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**Mark J. Kushner**

University of Michigan

Electrical Engineering and Computer Science Department

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**Academic Experience:**

*University of Michigan*

2008-present George I. Haddad Collegiate Professor, Electrical Engineering & Computer Science Dept.  
Professor, Nuclear Engineering and Radiological Sciences Dept.,  
Applied Physics Program, Chemical Engineering Dept.  
Director, Michigan Institute for Plasma Science and Engineering  
Director, Graduate Certificate Program in Plasma Science and Engineering  
Director, Dept. of Energy Center on *Control of Plasma Kinetics* (2009-present)

*Eindhoven University of Technology, The Netherlands*

2016 – 20 Distinguished Professor

*Iowa State University*

2005-2008 Dean, College of Engineering  
James Melsa Professor of Engineering, Dept. of Electrical & Computer Engr.  
Affiliate: Depts. of Materials Science & Engr., and Chemical & Biological Engr.

*University of Illinois at Urbana-Champaign*

1999-2004 Founder Professor of Engineering  
1991-2004 Professor, Department of Electrical and Computer Engineering  
2002-2004 Interim Head of Chemical and Biomolecular Engineering  
2001 Interim Head of Electrical and Computer Engineering  
2000 Interim Associate Dean of Administrative Affairs, College of Engineering  
1994-1995 Assistant Dean of Academic Programs, College of Engineering  
Affiliate: Dept. of Material Science and Engr. Dept. Mechanical and Industrial Engr.  
Dept. of Nuclear Engineering Dept. of Physics  
Dept. Chemical and Biomolecular Engr.  
Research Professor, Micro- and Nanotechnology Laboratory  
Associate Member, Beckman Institute  
1988-1991 Associate Professor, Electrical and Computer Engineering  
1986-1988 Assistant Professor, Electrical and Computer Engineering

*California Institute of Technology*

1979-1980 Weissmann Postdoctoral Research Fellow of Applied Physics  
1976-1979 Teaching and Research Assistant, Department of Applied Physics

**Education:**

PhD Applied Physics, California Institute of Technology, 1979  
MS Applied Physics, California Institute of Technology, 1977  
BS Nuclear Engr. (Summa Cum Laude), University of California at Los Angeles, 1976  
BA Astronomy (Summa Cum Laude), University of California at Los Angeles, 1976

### **Industrial and National Laboratory Experience:**

1983-1986 Principal Research Scientist, and Director of Electron, Atomic, and Molecular Physics, Spectra Technology, Inc., Bellevue, WA  
1981-1983 Physicist (Member of Technical Staff), Advanced Lasers and Laser Isotope Separation Programs, Lawrence Livermore National Laboratory, Livermore, CA  
1980-1981 Physicist (Member of Technical Staff), Laser Analytical Spectroscopy Division, Sandia National Laboratory, Albuquerque, NM

### **Consulting Activities (Partial Listing):**

E. I. DuPont de Nemours and Company	Applied Microwave Power Concepts, Inc.
Standard Oil Research Laboratories	Spectra Technology, Inc.
Los Alamos National Laboratory	Tetra Inc.
CVC, Inc.	Laser Technics
General Electric R&D Center	Applied Photolysis Technology
Energy and Environmental Res. Corp.	Advanced Micro Devices
Material Research Corporation	Becton-Dickinson and Company
LAM Research Corp.	Applied Materials Corp.
Nixon & Vanderhye P.C.	Mattson Technologies
Smart and Biggar-Fetherstonhaugh & Co..	Frommer, Lawrence & Haug LLP
Finnegan, Henderson, Farabow, Garret, & Dunn	Phoenix Science and Technology
Brinks, Hofer, Gilson and Lione	Heller Ehrman Attorneys
Cravath, Swaine and Moore	3M, Inc.
Sandia National Laboratory	Ngen Partners
PlasmaTherm, Inc.	Martine-Penilla Group LLP
Wilmer-Hale, Inc.	Rothwell Figg IP Professionals

