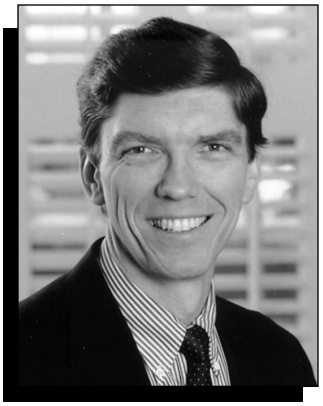
Clayton M. Christensen to Give Plenary Presentation on Business of Technology

Clayton M. Christensen, a professor of business administration at the Harvard Business School (HBS), will present the plenary talk at the 2001 Materials Research Society Fall Meeting in Boston. His talk is on "Matching the Trajectories of Technological Progress with the Customers' Ability to Utilize Progress."

Christensen holds a joint appointment in the Technology and Operations Management and General Management faculty groups. His research and teaching interests center on the management of technological innovation, developing organizational capabilities, and finding new markets for new technologies. Prior to joining the HBS faculty, Christensen served as chair and president of Ceramics Process Systems (CPS) Corp., a firm that he co-founded with several professors from the Massachusetts Institute of Technology in 1984. CPS, now a publicly traded company, develops products and manufacturing processes that use high-technology ceramic materials such as silicon nitride, silicon carbide, aluminum nitride, and aluminum oxide.

Among Christensen's awards are the Production and Operations Management Society's 1991 William Abernathy Award, the 1993 Newcomen Society's Award, and the 1995 McKinsey Award. Christensen's book, *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail* (Harvard Business School Press, Boston, 1997), received the Global Business Book Award for the best business book published that year. Christensen's writings have been published in *The Wall Street Journal*, the *Harvard Business Review, Business History Review, Research Policy, Industrial and Corporate Change, Strategic Management Journal, Production and Operations Management*, the *European Management Journal, Management Science*, and *Engineering Management Review*.

He holds a BA degree in economics from Brigham Young University and an MPhil degree in economics from Oxford University, where he studied as a Rhodes Scholar. Christensen received an MBA degree from Harvard Business School in 1979, graduating as a George F. Baker Scholar. He was awarded a DBA degree from Harvard Business School in 1992.



Clayton M. Christensen

The plenary session will be held on Monday, November 26, at 6:00 p.m. in the Grand Ballroom at the Sheraton Boston Hotel. MRS

The Materials Research Society and Optical Society of America invite Applications for the 2002–2003 Congressional Science and Engineering Fellowship.

See page 917 for details.

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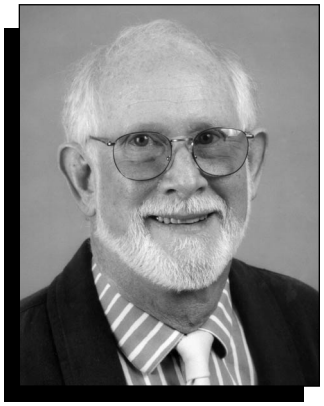
Simon C. Moss to Receive 2001 Von Hippel Award for Experimental and Theoretical Work on Structure of Complex Materials

The Materials Research Society's highest honor, the Von Hippel Award, this year will be given to Simon C. Moss, the M.D. Anderson Professor of Physics at the University of Houston. He is cited for "consistently timely and essential contributions to identifying and understanding the atomic-level structure of almost every new type of material discovered in the last 30 years." The Von Hippel Award is given annually to an individual in recognition of outstanding contributions to interdisciplinary research on materials.

Moss has pioneered the application of x-ray and neutron scattering techniques to understanding the structure of complex materials and its effect on their properties. He has also elucidated the theory behind experimental work that he and his colleagues have accomplished, for example, in the use of the Krivoglaz–Clapp–Moss (KCM) model to extract fundamental interactions in alloys from diffuse scattering; the use of the Reiter-Moss theory for modulated liquids to extract the modulation potential and thereby explain the host of complex phases and phase transitions in alkali-graphite intercalation compounds; the use of Bragg data from orientationally disordered C_{60} crystals to determine the single-particle mean-field orienting potential; and, more recently, the use of x-ray determination of sublattice order in GaInP to extract essential band-theory parameters.

