



corporation.

University of California, Berkeley, Cal. 1988–1998

*McKay Lecturer, Department of Electrical Engineering and Computer Science*

Taught graduate seminars in plasma processing and display technology, conducted research in semiconductor processing such as plasma sources for pattern definition and extreme UV lithography semiconductor technology at University of California and Lawrence Livermore Laboratories.

AT&T Bell Laboratories, Murray Hill, New Jersey

1977–1989

*Distinguished Member of Technical Staff*

Pioneering research in plasma etching, plasma, chemical vapor deposition, optoelectronics materials processing. Discovered/patented novel plasma chemistries and plasma sources, directional plasma CVD, fluorinated silicon nitride, oxygen enhanced diamond film deposition, laser-induced fluorescence diagnostics, photochemical-distillation purification technology. Managed design, purchase, installation and operations of Materials Research Division computer network. Personally did systems software support. Developed prototype instrumentation, computer hardware and Unix software to automate laboratory experiments. Member of patent and licensing review committees.

Texas A&M University, College Station, Texas

1972–1976

*Assistant Professor*

Taught core chemical engineering courses and performed research directed to air pollution chemistry and analyses. Developed exhaust and ambient air sampling and analysis techniques in collaboration with the EPA and Texas State Air Control Board. Research in corona discharge purification and ozone generation.

### Other Employment:

Crystalline Materials, San Ramon, Cal., *Founder and Vice President of Research and Development*. Invented and developed diamond manufacturing technology

Mattson Technology, Sunnyvale, Cal., *Vice President of Technology*. Managed process and product development

Solid State Technology, *West Coast Editor*. Reported technology news, wrote articles, gathered and reviewed content.

Foxboro Company, Foxboro, Mass., *Senior Design Programmer*. Designed and coded process control programs, direct digital control drivers and application software, supervised compiler and assembler subcontracts.

Stanford University and NASA Ames Research Center, Stanford/Mountain View Cal. *Summer Faculty Fellow*. Developed air purification technology for space cabin atmospheres.

Texas State Air Pollution Control Services, Austin, Texas. *Consultant*. Developed new techniques for source and ambient air pollution sampling and analysis.

Shell Development Co., Shell Chemical Co., Emeryville, Cal. and New York City. *Engineer*. Simulated chemical refinery problems.

Moleculon Corp., Cambridge, Mass. *Consultant*. Programmed computational chemistry codes.

IBM Corp., Santurce, Puerto Rico. *Systems Engineer*. Designed and programmed business and accounting applications.

### Short Course Instructor/Director

Continuing Education Seminars, Plasma Etching Technology, Plasma Chemical Vapor Deposition, Laser-Induced Fluorescence

organizations such as SEMI (Semiconductor Equipment and Materials Institute), IUPAC (International Union of Pure and Applied Chemistry), SPIE (International Society for Optical Engineering) and University of California Berkeley Continuing Education.

### Selected Board and Committee Memberships

MIT Educational Counselor (2004- present), No. Calif. Plasma Etch Users' Group (1991- present), SEMI Technology Symposium, (2000-2005); Board of Directors, Yield Up International Corporation, (1998- 2000), National Research Council, Panel for NIST CST Program Assessment, (1997-2000), National Science Foundation, Technology Center Review Board, 1988, IUPAC Subcommittee on Plasma Chemistry, (1980-1987), AWWA Joint Task Group, Std. Methods Dissolved Ozone (1978- 1985), National Science Foundation CPE Advisory Board, (1981- 1983), National and international technical meeting/conference organizer, chair, committee member for professional societies such as American Vacuum Society, SEMI, IUPAC, Gordon Conferences and SPIE.

### Misc. Honors, Awards

Japan Society for the Promotion of Science Fellowship, Bell Laboratories Exceptional Contribution Award (for discovery and development of fluorinated PECVD nitride), Tegal Corporation Thinker Award, Bell Laboratories Exceptional Contribution Award (for development and support of a divisional computer system), Bell Laboratories Distinguished Member of Technical Staff Award, Bell Laboratories Lump Sum Award (for conception and development of low pressure gaseous etching), NASA Certificate of Recognition for "Corona Discharge Air Purification System," NASA Certificate of Recognition for "Electric Discharge for Treatment of Trace Contaminants," National Science Foundation Graduate Fellowship.

### Technical Publications/Patents

Author of more than 150 articles and books in areas such as materials processing, plasma chemistry and physics, air pollution and general chemical engineering. Inventor/Co-Inventor of more than 20 U.S. patents.

#### *Samples, in the Area of Semiconductor Processing*

Multi-Temperature Processing, U.S. Pat. RE40,264, Apr. 29, 2008.

Process Depending on Plasma Discharges Sustained by Inductive Coupling, U.S. Pat. 6,017,221, Jan. 25, 2000

Process Optimization in Gas Phase Dry Etching, U.S. Pat. 5,711,849, Jan. 29, 1998

Device Fabrication by Plasma Etching, U.S. Pat. 4,314,875, Feb. 9, 1982

Plasma Etching of Silicon, U.S. Pat. 4,310,380, Jan. 12, 1982.

Devices and Process for Producing Devices Containing Silicon Nitride Films, U. S. Pat. 4,960,656, Oct. 2, 1990.

*Plasma Etching, An Introduction*, Academic Press, 1989.

Plasma Etching (with J.A. Mucha), Ch. 15 in *The Chemistry of the Semiconductor Industry*, S.J. Moss and A. Ledwith eds., Chapman and Hall, 1987.

Profiles and Chemistry Effects in Polysilicon and Tungsten Silicide EPROM "Stack" Etching, with R. Sadjadi and J. R. Perry, p.; p24 in SPIE Proc. Vol. 1803, 1993.

Anisotropic Etching of SiO<sub>2</sub> in Low-Frequency CF<sub>4</sub>/O<sub>2</sub> and NF<sub>3</sub>/Ar Plasmas

Hydrogen Passivation of Point Defects In Silicon, with J.L. Benton, C. J. Doherty, S.D. Ferris, L. C. Kimerling, and H. J. Leamy, Appl. Phys. Lett., p. 670, 1980.

Plasma Etching for III-V Compound Devices, Part I, Part II, with D. Ibbotson, in Solid State Technology, p. 77, Oct. 1988, p. 105, Nov. 1988.