

# Professor Gary W. Rubloff

Minta Martin Professor of Engineering and Director, Maryland NanoCenter

Professor, Department of Materials Science and Engineering and the Institute for Systems Research

Affiliate Professor, Institute for Research in Electronics and Applied Physics, Fischell Department of Bioengineering, Department of Electrical and Computer Engineering

Membership: Maryland NanoCenter, University of Maryland Energy Research Center

## University of Maryland at College Park

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Clarksville, MD 21029-1353  
(301) 854-0898

## EXPERIENCE

2004-present: Minta Martin Professor of Engineering, University of Maryland, College Park

1996-present: Professor, [Department of Materials Science and Engineering](#)  
and the [Institute for Systems Research](#)  
University of Maryland at College Park

2009-present: Director, Center for Nanostructures for Electrical Energy Storage, a DOE Energy Frontier Research Center led by the University of Maryland

2004-present: Founding Director, [Maryland NanoCenter](#)  
University of Maryland at College Park

**Affiliate Member:** [Institute for Research in Electronics and Applied Physics](#), [Fischell Department of Bioengineering](#), [Department of Electrical and Computer Engineering](#),  
University of Maryland, College Park

2001-present: Visiting Scientist, [FBK-IRST](#), Trento, Italy

1996-2001: Director, [Institute for Systems Research](#)  
University of Maryland at College Park

1993-1996: North Carolina State University, Associate Director, NSF Engineering Research Center for Advanced Electronic Materials Processing  
Thrust Area Leader, Equipment and Process Integration  
Professor, Department of Electrical and Computer Engineering

1992-1997: Yale University, Professor Adjunct, Department of Electrical Engineering

1973-1993: [IBM Thomas J. Watson Research Center](#), Yorktown Heights, NY

1992-1993: Manufacturing Research Department,  
Manager of Thin Film Process Modeling

1985-1991: Silicon Technology Department,  
Manager and Senior Manager in Thin Film Materials and Processing

1984-1985: Technical Assistant to J. A. Armstrong, IBM Research Vice-President for Logic and  
Memory

1973-1984: Physical Sciences Department, Research Staff Member

**1971-1973: Brown University, Research Associate in Physics**

## **EDUCATION**

**Ph.D., Physics, The University of Chicago, December, 1971**

Fannie and John Hertz Foundation Fellow

Ph.D. thesis: "Far Ultraviolet Reflectance Spectra and the Electronic Structure of Ionic Crystals",  
advisor H. Fritzsche

**M. S., Physics, The University of Chicago, September, 1967.**

**B. A., Physics, Dartmouth College, June, 1966**

Magna cum laude, Phi Beta Kappa, High distinction in Physics Honors Program

B.A. thesis: "Diagnostic Techniques in a Pulsed, Magnetically Confined Plasma", advisor F. I. Boley

## **ACCOMPLISHMENTS**

**Refereed publications ~200, invited conference talks >60**

**21 patents issued**

35 IBM patent publications, invention disclosures >90

### **Research:**

Biomaterials and bioMEMS for biochemical reaction process sequences; bio-assisted nanoassembly; novel approaches combinatorial materials research; semiconductor materials, processing, equipment, and underlying science for silicon and wide-gap semiconductor technology; real-time chemical sensors, metrology, and advanced process control; science and technology for advanced interconnects; mechanisms for chemical reaction processes at the macro and micro scales; innovative equipment design; dynamic simulation of equipment, process, and factory integration; environmental systems engineering in manufacturing; combinatorial and informatics approaches to materials development; biomaterials and bioMEMS technology; simulation-based electronic learning systems; ultraclean, integrated processing for manufacturing; advanced dielectric structures; thermal oxidation; CVD; novel diagnostics and characterization; metal/Si interfaces and silicides; metal/polymer interfaces; dynamic high-speed testing; time-resolved surface reactions; molecular reactions on metal and oxide surfaces; surface optical properties; optical properties of solids

