Golden Gate B1	H1: Molecular Dynamics & Chemistry I H2: Giant Fullerenes	H3: Properties of C_{60} Molecules & Solids H4: Endohedral Fullerenes		H5: Supercondtiv. & Alkali Metal Fullerides H6: Alkali Metal Fullerides	H7: C_{60}-Doped Polymer Comp. I; C_{60} Heterojunc. H8: II; Photo Carrier Dynamics in C_{60}	
I: Diamond & Other Forms of Carbon	Golden Gate A3	I1: Structure & Processing I	I2: Structure & Process. II		I3: Adhesion	I4: Elastic Properties & Deformation	
J: Hard Coatings for Plastics	Marina D						
K: High-Temperature Superconductors	Golden Gate A2	K1: Overview/Thin Film Processing	K2: HTS Thin Films & Multilayers		K3: HTS Junctions and SQUIDs	K4: Microwave Devices/ Interfaces	K5: Posters
L: Magnetic Films	Golden Gate C2	L1: Applic. & Novel Magnetic Nanostruc.	L2: Growth & Structure		L3: Giant Magneto Resistance I	L4: Interlayer Coupling & Related Properties	L5: Posters
M: Electromechanical Phenomena in Fluids	Marina F		M1: Magnetorheological & Magnetic Fluids		M2: Physical Prop. of Electrorheolog. Fluids	M3: Applic. of Electro-mechanic. Phenomena	M4: Posters
N: Polymer/Inorganic Interfaces	Sunset E				N1: Experimental Probes of Interfaces	N2/Z4: Biointeractions and Biointerfaces **(Nob Hill)**	
O: Ultraclean Semiconductor Processing	Sunset F	O1: Aqueous Si Surface Cleaning	O2: Chem. Mech. Polish. & Post-CMP Cleaning		O3: Metallic & Organic Surface Contamination	O4/T4: Preclean. Impact on Gate-Oxides & Silicidation **Sunset A/B**	
P: Rapid Thermal Processing	Sunset D		P1/R1: Reactor-Scale Modeling & Control		P2/R2: Process Control P3/R3: Depos. Proc. Model.	P4: Sensors & Controls P5: Integrated Processing	
Q: Energetic Beam Film Synthesis	Golden Gate B3	Q1: Pulsed Laser Depos. I Fundamentals Q2: PLD II - Plasma Dynam. & Oxide Growth	Q3: Ion Assist. Pulsed Laser & Pulsed Ion Depos. Q4: Opto-Electronic Matls.		Q5: Pulsed Laser Depos. III Syn. of SC & Ferrelec. Ox. Q6: Pulsed Laser Depos. IV Semiconductors	Q7: Beam-Induced Defects & Surface Morphology Q8: Beam-Induced Defects Affect Growth	
R: Modeling & Thin-Film Processing	Sunset C		R1/P1: Reactor-Scale Modeling & Control		R2/P2: Process Control R3/P3: Depos. Proc. Model.	R4: Film Topology and Etching	
S: Electronic Packaging	Marina C		S1: Natl. Tech. Roadmap		S2: Polymers	S3: Packaging Materials	
T: Microelectronics Reliability	Sunset A/B		T1: Model. & Simul. of Failure Mechanisms I		T2: Reliab. Issues for Sub-Micron IC Technology T3: Stresses in Thin-Films/Lines I	T4/O4: Precleaning Impact on Gate-Oxides & Silicidation	
U: Thin Films for Integrated Optics	Potrero Hill		U1: Liquid Crystals for Integrated Optics I		U2: Nonlinear Organics I	U3: Nonlinear Organics II	
V: Flat Panel Display Materials	Telegraph Hill				V1/A1: Flat Panel Display Technology **(G. Gate B2)**	V2/A2: FPD/TFT **(G.G. B2)** V3: TFT Tech. for FPDs	
W: Materials for Energy Storage/Conversion	Golden Gate A1	W1: Fuel Cell Materials	W1: (Contd.) W2: Oxides for Batteries		W2: (Contd.)	W3: Polymers for Fuel Cells & Batteries	
X: Frontiers of Materials Research	Presidio	X1/B1: Grown-In Defects in Bulk Crystals	X2		X3/Z3: Polymers for Tissue Engineering **(Nob Hill)**		
Y: Materials for Environmental Protection	Russian Hill				Y1	Y2	
Z: Polymers in Medicine/Pharmacy	Nob Hill	Z1: Polymers for Orthopaedic Applic.	Z2: Polymers for Drug Delivery		Z3: Polymers for Tissue Engineering	Z4/N2: Biointeractions and Biointerfaces	
AA: Materials in Sports & Recreation	Russian Hill						

