

# CURRICULUM VITAE

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Birthdate: 31 May 1943

Education: B. S. Physics, California Institute of Technology, 1963  
Ph.D. Physics, Princeton University, 1966

## POSITIONS:

September, 2000 - present: Member, UCSD Graduate Program in Neuroscience

July, 1988 - present: Professor of Physics;  
University of California, San Diego

July, 1988 - July, 1990: Chairman, Special Interest Group for  
Dynamical Systems, Society of Industrial and Applied  
Mathematics

July, 1987 - July, 1988: Chair, University of California - NASA  
Steering Committee for Joint Program in Nonlinear Science

January, 1987 - March, 1989: Chairman, California Coordinating Committee for  
Nonlinear Studies of the University of California;  
Member from 1984 to March, 1989;  
Deputy Chairman, November, 1984 to January, 1987

October, 1986 - present: Director, Institute for Nonlinear Science;  
University of California, San Diego

July, 1986 - June, 1988: Professor of Physics in Residence;  
University of California, San Diego

July 1, 1985 - June 30, 1988: JASON Steering Committee

January 1983 - present: Research Physicist, Marine Physical Laboratory;

Scripps Institution of Oceanography

March, 1986 - October, 1986:	Acting Director, Institute for Nonlinear Science; University of California, San Diego
January, 1984 - March, 1986:	Coordinator, Project in Nonlinear Science; University of California, San Diego
January, 1983 - July, 1986:	Adjunct Professor of Physics; University of California, San Diego
March-June, 1982:	Visiting Professor of Physics; University of California, San Diego
January-June, 1980:	Lecturer, Department of Physics; University of California, Berkeley
April, 1979 - December, 1982:	Staff Scientist, Lawrence Berkeley Laboratory
September, 1977 - September, 1979:	Adjunct Professor of Physics and Astronomy, Northwestern University
May - June, 1977:	National Academy of Sciences Exchange Scientist to Landau Institute for Theoretical Physics, Moscow and Leningrad
April - July, 1976:	Visiting Professor, auspices Japan Society for the Promotion of Science
1975 - 1976:	Visiting Professor of Physics; University of California, Santa Cruz
1975 - 1976:	Visiting Associate Professor of Physics, Stanford University
July, 1975 - April, 1976:	Visiting Scientist, Stanford Linear Accelerator Center
June, 1974 and December, 1975:	Exchange Scientist, Institute for Theoretical and Experimental Physics, Moscow
June-July, 1972, June 1974, December, 1975:	Visiting Scientist, Leningrad Nuclear Physics Institute
April-June, 1973; January - April, 1974; January - April, 1975:	Visiting Associate, California Institute of Technology
January - April, 1973:	Professorial Lecturer, University of Chicago

August, 1972 - June 1981:	Physicist, Theoretical Physics Department, Fermi National Accelerator Laboratory
Spring, 1972:	Visiting Scholar, Weizmann Institute of Science and Tel Aviv University
October, 1971 - April, 1972:	Visitor, Theory Group, National Accelerator Laboratory
Fall, 1971:	Member, Institute for Advanced Study
June - August, 1971:	Visiting Scientist, Stanford Linear Accelerator Center
June - August, 1970:	Visiting Scientist, Centre d'Etudes Nucleaires de Saclay, France
June - August, 1969:	Visiting Scholar, University of Washington
September, 1968 - August, 1972:	Assistant Professor of Physics, Princeton University
September, 1967 - September, 1968:	Research Associate, Stanford Linear Accelerator Center
June - August, 1967:	Visitor at Niels Bohr Institute, Copenhagen
September, 1966 - September, 1967:	Visiting Fellow, Princeton University
January, 1966 - September, 1966:	Research Associate, Princeton University

#### **AWARDS:**

National Science Foundation Predoctoral Fellow, 1963 - 1966  
 Honorary Woodrow Wilson Fellow  
 National Science Foundation Postdoctoral Fellow, 1966 - 1967  
 Alfred P. Sloan Foundation Research Fellow, 1969 - 1972

#### **OTHER:**

Member, U.S. Physics Delegation to the People's Republic of China, July, 1973  
 Honors Examiner, Swarthmore College, May, 1975, May, 1976  
 Member of JASON, August, 1974 - present  
 Organizer JASON Winter Study on Climatology, December, 1977

Co-Project Leader (with H. Foley), 1980 JASON study on Climatic Effects of Carbon Dioxide

Consultant to T-Division, Los Alamos National Scientific Laboratory, October, 1980 - January, 1984

Co-Project Leader (with W. Press), 1981 and 1982 JASON study on Adaptive Boundary Conditions

Project Leader: JASON program in Active Acoustics, 1983 - 1984

Member of Panel on Physical Oceanography of the Foreign Applied Science Assessment Center (FASAC); December 1982 - June 1983.