### **Management:**

Currently Founding Director of Maryland Center for Integrated Nano Science and Engineering; served as Director of U. Maryland's Institute for Systems Research 1996-2001; founding Chairman of Manufacturing Science and Technology Group in the American Vacuum Society; initiated collaboration between U. Maryland and North Carolina State U. NSF ERC's; industrial research management in advanced materials, processing, and manufacturing research; establishment of research thrusts in ultraclean, integrated processing; external research funding (government and consortium); leadership in identifying and promoting new thrust areas in professional societies; successful redirection of research programs; interactions across department and divisional lines within IBM; collaborations with universities and government labs; participation on agency review panels and consortium workshops

### **Education:**

Initiated program in application of dynamic simulation tools to learning environments for use by a broad range of students; developed new course on advanced semiconductor processing science and technology; guided postdocs with science background into advanced technology contributors

## **HONORS**

**Gaede-Langmuir Prize, American Vacuum Society, 2000** “for the inventive application of surface science and vacuum technology to the semiconductor industry, and for fostering an effective bridge between AVS research and manufacturing”. This award is presented biennially “to recognize and encourage outstanding discoveries and inventions in the sciences and technologies of interest to the American Vacuum Society”. It consists of a \$10,000. cash prize, a plaque, an award lecture and travel support to the National Symposium.

**Fellow of the American Vacuum Society (AVS)**, elected 1993 (first year of program)

**Fellow of the American Physical Society (APS)**, elected 1986

**Six Invention Achievement Awards, IBM Research Division**

**IBM Research Division Award for MCP Chromium Metallurgy, 1986**

**Founding Chairman, Manufacturing Science and Technology Group of the American Vacuum Society**

**Elected office, American Vacuum Society:**

Board of Directors, 1995-1997

**Elected office, American Vacuum Society Electronic Materials and Processing Division:**

Secretary, 1990-1997

Chairman and Program Chairman, 1987 (Vice-Chairman, 1986)

Executive Committee member, 1981-1983

**Elected office, American Physical Society Division of Materials Physics:**

Executive Committee Member-at-Large, 1993-1996

**Senior Member of the Institute of Electrical and Electronics Engineers (IEEE)**

**Research Fellowship at the Miller Institute for Basic Research in Science**, University of California, Berkeley, 1971 (not used)

## **CURRENT RESEARCH AND EDUCATION INTERESTS**

**Biomaterials and bioMEMS:** materials processing & characterization; microfactories for bioprocess engineering; chem-bio sensors and strategies; novel approaches to chemical sensing; bio-assisted nanoassembly

**Semiconductor materials and processes:** CVD process, equipment, & in-situ chemical sensing; advanced interconnects - metal CVD/ALD & low-K dielectrics; combinatorial materials processing; dynamic simulation of process & equipment

**Semiconductor manufacturing:** in-situ sensors and process metrology; advanced process control, including real-time/run-to-run course correction and fault management; spatially programmable reactor design; environmentally-benign semiconductor manufacturing; integrated, hierarchical modeling

**Education and training:** software/simulation architectures for electronic learning systems, applications in materials & processes, manufacturing, environment

## ***PERSONAL AND CIVIC ACTIVITIES***

Born: June 13, 1944, Peoria, Illinois

Family: Married, 2 children (ages 23 and 21)

### **Board of Education member (11+ years)**

Elected official of New York State, Katonah-Lewisboro School District  
President, 1992-1993; Vice-President, 1989-1992; Member, 1982-1989

### **Town of Bedford (NY) - Appointed Representative**

Community Development Advisory Group, U.S. Dept. of Housing and Urban Development  
Established Federal designation of Katonah NY Neighborhood Preservation Area  
Several Town Committees for planning and transportation issues (involving negotiations with New York State and Metro North Railway)  
Senior Citizens' Housing Committee

### **Other**

Katonah Village Improvement Society Executive Committee  
Dartmouth Alumni Fund representative  
Sunday School teacher - teen-agers

## ***INDUSTRY AND CONSORTIUM ACTIVITIES***

### **Semiconductor Industry Associates (SIA)**

Semiconductor Industry Associates (SIA) Metrology Technology Working Group member, 1997-present, International Technology Roadmap for Semiconductors.  
Semiconductor Industry Associates (SIA) Metrology Crosscut Working Group member, 1995.  
Group leader, Process Control Sensors, for Sematech Materials and Bulk Processes Metrology Workshop to revise SIA / NTRS Roadmap, May 5-6, 1994.