### **Awards and Honors:**

Plasma Chemistry Award, International Society for Plasma Chemistry, 2017  
Distinguished Technical Lecture, Dept. Nuclear Engineering, North Carolina State Univ., 2017  
Bikerman Lecture, Dept. of Chemical & Biomolecular Engr., Case Western Reserve Univ., 2016.  
Doctor Honoris Causa, Eindhoven University of Technology, The Netherlands, 2016  
Distinguished Lecturer, American Physical Society Division of Plasma Physics, 2016-17  
Charles K. Birdsall Award, Inst. Electrical and Electronic Engineers (IEEE), 2015  
National Academy of Engineering, 2011  
Will Allis Prize for the Study of Ionized Gases, American Physical Society, 2010  
Medard Welch Award, American Vacuum Society (AVS), 2010  
Alumni Academic Achievement Award, UCLA School of Engineering, 2009.  
Semiconductor Industry Association University Researcher Award, 2008  
AVS Distinguished Lecturer, 2001-2003  
IEEE Plasma Science and Applications Award, 2000  
AVS Plasma Science and Technology Prize, 1999  
Tegal Corporation Thinker Award for Plasma Processing Technology, 1997  
Semiconductor Research Corporation Technical Excellence Award, 1995  
Japanese Society for Advancement of Science Fellow, 1995  
Journal of Physics D-Highlights Collection: 2010, 2011, 2012 (2), 2013, 2014  
Plasma Sources Science and Technology Highlights Collection: 2014  
Best Student Paper Awards: SRC Student Symposium, 2005,06,14; Intl. Symposium Plasma Chemistry, 2015; Workshop on Atomic Layer Etching, 2017; Intl. Conf. on Plasma Sci. 2017.

Fellow, IEEE (1991)  
Fellow, Optical Society of America  
Fellow, Institute of Physics  
Fellow, Intl. Plasma Chemistry Soc. (2011)  
Eta Kappa Nu  
University of Illinois Honors:

Xerox Junior Faculty Research Award, 1988  
Xerox Senior Faculty Research Award, 1991  
T. Murphy University of Illinois Scholar, 1991-94  
Everitt Award for Undergraduate Instruction, 1990  
Burlington Northern Faculty Achievement Award, 1991  
Unofficial List of Teachers Rated Excellent by their Students 1987-95, 1997, 1999, 2001-4  
Anderson Consulting Award for Excellence in Advising, 1991, 94, 97, 98

Fellow, American Physical Society (1990)  
Fellow, American Vacuum Society (1999)  
Fellow, Intl. Union Pure & Applied Chemistry  
Phi Beta Kappa  
Tau Beta Pi  
Sigma Xi

### **Professional Activities and Organizations:**

#### **Editorships and Editorial Boards:**

*Plasma Sources, Science and Technology*, Editor-in-Chief, 2007-2013; Editorial Board, 1993-2013, 2015- 2017, Guest Editor, Special Issue, "Proceedings NATO ARW on Dusty Plasmas", Aug. 1994

*Journal of Physics D*, Editorial Board, 2003-2018; Assoc. Editor for Plasmas, 2005-2008

*Plasma Chemistry and Plasma Processing*, Editorial Board, 2005-2013

*Plasma Processes and Polymers*, International Advisory Board, 2004-2008

*Journal of Applied Physics/Applied Physics Letters*, Editorial Board, 2011-2012

*Journal of Vacuum Science and Technology A*, Editorial Board, 1998-2000

*IEEE Transactions on Plasma Science*, Associate Editor, 1989-2009

Guest Editor: Special Issue, "RF Discharges for Plasma Processing", April 1986;

Special Issue, "Modeling of Low Temperature Collisional Plasmas", April 1991;