In the area of disordered alloys, Moss' doctorate work on ordering in Cu_3Au led to a series of classic theoretical papers with P.C. Clapp in the late 1960s about the analysis of the disordered state. Clapp and Moss developed the theoretical basis for the understanding of diffuse scattering from binary alloys in terms of effective pairwise interactions. Beginning with an argument of Krivoglaz, Moss showed how the Fermi surface is imaged in diffuse scattering, which has since seen wide use.

In the area of phase transitions and phase transformations, Moss began with his pioneering study of atomic displacements in Fe-C martensite. Among the first scientists to identify the power of neutron scattering in understanding the physics underlying martensitic transformations, Moss, in his work with Keating and Axe, used inelastic neutron scattering to probe the underlying dynamics in the ω-phase $Nb_{0.20}Zr_{0.80}$ alloy and revealed a very unusual dynamical response, including strong elastic "central peak" components



Simon C. Moss

with symmetry-violating intensities. In more recent synchrotron work, Moss has studied the nature of the disordered state in V_2H above its order–disorder transition. While the surface "skin" showed a continuous transition, bulk measurements revealed a distinct first-order transition. Along with theoretical significance, this work is of technological importance because of the use of related hydrides in batteries as energy sources.

Moss began his extended studies of amorphous materials in his work with Graczyk at the Massachusetts Institute of Technology (MIT) on amorphous silicon. This work launched Moss' two-year tenure with Energy Conversion Devices (ECD), where he contributed to research on chalcogenide glasses, which was applied to optical devices and computer memories. Moss contributed to an ECD patent for a read/write optical memory that is now a preferred technology for optically based CDs. Moss also produced a seminal paper with D.L. Price pointing out intermediate range order as represented by the first sharp diffraction peak in a host of glasses.

The Moss group's modeling of synchrotron-based x-ray data in the area of layered materials demonstrated that "amorphous" melanin was composed of plane-polymerized units of 5,6-indolequinone separated by graphitic spacings, a standard today in the pigment-cell field. His group also modeled the growth of a quasicrystal with local growth rules. In related work, with colleagues from Harvard and Sendai, through electron microscopy, calorimetry, and synchrotron x-ray studies, he showed that the presumed glassy phases were actually all microquasicrystalline. In the area of superconductors, Moss' group shed light on the loss of superconductivity on doping Al for Cu in $YBa_2Cu_{3-x}Al_xO_\delta$ and the commonality of structure with the tweed microstructure in premartensitic crystals. The group also provided an accurate four-dimensional structural analysis of the BSCCO (2212) and elucidated the novel striped phases in $La_2CuO_{4+\delta}$ crystals through neutron scattering.

Moss has served on the Brookhaven National Laboratory's Materials Science Review Committee. His organization activities also include the American Physical Society's Fellowship Selection Committee; the National Facilities Review Panel for X-Ray and Neutron Scattering; the BESAC Subcommittee on Uses of Neutron Scattering in Materials Science, which he chaired; the National Academy of Sciences' Review Panel on the Advanced Neutron Source in 1990 and Panel on Neutron Facilities in the United States, Subpanel on Users and Education, which he chaired, in 1977; and the National Science Foundation's Advisory Boards for Condensed-Matter Physics and Facilities. He has also served as divisional associate editor of *Physical Review Letters*.

Recognized for his numerous contributions to materials research, Moss more recently received the Alexander von Humboldt Foundation Senior Scientist Award Extension; the Max Planck Research Award, Max Planck Gesellschaft/Alexander von Humboldt Foundation, shared with J.S. Peisl, University of Munich; and the David Adler Lectureship Award, American Physical Society. Other earlier honors include the Yamada Science Foundation, Japan; Lyle Traveling Fellow, University of Melbourne; John Simon Guggenheim Memorial Foundation Fellow; and the Ford Foundation Postdoctoral Fellow in Engineering, MIT.

Moss received his BS (1956) and MS (1959) degrees in metallurgy, then his PhD degree (1962) in metallurgy and materials science, all from MIT. He joined the MIT faculty in 1962 and joined the University of Houston in 1972. Moss has over 200 publications and has delivered over 200 invited presentations.

