



April 4-8, 1994  
San Francisco Marriott Hotel  
San Francisco, California

### Meeting Chairs:

**James M.E. Harper**, IBM T.J. Watson  
Research Center

**Alan J. Hurd**, Sandia National Laboratories

**James E. Mark**, University of Cincinnati

The 1994 MRS Spring Meeting offers 23 topical symposia, packed with 2,500 oral and poster presentations. Amorphous Silicon and Better Ceramics through Chemistry are the largest symposia, each with over 200 abstracts. Symposia on Wide-Bandgap Semiconductors, Polycrystalline Thin Films, High Temperature Superconductors, Ultrafine/Nanostructured Materials, and Theory and Simulation will also offer a substantial number of presentations. Some smaller symposia introduce topics new to MRS meetings, such as Flat Panel Displays and Materials for Musical Instruments. Also, permeating the meeting across symposium lines are environmental and manufacturing themes. See the session matrix on the following pages for a list of all symposia and session titles.

Symposium W, Theory and Simulation of Time-Dependent Processes in Materials, brings the topics of modeling and simulation to bear on many materials issues, from surface diffusion to fracture. Simulation tools are now capable of doing useful computations on enough atoms to resemble real materials. This marks a watershed beyond which simulation may replace some experiments.

A new cluster of symposia (K, L, M, and P) addresses display-related topics, including Liquid Crystal Polymers, Electroluminescent Polymers, Flat Panel Display Materials, and Scintillator and Phosphor Materials. Related sessions in Symposium A include a review of tech-

nology on flat panel displays in Japan. On Wednesday, M. Hack (Xerox PARC) will address active-matrix liquid crystal displays in an authoritative review for non-specialists in Symposium X.

Materials manufacturing is woven into several symposia. Moving amorphous silicon R&D to manufacturing is the theme of session A1/M1. Session B1 addresses manufacturing challenges associated with interconnects—the key to continued size reduction of electronic circuits and higher speed computers. A panel will discuss temperature measurement in rapid thermal processing in session G1. Emerging technologies and technology transfer are the focus of the leading sessions of Symposium O on Microwave Processing.

The interplay of materials and the environment appears in several formats. Symposia I and J directly cover Environmental Protection and Environmental Sciences, respectively. Waste remediation is covered in Symposium O (using microwave processing) and in Symposium R (using ceramic membranes for high temperature separation of gases). Also a panel discussion (see Special Features) will focus on the impact of automotive materials on the environment.

A symposium with a new tune for MRS is Symposium Q, Materials for Musical Instruments. Manufacturing and environmental issues are particularly important for the music instrument industry as international competition increases and suitable replacements are sought for increasingly rare Sitka spruce (pianos), Brazilian rosewood (guitars), and African mpingo (clarinets). Symposium X speaker, Thomas D. Rossing from Northern Illinois University will introduce the role of physics and materials in musical instruments in his Symposium X overview talk on Wednesday, April 6.

Fullerenes, foams, diamond, and even interstellar dust will be covered in Symposium T, Novel Forms of Carbon. Presentations about one-dimensional carbon, ionic properties of hydrogenated and fluorinated fullerenes, and a process to enable rapid deposition of diamond on large substrates are all slated for this symposium.

A group of symposia—B (Advanced Metallization), C (Materials Reliability in Microelectronics), and H (Polycrystalline Thin Films)—brings together many contributions on the role of microstructure of metal thin films in electronics. Symposium B includes a session on chemical-mechanical polishing, an emerging process of importance to the microelectronics industry.

Other symposium topics include Rapid Thermal and Integrated Processing, Compound Semiconductor Epitaxy, Epitaxial Oxide Thin Films, and Intermetallic Matrix Composites.

### Special Features

The Outstanding Young Investigator (OYI) Award and the Graduate Student Awards will be presented Monday evening, April 4, followed by the plenary presentation by James F. Gibbons from Stanford University on "Lessons from the History of Silicon Valley: Start-Ups and Strategic Alliances." The recipient of the OYI Award will give a special talk on Monday at noon. The Turnbull Lecture (awarded at the 1993 Fall Meeting) will be given on Wednesday, April 6 by Morris Cohen from MIT on "Societal Issues in Materials Science and Technology."

On Tuesday, April 5 a noontime panel discussion will feature Environmental Impact of Automotive Materials. The session will begin with presentations by speakers from Ford Motor Company, General Motors Research Laboratories, and Exxon Research and Engineering Company. Issues surrounding automotive materials include life-cycle analysis, control of emissions, alternative propulsion (electric propulsion, fuel cells, batteries), recycling, weight reduction, safety, fuel efficiency, and federal programs relating to the "clean car" and the 80 mpg car.

A noontime forum will be held Thursday on the Changing Federal Initiatives for Materials Science Programs. It will focus on the ramifications of President Clinton's newly chartered National Science and Technology Council. The NSTC supersedes and expands the role of the Federal Coordinating Council for Science, Engineering, and Technology (FCCSET). FCCSET formulated interagency Presidential Initiatives; the ones most relevant to materials are the Advanced Materials and Processing Program (AMPP) and the Advanced Manufacturing Initiative (AMI).

The Spring Meeting will also offer short courses and tutorials related to symposium topics, authoritative lunchtime reviews for nonspecialists, an extensive equipment exhibit, a job placement bulletin board, three evening poster sessions, a student mixer, and other auxiliary events. For further details about the meeting see the 1994 MRS Spring Meeting Program, which will be mailed to all MRS members. If you need a program or would like to register, call or fax the MRS Meetings Department (412) 367-3003; fax (412) 367-4373.

