

CURRICULUM VITAE

Lucy Y. Pao

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Research Interests:

Control systems (with applications to flexible structures, wind turbines, wind farms, power converters, tape systems, disk drives, atomic force microscopy, near-field scanning optical microscopy and lithography); multisensor fusion (with applications to uninhabited autonomous vehicles, satellites, and automotive active safety systems); and haptic and multi-modal visual/haptic/audio interfaces (with applications to scientific visualization and spatial communication).

Education:

- 9/1988 – 1/1992 **Stanford University**, Stanford, CA
Ph.D., Electrical Engineering. GPA: 4.00
Thesis Topic: *Proximate Time-Optimal Control of Higher-Order Servomechanisms*
Advisor: Professor Gene F. Franklin
- 9/1987 – 6/1988 **Stanford University**, Stanford, CA
M.S., Electrical Engineering. GPA: 3.93
- 9/1985 – 6/1987 **Stanford University**, Stanford, CA
B.S., Electrical Engineering, *with distinction*. GPA: 3.89

Major Honors and Awards:

- 2016 – 2017 Institute for Advanced Study Fellowship, Hanse-Wissenschaftskolleg, Delmenhorst, Germany
- 2016 Plenary Speaker, Alpbach Technology Symposium, Alpbach, Austria
- 2016 Plenary Speaker, American Control Conference, Boston, MA
- 2015 SIAM Journal on Control and Optimization Best Paper Prize
- 2013 Fellow of the International Federation of Automatic Control
- 2013 Plenary Speaker, IEEE Conference on Decision and Control, Florence, Italy
- 2012 IEEE Control Systems Magazine Outstanding Paper Award
- 2012 Plenary Speaker, ASME Dynamic Systems and Control Conference, Ft. Lauderdale, FL
- 2012 Fellow of the IEEE
- 2011 – 2013 Elected Member, IEEE Control Systems Society Board of Governors
- 2007 – 2013 General Chair, 2013 American Control Conference
- 2010 – 2011 Member, US Defense Science Study Group

- 2011 Plenary Speaker, ASME International Mechanical Engineering Congress & Exposition
- 2008 – 2014 Distinguished Lecturer, IEEE Control Systems Society
- 2008 Visiting Miller Professor, Miller Institute for Basic Research in Science, University of California at Berkeley
- 2008 Keynote Speaker, International Federation of Automatic Control Triennial World Congress, Seoul, Korea
- 2006 Plenary Speaker, IEEE Conference on Decision and Control, San Diego, CA
- 2005 Best Paper Award, World Haptics Conference, Pisa, Italy
- 2005 – 2007 Elected Member, IEEE Control Systems Society Board of Governors
- 2004 Best Commercial Potential Award, International Symposium on Haptic Interfaces for Virtual Environments and Teleoperator Systems
- 2001 – 2004 Program Chair, 2004 American Control Conference
- 1997 – 2000 Young Investigator Award, Office of Naval Research
- 1996 – 2001 Early Faculty CAREER Award, National Science Foundation
- 1996 Young Author Prize, International Federation of Automatic Control Triennial World Congress
- 1989 – 1992 Graduate Fellowship Award, National Science Foundation

Other Honors and Awards:

- 2015 Clean Energy Education & Empowerment Awards Finalist
- 2015 Appointed Member, IEEE Control Systems Society Board of Governors
- 2013 Keynote Speaker, Society of Instrument and Control Engineers Annual Conference
- 2013 Plenary Speaker, IEEE Power and Energy Conference at Illinois
- 2013 Dean's Faculty Fellowship, College of Engineering and Applied Science
- 2012 Distinguished Lecturer, Chinese Control and Decision Conference
- 2010 – Courtesy Professor, Aerospace Engineering Sciences Department
- 2009 – Fellow, Renewable and Sustainable Energy Institute
- 2009 – 2014 Richard and Joy Dorf Professor, Electrical, Computer, and Energy Engineering
- 2007 – 2011 Founding Scientific Director, Center for Research and Education in Wind
- 2008 – 2010 Honorary Seat, Renewable and Sustainable Energy Institute Leadership Council
- 2006 Dean's Faculty Fellowship, College of Engineering and Applied Science
- 2005 Featured in the "People in Control" column of the *IEEE Control Systems Magazine*, pp. 18-21, Dec. 2005
- 2005 Invited Participant, US-Japan Workshop on Sensors, Smart Structures, and Mechatronic Systems, Tokyo, Japan
- 2005 Project on "Haptic Interfaces for Spatial Reasoning" featured in the US National Science Foundation's Fiscal Year 2004 Performance Highlights
- 2004 Finalist, University of Colorado's Technology Transfer Office's Proof of Concept Program