### **Inficon, Inc., East Syracuse, NY**

Formal collaboration under beta-site agreement for assessment of mass spectrometry and other sensor hardware, software, and applications in CVD and etching  
Equipment donation recipient (mass spectrometry and other sensor systems)

### **Sematech**

IBM Representative to Equipment Process Modeling and Control Advisory Council, 1993.

### **Semiconductor Research Corporation (SRC)**

SRC Technology Transfer Course, "Sensing and Simulation for Environmentally-Conscious Manufacturing", NCSU, 11/16/95.  
University Advisory Council, 1994-1997

### **CVC Products, Inc., Rochester, NY, and Fremont, CA**

Collaboration plan for NSF proposal on "Simulator-Based Manufacturing Education and Training for Microelectronics Processing".

### **Visual Solutions, Inc., Westford, MA**

Collaboration plan for NSF proposal on "Simulator-Based Manufacturing Education and Training for Microelectronics Processing".  
Software beta site.

## ***CONSULTING – TECHNOLOGY AND INTELLECTUAL PROPERTY***

**Advanced Micro Devices**

**Dow Chemical**

**Inficon**

**Balzers Process Systems**

**LG Philips LCD, LG Display**

**AG Associates**

**Novellus Systems**

**Bain Inc.**

**STMicroelectronics**

## **GOVERNMENT AGENCY ACTIVITIES**

### **National Science Foundation**

- NSF Engineering Research Center Blue Ribbon Panel II, 2008
- NSF review panel for MRI/IMR equipment proposals, 2004.
- National Visiting Committee for the NSF Advanced Technological Education (ATE) program "Cross-Training Technicians and Engineers for Semiconductor Manufacturing" at the University of New Mexico, 1999-2002.
- NSF Committee of Visitors for Engineering Education and Centers Directorate, 2001
- NSF Engineering Research Center Blue Ribbon Panel, 1999-2000.
- National Visiting Committee for NSF Mid-America Earthquake Center at the University of Illinois, Urbana, July 8, 1999.
- NSF Panel, Institute for Civil Infrastructure Systems, Aug. 28-29, 1997.
- NSF Panel, Supplements to Engineering Research Centers for Research Opportunities for Graduates Outreach, Nov. 14, 1996.
- NSF/DOE Workshop, Basic Research Needs for Environmentally Responsive Technologies of the Future, New Orleans, Jan. 4-6, 1996.
- NSF Chemical and Thermal Systems Division Workshop on Research Needs in the Manufacturing Process Industries, Washington, D.C., Dec. 2-4, 1992.
- NSF Engineering Education Coalitions Phase I Review, Washington, D.C., July 19-21, 1992.
- NSF Workshop on Evaluating the Outcomes of NSF Center Programs, Washington, D.C., Jan. 21-23, 1992.
- NSF Science and Technology Site Review Team, 1990.

### **National Nanotechnology Initiative**

- Grand Challenge Workshop on Instrumentation and Metrology for Nanotechnology, NIST, Jan 27-29, 2004.

### **NSF Engineering Research Centers**

- IBM Representative to Industrial Advisory Board for North Carolina ERC for Advanced Electronic Materials Processing
- IBM Representative to Industrial Advisory Board for Wisconsin ERC for Plasma-Aided Manufacturing

### **Department of Energy**

- DOE Workshop on The Application of Positron Spectroscopy to Materials Sciences, Rancho Mirage, CA, Sept. 9-11, 1992.

**DOE Panel on Interfacial Bonding and Adhesion Workshop in Aspen, Colorado, Aug. 11-16, 1985**  
(Polymer and Semiconductor subgroups).