**MRS**

# MRS 1994 SPRING MEETING SESSION LOCATOR

| Symposium  | Location                    | Monday, April 4   |  |          | Tuesday, April 5  |   |            |
|--|-----------------------------|---|--|----------|---|---|------------|
|  |                             | a.m.  | p.m.   | eve.     | a.m.  | p.m.  | eve.*      |
| A. Amorphous Silicon Technology - 1994             | Golden Gate C2              |   |  |          | A1/M1: R&D Manufacturing<br>A2/M2: Flat Panel Display Materials | A3: Plasmas and Films<br>A4: Deposition Studies                               |            |
| B. Advanced Metallization for Devices and Circuits | Golden Gate A1              | B1: Manufacturability   | B2: Chem-Mechanical Polishing                                |          | B3: Copper Interconnection Metallization                        | B4: Diffusion Barriers/Cu<br>B5: Diffusion Barriers/Al                        |            |
| C. Materials Reliability in Microelectronics IV    | Golden Gate A3              |   |  |          | C1: Stress in Semiconductors<br>C2: Stress: Techniques          | C3: Stress in Metals<br>C4: Stress and Electromigration                       |            |
| D. Wide-Bandgap Semiconductors                     | Sunset A/B                  |   | D1: Surfaces and Surface Preparations                        |          | D2: Devices and Device Processing                               | D3: Diamond Growth  | Posters D4 |
| E. Compound Semiconductor Epitaxy                  | Golden Gate C3              | E1: Material Issues and Modeling  | E2: Selective-Area and Pattern Growth<br>E3: Nanoprobes      |          | E4: Wide Bandgap II-VI - Based Heterostructures                 | E5: II-VI Compound Semiconductors   |            |
| F. Epitaxial Oxide Thin Films and Heterostructures | Golden Gate B1              |   |  |          | F1: Epitaxial Oxides  | F2: Dielectric Oxide Thin Films   |            |
| G. Rapid Thermal & Integrated Processing III       | Golden Gate B3              |   | G1: Temperature Measurement                                  |          | G2: RTCVD I - SiGe<br>G3: Novel Applications of RTP             | G4: RTP for Metallization   |            |
| H. Polycrystalline Thin Films                      | Golden Gate A2              | H1: Microstructural Evolution in Thin Films                                 | H1: Microstructural Evolution in Thin Films                  |          | H2: Interphase Interfaces and Grain Boundary                    | H3: Polycrystalline Thin Films  |            |
| I. Environmental Protection                        | Sunset C                    |   |  | Sunset C | I1: Environmental Protection                                    | I2: Environmental Protection  |            |
| J. Environmental Sciences                          | Sunset C                    | J1: CO <sub>2</sub> Chemistry   | J2: Exhaust Gas Conversion                                   |          |   |   |            |
| K. Liquid Crystal Polymers                         | Marina A                    | K1: Theory, Computation and Application                                     | K2: Molecular Design and Synthesis                           |          | K3: Polymer Dispersed Liquid Crystals                           | K4: Characterization  |            |
| L. Electroluminescent Polymers                     | Marina C                    | L1: Electroluminescent Polymers   | L1: Electroluminescent Polymers                              |          |   |   |            |
| M. Flat Panel Display Materials                    | Golden Gate C2              |   |  |          | M1/A1: R&D Manufacturing<br>M2/A2: Flat Panel Display Materials | M3: Poly Si TFT Technology  |            |
| N. Better Ceramics Through Chemistry VI            | Presidio                    | N1: Precursor Chemistry<br>N2: Novel Chemical Routes for Oxide & Non-Oxides | N2: Novel Chemical Routes for Oxide & Non-Oxides             |          | N3: Hybrid-Organic Inorganic Materials & Composites             | N4: Design & Processing of Advanced Ceramics                                  | Posters N5 |
| O. Microwave Processing of Materials IV            | Sunset E/F                  | O1: Emerging Technology   | O2: Technology Transfer<br>O3: Alternative Microwave Sources |          | O4: Microwave Nondestructive Testing                            | O5: Dielectric Properties Measurements  |            |
| P. Scintillator and Phosphor Materials             | Marina A                    |   |  |          |   |   |            |
| Q. Materials in Musical Instruments                | Golden Gate C1              |   |  |          |   |   |            |
| R. Materials for Separation Technology             | Sunset D                    | R1: Microporous Inorganic Membranes   | R2: Polymeric Membranes                                      |          | R3: Sol-Gel Derived Inorganic Membranes                         | R4: Dense-Microporous Inorganic Membranes                                     |            |
| S. High Temperature Superconductors                | Golden Gate B2              | S1: High Tc Wire Development  | S2: High Tc Wire Development                                 |          | S3: High Tc Bulk Research                                       | S4: High Tc Bulk Research   | Posters S5 |
| T. Novel Forms of Carbon II                        | Nob Hill/Russian Hill       | T1: Novel Allotropes/Exoatmospheric Carbon                                  | T2: Fibers, Foams & Films                                    |          | T3: Fullerenes and Nanotubes I                                  | T4: Fullerenes and Nanotubes II   |            |
| U. Intermetallic Matrix Composites III             | Golden Gate C1              | U1: Overviews and Processing  | U2: Fibers for IMCs  |          | U3: Ti Aluminide and MoSi <sub>2</sub> Composites               | U4: NiAl Composites   |            |
| V. Nano-Structured Materials                       | Potrero Hill/Telegraph Hill |   | V1: Clusters, Metals and Structural Materials                |          | V2: Electronic and Magnetic Materials                           | V3: Self-Assembly, Bio/Molecular Engineering                                  |            |
| W. Time-Dependent Processes in Materials           | Marina D/E/F                | W1: Diffusion and Surface Effects   | W2: Composite Materials<br>W3: Ceramics Materials            |          | W4: Diffusion and Surface Effects                               | W5: Dislocations in Metals<br>W6: Microscopic Links to Macroscopic Properties | Posters W7 |
| X. Frontiers of Materials Research                 | Sunset A/B                  |   | X1   |          |   |   |            |

\*Evening posters in Presidio Room

| Wednesday, April 6  |  |                                   | Thursday, April 7   |  |                    | Friday, Apr. 8  |                              |
|---|--|-----------------------------------|---|--|--------------------|---|------------------------------|
| a.m.  | p.m.   | eve.*                             | a.m.  | p.m.   | eve.*              | a.m.  | p.m.                         |
| A5: Modified Bandgap Materials I<br>A6: Modified Bandgap Materials II | A7: Characterization Approaches<br>A8: Defect Metastability                      | Posters A9                        | A10: Thin Film Transistors<br>A11: Hydrogen's Role                    | A12: Solar Cells<br>A13: Electrical Transport                | Posters A14        | A15: Sensors, etc.<br>A16: Defects and Doping                             |                              |
| B6: Contacts to GaAs  | B7: Contacts to InP<br>B8: Novel Schemes on Semiconductors                       |                                   | B9: Silicides   | B10: Electro- and Stress-Migration<br>B11: Refractory Metals | Posters B12        | B13: Metal on Polymer Dielectrics/Glass/Ceramics<br>B14: Characterization |                              |
| C5: Electromigration  | C6: Realistic Interconnect Structures<br>C7: Electromigration & Stress Migration |                                   | C8: Electromigration & Microstructure<br>C9: Microstructure           | C10: Polymers: Stress and Techniques                         | Posters C11        | C12: Thin Polymers<br>C13: Coatings                                       | C14: Gate Oxidation          |
| D5: BN and SiC Epitaxial Growth                                       | D6: Nitride Epitaxial Growth   |                                   | D7: Doping, Impurities and Properties                                 | D8: Defects  | Posters D9         | D10: Contacts and Bulk Growth   |                              |
| E6: Dopants and Traps<br>E7: Chemical Beam Epitaxy/Metal-Organic MBS  | E8: Processing and Novel Techniques  |                                   | E9: Strained and Relaxed Structures<br>E10: In Situ Production Issues | E11: Epitaxy for Devices                                     |                    |   |                              |
| F3: Optical Oxide Thin Films  | F4/S7: Thin Films of High Tc Oxide   | Posters F5/S8                     | F6: Ferroelectric Thin Films  | F7: Titanate Thin Films                                      |                    |   |                              |
| G5: Dielectrics I   | G6: RTCVD and Integrated Processing II<br>G7: Rapid Thermal Annealing I          |                                   | G8: Dielectrics II<br>G9: Rapid Thermal Annealing II                  | G10: RTP Modeling and Equipment Issues                       |                    |   |                              |
| H4: Thin Film Magnetic Media  | H5: Magnetic Multilayers   | Posters H6                        | H7: Polycrystalline Dielectric Thin Films                             | H8: Polycrystalline Metallization                            | Posters H9         |   |                              |
| I3: Environmental Protection  | I4: Environmental Protection   |                                   | I5: Environmental Protection  | I6: Environmental Protection                                 |                    |   |                              |
|   |  |                                   |   |  |                    |   |                              |
|   |  |                                   |   |  |                    |   |                              |
| M4: AMLCD Materials and Processes                                     | M5: Emissive Displays  | Posters M6                        |   |  |                    |   |                              |
| N6: Sol-Gel Optics and Electronics                                    | N7: Non-Oxides   | Posters N8                        | N9: Porous Materials  | N10: Nano-Scale Materials                                    |                    | N11: In Situ Studies of Structural  | N12: Biological Perspectives |
| O6: Simulation and Modeling   | O7: Waste Remediation<br>O8: System Design<br>O9: Microwave Interactions         | O10: Microwave Processing Systems | O11: Microwave Processing of Materials                                | O12: Microwave Plasma Processing<br>O13: Microwave Joining   | Posters O14        | O15: Microwave Processing of Polymers                                     |                              |
| P1: Materials & Applications  | P2: Cross Luminescence and Scintillation   | Posters P3                        | P4: Scintillation Processes and Modeling                              | P5: Phosphors and Materials Preparation                      |                    | P6: Plastics and Glasses  | P7: Radiation Damage         |
| Q1: Strings I   | Q2: Strings II   | Q3: Panel Discussion              | Q4: Woodwinds<br>Q5: Brass  | Q6: Pianos<br>Q7: Percussion                                 |                    |   |                              |
| R5: Adsorbents  | R6: Inorganic Membranes  |                                   |   |  |                    |   |                              |
| S6: Metals, Superlattices, Multilayers & Diagnostics                  | S7/F4: Thin Films of High Tc Oxide   | Posters S8/F5<br>S9               | S10: TBCCO, MOCVD and Large Area Films                                | S11: Microwave, Field Effect and Hybrid Devices              | Posters S12<br>S13 | S14: Josephson Devices  |                              |
| T5: Fullerenes and Nanotubes III                                      | T6: Fullerenes and Nanotubes IV  | Posters T7                        | T8: Diamond I   | T9: Diamond II   |                    | T10: Diamond-Like Materials   |                              |
| U5/W8: Intermetallic Materials  |  |                                   |   |  |                    |   |                              |
| V4: Self-Assembly, Bio/Molecular Engineering                          | V5: Sol-Gel and Polymer Materials  | Posters V6                        | V7: Characterization and Modelling                                    | V8: Vapor Deposition and Si Particles                        |                    | V9: Synthesis and Properties VII  |                              |
| W8/U5: Intermetallic Materials<br>W9: Glass and Ionic Materials       | W10: Deformation Processes in Metals   | Posters W11                       | W12: Fracture   | W13: Semiconductor Materials                                 | Posters W14        | W15: Dislocations in Semiconductor Materials<br>W16: Polymeric Materials  |                              |
|   | X2   |                                   |   |  |                    |   |                              |



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San Francisco, California

# MRS 1994 SPRING MEETING GENERAL INFORMATION

**Location/Lodging**  
San Francisco Marriott Hotel  
55 Fourth Street  
San Francisco, CA 94103  
(800) 228-9290 Nationwide  
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**DEADLINE FOR HOTEL RESERVATIONS:  
MARCH 4, 1994**

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 to receive the special rates.