* Evening Poster Sessions: Presidio Room

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Wednesday, April 19			Thursday, April 20			Friday, Apr. 21	
a.m.	p.m.	eve.*	a.m.	p.m.	eve.*	a.m.	p.m.
A6: Deposition A7: New Ideas in Characteriz.	A8: Thin Film Transistors A9: Defects & Doping		A10: Solar Cells A11: New Ideas in Growth	A12: Structure & Defects A13: Struc./Prop. of Alloys	A14: Posters	A15: Hydrog.-Struc./Dynam. A16: Novel Amorph. Silicon-Based Devices	
B11: Defect Issues in Widegap Semiconductors	B12: Defect Characterization		B13: Ion Implantation	B14: Defects in Devices	B15/B16/ B17/B18: Posters	B19: Quantum Wells, Superlattices & Interfaces B20: Defect Prop., Reactn., Modification. & Passivation	
C6: Characterization II C7: Device Applications - I	C8: Device Applications II		C9: Device Applications III C10: Growth of Si-Based Materials I	C11: Growth of Si-Based Materials II C12: Growth of Comp. SC			
D1: Growth & Fabrication of Nanostructures	D2: Patterning	D3: Posters	D4: Proximal Probe Techniques	D5: A Bridge to the Nanoscale			
E5: Organic Light Emitters	E5: (Contd.) **Marina E/F**		E6: Si-Based Light-Emitting Materials & Devices E6: Posters **(Lobby)**				
F3: Low-Dielectric Constant Inorganic Films	F4/N4: Interface Charac. **Sunset E**						
G6: Stress & Mechanical Properties in Multilayers	G7: Magnetic, Electron. & Opt. Effects in Multilayers		G8: Struc. & Matls. Prop. of X-Ray Multilayers	G9: Novel Multilayers and Processing			
H9: Nanotubes (Theory) H10: Nanotubes (Experimental)	H11: Synth. of Fullerenes & New Fullerene Matls. H12: Molecular Dynamics & Chemistry II	H13: Posters	H14: C_{60} Thin Film Growth H15: C_{60} Single Crystal Growth, Film Growth, Stab.	H16: Novel Nanostruc. from Arc Synthesis H17: Novel Films from C_{60}			
I5: Residual Stresses	I6: Fracture & Fatigue	I7: Posters	I8: Friction and Wear	I9: Mechanical Properties/ Applications I		I10: Mechanical Properties/ Applications II	
J1: Preparation II (Carbon-Based Materials)	J2: Preparation I (Oxides)		J3: Characterization				
K6: BSCCO Conductors	K7: Applications of HTS	K8: Posters	K9: Current Limiting Mechanisms	K10: Melt Textured 123 HTSC	K11: Posters	K11: Thallium Conductors K13: Bulk-SC Properties	
L6: Spectroscopies, Magneto-Optical Properties	L7: Magnetic Anisotropy & Interfaces	L8: Posters	L9: Giant Magneto-resistance II	L10: Ultrathin Films, Magnetic Domains	L11: Posters		
M5: Materials for Electromechanic. Phenomena							
N3: Adhesion and Interphase Durability	N4/F4: Interface Charac.		N5: Silanes/Other Primers for Interface Preparation	N6: Interfaces & Composites		N7: Surface Preparation	
O5: Gas-Phase Cleaning	O6: Characterization of Cleaned Surfaces						
P6: Integrated Processing & Manufacturing P7: Panel Discussion	P8: Dielectrics P9: Poster Preview		P10: Epitaxy P11: RTCVD Device Applications	P12: Heterostructures & Novel Processes P13: p-n Junct. & Metalliz.			
Q9: Highly Ionized Beams Q10: Issues/Challenges in Mfg. w/Energetic-Beam-Growth Processes	Q11: Nitrides I Q12: Nitrides II	Q13/Q14/ Q15/Q16: Posters	Q17: Hyperthermal Jets & Surface Dynamics Q18: Chem. Effects/Proc.				
R5/T5: Model./Simul. of Failure Mechanisms II **Sunset A/B**	R6: Growth/Microstructure	R7: Posters	R8: Film Growth/Microstruc. R9: Silicon Proc. Model.	R9: (Cont'd)			
S4: Solder I - Education	S5: Solder II	S3: Posters	S6: Material Science Issues	S7: Ceramic Materials Interfaces			
T5/R3: Model. & Simul. of Failure Mechanisms II T6: Barrier Layers	T7: Electromigration Mechanisms	T8: Posters	T9: Reliability Issues for Copper Metallization T10: Analytical Techniques	T11: Electromigration & Microstructure T12: Electromigr. & Stress Void. in Circuit Intercon.		T13: Resistance Measure. of Electromigration Damage T14: Stresses in Thin Films/ Lines II	
U4: Liq. Crys. for Integr. Optics II	U5: Ferroelectric Thin Films for Waveguides		U6: Er-Doped Thin Films	U7: Inorganic Thin Film Waveguides			
V4: Electroluminescent FPDs	V5: Field Emission Flat Panel Displays		V6: Plasma Displays and Luminescent Materials				
W3: (Contd.) W4: Interfaces	W5: Hydrides & Alkaline Batteries		W6: Carbon & Lithium Ion Batteries	W6: (Contd.) W7: Matls. for Capacitors			
				X4			
Y3							
Z5: Properties & Characterization of Polymers	Z6: Synthesis, Modif. & Process. of Polymers						
	AA1: Invention, Education & Design		AA2: Dynamic Loading, Matls. & the Bicycle				

