

AVS MEETS IN SEATTLE

The American Vacuum Society will hold its 38th annual symposium in Seattle from 11 to 15 November. A total of 86 technical lectures and poster sessions will feature 868 contributed papers and 121 invited papers. In addition, the gathering will include lunchtime plenary speakers, an exhibition of vacuum and deposition equipment, a job-placement center, two topical conferences to highlight new areas of research and technology, and short courses on a variety of vacuum science topics. The symposium will be held in the Washington State Convention and Trade Center, which will also be the site of the short courses and topical conferences. AVS will also provide a press room for scientists to talk to reporters.

Divisional sessions

Technical sessions have been organized by each of the divisions of AVS and by one AVS committee, commencing on Monday morning, 11 November. The surface science division, the electronics materials and processing division, and the plasma science and technology division will each hold a dozen or more sessions. The applied surface science division will hold nine sessions, the thin film division and the vacuum metallurgy division will both hold eight sessions, and the vacuum technology division will hold five. The nanometer scale science and technology committee will hold six sessions. There will be a special session on Buckminsterfullerene, C_{60} , on Monday evening at 7:30 at the Sheraton Seattle Hotel.

Each plenary talk will be given at 12:45 pm, beginning Monday with a talk by Rustum Roy, the John Hugh Professor of the Solid State and a professor of geochemistry at Pennsylvania State University and the director of its Science, Technology and Society program. Roy will discuss "The Status of K-12 Education." Wednesday's speaker will be Michael L. Knotek, senior science director of Battelle Pacific Northwest Laboratory and manager of the lab's Molecular Science Research Center and Envir-

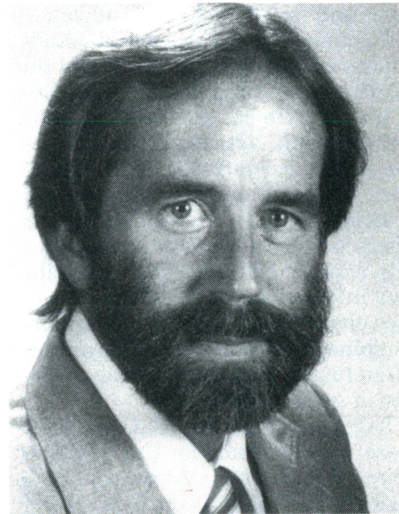
onmental and Molecular Sciences Laboratory. His talk will be on research needs and challenges in environmental remediation and waste management. Friday's plenary speaker will be Stanley E. Whitcomb, the deputy director of the Laser Interferometer Gravitational-Wave Observatory, which is being developed jointly by scientists at Caltech and MIT. Whitcomb will discuss LIGO's 8-km-long vacuum system.

The two topical conferences will run concurrently with the divisional sessions. The two-day topical conference on surface science at the solid-liquid interface will include nine invited speakers. Monday's sessions are being sponsored by the applied surface science division, and Tuesday's sessions are being sponsored jointly by the nanometer scale science and technology committee and the surface science division.

Max G. Lagally



Joseph E. Greene



Harold R. Kaufman



William J. Kaiser



At the topical conference on optical and magneto-optical recording sponsored by the thin film division, speakers will discuss various aspects of this technology, which is important in high-density data storage. Throughout the symposium more than 40 short courses on a variety of topics will be offered.

Awards assembly

On Wednesday, 13 November, at 6:30 pm in the Convention and Trade Center AVS will hold its annual awards assembly to recognize outstanding work in vacuum-related science.

The Medard W. Welch Award will go to Max G. Lagally of the University of Wisconsin, Madison. Lagally's award is for his "outstanding contributions to the quantitative understanding of defects with respect to ordering and growth of surface structures."

Lagally used low-energy electron diffraction to investigate aspects of surface structural disorder. His design and construction of advanced diffractometers enabled him to study chemisorbed layers on metals and the kinetics of ordering in submonolayers of metals. He has also studied static and dynamic structural disorder on semiconductor surfaces. With the advent of the scanning-tunneling microscope, Lagally investigated mechanisms of crystal growth on surfaces. His experiments provided quantitative information on a variety of surface phenomena. His recent work has combined diffraction and scanning tunneling microscopy to study disorder in surfaces and films.

Lagally earned his PhD in solid-state physics from the University of Wisconsin in 1968. After holding a visiting fellowship at the Fritz-Haber Institute in Berlin, he returned to Wisconsin as an assistant professor of materials science in 1971. He is currently the John Bascomb Professor at Wisconsin with joint appointments in materials science and engineering and in physics.

Joseph E. Greene of the University of Illinois, Urbana, will receive the John A. Thornton Memorial Award. He is cited for "outstanding research in thin-film science with emphasis on the effects of ion bombardment on the growth and properties of semiconductor materials."

Greene has primarily worked to understand and control vapor-phase crystal growth. He developed a technique combining sputter evaporation and deposition to grow a variety of epitaxial, metastable semiconducting alloys, now called "Greene alloys."