Special Issue, "Proceedings of ICOPS", 2004; Special Issues on "Images in Plasma

Science", February 1996, February 1999, February 2002, April 2005, June 2008,

August 2011

*Proceedings of the 6th Annual ONR/SDIO Pulse Power Review*, Editor, August 1993

#### **Advisory, Organizing and Executive Committee Memberships:**

##### **National Research Council:**

Panel on Plasma Processing of Materials, 1990-91

Naval Advisory Board on Plasma Processing, 1993-94

Panel on Database Needs in Plasma Processing, Co-Chair, 1994-96

Plasma Science Committee, 1998-2003

Panel on Decadal Study of Plasma Physics, 2005-2007; Chair, Low Temperature Plasmas

##### **National Science Foundation:**

Workshop on Plasma Engineering, 1988, 1993

Panel Reviewer for: Research Initiation Awards, 1989, 1994; Presidential Young

Investigator Awards, 1994; Small Business Innovative Research Awards, 1996; Plasma

Science Initiative, 2002; Nanoscale Interdisciplinary Research Teams, 2004; Combustion

and Plasma, 2010.

Workshop Organizer and Report Editor, *Science Challenges in Low Temperature Plasma Science & Engineering*, 2016

Institute of Electrical and Electronic Engineers (IEEE):

Nuclear and Plasma Sciences Society, Membership Committee 1995-96; Executive Committee for Plasma Science and Applications, 1986-89, 2013-2015; Conference on Plasma Science, Program Committee, 1986-88, 1991, 1993-95, 1997-99, 2000-1, 2003-5; Fellowship Committee, 2016  
Lasers and Electro-Optics Society, Technical Subcommittee Gas and UV Lasers, 1989-94; Annual Meeting Program Committee, 1992

Conference on Lasers and Electro-Optics, Program Committee, 1991-93

International Interconnect Technology Conference, Organizing Committee, 1997-99

American Vacuum Society (AVS) and Intl. Union for Vac. Sci., Technique & Applications

Plasma Science & Technology Division, Executive Committee, 1992-94, 1995-98; Head of Education Subcommittee, 1993-94; Chair, 1996-97, Program Committee, 2004-5

Co-Organizer, "Symposium on ULSI and its Plasma Processing Equipment", 1997

Manufacturing Science and Technology Group, Program Committee, 1995-96, 98-2000;

Executive Committee, 1994-97; Treasurer, 1994-2000; Chair Program Committee, 1998-99  
IUVSTA Divisional Representative for Plasma Science & Technique, 2010-2013; Member of PST Executive Committee, 2011-13.

Distinguished Lecture Series Committee, 1998-99

International Union for Pure and Applied Chemistry:

Titular Member, Plasma Chemistry Division, 1996-98

Member, Plasma Chemistry Working Group on Databases for Plasma Remediation, 1995-8

American Physical Society:

Gaseous Electronics Conference, Chair, 1996-98; Executive Committee, 1984-86, 1995-99; Co-Organizer Workshops – Plasma Kinetics, 2009; Control of Distribution Functions, 2011; Plasma Sources for Biomedical Applications, 2012.

Division of Material Physics, Focus Session Organizer, 1995

Division of Plasma Physics, Centennial Program Committee, 1997-99; Fellowship Committee, 1998, 2010; Program Committee 1999-2000, 2008, 2011; Executive Committee 2008-10; Nominating Committee 2009-10

Division of Atomic, Molecular & Optical Physics, Allis Prize Selection Committee, 2011.

Review, Advisory and Search Committees:

Office of Naval Research, Pulse Power Science Advisory Committee, 1989-90

ASEE Review Panel for NIST and ONR Postdoctoral Fellowship Programs, 1990

Sematech Plasma Processing Matrix Committee, 1991

Semi. Industry Assoc./Sematech Equipment Modeling & Design Working Group, 1992, 97

AIP Journal of Applied Physics/Applied Physics Letters Review Committee, 1998

Uni. of William and Mary, Dept. of Applied Science External Review Committee, 1999

AIP Journal of Applied Physics Editor Search Committee, 2000

OSA Meggers Award Committee, 2004-2006

X-Division Review Committee, Los Alamos National Laboratory, 1996-2006

DFG (German Research Foundation) "Fundamentals of Complex Plasmas" Review Panel, Griefswald, Germany, February 2005, 2009, 2013

STW (Technology Foundation, Netherlands), Jury Member, "Building on Transient Plasmas", 2009

Quantemole Inc., Advisory Board, 2006-17

American Soc. of Engr. Education, Engineering K-12 Center Advisory Board, 2007-8.