Organizer of the Scripps Institution of Oceanography Advanced Study Program in Physical Oceanography; April 1983, December 1983

Invited Participant, Program in Nonequilibrium Phenomena, Institute for Theoretical Physics, University of California, Santa Barbara, 1981 - 1982

Organizer of the First Annual University of California Summer School in Nonlinear Science, August, 1985

Editor-in-Chief, Springer-Verlag Series in Nonlinear Science; January, 1989—present

Member Office of Naval Research Board of Visitors in Physics, December, 1987, and in Physical Oceanography, 1989–1991

Visiting Scientist, Institute Haute Études Scientifique, Bures-sur-Yvette, France; September-October, 1989

Scientific Referee for *Journal of Fluid Mechanics*, *Physical Review*, *Physics of Fluids*, *Journal of Geophysical Research*, *Physical Review Letters*, *Journal of Mathematical Physics*, *Journal of the Atmospheric Sciences*, *Physica D*, *Journal of Nonlinear Science*, *International Journal of Bifurcation and Chaos*, *Science*, *Europhysics Letters*, *Journal of Mathematical Biology*, *Journal of Motor Behavior*, *Journal of Neurophysiology*, *Journal of Neuroscience*, *Mechanical Systems and Signal Processing*, *Journal of Sound and Vibration*, *Proceedings of the Royal Society*, *Journal of the Optical Society of America*, *Neural Computation*, *Journal of Computational Neuroscience*, *Proceedings of the National Academy of Science, USA*, *Journal of Neuroscience*, *Biological Cybernetics*

Scientific Referee for proposals submitted to U. S. Department of Energy, U. S. Central Intelligence Agency, U. S. Office of Naval Research, National Science Foundation, U. S. Army Research Office, German-Israeli Science Foundation, US-Israeli Bi-National Science Foundation, National Institutes of Health

Member of Board of Technical Advisors for Department of Energy Program in Global Climate Change; May, 1990—July, 1997

Visiting Scientist, Institute of Applied Physics of the Academy of Sciences of the USSR, Gorky (Nizhni Novgorod), October–November, 1990; October–November, 1991; April–May, 1992

Member, International Organizing Committee for Conference on “ Chaotic Dynamics: Theory and Practice ”, Patras, Greece, July, 1991

Member Visiting Committee for Program in Applied Mathematics, Naval Research Laboratory, February, 1991.

Member Board of Visitors for Office of Naval Research Directorate for Applied Science and Technology, February, 1991.

Consultant, Lockheed Palo Alto Research Laboratory, August, 1990—1992

Chairman, FASAC Committee on Soviet Nonlinear Dynamics, March, 1991—January, 1992

Consultant, Lockheed/Sanders Corporation, Nashua, New Hampshire, August, 1991—July, 1994

Co-Director (with A. Newell, V. Zakharov, and A. V. Gaponov-Grekhov) of the International Institute for Nonlinear Science, November, 1991—

Member, UCSD Academic Senate Library Committee; 1992-1993

Chair, UCSD Chancellor’s *Ad Hoc* Committee on International Programs in Research and Education. Focus is on Russian Scientists and UCSD Opportunities, January, 1992–July, 1992.

Consultant, Mission Research Corporation, Colorado Springs, CO., July, 1992—January, 1994

Consultant and Project Scientist, Randle Corp., Great Falls, VA, January, 1992—

Member, City Council, Del Mar, California; April, 1992–April, 1996

Member, San Diego Task Force on Integrated Waste Management; June, 1992—1993

Member, League of California Cities Committee on Environmental Quality; August, 1992—April, 1996

Member General Campus Organized Research Unit Advisory Committee; April 1, 1993–January, 1994

Member, UC Systemwide Selection Committee for Faculty Exchange with St. Petersburg, Russia; September, 1992—September, 1994

Alternate Member San Diego Wastewater Management District Board of Directors, February, 1993—September, 1994

Member, San Diego Interim Commission on Waste Management, July, 1993– May, 1994

Chair, UCSD Academic Senate Library Committee; September, 1993-September, 1994

Member, SD Solid Waste Commission Subcommittee on Audit/Budget; October, 1993–May, 1994

Panel Member, Department of Energy Scoping Workshop on the Future of Energy Research at the DOE; October, 1993.

Deputy Mayor, City of Del Mar; April, 1994–April, 1995.

Representative of the City of Del Mar to the San Diego Solid Waste Management Authority; June, 1994 –April, 1996

Chair, Audit/Budget Subcommittee, San Diego Solid Waste Authority, August, 1994–April, 1996

Member, Executive Committee, San Diego Solid Waste Authority, September, 1994–April, 1996

Member, Organizing Committee, Workshop on Nonlinear Dynamics of Material Processing and Manufacturing, March, 1995, La Jolla, CA

Member, Board of Trustees of the International Center for Advanced Studies, Nizhny Novgorod, Russia, November, 1994—

Managing Member, Applied Nonlinear Sciences, LLC (Limited Liability Corporation); March, 1995—

Mayor, City of Del Mar, April, 1995–April, 1996

Fellow of the American Physical Society, 1995—

Member, Organizing Committee, Workshop on Nonlinear Dynamics of Small Neural Systems, University of California, San Diego, December 7-8, 1995.

Consultant on Financial and Political Issues, San Diego Solid Waste Authority, April, 1996–December, 1996

Consultant on Financial and Political Issues, Regional Solid Waste Association, July, 1997—

Visiting Professor, University of Western Australia, Perth, Western Australia, October, 1997

Invited Participant, Working Session on “Dynamical Systems, Prediction, and Statistics”, The Newton Institute, Cambridge University, Cambridge, England; September, 1998.

Chairman, Department of Energy/Basic Energy Sciences Review Panel for the Center for Engineering Systems Advanced Research, Oak Ridge National Laboratory, September 16-17, 1997.