## **UNIVERSITY ACTIVITIES**

### **Courses taught:**

- University of Maryland, ENMA 490, Capstone Design, Spring, 2007.
- University of Maryland, ENMA 181, Introduction to Nanotechnology, Fall, 2006
- University of Maryland, ENMA 490, Capstone Design, Spring, 2006.
- University of Maryland, ENMA 465, Microprocessing of Materials, Spring, 2004.
- University of Maryland, ENMA 490, Capstone Design, Fall, 2003.
- University of Maryland, ENMA 465, Microprocessing of Materials, Spring, 2003.
- University of Maryland, ENMA 490, Capstone Design, Fall, 2002.
- University of Maryland, ENMA 489B/363, Microprocessing of Materials, Spring, 2002.
- NSF Workshop, "EquiPSim: Hands-on Training in Semiconductor Equipment and Process Behavior", G. W. Rubloff, Seventh Annual Conference/Workshops on Advanced Technological Education in Semiconductor Manufacturing, Austin, TX, July 30-Aug. 3, 2001.
- NSF Workshop, "Using Simulation-Based Learning Systems for Training in Semiconductor Manufacturing Equipment and Processes", G. W. Rubloff and A. Rose, Sixth Annual

Conference/Workshops on Advanced Technological Education in Semiconductor Manufacturing, Lake Buena Vista, FL, July 31-Aug. 4, 2000.  
 University of Maryland, ENSE 623 / ENPM 643 / ENMA 659S, Systems Design for Microelectronics Manufacturing Processes, Fall 1999 and Fall 2000.  
 University of Maryland, ENSE 623 / ENPM 643, Systems Engineering Design Project, Fall, 1998.  
 University of Maryland, ENMA 659S / ENEE 719S, Materials and Processes for Microelectronics, Spring 1997 and Spring 1998.  
 North Carolina State University, ECE 211, Electric Circuits I, Fall, 1995.  
 SRC Technology Transfer Course, "Sensing and Simulation for Environmentally-Conscious Manufacturing", NCSU, Nov. 16, 1995.  
 North Carolina State University, ECE 538, Integrated Circuits Technology and Fabrication (with C. Osburn) Fall, 1994.  
 Yale University, E&AS 929b, "Integrated Processing Science and Technology for Microelectronics", Spring, 1992.

**Current research supervision:**

Parag Banerjee	PhD	UMCP	Materials Science and Engineering
Michael Carrier	MS	UMCP	Materials Science and Engineering
Marshall Schroeder	PhD	UMCP	Materials Science and Engineering
Xinyi Chen	PhD	UMCP	Materials Science and Engineering
Jordan Betz	PhD	UMCP	Materials Science and Engineering
Alexander Kozen	PhD	UMCP	Materials Science and Engineering
Brad Zayac	BS	UMCP	Materials Science and Engineering
Keith Gregorczyk	PhD	UMCP	Materials Science and Engineering
Lauren Haspert	PhD	UMCP	Materials Science and Engineering
Yi Cheng	Postdoc	UMCP	Materials Science and Engineering

**Prior research supervision:**

Erin Robertson	PhD	UMCP	Materials Science and Engineering
Israel Perez	PhD	UMCP	Materials Science and Engineering
Laurent Henn-Lecordier	PhD	UMCP	Institute for Systems Research
Susan Buckhout-White	PhD	UMCP	Materials Science and Engineering
Marshall Schroeder	BS	UMCP	Materials Science and Engineering
Xiaolong Luo	PhD	UMCP	Bioengineering
Dean Berlin	MS	UMCP	Bioengineering
Jeff Gair	BS	UMCP	Bioengineering
Nicholas Mostovych	BS	UMCP	Materials Science and Engineering
Hyunmin Yi	Asst Res Scientist		Materials Science and Engineering
Anne Rose	Res Eng	UMCP	Human-Computer Interaction Laboratory
Jung Jin Park	PhD	UMCP	Materials Science and Engineering
Wei Lei	PhD	UMCP	Materials Science and Engineering
Yuhong (Joann) Cai	PhD	UMCP	Materials Science and Engineering
Soon Cho	PhD	UMCP	Materials Science and Engineering
Erin Dreyer	MS	UMCP	Materials Science and Engineering
Melissa Considine	BS	UMCP	Materials Science and Engineering
Mark Hanna	BS	UMCP	Materials Science and Engineering
Daniel Janiak	BS	UMCP	Materials Science and Engineering
Theresa Valentine	BS/MS	UMCP	Materials Science and Engineering
Tomomi Ino	Staff		Toshiba Corporate Manufacturing Center
De-Hao Tsai	PhD	UMCP	Materials Science and Engineering
Jessica Jensen	BS (REU)	U. Arizona	Chemical Engineering
Kriti Srivastava	BS (REU)	Rutgers	Chemical Engineering
Ting Zhang	BS (REU)	Purdue	Computer Science
Yijun Liu	Postdoc	UMCP	Institute for Systems Research
Momodou Fofana	MS	UMCP	Systems Engineering
Adam Melvin	BS (REU)	U. Arizona	Chemical Engineering

