

Selected Invited Lectures

- [1] Plenary Hour Address: (June 12, 1983) “Some Infinite Dimensional Lie Algebras and related System Theoretic Problems”, Symposium on the Mathematical Theory of Networks and Systems, Beer Sheva, Israel.
- [2] “Symmetries in Nonlinear Control Theory”, Berkeley-Ames Conference on Nonlinear Problems in Control and Fluid Mechanics, Berkeley, CA.
- [3] Decision and Control Seminar: (August, 1983) “Lie-Poisson Structures and Dual-Spin Spacecraft”, Division of Applied Sciences, Harvard University, Cambridge, MA.
- [4] Joint Electrical Engineering and Mathematics Colloquium: (February 15, 1984) “Lie-Poisson Structures and Dual-Spin Spacecraft”, University of California, Berkeley, CA.
- [5] Invited Lecture: (June 5, 1984) “Geometric Methods for Nonlinear Control”, NASA Langley Research Center, Hampton, VA.
- [6] Invited Lecturer and Panelist: (July 16, 1984) AFOSR Forum on Space Structures, Vienna, VA.
- [7] Dynamics Seminar: (February 20, 1985) “Hamiltonian Methods and Stability for Rigid Bodies with Flexible Attachments”, Department of Mathematics, University of California Berkeley, CA.
- [8] Control Seminar: (February 21, 1985) “An Exposition of the Theory of Screws”, Department of Electrical Engineering, University of California, Berkeley, CA.
- [9] Joint Princeton-Rutgers Systems Seminar: (April 10, 1985) “New Methods for the Stability and Control of Mechanical Systems”, Department of Mathematics, Rutgers University New Brunswick, NJ.
- [10] Decision and Control Seminar: (April 11, 1985) “Stability and Control of Mechanical Systems”, Division of Applied Sciences, Harvard University Cambridge, MA.
- [11] LIDS Seminar: (April 12, 1985) “Stability and Control of Mechanical Systems”, Massachusetts Institute of Technology, Cambridge, MA.
- [12] NASA/USRA Review Meeting: (December 4, 1985) “Advanced Mission Design Project at Maryland”, NASA Johnson Space Center, Houston, TX.
- [13] Oak Ridge Associated Universities Meeting: (October 10, 1985) “The Systems Research Center”, Oak Ridge Associated Universities Consortium, Knoxville, TN.
- [14] Special Session on Hamiltonian and Lagrangian Systems (June 10 - 14, 1985) Symposium on the Mathematical Theory of Networks and Systems, “Hamiltonian Mechanics of Rigid Bodies with Flexible Attachments”, Stockholm, SWEDEN.
- [15] Student-Faculty Colloquium: (March 17, 1986) “Some Mathematical Problems in Robotics”, Department of Mathematics, University of Maryland, College Park.
- [16] Symposium on Differential Geometry: The interface between pure and applied mathematics (April 23 - 25, 1986) “On the Control of Multibody Systems”, San Antonio, TX.
- [17] AT&T Bell Laboratories: (September 15, 1986) “The Intelligent Servomechanisms Project” Machine Perception Research Department, Holmdel, N.J.
- [18] IEEE Symposium on Computer Aided Control Systems Design: (September 24, 1986) “Control of a Flexible Arm: Design and Implementation” Washington, D.C.
- [19] AFOSR Workshop on Control of Systems Governed by Partial Differential Equations: (October 9, 1986) “Nonlinear Control and Stability of Interconnected Mechanical Systems” Val-David, Que. CANADA.