Member, City of Del Mar Airport Advisory Committee, January, 1997—August, 2002

Member, External Review Panel for Basic Research Programs, U. S. Naval Research Laboratory, December 16, 1997

Member Board of Directors, Planned Parenthood Action Fund, September, 1997–July, 2001

Member, Panel on Public Affairs, American Physical Society, January, 1998–December, 2000

Member Board of Directors, Planned Parenthood of San Diego and Riverside Counties, July, 1998–

Member, Board of Directors, Del Mar Foundation, May, 1998—July, 2000

Chair, UCSD Academic Senate Committee on Research, September 1, 1999–August, 31, 2000

Member, University of California, University Committee on Research Policy, September 1, 1999–August 31, 2000

Chair, Climate Change Evaluation Committee, American Physical Society, Panel on Public Affairs, January, 1999–January, 2001

Member, University of California Taskforce on Industry-University Relations, February–July, 2000

Chair, UCSD Academic Senate Committee on Research, September 1, 2000–August, 31, 2001

Member and Vice-Chair, University of California, University Committee on Research Policy, September 1, 2000–August 31, 2002

Member, National Science Foundation Scientific Review Panel on Biologically Inspired Computing, April 17-18, 2001

Co-Chair, University of California, University Committee on Research Policy, Subcommittee on the Relationship between the DOE Labs and UC; May, 2001—April, 2003

Chair, University of California, University Committee on Research Policy, September 1, 2001–August 31, 2002

Manager, Girls Under 16, Premier Soccer Team, La Jolla Nomads Soccer Club, June, 2000–June, 2001.

Member, Del Mar City Planning Commission, July, 2000-December, 2000.

Member, Del Mar City Council, December, 2000–December, 2008.

Member, San Diego Metropolitan Wastewater Commission, January, 2001–December, 2008

Member, Board of Directors, Chaos Telecom, Inc., San Diego, CA. January 2001–

Member, Steering Committee for the UCSD Graduate Program in Computational Neurobiology, 2000—2004

Chief Financial Officer and Secretary of the Board of Directors, Chaos Telecom, Inc., San Diego, CA. January 2001—January 2002.

Conference Committee Member, 8th Joint Symposium on Neural Computation. Salk Institute, May 19, 2001

Manager, Girls Under 17, Premier Soccer Team, La Jolla Nomads Soccer Club, June, 2001–June, 2002.

Member, University of California Search Committee for the position of Vice-Provost for Research; May–August, 2001.

Member International Scientific Committee, International Conference on Applications of Nonlinear Dynamics, Thessalonika, Greece, November, 2001

Joint Organizer (with Misha Rabinovich and Allen Selverston) of National Institute of Mental Health Workshops in Neural Computation; March and June, 2002

Invited Participant, “Innovative Approaches to Countering Biological Terrorism,” sponsored by SAIC, Mc Lean, VA, September 5-7, 2001.

Member, University of California, Council of the Academic Senate, October, 2001–September, 2002

Member, Public Utilities Advisory Committee to the City of San Diego, April, 2002—April, 2004

Member, Scientific Organizing Committee, International Conference on Bifurcation Theory, Chaos, and Control, Southampton, England, July 28-30, 2003

Manager, Girls Under 18, Premier Soccer Team, La Jolla Nomads Soccer Club, June, 2002–June, 2003.

Member, Scientific Organizing Committee, All-NIH Conference on Analysis of Multi-input Data in Neuroscience, July 29, 2002; Meeting, Fall, 2004.

Member of the UCSD Academic Senate Committee on Research, 2002/03; UCSD representative to the University Committee on Research Policy, 2002/03.

Member of the Steering Committee on the University of California Industry University Cooperative Research Program, 2002/03.

Member of the Advisory Board for the Center for Dynamics of Complex Systems, University of Potsdam, Potsdam, Germany. April, 2003—.

Member, Academic Council of the University of California, Academic Council Special Committee on the National Laboratories, May, 2003—.

Member, Science and Technology Working Group of the San Diego Foundation, May 2003–May, 2006

CoChair, SANDAG Energy Working Group, April, 2004–

Chair, UCSD Academic Senate Subcommittee of Planning and Budget Committee on the Campus Budget, September, 2004–August, 2006

Chairman, San Diego Metro Wastewater Commission and Joint Powers Authority, March, 2005–December, 2008

Member, Board of Directors, San Diego Association of Governments, January, 2005–December, 2008

Member, NSF/NIH Review Panel for Collaborative Research in Computational Neuroscience, March 2-3, 2006; Arlington, VA

Member, Advisory Board for the Bernstein Center in Computational Neuroscience, Munich, Germany; December, 2005–

Visiting Scientist, Max Planck Institute for Neurobiology, Martinsried, Germany, November, 2003, December, 2004; September, 2005; September, 2006.