Following his acceptance of the Von Hippel Award during the Awards Ceremony at the 2001 MRS Fall Meeting on Wednesday, November 28, at 6:00 p.m., in the Grand Ballroom, Sheraton Boston Hotel, Moss will present his talk, "Scattering Studies of Real Materials." MRS

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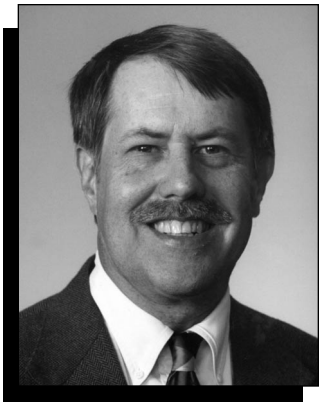
James R. Chelikowsky Selected for 2001 David Turnbull Lectureship for Modeling of Materials Properties

The David Turnbull Lectureship recognizes the career of a scientist who has made outstanding contributions to understanding materials phenonema and properties through research, writing, and lecturing, as exemplified by David Turnbull. This year, James R. Chelikowsky of the University of Minnesota has been selected to deliver the 2001 Materials Research Society's David Turnbull Lecture. Chelikowsky is cited for "contributions to the fundamental understanding of electronic, optical, mechanical, surface, and interface properties of bulk and nanostructured semiconductors, ceramics, and metals through *ab initio* calculations; and for excellence in teaching, lecturing, and writing."



James R. Chelikowsky

Through his application of computational techniques to unravel properties of materials and make predictions of new materials, Chelikowsky is known to produce seminal research in one area of materials physics, then move to another area where he invents new computational and physical approaches that solve problems at the forefront of the new field. Beginning with work at the University of California—Berkeley, where he received his PhD degree in physics in 1975, Chelikowsky played a major role in unraveling the optical and photoemission properties of semiconductors through a series of calculations of unprecedented accuracy on the band structure of these materials. His paper with M.L. Cohen on 11 diamond and zinc-blende semiconductors is a classic in the field and still used as a standard. Chelikowsky and his colleagues developed a new theoretical method—the self-consistent supercell technique—for computing the electronic properties of surfaces and interfaces. Through these calculations, he made numerous major advances in understanding the electronic properties of surfaces, chemisorption systems, metal-semiconductor interfaces, and point and line defects in solids.

Chelikowsky's more recent accomplishments include his study of the structure, energetics, and formation of semiconductor and metal clusters including fullerenes; the first *ab initio* calculations of the optical and dielectric properties of quantum dots; first *ab initio* molecular dynamics simulation of the structure and conductivity of ionic semiconductor liquids; determination of the mechanism of pressure-induced amorphorization of silica and other oxides; and the discovery of a new form of silica. This body of work has provided new insights and directions for further research.

Chelikowsky's monograph co-authored with M.L. Cohen, *Electronic Structure and Optical Properties of Semiconductors* (2d ed., Springer-Verlag, 1989), is known as the definitive reference on band structure and optical properties of semiconductors. Some of Chelikowsky's books have been adopted for graduate classes in electronic properties of materials, and his articles are highly cited. He has published six books and monographs and over 220 articles and book chapters.

Known as an entertaining lecturer, Chelikowsky's numerous invited talks are illuminating, with new information. He is a popular instructor at the university and has organized numerous courses, symposia, and conferences, promoting graduate education and training beyond his own institution.

Chelikowsky's most recent honors and fellowships include the Miller Institute Professor at the University of California (1999), the John Simon Guggenheim Fellowship (1995–1996), and the Neal Amundson Professorship at the University of Minnesota (1996). He has served as a reviewer for national programs for the U.S. Department of Energy, the Naval Research Laboratories, the National Research Council, and the National Science Foundation. He has served the American Physical Society in office and committee appointments, and the Materials Research Society as symposium organizer. He has held or currently holds editorial and advisory board positions for *Physical Review Letters, Journal of Physics and Chemistry of Solids, Theoretical Chemistry Accounts: Theory, Computation and Modeling, Computational Materials Science, and Computational Materials Science Network*. Chelikowsky has also held consulting and visiting positions at AT&T Bell Laboratories, Xerox Palo Alto Research Center, Lawrence Berkeley Laboratory, EPFL in Switzerland, and at the University of California—Berkeley. He received his BS degree in physics in 1970 from Kansas State University and his PhD degree in physics in 1975 at UC—Berkeley.