## Travel Arrangements

The official travel management company for the Materials Research Society's 1994 Spring Meeting is **Giselle's Travel Bureau**. They will guarantee the lowest fares on any airline at time of booking.

Call 800-523-0100 and ask for MRS Group 001  
Monday-Friday, 7:30 a.m.-5:30 p.m. PST  
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For alternative housing information, you may also contact Giselle's Travel Bureau.

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 • Car rental savings • Vouchers for discounts on vacation packages

**ONE MRS 1994 SPRING MEETING ATTENDEE WILL WIN TWO (2) FREE AIRLINE TICKETS TO ANYWHERE IN THE 48 CONTIGUOUS STATES.** To be eligible: You, your travel agent, or your in-house travel department must make your reservations through Giselle's Travel Bureau.

## Local Transportation

The San Francisco Airporter service between the airport and downtown San Francisco hotels is \$8 one way, or \$14 round trip. Cab fares are approximately \$28 each way.

## Parking

Parking at the San Francisco Marriott is \$24 per day (valet only). Public parking is available within easy walking distance of the hotel at an average cost of \$11 for 24 hours.

# MRS SHORT COURSE AND TUTORIAL PROGRAM

MRS will present its popular Short Course and Tutorial Program at the 1994 Spring Meeting, featuring a number of courses never before offered by MRS on the West Coast. The diverse array of short courses and tutorials includes:

## Characterization of Materials

### C-07 Amorphous Silicon Materials and Devices for Large Area Electronics

Instructors: Robert A. Street and Michael G. Hack

### C-18 TEM Specimen Preparation in the Physical Sciences

Instructor: Ronald M. Anderson

### C-28 IC Failure Analysis: Failure Mechanisms and Analytical Techniques

Instructors: Giorgio Riga and Alton D. Romig, Jr.

### C-31 Super-Resolution Imaging and Spectroscopy with Near-Field Scanning Optical Microscopy (NSOM)

Instructors: Hans Hallen and Mehdi Vaez-Iravani

## Preparation of Materials

### P-14 Film Formation, Adhesion, Surface Preparation, and Characterization of Thin-Film Structures

Instructor: Donald M. Mattox

### P-26 Metallization for Devices, Circuits, and Packaging and in Multilayer Schemes for VLSI and ULSI

Instructor: Shyam P. Murarka

## Advanced Materials

### M-17 Science and Technology of Nanostructured Materials

Instructor: Horst W. Hahn

### M-18 Diamond Films: Growth and Properties

Instructors: Linda S. Plano, David L. Dreifus, and Robert J. Nemanich

### M-19 Wide Bandgap II-VI Semiconductor Microstructures: Growth, Characterization, and Optical Devices

Instructor: Leslie A. Kolodziejski

## Tutorial Program

MRS Tutorials are designed to inform individuals about subjects that are outside their immediate interest or to bring individuals "up to speed" in an area that they are newly entering.

### TP-1 Transfer of Technology from R&D to Manufacturing

Instructors: Donald M. Mattox and Alton D. Romig, Jr.

### TP-5 Light-Emitting Porous Silicon: Fabrication, Properties, and Device Applications

Instructor: Philippe M. Fauchet

### TP-7 Electromigration

Instructor: James R. Lloyd

## Registration Information

Call MRS Headquarters, (412) 367-3003, to request a copy of the short course brochure, information about student scholarships, and other special short course and meeting registration discounts.

## Student Scholarship Program

Student scholarships are available for full-time graduate and undergraduate students. Application forms are available from MRS Headquarters. The application deadline is March 25, 1994.

## On-Site Short Course Program

For detailed information about the MRS Short Course Program for presentation at your facility, contact: Short Course Office, Materials Research Society, 9800 McKnight Road, Pittsburgh, PA 15237-6006 Telephone (412) 367-3003 • Fax (412) 367-4373

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**A MEETING PREREGISTRATION**

Please check category and enter amount in payment section below.

- \$250 Member  \$325 Nonmember
- \$300 After March 25, 1994  \$375 After March 25, 1994
- \$65 Student Member  \$90 Student Nonmember
- \$75 After March 25, 1994  \$100 After March 25, 1994

Student registration will not be processed without proof of full-time student status (class schedule with student's name or signed letter from faculty advisor or registrar must be submitted at time of registration).

- \$90 Unemployed/Retired (special application form available from MRS HQ to qualify) \$100 After March 25, 1994
- \$90 Short Course Attendee registered for at least two full course days \$100 After March 25, 1994

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- Symposium interest (please check all that apply):
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- B  D  F  H  J  L  N  P  R  T  V

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If you have already registered and paid 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 written notice**, less a \$25 service charge. This service charge will be waived if you apply \$25 or more of this refund to any other MRS product or service. MRS will not honor requests made more than one calendar month after the close of the meeting.

**B PROCEEDINGS** (published after this meeting)

These rates apply only to meeting or short course attendees and MRS members. Nonmembers must contact MRS headquarters for prices.

|   | No. Copies | Total |
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| A: Amorphous Silicon.....                             | \$54 x     | =     |
| B: Advanced Metallization.....                        | \$44 x     | =     |
| C: Materials Reliability in Microelectronics.....     | \$44 x     | =     |
| D: Diamond, SiC, Nitride Wide-Bandgap Semicond..      | \$37 x     | =     |
| E: Compound Semiconductor Epitaxy.....                | \$44 x     | =     |
| F: Epitaxial Oxide Thin Films & Heterostructures..... | \$37 x     | =     |
| G: Rapid Thermal & Integrated Processing.....         | \$38 x     | =     |
| H: Polycrystalline Thin Films.....                    | \$44 x     | =     |
| I: Environmental Protection.....                      | \$44 x     | =     |
| M: Flat Panel Display Materials.....                  | \$44 x     | =     |
| N: Better Ceramics Through Chemistry.....             | \$45 x     | =     |
| O: Microwave Processing.....                          | \$37 x     | =     |
| P: Scintillator and Phosphor Materials.....           | \$48 x     | =     |
| T: Novel Forms of Carbon.....                         | \$39 x     | =     |
| U: Intermetallic Matrix Composites.....               | \$49 x     | =     |
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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 \$90 (complete the Meeting Preregistration section at left).

After March 25, 1994, short course and tutorial registrations will be \$25 higher. Cancellations received by March 25, 1994, will be refunded less a service charge of \$25. There is no charge for transferring from one short course to another or from one tutorial to another.

**D SHORT COURSES**

Facilities registering three or more persons at the same time in one MRS Short Course receive a 20% discount for the third and all additional persons.

- C-07 Amorphous Silicon Materials and Devices .....\$395
- C-18 TEM Specimen Preparation.....\$495
- C-28 IC Failure Analysis .....\$795
- C-31 Near-Field Scanning Optical Microscopy .....\$395
- P-14 Thin-Film Structures.....\$595
- P-26 Metallization for Devices, Circuits, and Packaging/VLSI & ULSI.....\$395
- M-17 Nanostructured Materials.....\$395
- M-18 Diamond Films: Growth and Properties.....\$395
- M-19 Wide Bandgap II-VI SC Microstructures.....\$395

**E TUTORIALS**

- TP-1 Transfer of Technology from R&D to Manufacturing.....\$125
- TP-5 Light-Emitting Porous Silicon.....\$ 95
- TP-7 Electromigration.....\$ 95

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  - C** *Journal of Materials Research* (from above) \$ \_\_\_\_\_
  - D/E** Short Courses/Tutorials (from above) \$ \_\_\_\_\_
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■ The Materials Research Society wishes to comply with the **Americans with Disabilities Act** by taking those steps necessary to ensure that no individual with a disability is excluded from participation in MRS meetings. If you have a disability requiring accommodation at the 1994 Spring Meeting, please attach a written description of your needs.

