

APPENDICES

Appendix A. Biographies of Panelists and Other Team Members

PANELISTS

Dr. Richard W. Siegel (Panel Chair)

Robert W. Hunt Professor and Head, Materials Science and Engineering Dept.
Rensselaer Polytechnic Institute

Dr. Siegel holds an AB degree (Physics) from Williams College and MS (Physics) and PhD (Metallurgy) degrees from the University of Illinois in Urbana. He is the past Chairman of the International Committee on Nanostructured Materials and earlier served on the U.S. National Materials Advisory Board Committee on Materials with Submicron-Sized Microstructures and was the co-chairman of the Study Panel on Clusters and Cluster-Assembled Materials for the U.S. Department of Energy. He was on the faculty of the State University of New York at Stony Brook from 1966 to 1976 and at Argonne National Laboratory from 1974 to 1995.

He has authored more than 180 publications in the areas of defects in metals; diffusion; and nanophase metal, ceramic, and composite materials. In addition, he has presented more than 300 invited lectures around the world and has edited 9 books on these subjects. He was listed by *Science Watch* as the fourth most highly cited author in materials science during 1990-1994. Dr. Siegel is an associate editor of *Materials Letters* and a founding principal editor of *Nanostructured Materials*. He is a founder and director of Nanophase Technologies Corporation, and was recognized for this effort by a 1991 U.S. Federal Laboratory Consortium Award for Excellence in Technology Transfer. He is an honorary member of the Materials Research Societies of India and Japan, a 1994 recipient of an Alexander von Humboldt Foundation Senior Research Award in Germany, and he presented the 1996 MacDonald Lecture in Canada.

Dr. Evelyn Hu (Panel Co-chair)

Professor of Electrical and Computer Engineering and Director, Center for Quantized Electronic Structures
University of California Santa Barbara

Dr. Hu's research focus as Director of QUEST, the NSF-funded Science and Technology Center focusing on Quantized Electronic Structures, is high-resolution, low-damage fabrication of electronic and optoelectronic devices. She is also the Director of the University's node of the NSF-sponsored National Nanofabrication Users Network. Prior to joining UCSB, Dr. Hu was a member of technical staff and subsequently a supervisor in the Department of VLSI Patterning Processes at AT&T Bell Laboratories.

She received her BA in Physics (summa cum laude) from Barnard College and her MA and PhD in Physics from Columbia University. She currently serves on the Defense Advanced Research Projects Agency Defense Research Science Council. She is a Fellow of the IEEE, a Fellow of the American Physical Society (APS), and holds an honorary doctorate of engineering from the University of Glasgow.

Dr. Donald M. Cox

Exxon Research and Engineering Company

Dr. Cox is a physicist in the Corporate Research Laboratories of Exxon Research and Engineering Company. He received a BA in Physics and Mathematics from Indiana State College and his PhD degree in Atomic and Molecular Physics from the Joint Institute for Laboratory Astrophysics (JILA) at the University of Colorado. After postdoctoral research at New York University where he studied properties of thermal equilibrium alkali plasmas, he joined Exxon Research and Engineering Company in 1973.

At Exxon, Dr. Cox's research interests have encompassed a variety of areas, including laser isotope separation of molecules using infrared multiphoton excitation and dissociation; optoacoustic spectroscopy; studies of the electronic, magnetic, and chemical properties of size-selected transition metal clusters both in the gas phase and deposited on substrates; investigations probing the properties and uses of carbon clusters, fullerenes and carbon nanotubes; and most recently, studies of microporous materials useful in gas separations via membranes and sorption. He is a member of the APS and ACS and has two patents and over 100 publications.

Dr. Herb Goronkin

Director, Physical Research Laboratory
Phoenix Corporate Research Laboratories, Motorola Corp.

Dr. Goronkin received his BA, MA, and PhD in Physics from Temple University and began work on high-speed devices and compound semiconductor materials in 1963. He joined Motorola in 1977 to start the GaAs electronics program. This program developed Motorola's early versions of MESFETs, MMICs, and HFETs for low-power, low-noise applications, and the high-efficiency 3-volt power HFET for wireless applications. The Physical Research Lab is engaged in quantum devices for future ULSICs, giant magnetoresistance for nonvolatile memory, molecular self-assembly for future electronic and bioelectronic applications, and data mining using neural networks. The lab is the only non-Japanese organization working on MITI's 10-year program on quantum functional devices.