Consultant, Nativis Corporation, La Jolla, CA, August, 2006–; Member, Scientific Advisory Board, February, 2007–

#### **INVITED SPEAKER AT:**

American Physical Society, Washington, D.C. April, 1967

Liperi Summer School in Theoretical Physics, Liperi, Finland, August, 1967

Summer Institute in Theoretical Physics, Niels Bohr Institute, Copenhagen, August, 1967

Cargese Summer School in Physics, Cargese, Corsica, July, 1970

Boulder Summer Institute in Theoretical Physics, University of Colorado, June, 1971

American Physical Society, Washington, D.C., April, 1971

NATO School of Physics, Kaiserslautern, Germany, August, 1972

New York Academy of Sciences meeting on Recent Advances in Particle Physics, March, 1973

American Physical Society, Division of Particles and Fields, Berkeley, August, 1973

Canadian Summer School in Particle Physics, Montreal, September, 1973

International Symposium in Theoretical Physics, Pars College, Teheran, Iran, October, 1973

International Conference on Multiparticle Production, Zakopane, Poland, June, 1972; Leipzig, GDR, June, 1974

SLAC Summer Institute in Particle Physics, July, 1974

Niels Bohr Institute on Gauge Fields and Instantons, Copenhagen, December, 1976

500th Anniversary Celebration Summer Institute in Particle Physics, Tübingen University, June - July, 1977

Banff Summer Institute on Particles and Fields, Banff, Canada, August - September, 1977

Workshop on Nonlinear Properties on Internal Waves, La Jolla, January, 1981

'Aha Huliko'a Hawaiian Winter Workshop on Internal Waves and Small Scale Structure in the Ocean, University of Hawaii, Manoa, January, 1984

Navy Dynamics Institute Workshop on "Perspectives in Nonlinear Dynamics," May, 1985

National Intelligence Mathematics and Multiprocessing Program, DARPA, New York, October, 1985

Keynote Speaker, Society for Computer Simulation, January, 1987

Navy Workshop on Nonlinear Dynamics and Oceanography, February, 1989

UCSD/UCB Workshop on Nonlinear Dynamics and Neural Networks, Keynote Speaker, February, 1989

Invited Speaker at the NATO Advanced Research Workshop on "Model Ecosystems and Their Changes", Maratea, Italy; September, 1989

Invited participant at the Workshop on "Nonlinear Systems in Geophysics", Institute for Mathematics and its Applications, University of Minnesota, May-June, 1990

Invited Speaker Santa Fe Institute Workshop on "Prediction in Dynamical Systems", September, 1990.

Inaugural Speaker, Naval Research Laboratory, Special Project for Nonlinear Science, October 2, 1990.

Invited Speaker, Institute for Applied Physics, Gorky, USSR; October, 1990.

Invited Speaker, Gorky State University, Gorky, USSR; October, 1990.

Invited Speaker, 'Aha Huliko'a Hawaiian Winter Workshop on Internal Waves and Small Scale Structure in the Ocean, University of Hawaii, Manoa, January, 1991

Invited Speaker, Army Research Office, Workshop on Chaos and Nonlinear Dynamics: Theory and Applications; May 21-23, 1991

Invited Speaker, Oak Ridge National Laboratory Working Group on Prediction in Chaotic Systems, June, 1991

Invited Speaker, Conference on "Chaotic Dynamics: Theory and Practice ", University of Patras, Patras, Greece; July, 1991

Invited Speaker, Workshop on Nonlinear Dynamics and Fluidized Bed Flows, Morgantown (West Va.) Energy Technology Center of the Department of Energy, December, 1991

Invited Speaker, Exxon Research Center, February, 1992

Invited Speaker, The Levich Institute, City College of New York, February, 1992

Invited Speaker, US/"USSR" Conference on Magnetohydrodynamic Stability, Originally scheduled for Moscow, August, 1991, held in Chicago, May, 1992

Invited Speaker, University of California Conference on Statistical Mechanics, UCLA, April, 1992

Invited Speaker, Special Session of the American Geophysical Union on Prediction in Nonlinear Climate Systems, Montreal, Canada, May, 1992

Invited Speaker, Workshop on Dynamical Measures of Complexity and Chaos, Bryn Mawr College, August 13-15, 1992

Invited Speaker, Workshop on Climate as a Dynamical System, Argonne National Laboratory, September 25-26, 1992

Invited Speaker, European Geophysical Union, Meeting on Nonlinear Science in Geophysics; Wiesbaden, Germany, May, 1993.

Invited Speaker, Physics Colloquium, Georgia Institute of Technology, February 17, 1993.

Invited Speaker, Physics Colloquium, Penn State; April 21, 1993.

Invited Speaker, ORD/NSA Lectures in Signal Processing, February 18-19, 1993

Keynote Speaker, NUWC Conference on Full Spectrum Signal Processing, Mystic, Connecticut, April 26-28, 1993.

Scripps Institution of Oceanography, Physical Oceanography Seminar, May 5, 1993.

Invited Speaker, United States Geological Survey, National Center, Reston, Virginia, June 4, 1993.

Invited Speaker, IUTAM Symposium on Nonlinearity and Chaos in Engineering Dynamics, London, England, 19-23 July 1993.

Invited Speaker for Plenary Session at “Gran Finale” NATO Conference on ‘Chaos, Order and Patterns: Aspects of Nonlinearity’, A. Volta Center, Lake Como, Italy; University of Milan; September 5-10, 1993.

Keynote Speaker, Office of Naval Research Workshop on Turbulence in Boundary Layers; Washington, D.C.; August 6, 1993.

Invited Speaker, Department of Control and Dynamical Systems, Caltech, December 8, 1993.

Invited Speaker, Physics Colloquium, UCSD; January 6, 1994.

Invited Speaker, Physics Colloquium, UC Berkeley; April 13, 1994.

Invited Speaker, University of California Conference on Statistical Mechanics, UC Riverside, March 29, 1994

Invited Participant, DOD Workshop on “Exploring the Opportunities for Cooperative Research With the Former Soviet Union”, Orlando, Florida, April 8-9, 1994

Invited Speaker, Woods Hole Oceanographic Institution, Workshop on “Analysis of Nonlinear Time Series in Marine Ecology”, Woods Hole, MA, April 9-10, 1994.