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April 4-8, 1994  
San Francisco Marriott Hotel  
San Francisco, California

# MRS Exhibit

## San Francisco Marriott Hotel

### Buena Vista & Sea Cliff Ballrooms

#### Tuesday-Thursday, April 5-7, 1994

As part of the 1994 Spring Meeting, a major exhibit will be held to display analytical and processing equipment closely paralleling the nature of the technical symposia. The exhibit will be in the San Francisco Marriott Hotel. The technical program has been arranged to allow meeting participants ample opportunity to visit the exhibit.

### Exhibit Hours

Tuesday ..... noon-7:00 p.m.  
Free Reception ..... 5:00 p.m.-7:00 p.m.  
Wednesday ..... 9:30 a.m.-5:00 p.m.  
Thursday ..... 9:30 a.m.-2:00 p.m.

Coffee will be available during morning and afternoon breaks in the Exhibit area, Tuesday afternoon through Thursday morning.

### Indicates MRS Corporate Affiliate Member

#### Academic Press #614

525 B Street, Suite 1900  
San Diego CA 92101  
Contact: Karen Steele  
Tel: 619-699-6774  
FAX: 619-699-6580

New and classic titles include High Temperature Superconductors (Bourdillon), *Fundamentals of Ceramic Powder Processing* (Ring), *Molecular Nonlinear Optics* (Zyss), *Science and Technology of Rubber*, 2nd ed. (Mark et al.) and *Optical Characterization of Semiconductors* (Perkowitz). Sample copies of journals including the *Journal of X-Ray Science and Technology* are available in the booth. Discounts are offered on all books ordered at the meeting.

#### Aixtron Inc. #315

9150 SW Pioneer Suite D-1  
Wilsonville OR 97070  
Contact: Terry Lovis  
Tel: 503-682-4564  
FAX: 503-682-5673

AIXTRON, the leading manufacturer of MOCVD and CVD equipment for the growth of III-V, II-VI, HT, SC including SiC. Outstanding quality in manufacturing, reliability in safety, and highest uniformity results for epilayers.

Systems: AIX-200, AIX-200/4, AIX-2000, AIX-2400, AIX-200SC

#### AJA International #304

809 Country Way  
PO Box 246  
North Scituate MA 02060  
Contact: William Hale  
Tel: 617-545-7365  
FAX: 617-545-4105

Microwave power supplies and components, Planar ECR sources, circular and rectangular magnetron sputtering

sources and targets, electrostatic chucks and LN2 cooled electrodes, diamond film equipment, electron beam sources and systems, ATC R&D sputtering systems, vacuum components.

#### Anatech, Ltd. #100

5510 Vine Street  
Alexandria VA 22310  
Contact: George Barr  
Tel: 703-971-9200  
FAX: 703-971-4818

Anatech manufactures HUMMER® sputtering equipment for SEM sample preparation, FA sample preparation, and other R&D applications including high rate RF and DC sputtering. We also offer filamentless broad beam ion sources for ion milling, etching, and reactive etching. One new product is a one centimeter diameter beam benchtop ion mill.

#### APD Cryogenics Inc. #405

1833 Vultee Street  
Allentown PA 18103  
Contact: Robyn H. Gross  
Tel: 610-791-6700  
FAX: 610-791-0440

APD offers the widest range of cryogenic equipment available from a single supplier; standard and customized equipment for use in semiconductor manufacturing, laboratory research, military surveillance and guidance systems, and medical diagnostics. Superior product design is supported with expert service, qualified technical assistance, a fast response spare parts system, equipment exchange programs, and innovative research and development.

#### ASTeX/Applied Science and Technology, Inc. #602

35 Cabot Road  
Woburn MA 01801  
Contact: Jennifer Greenberg  
Tel: 617-933-5560  
FAX: 617-933-0750

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.

#### Biosym Technologies #203, 205

9685 Scranton Road  
San Diego CA 92121  
Contact: Cindy Dudy  
Tel: 619-597-9710  
FAX: 619-597-9777

Investigate solutions to your research needs with BIOSYM's broad range of software solutions. Receive demonstrations of our advanced molecular modeling programs that assist you in determining the atomic structures of materials, understanding structural principles, and predicting how changes in composition or conditions affect structures and properties.

#### Blake Industries, Inc. #200

660 Jerusalem Road  
Scotch Plains NJ 07076  
Contact: David G. Rognlie  
Tel: 908-233-7240  
FAX: 908-233-1354

Blake Industries will be exhibiting Huber rotary tables, translation stages, goniometerheads, X-Y slits for synchrotron and rotating anode experiments.

Blake monochromators, thin film cameras, Laue equipment will also be displayed.

#### CFD Research Corp. #416

3325 Triana Blvd.  
Huntsville AL 35805  
Contact: Serena E. Patterson  
Tel: 205-536-6576  
FAX: 205-536-6590

CFDRC provides research and development services and advanced analysis software for: fluid flow, heat transfer, combustion, fluid-structure interaction, and scientific data visualization. We will be exhibiting the following computer codes: CFD-ACE (a general-purpose computational fluid dynamics code, CFD-VIEW (a 3D graphics and animation software, and CFD-FASTRAN (a CFD code for compressible viscous flows).

#### Chemagnetics #319

2555 Midpoint Drive  
Fort Collins CO 80525  
Contact: Richard Moore  
Tel: 303-484-0428  
FAX: 303-484-0487

Chemagnetics is a full line manufacturer of NMR spectrometer systems. The CMX line of systems features include solids, liquids and liquids microimaging capabilities. Chemagnetics also offers a complete selection of probes and magnets, with additional probes and magnets supplied by Nalorac™ and Oxford™.

#### CI Systems Inc. #216

5137 Clareton Drive  
Suite 220  
Agoura Hills CA 91301  
Contact: Michael E. Adel  
Tel: 818-865-0402  
FAX: 818-865-0403

CI Systems develops and markets electro-optical measure-

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ment 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 #104

500 Pendleton Street  
Alexandria VA 22314  
Contact: David Day  
Tel: 703-548-0800  
FAX: 703-548-7405

## Crimatec #518

104 Route de Larchant, B.P. 521  
77794 Nemours Cedex  
FRANCE

Contact: Edouard Marienbach  
Tel: 33 1 64 45 10 10  
FAX: 33 1 64 45 10 01

Laser crystals: Ho, Tm, Cr;  
YAG; Nd: YAG, Nd: YLF;  
Crystals for non-linear optics:  
KDP, POM, NPP, LTO, LNO;  
Single crystal wafers of InP;  
Garnet crystals and epitaxial  
films: YAG, GGG, SGGG; YIG;  
Crystals for x-ray spectrometry:  
LiF, Beryl, TiAP, and PET;  
Scintillation crystals: NaI(Tl),  
CsI(Tl), CsI, BGO.

## Cryomech, Inc. #516

1630 Erie Blvd. East  
Syracuse NY 13210  
Contact: Peter E. Gifford  
Tel: 315-475-9692  
FAX: 315-422-1202

Cryomech Inc. will exhibit the following new products: the DC01 Cryorefrigerator (2 watts <77 K for detector cooling), the portable LNP48 Liquid Nitrogen Plant (2 liters/hour), and the soon to be introduced Liquid Helium Plant (1 liter/hour). Cryomech will also exhibit standard cryostats and cryorefrigerators for temperatures down to 3 K.

## DCA Instruments, Inc. #218

400 West Cummings Park  
Suite 3900  
Woburn MA 01801  
Contact: Jari Vanhatalo  
Tel: 617-937-6550  
FAX: 617-935-2405

DCA Instruments specializes in the design and manufacture of UHV deposition systems. We offer standard systems for the following deposition techniques: III-V MBE, II-VI MBE, CMT-MBE, metal MBE, UHV sputtering, UHV laser ablation, Si/Ge epitaxy and UHV CVD.