Mark Kastantin	BS (REU)	MIT	Chemical Engineering
SunJun Park	BS (REU)	NCSU	Electrical and Computer Engineering
Brian Conaghan	MS (12/99)	UMCP	Materials Science and Engineering
Yiheng Xu	PhD (12/00)	UMCP	Materials Science and Engineering
Eric Weisman	Undergrad	U. Arizona	Chemical Engineering
Mark Kastantin	Undergrad	MIT	Chemical Engineering
David Green	Staff	UMCP	Chemistry
Theodosia Gougousi	Postdoc	UMCP	ISR/Materials Science and Engineering
Ben Levy	Postdoc	UMCP	Institute for Systems Research
Zhiping (Rock) Shi	MS	UMCP	Electrical & Computer Engineering
Nayanee Gupta	MS	UMCP	Materials Science and Engineering
Ramaswamy Sreenivasan	MS	UMCP	Chemical Engineering
John Kidder	Postdoc	UMCP	ISR/Materials Science and Engineering
Yatin Sankholkar	MBA	UMCP	Business and Management
David Eckard	BS	NCSU	Electrical & Computer Engineering
Dheeraj Joshi	BS	UMCP	Chemical Engineering
Peter Joshua Wolf	MS	NCSU	Materials Science and Engineering
Monalisa Bora	MS	NCSU	Electrical and Computer Engineering
Nabil Rabbani	MS	NCSU	Electrical and Computer Engineering
Laura L. Tedder	Postdoc	NCSU	NSF Center for AEMP
Guangquan Lu	Postdoc	NCSU	NSF Center for AEMP
Iqbal Shareef	PhD	RPI	Chemical Engineering
Brian Conaghan	BS	Cornell	Chemical Engineering
Natasha Kositsyna	BS	UMCP	Computer Science

Approximately 15 postdocs worked under my direct supervision while I was at IBM Research.

**Thesis committees of other students:**

Angela Lewandowski	PhD		UMCP	Bioengineering (Bentley)
Rohan Fernandes	PhD		UMCP	Bioengineering (Bentley)
Rama Sreenivasan	PhD	spring 2007	UMCP	Chemical & Biomolecular Engineering
(Adomaitis)				
Jun Li	PhD	spring 2006	UMCP	Bioengineering (Bentley)
Rinku Parikh	PhD	fall 2006	UMCP	Chemical & Biomolecular Engineering
(Adomaitis)				
Chia-Wen Tsao	PhD		UMCP	Mechanical Engineering (DeVoe)
Shuan Yang	PhD		UMCP	Mechanical Engineering (DeVoe)
Akhil Singhal	MS	spring 2001	UMCP	Materials Science & Engineering
Li Ling	PhD	spring 2006	UMCP	Materials Science & Engineering (Oehrlein)
Hsiao-Yang Chang	PhD	spring 2000	UMCP	Chemical Engineering (Adomaitis)
Sean Gahagan	PhD		UMCP	Mechanical Engineering (Herrmann)
Nima Ghalichechian	MS	spring 2004	UMCP	Electrical & Computer Eng (Ghodssi)
Doug Kremer	PhD		UMCP	Chemical Engineering (Ehrman)
Chichang Zhang	PhD		UMCP	Materials Science & Engineering (Christou)
Sonam Shah	PhD		UMCP	Materials Science & Engineering (Phaneuf)
Sarah Hewitt	MS		UMCP	Mechanical Engineering (Herrmann)
Akhil Singhal	MS	spring 2001	UMCP	Materials & Nuclear Eng (Kidder)
Xiang Wang	MS	spring 2002	UMCP	Materials & Nuclear Eng (Oehrlein)
Stephanie Chanut	MS		NCSU	Materials Science & Engineering
Yi-hung Lin	PhD		UMCP	Chemical Engineering (Adomaitis)