Dr. Goronkin is a fellow of the IEEE and member of the American Physical Society and Sigma Xi. He has served on many conference committees and organizations and given several conference short courses on III-V device physics. He has over 40 patents and numerous publications. Motorola presented him with the Distinguished Innovator Award (1992) and the Master Innovator Award (1995), and he is a member of Motorola's Science Advisory Board Associates. Also, the Phoenix Section of the IEEE selected him as Senior Engineer of the Year (1993). He is currently director of the Physical Research Lab in the Phoenix Corporate Research Laboratories and a Motorola Dan Noble Fellow.

Dr. Lynn Jelinski

At time of this study: Professor of Engineering and Director, Center for
Advanced Technology and Office of Economic Development,
Biotechnology Program, Cornell University
Presently: Vice Chancellor for Research and Graduate Studies, Louisiana
State University

Dr. Jelinski's research involves the use of magnetic resonance for studies of biomaterials, including spider silk. Prior to joining Cornell in 1991 and Louisiana State University in 1998, she was head of the Biophysics and Polymer Chemistry Departments at AT&T Bell Laboratories.

She graduated from Duke University (BS) and the University of Hawaii (PhD), both in chemistry. She is on a number of editorial boards and has served nationally in various capacities, including as a member of the Galvin Commission on the Future of the Department of Energy Laboratories. She currently serves on numerous panels and advisory boards, including the

Massachusetts Institute of Technology's Department of Nuclear Engineering and the National Science Foundation's Mathematics and Physical Sciences Division. She has published over 100 papers on her research.

Dr. Carl C. Koch

Professor, Associate Department Head, and Director of Graduate Programs
Materials Science and Engineering Department, North Carolina State Univ.

Dr. Koch's present research interests include non-equilibrium processing, metastable materials, and intermetallic compounds. Current projects are studies of ductility of nanocrystalline materials and metastable structures in polymer alloys.

Dr. Koch received his PhD in metallurgy from Case Western Reserve University (1964) and was an NSF postdoctoral fellow at Birmingham University, England (1964-65). In 1965 he joined Oak Ridge National Laboratory, where he became a group leader in 1970. In 1983 he was appointed professor at North Carolina State University. He is a fellow of the APS, ASM International, and AAAS. He is a member of TMS and MRS. He has received a Department of Energy Metallurgy and Ceramics Award. He was cited in Science Watch (October 1995) for the third highest number of citations per paper in the world for high impact papers in materials science for 1990-1994. Cofounder of three U.S. patents, he has coedited four books and authored or coauthored over 170 papers. He is editor of *Material Science and Engineering A* and associate editor of *Nanostructured Materials*.

Mr. John Mendel

Senior Unit Director, Dispersion Technology
Emulsion Process Division, Eastman Kodak Co.

Mr. Mendel's unit is a particle technology center involved with process research and development, scale-up, technology transfer, and manufacturing support. The unit's scientists and engineers address issues in particle size reduction, dispersion stabilization, process scale-up, process verification, and characterization, as well as resolving day-to-day manufacturing issues. This work involves interaction with Kodak plants worldwide on a variety of nanoparticle systems, including organic dyes and pigments, and important inorganic materials.

Mr. Mendel received his BS degree in Physical Chemistry from the University of Washington in Seattle and his MS degree also in Physical Chemistry from Boston College prior to entering industry at Hercules Development Center. For three years he worked on pigmented polymer systems before joining Kodak in Rochester, New York. He has been with

Kodak for 26 years. For the past nine years he has been the Unit Director for the Dispersion Technology Unit in Kodak's Emulsion Process Division.