- 2003 Subaru Teaching Excellence Award
- 2003 Appointed Member, IEEE Control Systems Society Board of Governors
- 2002 Special Service Recognition Award, American Automatic Control Council
- 2001 – 2002 Senior Common Room Member, Cabot House, Harvard University
- 2001 – 2002 Faculty Fellowship Award, University of Colorado Council on Research and Creative Work
- 2001 Co-author and advisor on the paper that received the 2001 American Control Conference (ACC) Best Student Paper Award
- 2000 Exemplary Project Award, Colorado Advanced Software Institute
- 2000 Keynote Speaker, Japan/USA/Vietnam Workshop on Research and Education in Systems, Computation, and Control Engineering, Ho Chi Minh City, Vietnam.
- 2000 Invited Participant (by the US National Academy of Engineering), German-American Frontiers of Engineering Symposium, Bremen, Germany
- 1998 Elevated to Senior Member of the IEEE
- 1998 Keynote Speaker, Japan/USA/Vietnam Workshop on Research and Education in Systems, Computation, and Control Engineering, Hanoi, Vietnam
- 1997 Invited Participant, US National Academy of Engineering's Frontiers of Engineering Symposium
- 1997 Young Careerist Award, Boulder Business and Professional Women
- 1997 Junior Faculty Development Award, University of Colorado
- 1995 Member, Who's Who in the Midwest
- 1994 Nominated by the Stanford Alumni Association for an Alumni Trustee position on the Stanford Board of Trustees
- 1990 Scholarship Award, President Chiang Education Foundation
- 1987 – 1988 Masters Fellowship Award, Hughes Aircraft Company
- 1986 – 1987 Career Scholarship Award, Pacific Gas & Electric Company
- 1985 – 1987 Scholarship Award, Society of Women Engineers
- 1986 National Technical Presentation Award, Society of Women Engineers
- 1985 Scholarship Award, Chinese Medical and Health Association
- 1984 Special Superior Achievement Award, Naval Surface Warfare Center
- 1984 1st place, Washington, D.C. Society of Engineers undergraduate research paper competition

Employment:

- 8/1995 – **University of Colorado**, Electrical, Computer, and Energy Engineering Department, Boulder, CO
Richard and Joy Dorf Professor of Electrical, Computer, and Energy Engineering (2009-2014), Fellow of Renewable and Sustainable Energy Institute (2009-), Professor (2004-), Associate Professor (1999-2004), Assistant Professor (1995-1999), Courtesy Professor of Aerospace Engineering Sciences (2010-): Developing combined feedforward/feedback controllers that rapidly maneuver flexible structures while being robust to parameter errors. Developing and

analyzing multisensor fusion algorithms and sensor management methods. Studying human-tool and human machine interaction and developing haptic and combined visual/haptic displays for virtual environments. Teaching Sustainable Energy (Fall 2013 and Fall 2014), Linear Systems (Fall 1995, Fall 1998, Fall 2002, Spring 2005, and Spring 2008), Control Systems Analysis (Spring 1996, Fall 1996, Spring 2000, Spring 2001, Spring 2003, and Fall 2015), Automatic Control Systems (Spring 1998, Spring 2004, Spring 2007, and Spring 2011), Advanced Linear Systems (Fall 1999, Fall 2003, and Fall 2010), and Sampled-Data and Digital Control Systems (Fall 1997, Fall 2000, Fall 2004-2007, Spring 2010, Spring 2012, Fall 2012, Spring 2014-2016). Was a founding faculty member of the Colorado Center for Information Storage, 1997. Have served on the following Electrical, Computer, & Energy Engineering Department committees: Control Systems Graduate Preliminary Exam Committee (1995- , Chair in 1997-1998, 2002-2003, 2006-2007, 2009-2010, and 2014-2015), Graduate Orientation Committee (1996, 2000, 2003, 2007, 2009, 2013, and 2015), Graduate Studies Committee (1997-2002, 2004-2005, and 2009), Hiring Planning Committee (1998), Curriculum Committee (2002-2004), Faculty Search Committee (2002-2004, 2008-2009, 2011-2012, and 2013-2014 (chair)), ABET Linear Systems Core Course Assessment Team (2004-2005), Executive Committee (2005-2007), Reappointment, Tenure, and Promotion Committee (2007-2008 and 2013-2014), and the departmental leadership committee (2014-). Have also served on the Aerospace Engineering Sciences Department Faculty Search Committee (2004-2006), the College of Engineering Dean's Faculty Leadership and Advancement Group (2002-2005), the Colorado Center for Information Storage Executive Committee (2002-2007), the College Faculty Research Council (2006-2007), as a College of Engineering Dean's Scholar (2005-2008), as Chair of the Research and Engineering Center for Unmanned Vehicles (RECUV) Curriculum Committee (2005-2008), on the College Integrated Teaching and Learning Laboratory (ITLL) Task Force (2006-2008), on the University of Colorado Energy Initiative and Renewable and Sustainable Energy Institute Leadership Council (2008-2010), as a participating faculty member in the graduate and undergraduate Interdisciplinary Certificate Programs in Energy (2007-2011), and as the Founding Scientific Director for the Center for Research and Education in Wind (2007-2011). Currently serving as a Renewable and Sustainable Energy Institute Fellow (2009-).