Invited Speaker/Participant, Workshop on Boundary Layer Chaos, Army Research Office, Research Triangle Park, NC 29-30 July 1994

Invited Speaker, Short Course on *Statistical Problems in Fractals and Chaos*, Penn State Department of Statistics, August 5-7, 1994.

Invited Speaker, “Summer School on Fluid Physics”, Santander, Spain; September 5-10, 1994.

Colloquium Speaker, Department of Aerospace and Mechanical Engineering, University of Southern California, October 5, 1994.

Invited Speaker, Workshop on Nonlinear Dynamics in Science and Engineering, Georgia Tech, November 29–December 2, 1994.

Keynote Speaker, ANZIAM 95, Conference on Applied Mathematics, Perth, Australia; 3-9 February 1995

Invited Speaker, Workshop on Nonlinear Dynamics and Materials, Institute for Materials and Mechanics, UC, San Diego, March 20-23, 1995

Invited Speaker, International Conference on Internal Wave Dynamics, St. Petersburg, Russia; May, 1995.

Invited Speaker, 3rd Technical Conference on Nonlinear Dynamics (Chaos) and Full Spectrum Processing, Naval Undersea Warfare Center, Mystic, Connecticut, June, 1995.

Invited Speaker, Institute for Mathematical Statistics Workshop, Montreal, Canada, July 10-13, 1995

Invited Speaker, Fields Institute Workshop on “Bridges between Nonlinear Dynamics and Statistics”, Montreal, Canada; July 14-18, 1995

Co-Chair International Organizing Committee for the International School in Nonlinear Science, Nizhny Novgorod, Russia, September 5-16, 1995.

Lecturer, International School in Nonlinear Science, Nizhny Novgorod, Russia, September 5-16, 1995.

Invited Speaker, Conference on Nonlinear Dynamics, University of Florida, Gainesville, Florida; November 29-December 1, 1995

Invited Organizer of a Special Course in “Analysis of Observed Chaotic Data”, Joint Research Centre of the European Community, Ispra, Italy; January 22-26, 1996

Invited Lecturer, School in Chaos and Turbulence, von Karman Institute, Rhode-St-Genèse (Brussels), Belgium; May 6-10, 1996

Invited Speaker, 21st General Assembly of the European Geophysical Society; The Hague, Netherlands; May 10, 1996.

Invited Speaker, “Chance” Conference of Art Center College, Los Angeles, CA; Stateline, NV; November 8-10, 1996

Invited Speaker, Center for Magnetic Recording Research, UC, San Diego; March 4, 1997

Invited Speaker, Chaos and Nonlinear Dynamics Tutorial and Workshop, Electric Power Research Institute; May 9, 1997

Emilio Segre Distinguished Lecturer in Physics of the Sackler Foundation; Tel Aviv University, Israel; May, 1997.

Invited Speaker, Seminar on Neural Networks; Tel Aviv University, May 22, 1997.

Invited Speaker, Racah Institute for Physics, Hebrew University of Jerusalem, May 26, 1997.

Invited Speaker, SPIE Conference on Prediction and Fuzzy Systems, San Diego, CA; July 29, 1997.

Invited Plenary Session Speaker, International Conference on Control of Oscillations and Chaos, St. Petersburg, Russia; August 27-29, 1997

Invited Speaker, International Conference on Invertebrate Neurochemistry and Neurophysiology, Eilat, Israel; September 7-11, 1997.

Invited Speaker, The Arrowhead Conference, November, 1997.

Invited Speaker, U. S. Department of Energy, Office of Basic Energy Sciences, November, 1997

Invited Speaker, Physical Oceanography Seminar, Scripps Institution of Oceanography, January 28, 1998

Invited Speaker, American Geophysical Union Chapman Conference on Hydrology, Clemson University, South Carolina, May, 1998

Invited Speaker, Memorial Conference for Vladimir Gribov; Challenges in Theoretical Physics; Bonn, Germany, June 8-10, 1998.

Invited Speaker, DARPA Workshop on Mathematical Tools for Neural System Analysis, Arlington, VA; July 13, 1998

Invited Keynote Speaker, Isaac Newton Institute for Mathematical Sciences, Cambridge University, Cambridge, UK; Programme on *Nonlinear and Nonstationary Signal Processing*, September 20-26, 1998

Invited Speaker, California Institute of Technology, Control and Dynamical Systems, October 12, 1998

Invited Speaker, U.S. Naval Research Laboratory, November 20, 1998

Invited Speaker, Isaac Newton Institute for Mathematical Sciences, Cambridge University, Cambridge, UK; Summary of Programme on *Nonlinear and Nonstationary Signal Processing*, December 7-11, 1998

Invited Speaker, SISSA, Trieste, Italy; March 13-20, 1999

Invited Speaker, Lawrence Berkeley National Laboratory, April 30, 1999

Invited Speaker, European Conference on Circuit Theory and Design, Stresa, Italy; August 29–September 2, 1999

Invited Speaker, International Conference on Advances in Communications and Control, TELECOMMUNICATIONS/SIGNAL PROCESSING, Athens, Greece, 28 June-2 July 1999

First Distinguished Speaker, Memorial Series for John David Crawford, University of Pittsburgh, Department of Physics, October 4-5, 1999

Invited Speaker, Gompers Secondary School, San Diego Unified School District, January 20, 2000

Invited Speaker, Parents' Day, Warren College, University of California, San Diego; February 26, 2000

Invited Speaker, Fields Institute for Mathematical Sciences, University of Toronto, Workshop on Nonlinear Analysis of Data, Toronto, February 1-4, 2000

Visiting Scientist, University of Western Australia, Perth, Australia; March-April, 2000

Invited Colloquium Speaker, Department of Physics, University of Western Australia, Perth, WA; March 23, 2000

Invited Colloquium Speaker, Department of Mathematics and Statistics, University of Western Australia, Perth, WA; March 31, 2000

Visiting Scientist, Physics Department, Göttingen University, Göttingen, Germany, May, 2000.