- [20] Division of Applied Mechanics Colloquium: (October 30, 1986) “Modeling and Control of Interconnected Mechanical Systems” Stanford University Stanford, CA.
- [21] Department of Electrical Engineering Colloquium: (November 7, 1986) “Hamiltonian Structures for Interconnected Systems” Arizona State University Tempe, Arizona.
- [22] Department of Mathematics Colloquium: (Fall 1987) “Eulerian Many-Body Problems” University of Maryland.
- [23] Symplectic Integration Working Group: (March 19 & 20, 1988) “Eulerian Many-Body Problems” Los Alamos National Laboratory Los Alamos, New Mexico.
- [24] Dynamics Seminar: (September 20, 1989) “Rigid Body Dynamics in a Central Gravitational Field” Cornell University.
- [25] Geometric Phases Workshop: (October 10, 1989) “Geometric Phases, and Optimal Maneuvers of Coupled Rigid Body Systems” MSI, Cornell University.
- [26] AFOSR/AIAA Microgravity Simulation Workshop: (November 2, 1989) “Geometry and Control of Coupled Structures: Recent Developments” Denver.
- [27] AFOSR/AIAA Microgravity Simulation Workshop: (November 2, 1989), Denver, Panelist.
- [28] Algebraic and Geometric Integration Workshop: (November 9, 1989) “Symplectic and almost Poisson Integration of Rigid Body Systems” MSI, Cornell University.
- [29] Mathematics Colloquium: (November 14, 1989) “Mechanics, Control and Holonomy” Cornell University.
- [30] Theoretical & Applied Mechanics Colloquium: (December 22, 1989) “Geometry and Control of Coupled Structures” Cornell University.
- [31] Applied Dynamics Seminar: (March 8, 1990) “Geometric Phases and Optimal Reconfiguration Maneuvers”, University of Maryland.
- [32] Systems Science Seminar: (May 22, 1990) “Geometric Phases, Holonomy, and Optimal Control in Mechanical Systems”, Arizona State University.
- [33] Mathematics Seminar: (October 25, 1990) “Geometric Phases, Holonomy, and Optimal Control in Mechanical Systems,” Ohio State University.
- [34] NSF-EPRI Workshop on Intelligent Control: (October 15, 1990) “The Intelligent Servomechanisms Project”, EPRI, Palo Alto.
- [35] Annual Meeting of the American Association for the Advancement of Science: (February 19, 1991) “Geometric Phases, Optimal Control and Space Robotics”, Washington, D.C.
- [36] Mathematics Colloquium: (March 1, 1991) “Geometric Phases, Holonomy and Optimal Control in Mechanical Systems”, Georgetown University.
- [37] Workshop on Mathematical Problems in Robotics: (June 16 - June 22, 1991) “Geometric Phases & Anholonomy in Space Robotics”, Oberwolfach, Germany.
- [38] Workshop on Nonlinear Control: (July 24 - August 1, 1991) “Control Problems on Principal Bundles and Nonholonomic Mechanics”, Los Alamos National Laboratory.
- [39] Applied Mechanics and Mechanical Engineering Seminar: (May 26, 1992) “Constrained Variational Problem in Mechanics and Optimal Control”, California Institute of Technology.
- [40] Workshop on Microrobotics: (May 28, 1992) “Coordination of Legged Locomotion via Coupled Nonlinear Oscillators”, Jet Propulsion Laboratory.

- [41] Workshop on Geometric Variational Problems and Optimal Control: (June 6-9, 1992) “Constrained Variational Problems in Mechanics and Optimal Control”, Fields Institute for Mathematical Research, Waterloo, Canada.
- [42] AMS-SIAM Summer Seminar: (July 26-August 1, 1992) “Geometric Mechanics, Symmetry and Paradigms for Control Theory”, Colorado State University, Ft. Collins.
- [43] Dynamics Seminar: (November 12, 1992) “Intelligent Control of Movement: A Role for Coupled Oscillators”, University of Houston, Mathematics Department.
- [44] Robotics Workshop: (January 24-29, 1993) “Intelligent Control of Movement: A Role for coupled Oscillators”, IMA, University of Minnesota, Minneapolis-St. Paul.
- [45] Instrumentation & Controls Division Seminar: (March 29, 1993) “Rational Wavelets and Approximation of Linear Systems”, Oak Ridge National Laboratory, Oak Ridge, TN.
- [46] Eleventh Army Conference on Applied Mathematics and Computing: (June 8-11, 1993) “Rational Wavelets in Control”, Carnegie-Mellon University, Pittsburgh.
- [47] Conference on Geometric Methods in Theoretical and Computational Mechanics: (July 24-30, 1993) “Constraints, Controls and Reduction”, Oberwolfach, Germany.
- [48] Joint meeting of AMS and the Canadian Math Society: (August 15 - 19) “Hamiltonian Control System on Bundles”, Vancouver, B.C..
- [49] 1994 Science and Technology Symposium on *Motion, Control and Geometry*, National Academy of Sciences: (April 12, 1994) “Coupled Oscillators and Motion Control”, Washington, D.C.
- [50] Workshop on Geometric Mechanics Nonholonomic and Nonholonomic Systems, University of California, Berkeley: (August 12-13, 1994) “G-Snakes: Nonholonomic Kinematic Chains on Lie Groups”.
- [51] Engineering Systems Research Center Colloquium, University of California, Berkeley: (September 28, 1994) “Oscillations, Constrained Systems and Motion Control”.
- [52] SEMATECH Seminar (Jan 11, 1995) and Texas Instruments Seminar (Jan 12, 1995): “Intelligent Control”.
- [53] ONR-ARPA Workshop on Biocomotion and Control of Flow on Deformable Surfaces, Baltimore: (March 21, 1995) “Motion Control of Deformable Bodies”.
- [54] University of Arkansas Spring Lecture Series, Fayetteville: (April 8, 1995), “Geometry of Nonholonomic Systems on Lie Groups”.
- [55] Dynamics and Control Special Seminar, Department of Mechanical and Aerospace Engineering, Princeton University: (May 25, 1995) “Oscillations, Constrained Systems and Motion Control”.
- [56] Workshop on Monitoring and Control of Intelligent Epitaxy, Banff Conference Center: (June 12, 1995) “Wavelets and Neural Networks in Identification and Control”.
- [57] Industry Workshop on Semiconductor Manufacturing, Institute for Systems Research, University of Maryland at College Park: (May 16, 1996) “Modeling and Sensor Based Control for Semiconductor Processing”.
- [58] Varian Ion Implant Systems, Gloucester, Mass: (May 31, 1996) “Modeling and Sensor Based Control for Semiconductor Processing”.
- [59] Symposium on the Mathematical Theory of Networks and Systems, Washington University, St. Louis: (June 24-28, 1996) “Nonholonomic Mechanical Systems on Lie Groups”.