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MRS 1995 SPRING MEETING
San Francisco, CA

Lodging/Travel

San Francisco Marriott Hotel
55 Fourth Street
San Francisco, CA 94103
(800) 228-9290 Nationwide
(415) 442-6755 Direct
Reservation Fax (415) 442-0141

Deadline for Hotel Reservations: March 17, 1995

A block of rooms has been reserved for MRS meeting attendees at the San Francisco Marriott Hotel (30 minutes from the San Francisco International Airport). When making your reservations, mention the Materials Research Society Meeting to receive the special rates.

▶ Travel Arrangements

The official travel management company for the Materials Research Society's 1995 Spring Meeting is Giselle's Travel Bureau. They will guarantee the lowest fares on any airline at time of booking. **Call Giselle's, 800-523-0100**, and mention the Materials Research Society's meeting, **Monday - Friday, 7:30 a.m. - 5:30 p.m. PST; Fax (916) 565-0936**.

MRS meeting attendees receive the following travel benefits and services:

• Lowest fares on any airline guaranteed • Free flight insurance of $100,000 • Computerized driving instructions from major U.S. airports upon request • Car rental savings

▶ Local Transportation

The San Francisco Airporter service between the airport and downtown San Francisco hotels is $10 one way, or $14 round trip. Cab fares are approximately $25-$30 each way.

▶ Parking

Parking at the San Francisco Marriott is $24 per day (in/out privilege - valet only). Public parking is available within easy walking distance of the hotel at an average cost of $12 for 24 hours.

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Check with the Concierge Desk for a comprehensive roster of licensed and bonded sitters.

MATERIALS RESEARCH SOCIETY ▪ SHORT COURSES AND TUTORIALS

In Materials Science and Technology for the Applied Scientist and Engineer

Selected short courses and tutorial covering the latest developments in materials science and technology will be offered in conjunction with the l995 Spring Meeting of the Materials Research Society. These up-to-date presentations are at the forefront of science and technology and complement Spring Meeting symposium topics. **SPECIALTY, REVIEW, AND SURVEY COURSES** and **TUTORIALS** are designed to meet the needs of scientists, engineers, professional staff, and managers who want to know the latest techniques in materials science and technology. For information about registration, student scholarships, and special meeting registration discounts, contact MRS Headquarters: Phone (412) 367-3004 ext. 320; FAX (412) 367-4373.

C-07: AMORPHOUS SILICON MATERIALS AND DEVICES
Robert A. Street and Michael Hack, *Xerox Palo Alto Research Center*
Monday, April 17, 8:30 a.m. - 4:30 p.m. ..$395

C-32: ELLIPSOMETRY FUNDAMENTALS AND APPLICATIONS
Robert W. Collins, *Penn State University*
Eugene A. Irene, *University of North Carolina*
Friday, April 21, 8:30 a.m. - 4:30 p.m. $395

F-10: FUNDAMENTALS AND APPLICATIONS OF ION BEAM ASSISTED DEPOSITION
James K. Hirvonen, *U.S. Army Research Laboratory*
Thursday, April 20, 8:30 a.m. - 4:30 p.m. ..$395

M-11: MAGNETIC THIN FILMS: PHYSICS AND APPLICATIONS
Bruce A. Gurney and Ernesto E. Marinero, *IBM Almaden Research Center*
Thursday, April 20, and Friday, April 21
8:30 a.m. - 4:30 p.m. $595

M-20: LIGHT-EMITTING POROUS SILICON - FABRICATION, PROPERTIES, AND DEVICE APPLICATIONS
Philippe M. Fauchet, *University of Rochester*
Tuesday, April 18, 8:30 a.m. - 4:30 p.m. ..$395

M-21: EPITAXIAL METAL OXIDE FILMS & HETERO-STRUCTURES DEPOSITION
R. Ramesh, *Bellcore*
Monday, April 17, 8:30 a.m. - 4:30 p.m. ..$395