1/2009 –

National Renewable Energy Laboratory, National Wind Technology Center, Golden, CO

Visiting Scholar: Exploring advanced algorithms for control of individual wind turbines and for distributed control of wind farms. Developing model predictive controllers using preview measurements of upstream wind conditions from lidar sensors. Deriving models of continuous-wave and pulsed lidars. Investigating the use of coherence functions in modeling wind evolution. Developing a novel optical icing sensor and distributed hybrid controllers for de-icing wind turbine blades. Applying game

theoretic methods for developing coordinated controllers for arrays of wind turbines. Investigating active power control algorithms for wind turbines and wind power plants.

10/2016 – 7/2017 **Hanse-Wissenschaftskolleg, Institute for Advanced Study,**

Delmenhorst, Germany, and

ForWind Center for Wind Energy Research, Oldenburg University,

Oldenburg, Germany

Fellow: Investigating control of wind turbines and wind farms, control of atomic force microscopes, and control of tape drive systems.

9/2016 – 10/2016 **Boston University,** Boston, MA

Center for Information and Systems Engineering Resident Scholar:

Investigating control of atomic force microscopes, control of wind turbines and wind farms, and control of tape drive systems.

8/2016 – 9/2016 **University of California,** Santa Barbara, CA

Visiting Researcher: Investigating control of wind turbines and wind farms, control of atomic force microscopes, and control of tape drive systems.

8/2008 – 12/2008 **University of California,** Miller Institute for Basic Research in Science, and Department of Mechanical Engineering, Berkeley, CA

Visiting Miller Professor: Investigated different combined feedforward/feedback control architectures and algorithms, with applications ranging from megawatt wind turbines to disk drives to atomic force microscopes.

8/2001 – 7/2002 **Harvard University,** Division of Engineering and Applied Sciences, Cambridge, MA

Visiting Scholar: Developed aggressive control methods for disk-drive and tape-drive systems. Investigated applications of ordinal optimization and computing budget allocation techniques in the evaluation and comparison of multisensor fusion algorithms. Derived novel mechanism and hand models in order to achieve higher bandwidth force control of in-parallel multi-degree of freedom haptic interfaces. Explored how haptic interfaces can enhance spatial learning in blind users, users with learning disabilities, as well as the general population. Participated as a Senior Common Room Member of Cabot House, one of the residential houses at Harvard.

9/1993 – 7/1995 **Northwestern University**, Electrical Engineering and Computer Science Department, Evanston, IL

Assistant Professor: Derived robust near time-optimal control algorithms for flexible structures. Studied methods for human-robotic cooperation in assembly tasks. Compared and analyzed several implementations of multisensor fusion algorithms for tracking applications. Developed control algorithms for multifingered robotic hands. Set up an Engineering School wide instructional control laboratory. Taught Introduction to Feedback Systems (Winter 1994 and Winter 1995), Optimal Control (Spring 1994), System Theory (Fall 1993 and Fall 1994), and Nonlinear Problems in Engineering (Spring 1995). Served as Freshmen Advisor, on the Undergraduate Advisory Committee, Electrical Engineering Curriculum Committee, Instructional Laboratory Equipment Committee, McCormick Control Council, and as Secretary/Treasurer of the Northwestern University Chinese-American Faculty Association.

12/1991 – 8/1993 **The MITRE Corporation**, Signal Processing Department, Bedford, MA

Member of Technical Staff: Developed and evaluated centralized multisensory data fusion algorithms for multiple target tracking scenarios. Analyzed the tradeoffs in performance versus computational complexity and communication requirements of the developed algorithms.