He and his collaborators also used low-energy (50–200 eV) accelerated ions to dope silicon, the better to control incorporation probabilities and depth distribution of the dopant. Greene used uv photostimulation for low-temperature growth of silicon by atomic-layer epitaxy, and recently he has developed techniques to grow epitaxial, metastable mononitride alloys and superlattices.

Greene earned his PhD in materials science from the University of Southern California in 1971. He then went to the University of Illinois, where he is currently a professor in the materials science department. Since 1986 he has also been associate director of the NASA Space Vacuum Epitaxy Center in Houston. Greene was president of AVS in 1989.

The winner of the 1991 Albert Nerken Award is Harold R. Kaufman, professor emeritus of physics at Colorado State University. The award cites Kaufman for "invention of the electron-bombardment broad-beam ion source and extending its use in thin-film applications."

Kaufman invented the electron-bombardment ion source in 1960 for use as a thruster in spacecraft. Beginning in 1974 Kaufman applied the technology of ion sources to thin-film etching and deposition and developed a range of ion sources for laboratory and industrial applications. Among these are sources with dished grids for focusing; single-grid ion sources for high-current, low-energy operation; Hall effect ion sources for operation with a large ion current at low energies; and multiple ion sources for simultaneous deposition and etching.

In the early 1950s Kaufman began working at the Lewis Research Center, then a part of the National Advisory Committee for Aeronautics and now part of NASA. He earned his PhD from Colorado State University in 1971, and three years later he joined the faculty there as a professor in the mechanical engineering and physics departments. He retired from CSU in 1984 and founded his own company, Front Range Research. He is also vice president for research and development at Commonwealth Scientific, a manufacturer of ion sources and systems.

The Peter Mark Memorial Award, which honors a young scientist or engineer for work published, at least in part, in the *Journal of Vacuum Science and Technology*, will go to William J. Kaiser of NASA's Jet Propulsion Laboratory. Kaiser's "innovative applications of electron tunneling techniques" are cited in the award.

In 1984 Kaiser and Robert Jaklevic of the Ford Motor Company demonstrated electronic structure spectroscopy using scanning-tunneling microscopy. Kaiser has used STM to collect data on STM-induced band bending at semiconductor surfaces, superconducting energy gap spectroscopy and superconducting phonon spectroscopy. In 1987 Kaiser and Douglas Bell of JPL invented ballistic-electron-emission microscopy, which allows direct spectroscopic imaging of subsurface interfaces. Recently Kaiser developed a tunnel sensor technology for use in various instruments.

Kaiser was a member of the Ford Motor Company research staff from 1977 to 1986. He earned his PhD from Wayne State University in 1983. Since 1986 he has been an institute visiting associate at Caltech and a senior research scientist at JPL.

The *Journal of Vacuum Science and Technology* Shop Note Award, given by the vacuum technology division, will go to Berend T. Jonker of the Naval Research Laboratory for his contribution to "A Compact Flange-Mounted Electron Beam Source" (*J. Vac. Sci. Technol. A* 8, 3883, 1990). The award acknowledges novel solutions to instrumental or experimental problems published in the journal in the previous year.

Student awards

Several graduate students will receive AVS student awards. The Russell and Sigurd Varian Fellowship finalists are D. Howard Fairbrother of Northwestern University, Michael Flatté of the University of California, Santa Barbara, and Joy Watanabe of the University of Arizona. The winner of the Nellie Yeoh Whetten Award, which recognizes and encourages women graduate students, is Luci Markert of the University of Illinois.

Other graduate students receiving AVS Student Prizes are Heather Galloway of the University of California, Berkeley, Gregory Herman of the University of Hawaii, Michael Jost of the University of Minnesota, Robert Kusner of Case Western Reserve University, Wei Li of Syracuse University, Paul Mirkarimi of Northwestern University and Ioannis Zuburtikudis of the University of Rochester.

Other events

Once again the AVS symposium will provide meeting attendees with a chance to see systems, instruments and components used in vacuum-related science at the equipment exhibit, which will be run by the Ameri-

can Institute of Physics. Over 140 manufacturers will display equipment used in the production and study of films, surfaces and materials in halls A and B, level 4, of the

Convention and Trade Center. The exhibit will be open Tuesday, 12 November, from noon to 7 pm, and it will continue Wednesday from 11 am to 6 pm and Thursday from 10 am to 3

pm.

AIP will also run the job-placement center. It will be open from 8:30 am to 5 pm Tuesday through Thursday, and from 8:30 am to noon on Friday. ■

Invited Papers

Monday, 11 November

morning

Optical recording—from materials to manufacturing. *E. E. Marinero, B. Bartholomeusz*

Atomic structure—metals. *J. Nørskov*

Compound semiconductor epitaxy. *A. Zangwill, E. Colas, R. M. Park, H. H. Farrel*

Liquids and liquid molecules at interfaces. *J. Israelachvili, J. Porter, P. A. Thiel*

Pumps, pumping and related topics. *N. G. Wilson*

Particles in plasmas. *A. Garscadden, M. J. Kushner*

midday

Plenary lecture. *R. Roy*

afternoon

Optical recording: Multilayer, garnet and phase change media. *T. Yorozu, P. F. Carcia, J. Gonzalez-Hernandez*