P-14: FILM FORMATION, ADHESION, SURFACE PREPARATION, AND CHARACTERIZATION OF THIN-FILM STRUCTURES
Donald M. Mattox, *IP Industries*
Thursday, April 20 and Friday, April 21
8:30 a.m. - 4:30 p.m. $595

P-26: METALLIZATION FOR DEVICES, CIRCUITS, AND PACKAGING/VLSI & ULSI
Shyham Murarka, *Rensselaer Polytechnic Institute*
Monday, April 17, 8:30 a.m. - 4:30 p.m. ..$395

TP-06: ELECTROMIGRATION
James R. Lloyd, *Digital Equipment Corporation*
Monday, April 17, 8:30 a.m. - 12:30 p.m. ..$95

TP-11: FEDERAL MATERIALS RESEARCH PROGRAMS AND OPPORTUNITIES
Louis Ianniello, *Consultant (formerly with the Department of Energy)*
Tuesday, April 18, 8:30 a.m. - 12:30 p.m. ..$95

TP-12: GROWTH, CHARACTERIZATION AND APPLICATION OF III NITRIDES
Jacques Pankove, *Astralux, Inc.*
Theodore Moustakas, *Boston University*
Monday, April 17, 8:30 a.m. - 12:30 p.m. ..$95

In conjunction with the Materials Research Society's 1995 Spring Meeting, after March 31, 1995, short course and tutorial registrations will be $25 higher.

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Preregistration MRS 1995 Spring Meeting–San Francisco, CA • April 17-21, 1995

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Preregistration Deadline: March 31, 1995

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A Meeting Preregistration

Please check category and enter amount in payment section below.

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Student registration will not be processed without proof of full-time student status.

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All registrations include complimentary MRS membership through June 30, 1996.

Enter total here and in box below right. **TOTAL $** _____

Symposium interest (please check all that apply):

☐ A	☐ D	☐ G	☐ J	☐ M	☐ P	☐ S	☐ V	☐ Z
☐ B	☐ E	☐ H	☐ K	☐ N	☐ Q	☐ T	☐ W	☐ AA
☐ C	☐ F	☐ I	☐ L	☐ O	☐ R	☐ U	☐ Y	

B Proceedings

(published after this meeting)
These rates apply only to meeting attendees and MRS members. Nonmembers must contact MRS headquarters for prices.

		No. Copies	Total
A:	Amorphous Silicon Technology - 1995 ..... $53	x _____	= $_____
B:	Defect and Impurity Engrd. SCs and Devices $58	x _____	= $_____
C:	Strained Layer Epitaxy $48	x _____	= $_____
D:	Matls. - Fabrication & Pattern. at the Nanoscale $58	x _____	= $_____
F:	Low-Dielectric Constant Materials $58	x _____	= $_____
G:	Multilayered Thin Films $59	x _____	= $_____
I:	Diamond and Other Forms of Carbon $54	x _____	= $_____
L:	Magnetic Ultrathin Films, Multilayers, & Surf. $54	x _____	= $_____
N:	Polymer/Inorganic Interfaces $52	x _____	= $_____
O:	Ultraclean SC Proc. & Surf. Chem. Clean. & Passiv.... $48	x _____	= $_____
P:	Rapid Thermal and Integrated Processing IV $49	x _____	= $_____
Q:	Film Synthesis and Growth Using Energetic Beams .$54	x _____	= $_____
R:	Modeling and Simulation of Thin-Film Processing $52	x _____	= $_____
S:	Electronic Packaging Materials Science VIII $50	x _____	= $_____
T:	Materials Reliability in Microelectronics V $52	x _____	= $_____
U:	Thin Films for Integrated Optics Applications $52	x _____	= $_____
W:	*Matls. for Electrochem. Energy Stor. & Conversion* ... $52	x _____	= $_____
Z:	Polymers in Medicine and Pharmacy $54	x _____	= $_____

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C Journal of Materials Research 1995

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D Short Courses and Tutorials

To preregister, check each short course/tutorial in which you wish to enroll. If you register for two or more short course days, you may attend the technical meeting for only $105 (complete the Meeting Preregistration section at left).

After March 31, 1995, short course and tutorial registrations will be $25 higher.

Short course or tutorial cancellations received by **March 31, 1995**, will be refunded less a $25 service charge. There is no charge for transferring from one short course to another or from one tutorial to another.

Facilities registering three or more persons at the same time in one MRS Short Course receive a 10% discount for all persons.