Invited Speaker, Third Physics Institute, Göttingen University, Göttingen, Germany; May, 2000

Visiting Scientist, Department of Electrical Engineering, University of Mining and Metallurgy, Krakow, Poland; May, 2000

Invited Speaker, NIH Sponsored Conference on "Nonlinear Synchronization in Neuroscience," May 19-20, 2000; George Mason University, Fairfax, VA

Invited Speaker, "Gribov-70", University of Paris, 27-29 March 2000

Invited Speaker, Institute for Theoretical Physics, University of California, Santa Barbara, June 7, 2000

Invited Speaker, Symposium on Synchronization of Chaotic Systems, International Centre for Theoretical Physics, Trieste, Italy, July 3-5, 2000

Invited Speaker, Max Planck Institute for Flow Research, Göttingen, Germany, July 7, 2000

Invited Speaker, "Global Dialogue", Hannover, Germany, 11-13 July 2000; sponsored by the German Science Organizations

Invited Speaker, World Congress of Nonlinear Analysts, July 19-26, 2000; Catania, Italy.

Invited Speaker, "Symposium 2000," Banff, Alberta; October 1-4, 2000

Invited Speaker, Center for Language and Speech Processing, Johns Hopkins University, August 9-10, 2000

Invited Speaker, Department of Applied Physics, Stanford University, October 31, 2000

Invited Speaker, Department of Neuroscience, Division of Biology and Medicine, Brown University, November 16, 2000

Invited Speaker, Dynamics Days, January 3-7, 2001, Duke University.

Keynote Speaker, Conference on “Biological Information Processing and Systems,” Clemson University, January 19-20, 2001

Colloquium Speaker, Stanford Linear Accelerator Center, January 31, 2001

Invited Speaker, Applied Dynamics Seminar, University of Maryland, April 26, 2001//

Invited Speaker, 8th Joint Symposium on Neural Computation. Salk Institute, May 19, 2001

Invited Speaker, Dynamics Days Europe 2001, June 5-8, 2001, Dresden, Germany

Invited Speaker, “Progress in Nonlinear Science”, Meeting for the 100th Anniversary of the Birth of A. A. Andronov, Nizhny Novgorod, Russia, July 2-6, 2001

Invited Speaker, Conference on Experimental Chaos, Potsdam, Germany, July 22-26, 2001

Invited Lecturer, “Winter School in New Physics,” University of Buenos Aires, Buenos Aires, Argentina, July 23-28, 2001.

Invited Speaker, Workshop on Nonlinear Signal Processing for Continuum Systems, Freiburg, Germany, September, 2001.

Invited Participant, Workshop on Time Series Analysis and Applications to Geophysical Systems, November 12-16, 2001, Institute for Mathematics and its Applications, Minneapolis, MN.

Invited Speaker, Northwestern University Seminar in Nonlinear Dynamics, NSF IGERT Program, November 30, 2001

Invited Speaker, Workshop on Computational Challenges in Dynamical Systems, Fields Institute, University of Toronto, Toronto, Canada, December 2-7, 2001

Invited Participant, SAIC Workshops in “Unconventional Approaches to Countering Biological Terrorism”, September, 2001; February, March 2002.

Invited Speaker, Los Alamos Theoretical Physics Seminar, March 28, 2002

Invited Speaker, Salk Institute for Biological Studies, Computational Neurosciences Seminar, May 3, 2002

Invited Speaker, Department of Physics, University of Freiburg, Germany, May 24, 2002

Invited Speaker, NATO Advanced Study Institute on Synchronization in Nonlinear Dynamics, Yalta, Ukraine, May, 2002.

Invited Speaker, NIMH Workshop on Dynamics and Neuroscience, Washington, D.C., June 7-9, 2002.

Member, Planning Panel All-NIH Workshop on Data Analysis in Life Sciences, July 29, 2002, Rockville, MD

Invited Speaker, Third International Conference on Discrete Dynamical Systems, Tokyo, Japan, September 9-13, 2002.

Invited Speaker, Max Planck Institute for Neurobiology, Martinsried, Germany, 6 November 2002.

Invited Speaker, Technical University of Munich, Department of Biophysics, 7 November 2002.

Keynote Speaker, Center for Interdisciplinary Dynamics, University of Firenze, Florence, Italy, January 23–February 8, 2003.

Invited Speaker, Minischool in Biological Physics, University of Florence, Department of Physics, Florence, Italy, February 3-5, 2003

Invited Speaker, “The 2003 Latsis Symposium on Neural Coding and Modeling,” EPFL, Lausanne, Switzerland, February 17-19, 2003.