Semiconductor surface science I—hydrogen adsorption. *R. S. Becker*

Dielectrics. *T. P. Ma*

Photon spectroscopies and phenomena. *M. J. Weaver, R. M. Corn*

Gas flow and analysis. *D. B. Fraser*

Wafer/reactor characterization. *V. M. Donnelly*

In situ, real-time diagnostics I. *R. W. Collins, G. N. Maracas, F. H. Pollak*

Tuesday, 12 November

morning

ECR and plasma-enhanced CVD of films. *F. F. Chen*

Chemistry on metals I. *W. H. Weinberg*

Structural studies of the solid surface. *A. A. Gewirth, B. M. Ocko*

Special sessions on manufacturing processes for coatings and thin films. *D. M. Mattox, C. Hayashi, R. Lacher*

Depth profiling and imaging. *A. Benninghoven, J. A. Knapp*

Plasma diagnostics. *H. Sugai*

In situ, real-time diagnostics II. *P. I. Cohen, J. Y. Tsao, Y.-C. Chang*

Gauges and pressure measurement. *R. A. Redhead*

afternoon

Stress and mechanical properties of thin films. *D. S. Gardner, J. C. Bravman, J. B. Ketterson*

Surface dynamics I. *B. D. Kay*

Surface science and electrochemistry. *F. T. Wagner, A. J. Bard*

Special sessions on manufacturing processes for coatings and thin films. *J. T. Felts, B. F. Phillips*

Modified surfaces I: Inorganics. *P. Wynblatt*

Plasma etching—patterning. *R. A. Gottscho*

Semiconductor surface chemistry II. *S. M. George*

Particulate control, cleaning and outgassing. *J. F. O'Hanlon, H. F. Dylla*

Wednesday, 13 November

morning

Heteroepitaxy of semiconductors. *L. Kolodziejski, M. O. Thompson*

Surface dynamics II. *T. F. Heinz*

Surface cleaning and integrated processing. *S. Kasi*

Biological applications of STM/AFM. *P. K. Hansma*

Ion-assisted deposition, implantation and cathodic arc processes. *J. Vyskocil, P. J. Martin, G. K. Wolf, R. B. Alexander*

Catalysts, glasses and ceramics. *T. S. King, C. G. Pantano*

Fusion plasma—surface interactions. *G. L. Jackson, S. A. Cohen*

Semiconductor surface chemistry III. *J. J. Boland*

ECR I. *K. Nishioka*

midday

Plenary lecture. *M. L. Knoutek*

afternoon

Optical and solar coatings. *R. B. Nikodem, S. Pongratz*

Chemistry on metals II. *D. W. Goodman*

Passivation. *C. J. Sandroff, S. J. Ingre*

STM/AFM studies of molecular adsorbates. *W. Mizutani*

Magnetron sputtering. *J. M. E. Harper, R. P. Howson*

Modified surfaces II—organics. *L. J. Gerenser*

Inertial confinement—fusion targets. *T. P. Bernat*

Elemental semiconductor-based heterostructures I. *T. O. Sedgwick, J. Derrien*

ECR II. *L. G. Jerde*

Thursday, 14 November

morning

High- T_c superconductors: Fabrication and characterization. *W. Y. Lee, T. Venkatesan*

Nucleation and growth I. *Y. W. Mo, R. O. Hwang*

CVD I. *K. Tsubouchi*

Properties of nanoscale structures. *E. Betzig, K. Kash, M. L. Roukes, W. J. Kaiser*

Solar photovoltaic materials and devices. *L. L. Kazmerski, R. W. Birkmire, B. M. Basol, T. A. Gessert*

Organic and molecular surfaces/interfaces I. *J. F. Rabolt*

Plasma modeling. *M. A. Lieberman*

Elemental semiconductor-based heterostructures II. *D. Cherns, E. Kasper, S. S. Iyer*

midday

Plenary lecture. *S. E. Whitcomb*

afternoon

Ferroelectric films: Fabrication and function. *S. Sinharoy, S. B. Krupanidhi*

Semiconductor surface structure I. *C. B. Duke*

CVD II. *J. E. Crowell*

Nanostructures and instrumentation. *J. E. Griffith, D. Rugar*

Laser ablation deposition. *R. Muenchausen, D. B. Chrisey*

Organic and molecular surfaces/interfaces II. *E. T. Samulski*

Large vacuum systems. *C. K. Sinclair, M. Ulrickson*

Sputtering: Theory and experiments. *D. N. Ruzic, J. E. Greene*

Friday, 15 November

morning

Nucleation and growth II. *A. E. Depristo*

Metal—semiconductor interfaces. *C. J. Palmström*

Nano- and microengineering. *D. P. Kern, J. A. Dagata, R. S. Muller*

Diamond and diamond-like carbon. *L. K. Bigelow, D. S. Hoover*

Quantitative surface analysis. *R. Shimizu, A. Jablonski*

Particle beam/plasma—surface interactions. *K. Seaward*

Semiconductor surface structure II. *J. E. Northrup*