We also offer a wide range of components including effusion cells and a wobble-free substrate manipulator.

## Denton Vacuum, Inc. #316

1259 North Church Street  
Moorestown NJ 08057  
Contact: James L. Campbell  
Tel: 609-439-9100  
FAX: 609-439-9111

Denton Vacuum is a premier manufacturer of High Vacuum Thin Film Deposition Systems. For applications ranging from the preparation of samples for electron microscopy; semiconductor failure analysis and quality control; thin film research; and production size optical coating systems Denton Vacuum offers an appropriate system to meet a wide range of technical requirements. In addition to its system offerings, DVI also has a wide variety of accessory equipment such as Electron Beam Evaporation Guns and Power supplies, Ion sources, Optical Monitors, Sputter Cathodes, Feedthroughs, and Thermal Evaporation Supplies.

## Duniway Stockroom

Corp. #110  
1600 N. Shoreline Blvd.  
Mountain View CA 94043  
Contact: Ralph R. Duniway  
Tel: 415-969-8811  
FAX: 415-965-0764

Duniway Stockroom will be exhibiting NEW Variable Leak Vales, ion pumps, elements, cables, and replacement parts. Also 12-point bolts, copper gaskets, Conflat & Quik flange hardware, DP & mechanical pump oil, vacuum hose and TSP cartridges. New 44 page catalog will be available.

## Elsevier Science/Pergamon

#611, 613  
655 Avenue of the Americas  
New York, NY 10010  
Contact: Marsha Levell  
Tel: 212-633-3767  
FAX: 212-633-3764

North Holland, Elsevier, and Pergamon are 3 of the outstanding imprints of Elsevier Science. We will be featuring a wide range of materials science and Solid State physics publications. The *Handbook of Semiconductors* and the *Handbook of Crystal Growth* will be on display with our many other fine publications. A FREE sample copy of our journals will be available for meeting attendees, especially Computational Materials Science. We will demonstrate CoDAS, a new direct alerting service. (see ad in this issue)

## EMCORE Corporation #202

35 Elizabeth Avenue  
Somerset NJ 08873  
Contact: Peter Broskie  
Tel: 908-271-9090  
FAX: 908-271-9686

Manufacturer of TurboDisc Deposition systems producing highest quality thin film compound semiconductor wafers with uniformity of thickness, doping and composition, and interface abruptness required for modern electronic, microwave and optoelectronic devices. EMCORE's TurboDisc systems are further distinguished by throughput, capacity and process conditions and utilize major deposition technologies including MOCVD, ALE, and CVD depending on application requirements.

## Charles Evans & Associates #206

301 Chesapeake Drive  
Redwood City CA 94063  
Contact: Rennie J. Harrington  
Tel: 415-369-4567  
FAX: 415-369-7921

Charles Evans & Associates is a complete analytical service laboratory specializing in surface, trace-level, and micro-analysis of materials. We have an outstanding analytical laboratory with SIMS, ESCA, Static SIMS, FTIR, SEM, AUGER, RBS, AFM, and many other techniques for surface analysis. Our capabilities include measurement of trace-level impurities and dopants, characterization of thin or thick films, particle analysis, and failure analysis. Stop by our booth to discuss your materials characterization requirements.

## ETP-USA/Electron Detectors Inc. #209

1650 Holmes Street Building C  
Livermore CA 94550  
Contact: Robert Ruscica  
Tel: 510-449-8534  
FAX: 510-449-8996

ETP-USA will be exhibiting the Robinson Backscattered Electron Detector for SEMS. Outstanding resolution, TV imaging, and robust design puts the Robinson detector in a class by itself. We will also feature our new SEM ChamberView TV system.

## Falex Corporation #504

2055 Comprehensive Drive  
Aurora IL 60505  
Contact: Michael Anderson  
Tel: 708-851-7660  
FAX: 708-898-7851

World's largest manufacturer of materials test equipment specializing in the measurement of friction, wear, abrasion and erosion. Complete test facilities. Design and manufacture of custom test equipment.

## FEI Company #302

7451 NE Evergreen Parkway  
Hillsboro OR 97124  
Contact: Andree Kraker  
Tel: 503-640-7500  
FAX: 503-640-7509

FEI Company features a new, compact 2-lens liquid metal ion(LMI) focusing column. Superior milling and imaging performance, reliable UHV construction and a modular design philosophy are combined in this new component ion focusing column. Also featured are single-lens ion and electron field emission columns, LaB6/CeB6 electron sources, and FIB workstations.

## E.A. Fischione Instruments, Inc. #308

9003 Corporate Circle  
Export PA 15632  
Contact: Paul E. Fischione  
Tel: 412-325-5444  
FAX: 412-325-5443

Features a full line of TEM Specimen Preparation devices. New product introductions include the Model 3000 Ion Mill and the Model 330 Ultrasonic Disk Cutter. Other devices on display are the Twin-Jet Electropolisher, the FIM/FEM Micro Polisher, and the Model 2000 Specimen Prep System (a state-of-the-art, microprocessor based, ultra-precision dimpling grinder). Also displayed are SEM and TEM Specimen Holders including the new Cryo-Prep Station/TEM Holder.

## Fison Instruments #501, 503

55 Cherry Hill Drive  
Beverly MA 01915  
Contact: Marie Mello/Jacky Kieras  
Tel: 508-524-1000  
FAX: 508-524-1019

Displaying our comprehensive range of molecular beam epitaxy systems and fully integrated surface analysis instruments. And the KEVEX SIGMA, an energy dispersive X-ray microanalysis system. Together with

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the unique SuperDry detector that requires no liquid nitrogen, the system combines dedicated real-time data acquisition with the convenience of a high performance Windows PC.

## **Gatan Inc. #509**

6678 Owens Drive  
Pleasanton CA 94588-3334  
Contact: Christopher Byrne  
Tel: 510-463-0200  
FAX: 510-463-0204

Manufacturer of instrumentation for TEM & SEM including: TV-rate and Slow-Scan CCD imaging systems; DigitalMicrograph™ image acquisition and processing software; the Parallel-Detection electron energy loss spectrometer (PEELS™); specimen preparation equipment; DuoMill™ ion milling system and precision dimple grinder; GIF™ Gatan image filter; DigiScan™ for SEM image acquisition and processing; TEM straining holders (heating and cryo); Macintosh video processor; PIP~ precision ion polishing system and high resolution ion beam coater.

## **Goodfellow Corp. #605**

130 Lindenwood Drive  
Suite 140  
Malvern PA 19355-1758  
Contact: Dolores L. McCabe  
Tel: 800-821-2870  
FAX: 800-283-2020

Goodfellow present their unique range of metals and materials for research and development. Metals, Alloys, Compounds, Ceramics, Polymers and Composites in many different forms -Foil, Wire, Powder, Tube and Rod. More than 3600 items available from stock. New 1993/94 catalog available at the booth.

## **Granville-Phillips Co. #208**

5675 Arapahoe Avenue  
Boulder CO 80303  
Contact: Lisa Whitten  
Tel: 303-443-7660  
FAX: 303-443-2546

Granville-Phillips designs and manufactures instrumentation intended to help reduce processing costs associated with vacuum measurement. The new STABIL-1™ Vacuum Measurement System provides stability of calibration that is approximately ten times better than commonly used, older technology gauges. This stability results in more reliable process repeatability and replication.

## **High Voltage Engineering**

### **Europa B.V. #214**

PO Box 99  
3800 AB Amersfoort  
THE NETHERLANDS  
Contact: Henri van Oosterhout  
Tel: 31 33 619741  
FAX: 31 33 615291

Particle accelerator systems for scientific, educational, and industrial research communities. (see ad in this issue)

## **Huntington Mechanical**

### **Laboratories #212**

1040 L'Avenida  
Mountain View CA 94043  
Contact: Ken Kissane  
Tel: 415-964-3323  
FAX: 415-964-6153

Huntington Laboratories is an integrated supplier of UHV component hardware including valves, roughing components, and viewports as well as positioners, feedthroughs, and custom chambers. Huntington also offers prototype and high volume production support services for custom or standard UHV requirements including engineering design assistance. (see ad in this issue)

## **IBM Analytical Services #505**

1580 Route 52  
Hopewell Junction NY 12533  
Contact: David Fouts  
Tel: 914-892-2450  
FAX: 914-892-2003

Offers a broad range of capabilities from failure analysis to chemical and electrical characterization, all performed by a highly experienced staff of experts in their specific fields. We offer high-quality work performed on state-of-the-art equipment in a timely and cost-competitive environment.