Dr. David T. Shaw

Professor, Electrical and Computer Engineering
Executive Director, New York State Institute of Superconductivity
Director, Integrated Nanostructure Characterization Laboratory, State
University of New York, Buffalo

As founding president of the American Association for Aerosol Research (AAAR), Dr. Shaw has been actively involved with the development of nanoparticle technology. Together with Benjamin Liu and David Ensor, he was one of the founding editors-in-chief for the journal *Aerosol Science and Technology*, which is one of the major journals covering the generation, characterization, and applications of nanoparticles. He has published more than 230 journal papers and is the editor of seven monographs on aerosol science and technology. He has lectured extensively in Japan, Europe, and China and is well known for his work on the role of nanoparticles in the fundamental and the applied aspects of superconductivity, and for his work on magnetic and supermagnetic nanoparticles.

Dr. Shaw was a member of the US/USSR and US/OECD delegations on submicron particles, and led the U.S. delegation in a jointly sponsored effort to promote cooperation in the field of superconductivity between the United States and Japan. He is the recipient of the Association Award (1985) and the International Research Fellow Award (1994) from AAAR. Prof. Shaw received a bachelor's degree in Mechanical Engineering from the National Taiwan University and his MS and PhD degrees from Purdue University.

NSF COORDINATOR

Dr. M.C. Roco

Program Director, Directorate for Engineering
National Science Foundation (NSF)

Dr. Roco's area of responsibility at NSF includes chemical and mechanical engineering and the initiatives on functional nanostructures and nanoparticle manufacturing. He was a professor of mechanical engineering at the University of Kentucky (1981-1995) and has been a consultant to industry in the areas of two-phase flow equipment, surface phenomena, computer-aided design, toner-based copy machines, and chemical processing. Dr. Roco was honored as a recipient of the Carl Duisberg

Award in Germany, Gary Leach Award in the United States, special service awards from ASME and AIChE, the ASME Fluids Engineering Award, and as Outstanding Research Professor at the University of Kentucky. He served as associate technical editor for the *Journal of Fluids Engineering* and *Engineering Journal of Flow Visualization* and is currently editor of the *Journal of Nanoparticle Research*. He is credited with 13 inventions, has authored more than 100 archival articles, and has coauthored the books, *Slurry Flow: Theory and Practice* (1991) and *Particulate Two-Phase Flow* (1993). He is a fellow of ASME and is currently chair of the International Multiphase Award Committee (since 1995), chair of the Particle Technology Forum of AIChE (since 1996), and member of the executive committee of the Institute of Multiphase Science and Technology.

OTHER TEAM MEMBERS

Hiroshi Morishita

President, HMI Corporation

Mr. Morishita specializes in ultramicro manipulation technology for microelectromechanical systems. He founded HMI Corporation in 1991 to commercialize his ultramicro manipulator system. He extended his interest and business to the field of archaeological excavating machines and to the new robot manipulator system to help bed-ridden persons. In 1994, he became a consultant to WTEC panel members concerning their study tours in Japan. He graduated from the University of Tokyo (BA, MA in mechanical engineering) and is in the final stages of preparing his doctoral thesis. He was a visiting researcher in the Mechanical Engineering Department (1992 and 1993) and in the Research Center for Advanced Science and Technology (in 1994 and 1995) of the University of Tokyo.

Cecil H. Uyehara

Senior Advisor to WTEC for Japan Operations

President, Uyehara International Associates

Cecil H. Uyehara, president of Uyehara International Associates, is a consultant on U.S.-Japanese relations in the fields of science and technology. He served in the U.S. government for almost 25 years, with the U.S. Air Force (weapons systems planning), the Office of Management and Budget (military assistance), and the Agency for International Development (AID). He has published on Japanese politics, scientific advice and public policy, and Japanese calligraphy. He organized the first U.S. Congressional

hearings on Japanese science and technology, lectures at the U.S. Foreign Service Institute on Japanese science and technology, and has served as a consultant to the *Yomiuri Shimbun* and the Library of Congress on Japanese calligraphy. He received a BA from Keio University and an MA from the University of Minnesota, both in Political Economy. He has received awards and grants from the Ford Foundation, American Philosophical Society, University of Minnesota (Shevlin Fellowship), and the National Institute of Public Affairs.



Figure A.1. Panelists and other team members at the Yaesu Fujiya Hotel in Tokyo, July 1997. From left: David Shaw, John Mendel, Lynn Jelinski, Donald Cox, Carl Koch, Richard Siegel, Herb Goronkin, Mike Roco, Cecil Uyehara, Evelyn Hu, Hiroshi Morishita.