☐	C-07	Amorphous Silicon Materials and Devices	$395
☐	C-32	Ellipsometry Fundamentals and Applications	$395
☐	F-10	Ion Beam Assisted Deposition	$395
☐	M-11	Magnetic Thin Films	$595
☐	M-20	Light-Emitting Porous Silicon	$395
☐	M-21	Epitax. Metal Oxide Film & Heterostruc. Depos.	$395
☐	P-14	Thin-Film Structures	$595
☐	P-26	Metalliz. for Devices, Circuits, & Pkg./VLSI & ULSI	$395
☐	TP-06	Electromigration	$ 95
☐	TP-11	Federal Materials Research Programs/Opportunities	$ 95
☐	TP-12	Growth, Characterization & Applic. of III Nitrides	$ 95

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C	Journal of Materials Research (from above)	$ _____
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Cancellation/Refunds

If you have already registered and find that you are unable to attend, **you must notify MRS in writing of your request for a refund.** Refunds will be made upon receipt of this written notice, less a $25 service charge. If you apply a portion of this refund to member dues or any MRS publications, the service charge will be waived. **MRS will not honor requests made more than one calendar month after the close of the meeting.**

950027

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MRS Exhibit

San Francisco Marriott Hotel
Buena Vista & Sea Cliff Ballrooms
Tuesday-Thursday, April 18-20, 1995

Exhibit Hours:
Tuesday, noon - 7:00 p.m.
Complimentary Reception 5:00 - 7:00 p.m.
Wednesday, 9:30 a.m. - 5:00 p.m.
Thursday, 9:30 a.m. - 2:00 p.m.

April 17-21, 1995
San Francisco Marriott
San Francisco, CA

As part of the 1995 MRS Spring Meeting, a major exhibit will be held to display analytical and processing equipment closely paralleling the nature of the technical symposia. The technical program has been arranged to allow meeting participants ample opportunity to visit the exhibit.

◆ Indicates MRS Corporate Affiliate Member

A & N Corporation #206
P.O. Box 878
Inglis, FL 34449
Contact: Daniel Vaudreuil
Telephone: (904) 447-2411
Fax: (904) 447-2322
A&N Corporation has been a manufacturer of high vacuum components since 1965. Our product lines include: ISO-KF (QF) flanges, ISO-MF (LF) flanges, UHV (CF) flanges, ASA flanges, Vacuum couplings, Feedthroughs, and Vacuum Ball Valves. We maintain extensive inventories of all catalogued items, and routinely ship products on a same or next day basis.

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Contact: Andreas Melas or Terry Lovis
Telephone: (503) 682-4564
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Magnetron Sputtering Sources (circular, rectangular, cylindrical and "tilting head" versions), Sputtering "Cluster Flanges", Heated/Cooled Substrate Holders, Sputtering Targets, RF & DC Power Supplies, ATC Sputtering Systems, Microwave Power Supplies & Components, ECR Sources, Diamond Film Equipment.

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Woodbury, NY 11797
Contact: William Phillips
Telephone: (516) 576-2411
Fax: (516) 576-2374
E-mail: mktg@aip.org
AIP introduces its first electronic journal, Applied Physics Letters Online, and a new document delivery service, Articles in Physics. Free samples available of Physics Today, Computers in Physics, and Chaos. AIP PRESS books on display include: Statistical Physics of Macromolecules, AIP Handbook of Modern Sensors, and a NEW paperback edition of Measurement Errors.

◆ APD Cryogenics, Inc. #201
1833 Vultee Street
Allentown, PA 18103
Contact: Robyn H. Gross
Telephone: (610) 791-6700
Fax: (610) 791-0440
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Applied Surface Technologies #516
15 Hawthorne Drive
New Providence, NJ 07974
Contact: Robert Sherman
Telephone: (908) 464-6675
E-mail: ROBERTC02@aol.com
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◆ ASTeX/Applied Science and Technology, Inc. #507
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Woburn, MA 01801
Contact: Austin Ashley
Telephone: (617) 933-5560
Fax: (617) 933-0750
E-mail: sales@astex.com
ASTeX/Applied Science and Technology, Inc. manufactures a wide range of microwave power supplies, plasma sources, ozone generators, and plasma deposition systems for materials processing. Applications include CVD (diamond, GaN, SiC, cBN, a-Si, and other coatings), production of ions and radicals, etching, and ashing. ASTeX also offers a low-cost Raman spectrometer for materials analysis.

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Contact: Cindy Dudy
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Fax: (619) 458-0136
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Contact: David G. Rognlie
Telephone: (908) 233-7240
Fax: (908) 233-1354
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CHA Industries #100
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Contact: Shannon Pimentelli
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Fax: (510) 683-3848
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Agoura Hills, CA 91301
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Fax: (818) 865-0403
CI Systems develops and markets electro-optical measurement systems for industrial, scientific markets worldwide. CI System's NTM1 is a dual channel active/passive *in situ* noncontact temperature monitor for semiconductor wafers during processing. The active channel is an infrared reflection spectrometer, relying on absorption edge temperature sensing. The passive channel is an emissivity compensating pyrometer.