## **Institute for Scientific**

### **Information #603**

3501 Market Street  
Philadelphia PA 19104  
Contact: Frank Spiecker  
Tel: 215-386-0100  
FAX: 215-386-6362

Demonstrating the Materials Science Citation Index with reduced pricing. This CD-ROM product covers the current journal and conference proceeding literature on metals, ceramics, composites and polymers, and their applications in electronics, optics, construction, dentistry and medicine; and energy products. Cited references, all bibliographic material and abstracts are indexed.

## **Institute of Physics**

### **Publishing #615**

The Public Ledger Bldg.  
Suite 1035  
Philadelphia PA 19106  
Contact: Barbara Aiona  
Tel: 215-627-0880  
FAX: 215-627-0879

Institute of Physics Publishing, a wholly owned subsidiary company of the Institute of Physics (the professional body and not-for-profit learned society for physicists in the UK) is responsible for all the Institute's publishing activities. These encompass over 30 research journals (including *Modelling & Simulation in Materials Science & Engineering*, *Superconductor Science & Technology*, *Nanotechnology*, *Journal of Hard Materials*, *High Performance Polymers*, and *Journal of Physics: Condensed Matter*), associated electronic products, professional magazines, reference works (including *Biographical Encyclopedia of Scientists*), and over 30 new books each year in physics and related disciplines.

## **Intevac MBE Equipment**

### **Division #201**

3550 Bassett Street  
Santa Clara CA 95054  
Tel: 408-986-9888  
FAX: 408-727-7350

## **Ion Tech Inc. #513**

2330 East Prospect  
Ft. Collins CO 80525  
Contact: Gerald Isaacson  
Tel: 303-221-1807  
FAX: 303-493-1439

Manufacturer of DC & RF ion beam sources, power supplies, and systems for thin film deposition, etching, cleaning, and modification. Provides complete turnkey systems for production or R&D, standard or custom designed to accommodate various optical or other components.

## **JEOL USA #403**

11 Dearborn Road  
Peabody MA 01960  
Contact: Charlie Nielsen or Mike Kersker  
Tel: 508-536-2271  
FAX: 508-536-2205

JEOL is a leading supplier of analytical electron-optical instrumentation which includes TEM, SEM, EPMA, and Auger. JEOL also markets a complete line of image archiving and automated metrology attachments.

## **Keithley Instruments #309**

28775 Aurora Road  
Solon OH 44139  
Contact: Kristin Rice  
Tel: 216-248-0400  
FAX: 216-248-6168

Keithley is a leading manufacturer of sensitive test instruments for making accurate and reliable DC measurements in materials research applications. Keithley manufactures a full line of electrometers, DMMs, picoammeters, source-measure units and much more. Keithley products are found in universities, industrial research labs, and engineering development departments worldwide.

## **Kluwer Academic Publishers #612**

101 Philip Drive  
Norwell MA 02061  
Contact: Annie Rollins  
Tel: 617-871-6600  
FAX: 617-871-6528

Kluwer Academic Publishers will again be attending the Spring MRS Meeting. Please stop by our booth -on display will be the latest research books and journals in materials science including information on polymers, ceramics, and microwave technologies. Pickup a free sample copy of one of our many esteemed journals in the area which includes *Interface Science* and the *Journal of Sol-Gel Science and Technology*.

## **Kratos Analytical Inc. #107**

535 East Crescent Ave.  
Ramsey NJ 07446  
Contact: David Surman  
Tel: 201-825-7500  
FAX: 201-825-8659

Kratos Analytical will be featuring information on its range of Surface Analysis Instrumentation. The company specializes in X-ray Photoelectron Spectroscopy and Auger Electron Spectroscopy, with particular emphasis on small area analysis and imaging. Information on the VISION data system for spectral and image analysis will also be available.

## **Lake Shore Cryotronics #500**

64 East Walnut Street  
Westerville OH 43081  
Contact: Kristina S. Cooper  
Tel: 614-891-2243  
FAX: 614-891-1392

Cryogenic temperature sensors including diodes, resistors, capacitance, rhodium-iron, magnetic field hall sensors and



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Cernox~ sensors with low magnetic field dependence; analog and autotuning temperature controllers, helium level monitors, temperature transmitters and current sources; gaussmeters for benchtop and handheld applications; AC Susceptometers/DC Magnetometers; Vibrating Sample Magnetometers; true, four-quadrant Magnet Power Supplies for electromagnets and superconducting magnets and laboratory electromagnets.

## Lasertec USA Inc. #108

2001 Gateway Place  
Suite 130

San Jose CA 95110

Contact: Tamotsu Chinone

Tel: 408-437-1441

FAX: 408-437-1430

Confocal Laser Scanning Microscope, featuring Real Time Image, Surface Profiling, Critical Dimension Measurement and 3D Surface Image.

## Kurt J. Lesker Co. #301, 303

1515 Worthington Avenue  
Clairton PA 15025

Contact: Joseph Wolfenberger

Tel: 412-233-4200

FAX: 412-233-4275

High precision, multi-axis UHV sample manipulators from Vacuum Generators. Rotary and linear motion feedthroughs from Vacuum Generators and Ferrofluidics. Flanges, gaskets, and components on all flange systems. Power, instrumentation, and thermocouple feedthroughs. Vacuum gauges from 1200 to  $10^{-10}$  Torr. Torus sputter sources and pure materials. Full range of surface science components. (see ad in this issue)

## Luxtron Corporation #101

2775 Northwestern Parkway  
Santa Clara CA 95051-0903

Contact: William Kolbeck

Tel: 408-727-1600

FAX: 408-727-1677

Optical fiber temperature measurement and control instrumentation. Offers non-contact and contact temperature measurements from  $-200^{\circ}\text{C}$  to  $4000^{\circ}\text{C}$  with resolution to  $0.01^{\circ}\text{C}$ .

## MDC Vacuum Products

Corporation #306

23842 Cabot Boulevard  
Hayward CA 94545

Contact: Phil Crane, Mike Weiss

Tel: 510-887-6100

FAX: 510-887-0626

Complete line of UHV compo-

nents including: flanges and fittings, valves, roughing components, instrumentation, electrical feedthroughs, XYZ manipulators, rotary and linear feedthroughs, fast entry load-lock systems, all-metal sealed right angle valves and M.E.S.A. compatible rectangular gate valves.

Featured products will be a complete line of electron beam evaporation sources in single pocket and multi-pocket configuration with matching 6 kW, 10 kW and 15 kW solid state switching power supplies. (see ad in this issue)

## Micro Photonics Inc. #317

PO Box 3129

Allentown PA 18106

Contact: George Ferrio

Tel: 215-366-7103

FAX: 215-366-7105

Will be featuring mechanical properties testing instruments from Micro Materials, CSEM and BICERI for testing hardness, modulus, adhesion, friction and wear resistance of thin films and bulk materials. Also featured will be in-situ ellipsometers from Sofie Instruments for monitoring and controlling thin film deposition and etching.

## MicroCal Software, Inc. #517

One Roundhouse Plaza

Northampton MA 01060

Contact: Ms. Gillian L. McGarvey

Tel: 413-586-2013

FAX: 413-585-0126

Origin, the first technical graphics and data analysis software for Windows, offers a complete data management solution for collecting, analyzing and presenting experimental data. Origin's Data Acquisition and User Interface Modules provide the unique capability to build and control real-time data acquisition from a wide variety of laboratory devices, all from your desk top.

## Microwave Laboratories, Inc. #103

8917 Glenwood Avenue

Raleigh NC 27622

Contact: Arvid C. Johnson

Tel: 919-781-4260

FAX: 919-781-4187

Microwave Laboratories, Inc. (MLI), is a recognized leader in the design, development, and manufacture of high-power microwave amplifiers, sub-systems, and systems for industrial and military applications.

MLI's Variable Frequency Microwave Furnace makes use of patented technology to provide uniform microwave heating over large volumes for advanced materials processing. (see ad in this issue)

## Modular Process Technology Corp. #520

966 Shulman Ave.

Santa Clara CA 95050

Contact: Meiyng F. Forney

Tel: 408-988-7808

FAX: 408-988-7807

MACVD-6000 Advanced Microwave-Assisted CVD system for depositing high quality polycrystalline diamond thin films. This highly flexible system incorporates DC/RF substrate bias in addition to RTP/CVD capability.