Invited Keynote Speaker, International Conference of the Society for Industrial and Applied Mathematics (SIAM), Montreal, Canada, June, 2003.

Invited Speaker, International Microwave Symposium, Philadelphia, PA, June 8, 2003.

Invited Speaker, 25<sup>th</sup> Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Cancun, Mexico, September 17-21, 2003.

Invited PhD Examiner for The University of Queensland, Brisbane, Australia for Mr. Greg Kociuba, student of Professor Norman Heckenberg, Spring, 2003.

Invited Speaker, Workshop on Weapons of Mass Destruction, Institute for Global Conflict and Cooperation, IGERT Program on Public Policy and Nuclear Threats, Workshop on Terrorism, August 2, 2003, UCSD

Keynote Speaker, CMC<sup>3</sup>-South Mini-Conference (Community College Mathematics Teachers), Mt. San Antonio College, Walnut, CA, October 4, 2003.

Member, National Institutes of Health Study Section on Sensorimotor Integration, November, 2003–

Invited Speaker, Neuroscience Seminar, Brown University, November 19, 2003.

Invited Speaker, Dynamics of Structured Systems, Mathematical Research Institute Oberwolfach, Oberwolfach, Germany, December 14-20, 2003

Invited Speaker, International Conference on Nonlinear Phenomena, Bangalore, India, January 5-10, 2004.

Invited Speaker, Workshop on Multivariate Time Series Analysis, Heidelberg, Germany, February 25-28, 2004.

Invited Speaker, Workshop on Spike Time Dependent Plasticity, Ascona, Switzerland, February 29-March 5, 2004.

Invited Speaker, mini-symposium on Chaos and Turbulence, 4th World Congress of Nonlinear Analysis, Orlando, Florida, June 30 - July 7, 2004.

Invited Speaker, Friday Harbor Symposium on Computation in Biology, June 7-10, 2005

Invited Mini-Symposium Organizer (with F. Takens, University of Groningen), Fifth EUROMECH Nonlinear Dynamics Conference, Eindhoven, Netherlands, August 2-7, 2005.

Invited Speaker, Bernstein Center for Computational Neuroscience, Freiburg, Germany, September 15, 2005

Invited Speaker, Nonlinear Dynamics of Electronic Systems, Potsdam, Germany, September 19, 2005

Invited Speaker, Helmholtz Institute for Supercomputational Physics, Fifth Summer School (2005): Complex Networks in Brain Dynamics, Potsdam Germany, September 20-21, 2005, 2005

Invited Speaker, University of Goettingen, Third Institute for Physics, September 23, 2005

Invited Speaker, Bernstein Center for Computational Neuroscience, Munich, Germany, September 26, 2005

Invited Speaker, Colloquium in Neuroscience, University of Texas, Health Center at Houston, Houston, Texas, October 20, 2005

Invited Speaker, American Geophysical Union Annual Conference, December 5-9, 2005, San Francisco, CA, Special Session on "Nonlinear data sciences for finite observations with noise and periodicity"

Invited Speaker, ICMS meeting on "Parameter Estimation and Continuous Time Models," University of Edinburgh, Scotland, UK, December 5-9, 2005

Invited Speaker, COSYNE Workshop on Birdsong, March 9, 2006

Invited Speaker, Applied Mathematics Seminar, Caltech, May 24, 2006

Invited Speaker, 8<sup>th</sup> Workshop on Nonlinear Dynamics, Yalta, Ukraine; May 15-26, 2006

Keynote Speaker, Workshop on the Transmission of Chaotic Signals, University of Bristol, Bristol, UK, August 1-3, 2006

Invited Speaker, Max Planck Institute for Medical Research, Heidelberg, Germany, September 18, 2006

Invited Speaker, Max Planck Institute for Neurobiology, Martinsried, Germany, September 20, 2006

Invited Speaker, Indiana University, Physics Colloquium, October 18, 2006

Invited Speaker, Institute for Global Cooperation and Conflict, January 30, 2007

Invited Speaker, Los Alamos National Laboratory, "The Grand Challenges in Neural Computation," February 19-21, 2007

Invited Speaker, "Neuroscience today: neuronal functional diversity and collective behaviors," Florence, Italy, March 26-28, 2007

Invited Speaker, "Towards a Trans-disciplinary Research Agenda for Societal Dynamics," Ljubljana, Slovenia, May 24-27, 2007

Visiting Scientist, Max Planck Institute for Neurobiology, June 18-30, 2007

Invited Speaker, International Conference on Dynamical Systems and Turbulence," Indian Institute for Science, Bangalore, India, July, 2008

## **RESEARCH GRANTS:**

### **At the Lawrence Berkeley Laboratory for Studies in Nonlinear Dynamics**

Defense Advanced Research and Projects Agency, April, 1979 - January, 1983

LBL Director's Fund, April, 1979 - December, 1980

Department of Energy, Office of Basic Energy Sciences, 1981 - 1983

### **At the Marine Physical Laboratory, Scripps Institution of Oceanography:**

Defense Advanced Research and Projects Agency, January, 1983 - October, 1984

Department of Energy, Office of Basic Energy Sciences, October, 1983 - present

Office of Naval Research Physical Oceanography Code 1122; October, 1983 - July, 1988

Support for a Postdoctoral Fellow in Nonlinear Dynamics and Physical Oceanography through the Mellon Foundation