- [60] Symposium on the Mathematical Theory of Networks and Systems, Washington University, St. Louis: (June 24-28, 1996) “Geometric Methods for Motion Control of Deformable Bodies”.
- [61] College of Engineering Control Colloquium, University of Michigan, Ann Arbor: (October 25, 1996) “Models and Motion Control for Deformable Bodies in Fluids”.
- [62] ECSE Seminar, Harvard University, Cambridge: (February 20, 1997) “Learning from Repeated Trials: A Dynamical System”.
- [63] Department of Mathematics Colloquium, Boston University: (February 21, 1997) “Models and Motion Control for Deformable Bodies in Fluids”.
- [64] University of Kaiserslautern, Germany, Workshop on Three Decades of Algebraic Systems Theory in Honor of the 60th Birthday of Paul A. Fuhrmann: (September 24, 1997) “Modeling and Reduction: Spectra, Wavelets and PCA”.
- [65] Allerton Workshop on Future Directions in Systems and Control, University of Illinois, Urbana-Champaign: (September 28, 1997) “On Controlling the Formation of Spatio-Temporal Patterns”.
- [66] Workshop on Geometric Mechanics and Control, Caltech, Pasadena: (Dec 13, 1997) “Magnetostrictive Actuation”.
- [67] Department of Mathematics Colloquium, Virginia Polytechnic Institute and State University, Blacksburg: (April 10, 1998) “Control and Mechanics: A Geometric Perspective”.
- [68] IMA Workshop on Nonlinear Systems and Identification, Minneapolis-St. Paul: (April 30, 1998) “From Smart Devices to Smart Systems”.
- [69] IMA Workshop on Animal Locomotion and Robotics, Minneapolis-St. Paul: (June 1, 1998) “Oscillations and Motion on Lie Groups”.
- [70] Workshop on Introduction to Smart Structures, Tampa, FL: (December 1998) “Piezoelectric and Magnetostrictive Actuation”
- [71] Workshop on Perspectives in Control, Harvard University: (October 23-24, 1998) “Patterns in Control”.
- [72] NSF Learning and Intelligent Systems Workshop, Georgetown University: (May 3-4, 1999) “Binaurally Directed Movement”
- [73] LIDS Colloquium, Massachusetts Institute of Technology: (May 11, 1999) “Geometry of Model Reduction”
- [74] Workshop on Flow Control, University of California, San Diego: (May 31-June 1, 1999) “Patterns in Control of Flows”
- [75] Workshop on Mechanics, Oberwolfach Math Institute, Germany: (July 25-31, 1999) “Geometry of Magnetoelasticity”
- [76] Workshop on Lie Groups, Wuerzburg, Germany: (August 3-6, 1999) “Motion Control on Lie Groups”
- [77] ARO Workshop on Smart Structures, Pennsylvania State University: (August 16-18, 1999) “Patterns in Control”
- [78] SPIE Conference on Mathematics and Control of Smart Structures, Newport Beach: (March 8, 2000) “Geometry of Magnetoelasticity”
- [79] Workshop on Applied Mathematics and Optimization, University of Notre Dame: (April 8, 2000) “Control using Auditory Feedback”