**University of Maryland Service:**

Founding Director, Maryland NanoCenter, 2004-present



- Member, Review Committee for IREAP Director, 2010
- Member, Maryland NanoCenter Steering Committee, FabLab Committee, NispLab Committee  
Graduate Program Committee, MSE Department, 2008-present
- Member, Physics Dept. Faculty Search Committee, 2006-2008
- Chair, Ad Hoc Committee for Maryland Nano-Bio Science and Technology Initiative
- Member, Campus Intellectual Property Committee, 2005-2008
- Member, IREAP Director Search Committee, 2005-2006
- Chair, FabLab Manager Search Committee, 2004.
- Member, Faculty Search Committee, Dept. of Materials Science and Engineering, 2004-2005.
- Member, Faculty Search Committee, Dept. of Chemistry/Biochemistry, 2004-2005.
- Member, Search Committee for Director, Office of Research Administration and Advancement, 2004.
- Director, Laboratory for Advanced Materials Processing (LAMP), Dept. of Materials Science and Engineering, 2001-present.
- Member, Search Committee for Chair, Dept. of Materials Science and Engineering, 2002-2003.
- Member, Provost's Committee on Intellectual Property, 2002.
- Member, Nanotechnology Search Committee for Dept. of Materials and Nuclear Engineering, 2001-2002.
- Chair, Committee to Construct Conflict of Interest and Conflict of Commitment Policy and Procedures for University of Maryland, College Park, 2001.
- Chair, APT Subcommittee for Professor of the Practice, Dept. of Materials and Nuclear Engineering, 2001.
- Member, Search Committee for Director, Institute for Plasma Research, 2001.
- Member, Search Committee for Dean of Engineering, 1999-2000.
- Member, MNE Microelectronics Search Committee, 1999.
- Member, Advisory Board, Small Smart Systems Center, College of Engineering, 1999.
- Member, Search Committee for Executive Director, Maryland Applied Information Technology Initiative, 1999.
- Chair, Promotion Subcommittee, Dept. of Materials and Nuclear Engineering APT Committee, 1998.
- Member, Committee on PhD Qualification, Dept. of Materials and Nuclear Engineering, 1998.
- Member, Internal Advisory Committee, University of Maryland Materials Research Science and Engineering Center, 1996-present.
- Member, MNE Microelectronics Search Committee, 1998.
- Member, Five Year Chair Review Committee for Department of Materials and Nuclear Engineering, 1997-1998.
- Member, University Committee on Indirect Cost Rates, appointed by UMCP Associate Provost for Research and Dean of the Graduate School I. Nagel, 1998, chaired by N. Farvardin, Chair of Electrical Engineering.
- Member, Search Committee for UMCP Dean of the College of Education, 1998, appointed by Provost G. Geoffroy, chaired by J. Harris, Dean of the College of Arts and Humanities.
- Member, University Committee on Sponsored Research, appointed by UMCP Associate Provost for Research and Dean of the Graduate School I. Nagel, 1998, chaired by P. Mazzocchi, Dean of the College of Life Sciences.

## **PROFESSIONAL SOCIETY ACTIVITIES**

### **Co-Chair, AVS-ALD Atomic Layer Deposition 2011 Conference**

Cambridge, MA, June 26-29, 2011, co-chair with Dr. Jill Becker

### **American Vacuum Society, Manufacturing Science and Technology Group:**

Member, Executive Committee, 1994-present.

Founder and First Chair, 1994-1999.

### **American Vacuum Society:**

Board of Directors, 1995-1997.

### **American Vacuum Society, Electronic Materials and Processing Division:**

Secretary, 1990 – 1997.

Member, Long Range Planning Committee, 1992 – 1997.

Chairman and Program Chairman, 1987 (Vice-Chairman, 1986).

Executive Committee member, 1981-1983.

### **Materials Research Society:**

Member, Grass Roots Education Committee, 1992-1994.

### **American Physical Society:**

Executive Committee Member-at-Large, Division of Materials Physics, 1993-1996.

Fellow, 1986.