9/1988 – 12/1991 **Stanford University**, Information Systems Laboratory, Stanford, CA

Research Assistant: Developed nonlinear robust near time-optimal control algorithms for third- and fourth-order servomechanisms. Proved global stability of several nonlinear controllers for different third-order marginally stable plants. Simulation and experimental results demonstrated the effectiveness of the algorithms developed.

6/1988 – 9/1988 **AT&T Bell Laboratories**, Machine Perception Research Department, Holmdel, NJ

Member of Technical Staff: Developed an algorithm for the transformation of human hand positions for controlling robotic hands. Applied the algorithm to the Utah/MIT Dextrous Hand using (one at a time) the VPL DataGlove and the Exos Dextrous Hand Master as the human hand position measurement device.

6/1987 – 9/1987 **Hughes Aircraft Company**, Space and Communications Group, Dynamics and Control Department, El Segundo, CA

Member of Technical Staff: Designed and tested a compensator for a proportional control automobile anti-lock braking system modulator. Developed a servovalve and actuator model and implemented it in an active suspension control algorithm simulation program for a Chevrolet Corvette.

- 6/1986 – 9/1986 **Pacific Gas & Electric Company**, Transmission Planning Department, San Francisco, CA
Technical Intern: Analyzed and predicted loading conditions to improve power distribution efficiency.
- 5/1985 – 1/1986 **Naval Surface Warfare Center**, Electromagnetics Branch, Silver Spring, MD
Engineering Technician: Performed software and hardware engineering for a hand-held prototype timer programmer.
- 6/1983 – 5/1985 **Naval Surface Warfare Center**, Metallic Materials Branch, Silver Spring, MD
Engineering Aide: Conducted thermal analysis and magnetic annealing experiments on shape memory alloys and metallic glasses.

Publications

Book

- B1) L. Y. Pao and J. H. Laks, *Model Predictive Control of Wind Turbines*, in preparation, Springer.

Book Chapters

- BC2) S. Shajiee, L. Y. Pao, and R. R. McLeod, "Monitoring Ice Accumulation and Active De-Icing Control of Wind Turbine Blades," chapter in *Wind Turbine Control and Monitoring*, pp. 193-230, Springer, *Advances in Industrial Control* series, edited by N. Luo, Y. Vidal, and L. Acho, 2014, ISBN 978-3-319-08412-1.
- BC1) L. Y. Pao, "Active Power Control of Wind Power Plants for Grid Integration," article in *Encyclopedia of Systems and Control*, edited by J. Baillieul and T. Samad, DOI 10.1007/978-1-4471-5102-9_272-1, Springer-Verlag London 2014.

Book Foreward

- BF1) L. Y. Pao, Foreword for book on *Stochastic Simulation Optimization for Discrete Event Systems – Perturbation Analysis, Ordinal Optimization, and Beyond*, World Scientific, 2013.

Refereed Technical Journal Papers

- J71) J. Aho, L. Pao, and P. Fleming, "Controlling Wind Turbines for Providing Active Power Control Ancillary Services," pre-print, to be submitted for publication in *Wind Energy*.
- J70) S. Shajiee, A. Najafi, L. Y. Pao, and R. R. McLeod, "Closed-Loop Thermal Control of Distributed Resistive Heaters for Active De-icing of Wind Turbine Blades," pre-print, to be submitted for publication in *Wind Energy*.