CVD-6000 Advanced Process Modules/turnkey flexible single-wafer multiprocessing systems incorporating in-situ process monitoring.

RTP-600S Advanced RTP Systems/integrated PC, 6 MFC Channels/vacuum/UV Ozone Cleaning capability.

## Molecular Simulations

#406, 408

16 New England Executive Park  
Burlington MA 01803

Contact: Mike Weitz

Tel: 617-229-9800

FAX: 617-229-9899

Come to our booth and step into the future of materials modeling where we will be presenting the next generation of Solutions through Simulation<sup>SM</sup>. See how applications from the whole range of materials science are integrated in a revolutionary and unrivaled new software environment.

## National Electrostatics Corp. #307

Graber Road

PO Box 620310

Middleton WI 53562-0310

Contact: Gregory A. Norton

Tel: 608-831-7600

FAX: 608-256-4103

National Electrostatics manufactures a wide range of ion beam systems from below 100 keV to the hundreds of MeV region. These systems include dedicated materials analysis instruments for RBS, PIXE, NRA, and other analysis procedures requiring MeV beams. NEC also manufactures electron beam and x-ray systems in the MeV region. (see ad in this issue)

## NORAN Instruments, Inc. #217

2551 West Beltline Highway

Middleton WI 53562

Contact: Craig Eversoll

Tel: 608-831-5125

FAX: 608-836-7224

NORAN Instruments, Inc. is a premier manufacturer of energy-dispersive spectrometry microanalysis systems and confocal light microscopes. Preeminence in these fields has been achieved through extensive market research to determine which instrument features are needed most. This research establishes the basic guidelines used in product development at NORAN Instruments.

## Nor-Cal Products, Inc. #418

1967 S. Oregon Street

PO Box 518

Yreka CA 96097

Contact: Tom Deany

Tel: 916-842-4457

FAX: 916-842-9130

Manufacturer of stainless steel vacuum components. Standard products include: NW, ISO, ASA, CF and Wire Seal Flanges; fittings, viewports, feedthroughs and flexible hoses; manual and pneumatically actuated valves; and liquid nitrogen, molecular sieve, water-cooled and particulate foreline traps. Custom chambers, manifolds, feedthrough collars and baseplates can be manufactured from customer specifications, sketches or drawings.

## North Eastern Analytical #511

17 Sherman Road

PO Box 25

Millis MA 02054

Contact: Joan A. Flanagan

Tel: 508-376-4132

FAX: 508-376-8687

Displaying Bede Scientific High Resolution X-Ray Diffractometer Systems. Glancing Incidence Reflectometer Systems. "RADS" Rocking Curve and "REFS" Reflectivity Simulation Software. X-Ray Generators, X-Ray Tubes, and Radiation Enclosures.

## Perkin Elmer #300

6509 Flying Cloud Drive

Eden Prairie MN 55344

Contact: Molly Whelan

Tel: 612-828-6156

FAX: 612-828-6322

Manufacturer of surface analysis equipment and analytical services will provide graphics and literature on their 670xi Scanning Auger Microprobe,

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5600ci Multi Technique and 7200 TOF-SIMS systems. Also, stop by and find out more on PHI's latest components, sub-systems, XPS Research System and UHV equipment.

## Philips Electronic Instruments Company #102

85 McKee Drive  
Mahwah NJ 07430  
Contact: Bob Sommerville  
Tel: 201-529-3800  
FAX: 201-529-5084

Philips Electronic Instruments, the leading manufacturer of X-Ray Fluorescence and X-Ray Diffraction equipment, has recently achieved ISO9001 certification. The most stringent of the three ISO classifications, it requires that an established, effective Quality System be in place.

## Philips Semiconductors #600

Materials Analysis Group  
MS 65

811 E Arques  
Sunnyvale CA 94088  
Contact: Alan E. Morgan  
Tel: 408-991-4868  
FAX: 408-991-4801

Materials Analysis Group is an analytical service laboratory for composition and structural characterization of surfaces, interfaces, thin films, and bulk materials. Techniques include dynamic and static SIMS, Auger, ESCA, RBS/ERD, XRF, TEM, SEM/EDX, AFM, XRD, acoustic microscopy, FTIR, GC/MS/IR, TGA/TMA/DSC, UV/Vis, ICP, AA, IC, and GPC. High precision TEM and field emission SEM cross-section images are guaranteed.

## Publishers Display Group, Inc. #617

44 Bayview Avenue  
Valleystream NY 11581  
Contact: Debi Drayer  
Tel: 516-872-3217  
FAX: 516-561-9054

Publishers Display Group, Inc., will be displaying publications of interest to conference participants.

## Pure Tech Inc. #215

Commerce Drive  
PO Box 1319  
Carmel NY 10512  
Contact: Matthew T. Willson  
Tel: 914-878-4499  
FAX: 914-878-4272

PURE TECH is an American small business devoted to the quality manufacture of high purity materials for sputtering

and evaporation. Specialists in difficult or unusual materials for research & development or production orders. Our in-house capabilities include vacuum melting, hot pressing, metal & ceramic machining, custom designed backing plates and target bonding services.

## Research and PVD Materials Corporation #415

PO Box 4796  
Wayne NJ 07474  
Contact: Melvin Hollander  
Tel: 201-575-4245  
FAX: 201-227-2530

Research and PVD Materials Corporation has established a unique SERVICENTER, 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.

## SOPRA Inc. #204

33 Nagog Park  
Acton MA 01720  
Contact: Barry Glasgow  
Tel: 508-263-2520  
FAX: 508-263-2790

The GESP5 is the first commercially available instrument to combine spectroscopic ellipsometry with accurate measurement of light scattering, transmittance, and reflectance as a function of wavelength, incidence angle and polarization.

## South Bay Technology Inc. #400

1120 Via Callejon  
San Clemente CA 92673  
Contact: David Henriks  
Tel: 714-492-2600  
FAX: 714-492-1499

South Bay Technology, Inc. will be displaying sample preparation equipment & supplies for the following applications: Lapping & Polishing, Crystal Orientation, TEM Sample Preparation, Damage Free Sample Preparation, Cutting & Sectioning. New products on display include Diamond Band Saw, Real Time Back Reflection Laue Camera, EZorient~Digitizing System for Laue Back Reflection, Lapping &

Polishing Machine, Metallographic Supplies. Applications engineers will be available to address specific sample preparation requirements. For additional information please call (800) SBT-2233 or FAX (714) 492-1499.

## Spectrum Sciences, Inc. #507

3050 Oakmead Village Drive  
Santa Clara CA 95051-0808  
Contact: Don Weeks  
Tel: 408-727-1567  
FAX: 408-727-1322

Spectrum Sciences Inc. offers ion implantation systems for very large substrates (500x500mm) such as Flat Panel Displays or multiple wafer batches. The company is also developing an Ion Shower system for doping both amorphous Si and poly Si AMLCD's. For those organizations involved in surface modification, SSI has developed the Low Energy Ion Implantation Deposition (LEIID) system.

Also exhibiting in Booth #507  
**IICO and Arifov Institute of Electronics.**

## Stanford Research System #207

1290-D Reamwood Avenue  
Sunnyvale CA 94089  
Contact: David R. Ames  
Tel: 408-744-9046  
FAX: 408-744-9049

Featuring our full line of scientific and engineering test equipment including lock-in amplifiers, current amplifiers, optical choppers, low-noise preamplifiers, photon counters, boxcar integrators, synthesized function generators, spectrum analyzers and digital delay/pulse generators

## Superior Vacuum Technology #515

7620 Executive Drive  
Eden Prairie MN 55344  
Contact: James E. Tolan  
Tel: 612-934-1993  
FAX: 612-934-2021

Superior Vacuum Technology (SVT) is a manufacturer of molecular beam epitaxy (MBE) and ultra-high vacuum (UHV) deposition equipment. SVT's continual research and development in the industry allows us to offer the highest performance on systems and components such as high temperature sample heaters, effusion cells, e-beam evaporators and manipulators.