◆ Commonwealth Scientific Corporation #416
500 Pendleton Street
Alexandria, VA 22314
Contact: David Day
Telephone: (703) 548-0800
Fax: (703) 548-7405
E-mail: csc@digex.net
Commonwealth Scientific will display their complete line of ion beam source and systems. Applications include Ion Assisted Deposition, Sample Precleaning, Ion Beam Etching, Reactive Ion Beam Etching, and Ion Beam Deposition. CSC's gridded sources range from 3 to 38 cm in size to accommodate any application. New products to be displayed this year include the 20 and 50 cm Linear Gridless Ion Sources, as well as RF sources.

Cryomech, Inc. #517
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Syracuse, NY 13210
Contact: Peter Gifford
Telephone: (315) 475-9692
Fax: (315) 422-1202
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1995 MRS Spring Meeting Exhibit

CSEM Centre Suisse d'Electronique et de Microtechnique SA #603
Maladière 71, P.O. Box 41
CH-2007 Neuchâtel
Switzerland
Contact: Rainer Christoph
Telephone: (41) 38-205-643
Fax: (41) 38-205-580
E-mail: christoph@csemne.ch
CSEM applies its engineering and scientific capabilities to tasks in the area of microtechnologies and miniaturized systems and instruments. The research and development of surface characterization instruments rely on more than 25 years of expertise in the domain of surface coating (adhesion, hardness and tribometry) and related metrology (morphology, roughness and friction).

◆ DCA Instruments, Inc. #203
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Woburn, MA 01801
Contact: Jari Vanhatalo
Telephone: (617) 937-6550
Fax: (617) 935-2405
E-mail: dcambe@village.com
DCA Instruments specializes in the design and manufacture of high quality UHV deposition systems, offering standard systems for the following deposition techniques: III-V, II-VI, CMT-MBE, metal MBE, UHV sputtering, UHV laser ablation, and UHV CVD. We will be introducing a new line of solid source and gas source MBE for Si/Ge and SiC. DCA Instruments also offers a wide range of MBE components which are retrofittable to the majority of existing systems. Components include effusion cells, soft-action magnetically driven linear shutters, a 'zero-wobble' substrate manipulator and a self-regulating Mercury source.

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Telephone: (609) 439-9100
Fax: (609) 439-9111
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◆ Digital Instruments #408
520 E. Montecito Street
Santa Barbara, CA 93103
Contact: Terry Mehr
Telephone: (805) 899-3380
Fax: (805) 899-3392
E-mail: info@di.com
Digital Instruments, the world leader in Scanning Probe Microscopy (SPM), will be exhibiting its NanoScope® SPMs including the MultiMode™ Atomic Force Microscope (AFM), the world's best selling and highest resolution SPM. Featured at MRS this year is the Dimension™ 3000 SPM/AFM (Atomic Force Microscope), offering the complete range of SPM techniques for small or large samples, including topography, magnetic force, lateral force, electro chemistry, TappingMode™, force modulation and others.
(see ad in this issue)

Duniway Stockroom Corporation #110
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Mountain View, CA 94043
Contact: Ralph R. Duniway
Telephone: (415) 969-8811
Fax: (415) 965-0764
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655 Avenue of the Americas
New York, NY 10010
Contact: Sandra Pierre-Lys
Telephone: (212) 633-3758
Fax: (212) 633-3764
E-mail: s.pierre-Lys@elsevier.com
Elsevier Science (imprints: North Holland & Pergamon) will exhibit a wide range of materials science and related solid state physics publications. Titles on display include:
- Journals such as Materials Letters, Computational Materials Science, Nanostructured Materials and Applied Superconductivity. Free Samples are available.
- New editions of The Handbook of Semiconductors and the Handbook of Crystal Growth.
- Newly published: The Encyclopedia of Advanced Materials, the first and only complete treatment of the synthesis, processing, theory and applications of all classes of advanced materials.
- Electronic information services such as CONTENTS-Alert.

◆ EMCORE Corporation #103
35 Elizabeth Avenue
Somerset, NJ 08873
Contact: Bill Kroll
Telephone: (908) 271-9090
Fax: (908) 271-9686
E-mail: Bill@EMCORE.USA.com
EMCORE Corporation is a manufacturer of TurboDisc Deposition systems producing highest quality thin film compound and silicon semiconductor wafers with uniformity of thickness, doping and composition, and interface abruptness required for modern electronic, microwave and opto-electronic devices. EMCORE's TurboDisc systems are further distinguished by low cost of ownership, reliability (high MTBF), throughput, capacity and process conditions, and utilize major deposition technologies including MOCVD, ALE, and CVD depending on applications requirements.