- [80] College of Engineering Controls Colloquium, University of Michigan: (April 14, 2000) “Some Recent Progress in Distributed Control”
- [81] NSF Workshop on Mathematical Problems in Robotics, Arlington: (May 15, 2000) “Control using Auditory Feedback”
- [82] Workshop on Biological Control Systems, Chicago: (June 27, 2000) “Learning Binarily Directed Movement”
- [83] IMA Workshop on Matheamtical Challenges in GPS, St. Paul, Minnesota: (August 17, 2000) “Approximate Nonlinear Filtering and GPS”
- [84] Workshop on Hysteresis, Metastability and Aftereffect, University of Illinois at Chicago: (August 28, 2000) “Modeling and Control of Hysteresis”
- [85] Colloquium, Mathematics Department, University of Maryland at Baltimore County: (December 1, 2000) “Relative Equilibria and Rings of Satellites”
- [86] Workshop on Cooperative Control and Optimization, University of Florida: (December 4, 2000) “Role of Symmetries and Nonlinearities in Distributed Cooperative Control”
- [87] Distinguished Lecture Series (Mechanical and Industrial Engineering Department), University of Illinois, Urbana-Champaign: (April 24, 2001) “Synthetic Potentials and Dissipation”
- [88] Decision and Control lab Seminar, University of Illinois, Urbana-Champaign: (April 25, 2001) “Arrays, Patterns and PDE’s in Control”
- [89] Third Interneational Symposium on Hysteresis and Micromagnetic Modeling HMM-01, George Washington University: (May 21-23, 2001) “Conserving Algorithms for Micromagnetics ”
- [90] SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah: (May 23, 2001) “Model Reduction and Control”
- [91] Workshop in Micromagnetics and Applications to MRAMS, Princeton University: (June 7-8, 2001) “Cayley Transforms in Magnetics”
- [92] Fifth SIAM Conference on Control and its Applications, San Diego: (July 11-14, 2001) “Cayley Transforms in Magnetics
- [93] Fifth SIAM Conference on Control and its Applications, San Diego: (July 11-14, 2001) “Synthetic Potentials in the Control of Mechanical Systems”
- [94] Fifth SIAM Conference on Control and its Applications, San Diego: (July 11-14, 2001) “Vibratory Gyroscopes, Moving Systems, and Geometric Phase ”
- [95] Division of Applied Sciences Colloquium, Harvard University: (November 2, 2001) “Controlling Optical Fields ”
- [96] Distinguished Lecture at Symposium on Mathematics in the 21st Century, Texas Tech University: (November 8-9, 2001) “Patterns in Control”
- [97] Conference on Cooperative Control and Optimization, University of Florida: (November 12-14, 2001) “Dynamics and Control of Agile Formations”
- [98] Mathematics Department Student-faculty Colloquium, University of Maryland: (March 16, 2002) “Temporal Patterns in Control”
- [99] GN&C Seminar, NASA Goddard Spaceflight Center: (March 25, 2002) “Coordinated Orbit Transfer for Satellite Clusters”
- [100] GRASP Laboratory Lunch Seminar, University of Pennsylvania: (April 12, 2002) “Control with Auditory Feedback”

- [101] Mathematics Department Geometry-Topology Seminar, University of Maryland: (May 6, 2002) “Momentum Maps, Constrained Dynamics, and Control”
- [102] Testbed Workshop, Research Institute for Autonomous Precision Guided Systems University of Florida: (July 17-18, 2002) “Geometric Methods for Formation Dynamics and Control”
- [103] Workshop on Geometry, Mechanics, and Dynamics, in honor of the 60th birthday of J.E. Marsden. Fields Institute, Toronto: (August 7-11, 2002) “Interactions on Lie Groups”
- [104] Workshop on Future Directions in Nonlinear Control of Mechanical Systems, University of Illinois: (October 5 2002) “Shapes, Patterns and Controls”
- [105] Symposium on New Trends in Nonlinear Dynamics and Control in honor of the 60th birthday of A.J. Krener. Naval Postgraduate School, Monterey: (October 17-18, 2002) “Interacting Particles on Lie Groups”
- [106] Control and Dynamical Systems Seminar, California Institute of Technology: (April 16, 2003) “Geometry of Gyroscopic Feedback: From Rigid Bodies to Swarms”
- [107] Vision Lunch Seminar, Yale University: (May 16, 2003) “Geometry of Gyroscopic Feedback: From Rigid Bodies to Swarms”
- [108] Minisymposium on Swarming, SIAM Conference on Applications of Dynamical Systems 2003: (May 27, 2003) “Geometry of Steering Laws in Cooperative Control”
- [109] Minisymposium on Geometric Dynamics, SIAM Conference on Applications of Dynamical Systems 2003: (May 28, 2003) “Dynamics on $SU(n)$ and adaptive optics”
- [110] Workshop on Cooperative Control, Block Island: (June 10, 2003) “Geometry of Gyroscopic Feedback: From Rigid Bodies to Swarms”
- [111] Workshop on Biological and Artificial Swarms Institute for Pure and Applied Mathematics, UCLA: (October 3-4, 2003) “Geometry of Steering Laws for Swarms”
- [112] Workshop on New Directions in Control Theory and Applications: Texas Tech University, Lubbock: (November 14-15, 2003) “A System Identification Problem from Lord Rayleigh”