Naval Research Lab., Plasma Physics Division External Review Committee, 2013, 2016  
Princeton Plasma Physics Laboratory Advisory Committee, 2013-2016  
Interuniv. Attraction Poles Physical Chem. Plasma-Surface Interactions, Belgium, 2013-15  
Sci. Foundation Ireland)Strategic Research Cluster-Plasma Technol. Nano Mfg., 2010-15  
Center Integrated Comp. & Analysis of Reconnection, U. New Hampshire, 2011-14  
Instituto Superior Técnico (IST/UTL) Portugal, Advanced Program in Plasma Science and  
Engineering, External Advisory Board, 2013-2017  
Department of Energy – Frontiers in Plasma Science Panel, 2015-16

Other Organizing and Program Committees:

SPIE Symposia on Metal Vapor Lasers and Pulsed Power, Organizing Committee, 1989  
AIAA, Technical Committee on Plasma Dynamics and Lasers, 1987-89  
Power Modulator Symposium, Technical Advisory Committee, 1987-8, 1989-96  
NATO ARW on Dusty Plasmas, Organizing Committee, France, 1993  
6<sup>th</sup> SDIO/ONR Pulse Power Meeting, Organizer and Host, 1993  
3<sup>rd</sup>, 4<sup>th</sup> International Conference on Reactive Plasmas, Advisory Committee, 1996-1998  
Coalition on Plasma Science, Steering Committee, 1997  
International Conference on Atomic and Molecular Data and Their Applications  
International Program Committee, 2001-02  
Gordon Research Conference for Plasma Processing Science; Vice-Chair, 1994-96;  
Program Committee, 1998-2004; Vice-Chair, 2000-02; Chair, 2002-04.  
Intl. Workshop on Microplasmas, Int'l Scientific Committee, 2007-2015  
Dry Process Symposium, Int'l Program Committee, 2006, 2008-2012  
1<sup>st</sup> International Conf. on Plasma Medicine, Scientific Program Comm., October 2007.  
7<sup>th</sup> Intl. Meeting on Information Display, Program Comm. Daegu, Korea, August 2007.  
DOE Workshop on Low Temperature Plasma Science and Engr., Co-Chair, March 2008  
Intl. Conf. on Microelectronics & Plasma Technol., Intl. Advisory Comm., 2008-9, 2011-2  
International Workshop on Plasmas with Liquids, Intl. Organizing Committee, 2010  
International Plasma Chemistry Society, Board of Directors, 2010-2013  
10<sup>th</sup> Asia-Pacific Conference on Plasma Science and Technology / 23<sup>rd</sup> Symposium on  
Plasma Science for Materials, International Advisory Committee, 2010.  
22<sup>nd</sup> International Conf. on Numerical Simulation of Plasmas Program Committee, 2011  
Intl. Vacuum Congress-19, Intl. Scientific Committee, Plasma Science Chair., 2013  
Intl. Conference on Phenomena in Ionized Gases, Int. Scientific Comm., 2011-2017  
Lorentz Workshop on Plasmas and Liquids, Co-Chair, 2014

Professional Society Memberships:

Institute of Electrical and Electronics Engineers (Fellow)  
Optical Society of America (Fellow)  
American Physical Society (Fellow)  
American Vacuum Society (Fellow)  
Institute of Physics (Fellow)  
International Union of Pure and Applied Chemistry (Fellow)  
International Plasma Chemistry Society (Fellow)  
American Society for Engineering Education  
Material Research Society  
American Institute of Chemical Engineers