Surface/Interface Inc. #609  
110 Pioneer Way, Suite D  
Mountain View CA 94041  
Contact: Charles E. Bryson, III  
Tel: 415-965-8205  
FAX: 415-965-8207

- ESCA-Tools Software
- Reference Materials
- Spectrometer Systems
- Precision Angular Manipulators
- Precision Magnetic Manipulators
- BEES-Ballistic Electron Emission Spectroscopy
- Custom Chambers & Loadlocks
- Rotary Seals

## Technical Instrument Company #113

348 Sixth Street  
San Francisco CA 94103-4788  
Contact: Francis E. Lundy  
Tel: 415-431-8231  
FAX: 415-431-6491

Confocal Scanning Optical Microscopes and attachments from the K-2 and K2-IND series for failure analysis, materials inspection and non-destructive testing. Atomic Force and Scanning Tunneling Microscopes for non-destructive testing and materials analysis. Technical Instrument Company specializes in advanced microscopical image enhancement systems and attachments for submicron observation in real time. Metrology systems are also available using these techniques.

## Tencor Instruments #401

2400 Charleston Road  
Mountain View CA 94043  
Contact: Gail Nishimura  
Tel: 415-988-4313  
FAX: 415-969-6371

Automated surface profiling systems with ability to provide comprehensive surface analysis of even very soft films. Precise alignment, proven reliability, and guaranteed repeatability ensure highly accurate measurements. Large sample profiler for flat panel displays, printed circuit boards. Thin film stress measurement systems for analysis at temperatures from -65 to 900°C. Automated film stress measurement system with radial stress mapping.

# 1994 MRS SPRING MEETING EXHIBIT

## TFI Telemark #318

51 Whitney Place  
Fremont CA 94539  
Contact: Chris Johnson  
Tel: 510-770-8700  
FAX: 510-770-8879

Telemark manufactures PVD components, including Electron Beam Sources, E-Beam Power Supplies (switching and tube-type), DC Sputter Power Supplies, Sputter Cathodes, Optical Monitors, and related accessories. New products include low cost, 3kW E-Beam Sources (with inexpensive power supply) which are UHV compatible, and an inexpensive 1.5kW Sputter Power Supply.

## Thermionics Laboratory Inc. #506, 508

22815 Sutro Street  
PO Box 3711  
Hayward CA 94540  
Contact: John Brooks  
Tel: 510-538-3304  
FAX: 510-538-2889

Thermionics features precision, UHV sample manipulation products; sample introduction, heating, cooling and transfer, differentially pumped rotary seals, linear and rotary feedthrus and precision gearboxes; UHV systems, ion pumps, UHV gate valves, HM2 e-guns and power supplies, MBE systems and R-HEED components.

## TopoMetrix #404

5403 Betsy Ross Drive  
Santa Clara CA 95054  
Contact: Eddy Robinson  
Tel: 408-982-9700  
FAX: 408-982-9751

TopoMetrix manufactures and distributes worldwide a complete family of scanning probe microscope products. Featured in their exhibit will be the Aurora Scanning Near-field Optical Microscope, a unique SPM concept. Aurora offers conventional optical characterization and contrast mechanisms with resolution on the scale of SPM techniques.

## Vacuum Engineering and Materials Co., Inc. #114

PO Box 4480  
Santa Clara CA 95056-4480  
Contact: Dick Gilman  
Tel: 408-986-8900  
FAX: 408-986-8980

High Purity P.V.D. Materials  
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• Metals, Alloys, Intermetallics  
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- Carbides/Flourides Purities from 98% to 99.9999+%
- Complete Target Bonding Services
- Sputtering Targets/Backing Plates or Major Cathode Designs, Crucibles

## VCR Group, Inc. #601

250 E. Grand Avenue, #31  
So San Francisco CA 94080  
Contact: Ron Douglass  
Tel: 415-875-1000  
FAX: 415-875-7111

See it! XLA/2000 Ion Mill, PC based: data set-up, record logging and scheduling... Larger electron transparent areas, one or two sided low angle milling ( $s_4^*$ ), and adjustable ion beam striking position. DIMPLER®, D500i-Robotic, automatic, low angle dimpling. IBS/TM2005-8A Cr films without Cr X-ray peak! Unobservable ultra thin metal films: Ta, W, Ir, Pt and Carbon.

## Veeco/Sloan Instruments, Inc. #604, 606

602 E. Montecito Street  
Santa Barbara CA 93103  
Contact: Wendy Robinson  
Tel: 805-963-4431  
FAX: 805-965-0522

The Dektak 16000 is an advanced stylus based surface profiler capable of precise film thickness and surface texture measurements on flat panels up to 450mm X 500mm for R&D applications. Optional robotic substrate handling with automatic alignment provides completely automated operation for in-line production testing.

## Virginia Semiconductor, Inc. #608

1501 Powhatan Street  
Fredericksburg VA 22401  
Contact: N. Perry Cook  
Tel: 703-373-2900  
FAX: 703-371-0371

Featuring Ultrathin™ and Ultra-machining™ silicon wafers with flatness within  $s_3$   $\mu$ , planarity of  $s_3$   $\mu$ , and taper  $s_3$   $\mu$ ; also offering back side polishing services, custom or research wafer and ingot preparations, and conventional small diameter single and double side polished Cz or Fz wafers.

For precisely engineered silicon wafers, "If we can't make it, you don't need it!" (see ad in this issue)

## Voltaix, Inc. #409

197 Meister Avenue  
Box 5357 North Branch NJ 08876  
Contact: John P. de Neufville  
Tel: 908-231-9060  
FAX: 908-231-9063

State of the art CVD gases, custom filled and packaged to the customer's specifications. Products include silane, disilane, methylsilane, germane, digermane, diborane, phosphine, trimethylboron, their mixtures, and ion implant gases including boron trifluoride. Custom synthesis of selected gases such as deuterated diborane, trimethylboron, and silane. (see ad in this issue)

## Waters, Extrel Mass Spectrometry #407

34 Maple Street  
Milford MA 01757  
Contact: Carolyn Norton  
Tel: 508-478-2000 ext. 3641  
FAX: 508-478-5839

Waters will exhibit Extrel® Mass Spectrometry Products including the Extrel 2001 series of Ultrahigh Resolution Fourier Transform Mass Spectrometers (FT/MS®) which features Lazer Probe Ionization, MS/MS and the Odyssey Data System with patented SWIFT™ Technology. Quadrupole Power Supplies, Quadrupole Mass Filters and Electron Impact Ionizers will also be exhibited.

## Westlake Rare Earth Industries #109

A Division of Westlake Development Co., Inc.  
520 El Camino Road, 9th Floor  
San Mateo CA 94402  
Contact: Dr. J.J. Lin  
Tel: 415-579-1010  
FAX: 415-340-8459

Westlake Rare Earth Industries, a manufacturer and distributor of rare-earth resources, exhibits

the production line of rare earth materials, including RE metal and oxides, RE alloys and inorganic compounds as well as RE related products such as phosphors powders for color TV and lamps, glass polishing powders, permanent magnets.

## J.A. Woollam Co., Inc. #105

650 J Street, Suite 39  
Lincoln NE 68508  
Contact: Kevin Lilly  
Tel: 402-477-7501  
FAX: 402-477-8214

Non-Destructive multilayer and multiconstituent materials analysis by Spectroscopic Ellipsometry. Measure film thickness, optical constants, alloy fractions and surface and interfacial roughness. In situ and ex situ configurations for industrial and research applications, including semiconductors, magnetic materials, optical coatings and flat panel displays. New, fast, multiwavelength in situ ellipsometer supports process monitoring control.

## Zygo Corporation #112

Laurel Brook Road  
Middlefield CT 06455  
Contact: Polly White  
Tel: 203-347-8506  
FAX: 203-347-8372

Zygo Corporation is a world leader in the manufacture of high-precision noncontact measuring instruments and optical components. Zygo has launched a line of interferometric microscopes for measuring and quantifying the shape and microroughness of surfaces. The NewView 100 microscope is capable of characterizing an amazing array of samples and is a true breakthrough in measurement.

Companies interested in exhibiting may contact:

**Mary E. Kaufold**  
Advertising & Exhibit Manager  
Materials Research Society  
9800 McKnight Road  
Pittsburgh PA 15237  
Phone: (412) 367-3036  
FAX: (412) 367-4373