Chelikowsky will present his talk, "Silicon in All Its Forms," at the 2001 MRS Fall Meeting on Tuesday, November 27, in the Sheraton Boston Grand Ballroom at 5:05 p.m.

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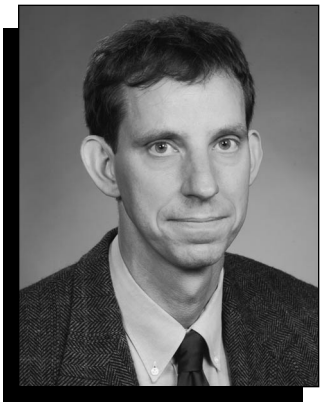
Bartelt, Mate Named 2001 MRS Medalists

The Materials Research Society (MRS) has selected two scientists to receive the 2001 MRS Medal awards, which recognize a specific outstanding recent discovery or advancement that is expected to have a major impact on the progress of any materials-related field. Norm Bartelt of Sandia National Laboratories and Mathew Mate of IBM Almaden Research Center will receive their medals at the 2001 MRS Fall Meeting during the Awards Ceremony on Wednesday, November 28, at 6:00 p.m. in the Grand Ballroom at the Sheraton Boston Hotel.



Norm Bartelt

Mathew Mate

Norm Bartelt is named MRS Medalist "for contributions to the statistical mechanics of materials surfaces." He is a scientist in the Thin Film and Interface Science Department at Sandia National Laboratories in Livermore, California. Bartelt is a leading theoretician in the area of statistical mechanics and thermodynamics of surface dynamical processes and morphological evolution, which is essential to the development of self-assembly and nanotechnology. In particular, he has developed a set of theoretical models linking the temporal evolution of solid surfaces to their atomic structure. This work has transformed the way experiments are performed and analyzed by researchers using real-time imaging techniques. His most recent work has focused on gaining an understanding of the dynamics of alloying on metal surfaces and how mass exchange between surface and bulk affects the evolution of surface morphology.

With a BS (1979) and PhD (1986) degree in physics from the University of Maryland, Bartelt has over 70 publications in major journals including, *Physical Review Letters, Science,* and *Nature*. He is a Fellow of the American Physical Society, Division of Materials Physics, and currently serves on the editorial boards of *Physical Review Letters* and *Surface Science*. He joined Sandia in 1995.

Bartelt will deliver his Medalist talk in Symposium X on Thursday, November 29 at 12:45 p.m. in the Sheraton Boston Grand Ballroom.

Mathew Mate is named MRS Medalist "for pioneering studies of friction at the atomic and molecular level." Since his first-authored announcement in 1987 in *Physical Review Letters* of the invention of the friction force microscope and first observation of atomic scale friction, Mate is associated with the establishment of the field of nanotribology. He adapted the atomic force microscope (AFM) for the study of friction, lubrication, and adhesion at the atomic and molecular level. Insights gleaned from his fundamental studies were used to improve magnetic disk drives, and have shown an impact on other areas of research and technology, including microelectromechanical systems technology, and the science of thin polymer films and their various industrial applications. The majority of commercial AFM instruments are now equipped to measure friction forces and force-versus-distance curves, two techniques pioneered by Mate and now routinely used for determining the mechanical properties of surfaces.

These contributions have led to numerous awards by IBM and to Mate's election as a Fellow of the American Physical Society. Mate obtained his BSc (1981) and PhD (1986) degrees from the University of California—Berkeley. He did his postdoctoral work at the IBM Almaden Research Center where he joined the Research Staff in 1988. He has numerous publications in peer-reviewed journals and has given invited talks in the area of nanotribology. In other professional contributions, Mate has organized symposia for the American Chemical Society and the American Physical Society, and he serves on the editorial board for *Tribology Letters*.

Mate will deliver his Medalist talk in Symposium X on Thursday, November 29 at 12:05 p.m. in the Sheraton Boston Grand Ballroom. MRS

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