## **University Service**

### **University of Illinois (Partial List):**

*Campus:* Honorary Degrees Committee (1987-88), Academic Senate (1988-92,96-98), Campus Honors Program Advisor (1990-98), Search Committee for Vice Chancellor for Academic Affairs (1993), Ethics and Graduate Students Workshop (Graduate College, 1994-95); Graduate Student Discipline/Graduate College Grievance Committee (1996-1997); Workshop on Sponsored Research (1997), Chair of Search Committee for Director of Research Technology Management Office (1997), Ad-Hoc Committee on Conflict of Interest from Internet Instruction (1997-98), Academic Integrity Inquiry Team (1998), Campus Budget Oversight Committee (1998-1999), Federal Demonstration Partnership Representative (1998-2001), Strategic Advisory Committee on Policies for Entrepreneurship (1999), Research Policy Committee (1999-2000), Research Technology and Management Advisory Committee (Chair, 1999-2000), Facilities Planning Committee (2000-2001), Search Committee for CCSO Director (2000-1), UIUCnet Enterprise Communications Funding Plan (2000), Faculty Director for CNRS-UIUC Collaborative Research Program (2001-02), Economic Development and the University Assessment Committee (2001-2); MS in Bioinformatics Steering Committee, Chair (2002-4); Chemical Sciences Leadership Council (2002-3); Committee to Review Sponsored Research Agreements (2003), Conflict of Interest Review Committee (1997-2004, Chair 1999-2004), Campus Promotion and Tenure Committee (2003-4), Administrative Review Portal Assessment (2003)

*College of Engineering:* Dean's Committee on Student Affairs (1991-92), Search Committee for Assoc. Dean for External Affairs (1993), Review Panel for IBM SURS (1993), Forward Planning Committee (1994-97), Strategic Planning Committee for Computers and Networks (1994-96), Women in Engineering Steering Committee (1995-97), Search Committee for Director of Women in Engineering (1995-6), Department Head Evaluation Committee (1997), Annual Meeting on Ethics in Engineering (1995,97), Dean's Retreat on Future Directions (1997), Search Committee for Fisher Chair Professor (1997), Computer Science and Engineering Fellowship Committee (1997,99), College Executive Committee (1997-00, Secretary 1998-99, Vice-Chair 1999-2000), College Administrative Committee (1998-2000, Secretary 1998-99), Promotion and Tenure Committee (1998-99, Chair 1999-2000), Committee on Interdisciplinary Graduate Programs (1998-99), Dean Review Committee (1998-99), Chemical Engineering Faculty Search (1998-2000), Engineering-Physics Liaison (2001-3), Center for Nanoscience and Technology Strategic Planning Committee, Chair (2002); Options Review Committee for Industrial and General Engineering, Chair (2003); Coordinator for College of Engineering Reorganization (2003-4); Thurnauer Professorship Selection Committee (Chair, 2003)

*Department of Electrical and Computer Engineering Committees:* Microelectronics and Quantum Electronics Area (1987-94,98-2004), Qualifying Exam (1987-90, 95-96,98-99), Teaching Evaluation and Awards (1988-90,96-97), Annual Review of Electronics Conference (1989-90, Co-Chair), Computer Resources (1990-3, Chair), Curriculum (1991-93), Curriculum Revision Committee (Chair, 1992), Graduate (1993-96), Physical Electronics Curriculum (1994), Physical Electronics Faculty Recruitment (1994-95,97-98 Chair, 99-2000), Faculty Search and Recruitment (1994-99, 2003-4), ABET (1994-95), Promotion Reevaluation (1997), Advisory (1997-99), Coordinator for Senior Theses (1996-2000), Annual Undergraduate Research Symposium Chair (1997-2000), Search for Grainger Chair Professor (1997); Engineering Open House (1998), Graduate Student Recruitment (1998, 1999-2001), Facilities

(2000-2, 2003-4), Promotion and Promotion Review (Chair, 2001-3), New Building Concept Committee (2003)

**Iowa State University Major Committee Service (Partial List):**

Committee on Energy Efficiency and Conservation, 2008.