### **Institute of Electrical and Electronics Engineers:**

AVS liaison to IEEE TAB Steering Committee for Design and Manufacturing Engineering

Senior Member, 1993.

**Member: AVS, IEEE, MRS, APS**

## **EDITORIAL ACTIVITIES**

Editorial Board, Journal of Vacuum Science and Technology, 1988-1992, 1995-1997.

Co-Editor (with M. Liehr), Primer for American Vacuum Society Topical Conference on "A Key to Competitiveness: The Science and Technology of Manufacturing", AVS Nat'l. Symp., Nov. 15-19, 1993, Orlando, FL.

Co-Editor (with Y. I. Nissim and A. Katz), "Integrated Processing for Micro- and Optoelectronics", Proceedings of European MRS Symposium D, Strasbourg, France, May 4-7, 1993, Microelectronic Engineering Vol. 25, No's. 2-4, August 1994, pp. 91-374 (North-Holland, Amsterdam, 1994).

Co-Editor (with R. J. Nemanich, C. R. Helms, and M. Hirose), "Chemical Surface Preparation, Passivation and Cleaning for Semiconductor Growth and Processing", Proceedings of 1992 MRS Spring meeting Symposium B, Vol. 259 (Materials Research Society, Pittsburgh, Pa., 1992).

Editor, "Deposition and Growth: Limits for Microelectronics", Proceedings of the Topical Conference held at the 1987 American Vacuum Society meeting (AIP Conf. Proc. No. 167, No. 4 in AVS series).

## **CONFERENCE ORGANIZATION ACTIVITIES**

Program Committee, 2005 International Conference on Characterization and Metrology for ULSI Technology, University of Texas at Dallas, March 15-18, 2005.

Program Committee, 2003 International Conference on Characterization and Metrology for ULSI Technology, Austin, TX, March 24-28, 2003.

Executive Committee Member and past-Chair, Manufacturing Science and Technology Group, American Vacuum Society.

Program Committee member, Manufacturing Science and Technology Group, AVS National Symposium 2000, 2001, 2002, 2003.

Member, Metrology Technology Working Group, Semiconductor Industry Associates' International Technology Roadmap for Semiconductors. 1994 - present.

Program Committee, Workshop on "Semiconductor Characterization: Present Status and Future Needs II", NIST, Gaithersburg, MD, June 26-29, 2000.

Chairman, American Vacuum Society Manufacturing Science and Technology Group Program Committee, AVS Nat'l. Symp., Baltimore, MD, Nov. 2-6, 1998.

Program Committee, Workshop on "Semiconductor Characterization: Present Status and Future Needs II", NIST, Gaithersburg, MD, March 30 - April 3, 1998.

Co-Organizer, Sematech Topical Workshop on "Economic and Technical Issues in Optimizing Plasma Processes to Minimize Environment, Safety and Health Impacts", Austin, TX, July 1-2, 1996.

Chairman, American Vacuum Society Topical Conference on Manufacturing Science and Technology, AVS Nat'l. Symp., Denver, CO, Oct. 24-28, 1994.

Chairman, American Vacuum Society Topical Conference on "A Key to Competitiveness: The Science and Technology of Manufacturing", at AVS Nat'l. Symp., Orlando, FL, Nov. 15-19, 1993.

Co-Organizer, European Materials Research Society, "Integrated Processing for Micro- and Optoelectronics", Symposium B, Strasbourg, France, June, 1993.

Co-Organizer, Materials Research Society, "Chemical Surface Preparation, Passivation and Cleaning for Semiconductor Growth and Processing", Symposium B, MRS Spring meeting, San Francisco, CA, April 27-29, 1992.

Organizer, American Vacuum Society, session on "Microelectronics Challenges and Integrated Materials Processing", 1989.

Organizer, American Vacuum Society Topical Conference on "Deposition and Growth: Limits for Microelectronics", 1987.

Electronic Materials and Processing Division, American Vacuum Society  
Program Committee, 1990.  
Program Committee, 1986

Program committee, IEEE Semiconductor Interface Specialists Conference 1987.

Co-organizer, IBM Europe Institute Conference on Thin Films and Interfaces, Davos, Switzerland, August 13-17, 1984.

## **SIGNATURE**