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Telephone: (415) 369-4567
Fax: (415) 369-7921
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Hillsboro, OR 97124
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Fax: (503) 640-7509
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Telephone: (412) 325-5444
FAX: (412) 325-5443
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Fax: (508) 524-1100
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Boulder, CO 80303-1398
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Telephone: (303) 443-7660
Fax: (303) 443-2546
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1995 MRS Spring Meeting Exhibit

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E-mail: nec@well.sf.ca.us
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2551 West Beltline Hwy.
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◆ North Eastern Analytical Corp. #513
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P.O. Box 25
Millis, MA 02054-0025
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Fax: (408) 747-1601
E-mail: symanski@park.com
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◆ Philips Electronic Instruments Company #404
85 McKee Drive
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Contact: Lisa Schroeder
Telephone: (201) 529-3800
Fax: (201) 529-5084
Philips Electronic Instruments Company is the leading manufacturer of X-Ray Diffraction and X-Ray Fluorescence equipment as well as a full line of Scanning and Transmission Electron Microscopes. Information is available on all product lines. Philips Electronic Instruments Company is ISO 9001 certified. We adhere to the most stringent of the three ISO classifications which requires an established, effective quality system be in place.

Photonetics, Inc. #113
401 Edgewater Place, Ste. 140
Wakefield, MA 01880
Contact: Robert Blocksidge
Telephone: (617) 245-2333
Fax: (617) 245-2144
Photonetics is recognized worldwide as a leader in the design and manufacture of fiber optic instruments and components. The company's Metricor Division, located in Wakefield, Massachusetts, is its center for production of fiber optic sensors used to measure pressure, temperature and refractive index. These systems are currently used in chemical and pharmaceutical processing, composite curing, food processing, microwave testing and various other applications.

◆ Physical Electronics #407
6509 Flying Cloud Drive
Eden Prairie, MN 55344
Contact: Molly Thuma
Telephone: (612) 828-6100
Fax: (612) 828-6322
Physical Electronics (PHI) develops, manufactures and markets a complete line of surface analysis instrumentation, surface analysis subsystems, components and ultrahigh vacuum equipment. Surface analysis instruments from PHI utilize the Auger, ESCA/XPS and TOFSIMS techniques. Vacuum products include ion pumps, gauge controllers, and ion pump power supplies.

PlasmaQuest, Inc. #108
850 N. Dorothy Drive, Ste. 504
Richardson, TX 75081
Contact: Bill Dillon
Telephone: (214) 680-1811
Fax: (214) 680-1539
PlasmaQuest produces fully computer-controlled plasma etch and CVD reactors for use in development labs, pilot lines, and production facilities. PlasmaQuest reactors are used throughout the world for a wide range of advanced semiconductor applications. PlasmaQuest's line of ECR reactors provide high density plasmas with exceptional uniformity and control for the most demanding processes.

◆ Plasma Sciences, Inc. #609
7200A Telegraph Square Drive
Lorton, VA 22079
Contact: Steven Collins
Telephone: (703) 550-7888
Fax: (703) 339-9860
Plasma Sciences, Inc. specializes in the manufacture of high quality thin film deposition and etching systems for research and pilot production. Available are single and multi source DC/RF planar magnetron sputtering systems, broad beam ion beam R&D etching systems, and reactive ion etchers.
(see ad in this issue)

◆ Pure Tech, Inc. #217
Commerce Drive
P.O. Box 1319
Carmel, NY 10512
Contact: Matthew T. Willson
Telephone: (914) 878-4499
Fax: (914) 878-4727
Pure Tech is an ISO 9002 certified American manufacturer of high purity materials for sputtering and evaporation. Pure Tech produces both standard and custom materials for research and development as well as production. In-house capabilities include vacuum melting, hot pressing, metal and ceramic machining, custom backing plates and target bonding.

1995 MRS Spring Meeting Exhibit

◆ Research & PVD Materials Corporation #417
P.O. Box 4796
Wayne, NJ 07474
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Telephone: (201) 575-4245
FAX: (201) 575-6460
Research and PVD Materials Corporation has established a unique SERVICECENTER, manufacturing a comprehensive offering of highly characterized materials for the diverse and sophisticated requirements of the semiconductor, electronics, electro optic and related research communities. Products from this single quality source include but are not limited to fabricated forms of specialty and exotic metals, alloys, ceramics and custom "one off" vacuum components.

◆ Rigaku/USA #105
Northwoods Business Park
199 Rosewood Drive
Danvers, MA 01923
Contact: Kelly Pierce
Telephone: (508) 777-2446 Ext.110
Fax: (508) 777-3594
Rigaku will exhibit the new compact rotating anode X-ray generator. Combined with a new range of accessories, this generator forms the basis of a complete system for materials analysis. Specifically, accessories for the analysis of thin films, texture, stress and reflectometry are among those available.