Chair, Search Committee, Director of Center for Transportation Research & Education, 2006.

Search Committee, Director of Ames Laboratory, 2007.

BioBased Products and Renewable Fuels Steering Committee, 2006-8.

Adv. Board, Language & Culture for Professions, Dept. World Cultures & Languages, 2006-8

University Budget Model Committee, 2005-06.

Ames Economic Development Corp., 2005-06.

Plant Science Institute Advisory Board, 2005-08.

Iowa Space Grant Consortium Coordinator and Executive Committee, 2005-08.

Pappajohn Center for Entrepreneurship Advisory Board, 2005-07.

Association of American Colleges and Universities, Campus Representative, 2005-06.

ISU Research Foundation, Board of Directors, 2006-8.

Invent Iowa, Advisory Board, 2006-7.

Institute for Combinatorial Discovery, Advisory Board, 2006-8.

**University of Michigan (Partial List):**

*Campus:* Director, Michigan Institute for Plasma Science and Engineering (2008-17); Chair Program Committee, Graduate Certificate in Plasma Science and Engineering (2009-17); Senate Financial Affairs Advisory Committee (2011-2014); Senate Development Advisory Committee (2012-2015); M-Cubed Evaluation Committee (2012); Sensitive Data Advisory Committee (2012); Applied Physics Admissions Committee (2013); Faculty Ally ECE Representative (2012-2017); Russel Lectureship Selection Committee (2016-17), Senate Advisory Committee on Financial Affairs (2016-17), Senate Advisory Committee on External Relations and Communications (2016-17)

*College of Engineering:* Nucl. Engr. Radiological Sciences (NERS) Faculty Review Committee (2008-9); NERS Chair Search Committee (2009-10); Casebook (Promotion and Tenure) Committees: Atmospheric, Oceanic and Space Science (2010-17), NERS (2010-12, 14-15), Chem. Eng. (2012-13), EECS (2016-17); Strategic Planning (2010); NAE Faculty Committee, (2011-2017); NextProf Workshop (2012); Bicentennial Support Committee (2012-13); ADVANCE Advisory Committee (2013-2017); Center Proposal Enhancement Program (2012-2017); Senior Hire Committee (2012-13); Research Advisory Committee (2012-2016); Faculty Launch Committees (2013-16, chair 2014-15); IT Futures Committee (2014), IT Advisory Committee (2015-17), Faculty Diversity Advisory Committee (2015-16), Chem. Engr. Chair Search Committee (2016-17), Named Professorship Committee (2017)

*Division of Electrical and Computer Engineering:* Faculty Search Committee (Chair 2009-2014, 2016-17); Executive Committee (2009-11); Curriculum Committee (2011-12); Strategic Planning (2011-12); Faculty Mentoring Committee, Co-Chair (2012-2013); Graduate Advisor-Radiation Laboratory (2014), Undergraduate Advisor (2015-2016)

**Graduate Student, Post-Doctoral and Scientist Supervision:**

20 MS Theses, 37 PhD Theses, 17 Post-doctoral fellows and research scientists

**Areas of Professional Interest:**

Low Temperature Plasmas, Laser Physics and Spectroscopy, Plasma Chemistry, Plasma and Photochemical Materials Processing, Amorphous Thin Films, Pulse Power Plasmas, Environmental and Medical Applications of Plasmas

**Publications:**

327 Refereed Journal Articles, 170 Invited Conference Presentations, 583 Contributed Conference Presentations, 159 Invited Symposia, Seminar and Short Course Presentations, 10 NRC Reports, DOE, NSF Trade, Book Chapters and Popular Publications, 7 Guest Editorials, 8 patents/registrations/applications

Google Metrics (26 July 2017): 15,002 Citations, h-index = 64, i10-index=257