CIA/ONR for Nonlinear Signal Processing, July, 1990—July, 1992

**At the Institute for Nonlinear Science:**

DARPA Contract in “Nonlinear Stability of Fluids and Plasmas,” Joint PI with J. Marsden, UC Berkeley, July, 1986 - August, 1989

Principal Investigator on DARPA/URI Program in Turbulent and Chaotic Fluid Dynamics, September, 1986 - September, 1991

NASA grant for studies in stratified flows, with J. A. C. Humphrey and C. W. VanAtta, July, 1986

NASA grant for studies in Neural Networks, June-September, 1986

ONR grant for study of Hamiltonian Methods for Geophysical Fluid Dynamics, June, 1989–May, 1992

Institute for Scientific Computing Research, Lawrence Livermore National Laboratory; with Otis Walton, Lawrence Livermore National Laboratory, for work on “Computation in Fluid Flows with Suspensions”, June, 1989–May, 1990.

NASA Grants for use of Cray Class Supercomputers at the National Aerodynamical Simulator (NAS); 1988-89–25 hours; 1989-90–150 hours; 1990-91–200 hours.

Office of Naval Research for “Detection and Estimation of Chaotic Signals Contaminated by Channels and Noise”, with A. V. Oppenheim, MIT and D. Mook, Lockheed/Sanders; May, 1991—September, 1994.

Lockheed Palo Alto Research Laboratory—Unrestricted grant for research in nonlinear systems; January, 1991–September, 1992

Army Research Office for “Modeling of Chaotic Fluctuating Channels for Signal Detection”, with D. Mook and C. Myers, Lockheed/Sanders; August, 1991—September, 1995.

National Science Foundation for “Nonlinear Signal Processing”, with A. M. Fraser, Portland State University, March, 1992–April, 1994.

CIA for analysis of Chaotic Signal Masking, September, 1992–September, 1993.

Office of Naval Research for “Hamiltonian Dynamics of Nonlinear Ocean Waves”, August, 1992–July, 1994, with J. E. Marsden and T. Ratiu; July, 1994–December, 1996.

ARCS Foundation for support of graduate student in Nonlinear Science, September, 1992—September, 1994.

FBI/DARPA for work on private communications channel; September 1, 1996– August 31, 1997

National Science Foundation for “Nonlinear Dynamics and Predictors of Climate”, with U. Lall; September, 1995–August, 1998

EPRI for support of research in dynamics of power plant monitoring and control; November 1, 1995—October 31, 1997

National Science Foundation for “Nonlinear Processes in Central Pattern Generators” with A. I. Selverston. NSF Division of Biology; September, 1996–August, 1997.

National Science Foundation for “Synchronization and Communication in Nonlinear Optical Systems”, with S. Strogatz (Cornell) and R. Roy (Georgia Tech); NSF Division of Optical Sciences; October, 1996—September, 1999

Central Intelligence Agency for “Dynamics and Computational Capability of Neurons”, with A. I. Selverston; September 1997–November, 1999

Central Intelligence Agency for “Couriers: Chaotic Carriers of Information”, with L. Larson; January, 1998–December, 1999

Army Research Office, “Digital Communications Devices Based on Nonlinear Dynamics and Chaos”, MURI Award, with L. Larson, Lev Tsimring, J-M Liu (UCLA) and W. Dally (Stanford), May, 1998—April, 2003.

ST Microelectronics, January, 2000–December, 2000; Topics in Chaotic Communications

UC CoRe; March, 2000–February, 2001; Topics in Chaotic Communications

Army Research Office, January, 2001–December, 2001, Postdoctoral Fellow Support in Neuroscience Research.

Office of Naval Research, January 2000 – December, 2001, Postdoctoral Support in Neuroscience Research.

National Science Foundation, “Biophysics and Nonlinear Dynamics Underlying Synchronization of Chaotic Neurons”, July 1, 2001–June 30, 2007.

National Science Foundation, “Principles of Information Dynamics in Basic Neural Circuits: A Hybrid Systems Approach”, with M. I. Rabinovich, A. Szücs, and P. Varona. January 1, 2002–December 31, 2005.

National Science Foundation, “Biological Computation in Olfactory Systems: experiment, theory, and analog circuit modeling”, with Gilles J. Laurent and M. I. Rabinovich. January 1, 2002–December 31, 2005.

National Institutes of Health, “Basic Circuitry of Central Pattern Generators” with A. I. Selverston and M. I. Rabinovich, National Institutes of Health, NIH R01 NS40110-01A2.

National Science Foundation, IGERT Grant for the Graduate Program in Computational Neurobiology, with T. Sejnowski, W. Kristan, D. Kleinfeld, R. Hecht-Nielsen, and M. Whitehead.

National Science Foundation, Physics Frontier Center Grant 2002/07 for the Center for Theoretical Biological Physics, with H. Levine, J. Ohnucic, P. Wolynes, D. Case, T. Hwa, A. McCammon, T. Sejnowski, D. Kleinfeld, C. Stevens, K. Baldridge, and C. Brooks.

San Diego Foundation, Blasker Foundation Award for Research in Synaptic Plasticity of Inhibitory Synapses, July 1, 2005–June 30, 2006

UCSD Academic Senate Research Award, March, 2007

Kavli Institute for Brain and Mind, Research Grant, 1 May 2007–30 April 2008

Principal Investigator, MURI Research Grant, “Chemical Discrimination and Localization using Biologically Based Olfactory Processing,” 1 May 2007-30 April 2012

May 23, 2007