Rippey Corporation #202
5000 Hillsdale Circle
El Dorado Hills, CA 95672
Contact: Philip MacDougall
Telephone: (916) 939-4332
Fax: (916) 939-4338
E-mail: QC^pmacdouga
Colloidal Fumed Silica Dispersions for CMP. Industry leaders in CMP technology for both oxide and metal slurries. Manufactured by Cabot Corporation, with world-wide distribution through Rippey Corporation. CMP Division: Polishing Compounds (oxide & metal CMP), Polishing Pads, Specialty PVA Products. Equipment Division: ADS-800 Chemical Management System, Smart DI (IR) Ultrapure Water Heating System, Chemflo Hot Chemical Recirculating System, Chemical Dispensing Pumps.

◆ Santa Clara Plastics #112
400 Benjamin Lane
Boise, ID 83704
Contact: Denise DeCoster
Telephone: (208) 378-5444
Fax: (208) 375-4540
Santa Clara Plastics is the domestic leading supplier of surface preparation systems for the semiconductor industry. SCP's newest generation system, the 9400 SPS, reduces the cost and improves the quality of wafer processing at .35 micron technology. Smaller cassettes and tanks and the minienvironment translate into significant cost savings in chemical and DI wafer usage. SCP's IPA Vapor Jet Dryer (stand alone or as a system module) will process up to fifty 200mm clean dry wafers with extremely low IPA consumption and recovery.

SCIENCE #619
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Washington, DC 20005
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Fax: (202) 682-0816
Founded in 1880 by Thomas Edison, SCIENCE ranks as the world's leading scientific journal. Each week SCIENCE provides over 162,000 scientists with global coverage and leading edge research from all areas in the life sciences, including peer reviewed scientific research articles and reports, science and research news, policy forums and perspectives on current topics.

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Fax: (608) 276-3006
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San Clemente, CA 92673
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Fax: (714) 492-1499
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◆ Staib Instrumente #419
Obere Hauptstrasse 45
85354 Freising
Germany
Contact: Philippe Staib
Telephone: (49) 8161-7740
Fax: (49) 8161-7709
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Fax: (415) 965-8207
E-mail: sii@aip.org
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◆ Thermionics Laboratory, Inc. #506, 508
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P.O. Box 3711
Hayward, CA 94540
Contact: John Brooks
Telephone: (510) 538-3304
FAX: (510) 538-2889
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◆ Virginia Semiconductor, Inc. #608
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◆ Voltaix, Inc. #409
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Fax: (908) 231-9063

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Fax: (602) 294-1799

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950024

Student Tip Sheet for Students attending the MRS Spring Meeting

- List of events of special interest to students
- Opportunities available through MRS University Chapters
- Travel and budget tips
- Job Placement info

Ask for Student Tip Sheet at:
MRS Member Services
INFO@mrs.org
FAX: 412/367-4373
TEL: 412/367-3004 x400 (leave message)

Job Placement Services at the 1995 MRS Spring Meeting

MRS Members need not attend to participate

- Your résumé on file for employer reference
- Positions posted on bulletin boards at Spring Meeting
- On-site message service for employers and applicants
- Private interview space
- After the meeting: If you didn't attend we'll send you a photocopy of the positions posted
- Free to current Members and meeting attendees

For more information:
MRS Member Services
E-Mail: INFO@mrs.org
Fax: 412/367-4373
Phone: 412/367-3004 x400
(leave message)

Women in MRS

A special event to be held at the 1995 MRS Spring Meeting
Tuesday, April 18, 7:00 a.m.
San Francisco Marriott Hotel, (Room to be determined)
Continental breakfast

The purpose of this group is to address the concerns of women in materials science and to promote women in the field. This will be an informal, *exploratory* meeting to organize the group and determine the interests and concerns of the participants. All interested MRS Members are invited to attend.

Please let us know if you plan to come! Contact:
Amy Moll
E-Mail: amy@dcssd.sj.hp.com
Fax: 408-435-6335 • Phone: 408-435-4418

MRS Meetings: Now better than ever for keeping your MRS membership current.

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Whether or not your membership is current, registering for the Spring Meeting will get you complimentary membership through June 30 of the *following* year.

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Effective in 1995, Spring Meeting attendance will include complimentary membership through June 30 of the following year. Fall Meeting attendance will include complimentary membership through December 31 of the following year. NOTE: If you attended the 1994 Spring Meeting, your membership may have lapsed on Jan. 1, 1995. Contact MRS Member Services for more information at 412/367-3004 x400; E-mail INFO@mrs.org.