- J69) R. Ungurán, V. Petrović, L. Y. Pao, and M. Kühn, "Blade Mounted LiDAR based Feedback-Feedforward Individual Pitch and Trailing Edge Flap Control of Wind Turbines," pre-print, to be submitted for publication in *Wind Energy*.
- J68) S. C. Rowe, L. Y. Pao, A. W. Weimer, and D. E. Clough, "C-Optimality for Plant Alignment and Reduced State Estimation in Chemical Process Models," submitted for publication in the *IEEE Trans. Control Systems Technology*.
- J67) R. A. Braker and L. Y. Pao, "Proximate Time-Optimal Control of a Harmonic Oscillator," submitted for publication in the *IEEE Trans. Automatic Control*.
- J66) J. H. Laks and L. Y. Pao, "Observer-Controllers for Output Regulation: The Internal Model Principle Revisited," submitted and revised for publication in *Automatica*, under review.
- J65) V. V. Kulkarni, V. Pannala, L. Y. Pao, M. G. Safonov, and K. V. Venkatesh, "System of *Saccharomyces cerevisiae*: Determining a Lower Limit on the Domain of Attraction of an Equilibrium State of its ODE Model," *Systems and Synthetic Biology*, in press.
- J64) F. Dunne and L. Y. Pao, "Optimal Blade Pitch Control with Realistic Preview Wind Measurements," *Wind Energy*, 19(12): 2153-2169, Dec. 2016.
- J63) P. Fleming, J. Aho, A. Buckspan, E. Ela, Y. Zhang, V. Gevorgian, A. Scholbrock, L. Pao, and R. Damiani, "Effects of Power Reserve Control on Wind Turbine Structural Loading," *Wind Energy*, 19(3): 453-469, Mar. 2016.
- J62) E. Simley, N. Angelou, T. Mikkelsen, M. Sjöholm, J. Mann, and L. Y. Pao, "Characterization of Wind Velocities in the Upstream Induction Zone of a Wind Turbine using Scanning Continuous-Wave Lidars," *J. Renewable and Sustainable Energy*, 8(1), 013301, pp. 1-26, Jan. 2016.
- J61) P. M. O. Gebraad, F. W. Teeuwisse, J. W. van Wingerden, P. A. Fleming, S. D. Ruben, J. R. Marden, and L. Y. Pao, "Wind Plant Power Optimization through Yaw Control Using a Parametric Model for Wake Effects," *Wind Energy*, 19(1): 95-114, Jan. 2016.
- J60) E. Simley and L. Y. Pao, "Evaluation of a Wind Speed Estimator for Hub-Height and Shear Components," *Wind Energy*, 19(1): 167-184, Jan. 2016.
- J59) D. Schlipf, E. Simley, F. Lemmer, L. Pao, and P. W. Cheng, "Collective Pitch Feedforward Control of Floating Wind Turbines Using Lidar," *J. Ocean and Wind Energy*, 2(4): 223-230, Nov. 2015.
- J58) S. Shajiee, L. Y. Pao, and R. R. McLeod, "Optimizing the Layout of Heaters for Distributed Active De-icing of Wind Turbine Blades," *Wind Engineering*, 38(6): 587-600, Dec. 2014.
- J57) I. P. Girsang, J. S. Dhupia, E. Muljadi, M. Singh, and L. Y. Pao, "Gearbox and Drivetrain Models to Study Dynamic Effects of Modern Wind Turbines," *IEEE Trans. Industry Applications*, 50(6): 3777-3786, Nov. 2014.
- J56) J. R. Marden, H. P. Young, and L. Y. Pao, "Achieving Pareto Optimality through Distributed Learning," *SIAM J. Control & Optimization*, 52(5): 2753-2770, Oct. 2014. **Awarded the 2015 SIAM J. Control & Optimization Best Paper Prize.**
- J55) E. Simley, L. Y. Pao, R. Frehlich, B. Jonkman, and N. Kelley, "Analysis of Light Detection and Ranging Wind Speed Measurements for Wind Turbine Control," *Wind Energy*, 17(3): 413-433, March 2014.
- J54) N. Bernstein, D. Lawrence, and L. Pao, "Dynamics Modeling for Parallel Haptic Interfaces with Force Sensing and Control," *IEEE Trans. Haptics*, 6(4): 429-439, Oct.-Dec. 2013.

- J53) J. P. Aho, A. D. Buckspan, F. Dunne, and L. Y. Pao, "Controlling Wind Energy for Utility Grid Reliability," *ASME Dynamic Systems and Control Magazine*, 1(3): 4-12, Sept. 2013.
- J52) J. R. Marden, S. D. Ruben, and L. Y. Pao, "A Model-Free Approach to Wind Farm Control using Game Theoretic Methods," *IEEE Trans. Control Systems Technology*, 21(4): 1207-1214, July 2013.
- J51) J. A. Butterworth, L. Y. Pao, and D. Y. Abramovitch, "Analysis and Comparison of Three Discrete-Time Feedforward Model-Inverse Control Techniques for Nonminimum-Phase Systems," *Mechatronics*, 22(5): 577-587, Aug. 2012.
- J50) J. A. Butterworth, L. Y. Pao, and D. Y. Abramovitch, "A Discrete-Time Single-Parameter Combined Feedforward/Feedback Adaptive-Delay Algorithm with Applications to Piezo-Based Raster Tracking," *IEEE Trans. Control Systems Technology*, 20(2): 416-423, March 2012.
- J49) V. V. Kulkarni, L. Y. Pao, and M. Safonov, "On Stability Analysis of Systems Featuring a Multiplicative Combination of Nonlinear and Linear Time-Invariant Feedback," *Int. J. Robust and Nonlinear Control*, 21(18): 2101-2108, Dec. 2011.
- J48) J. Laks, L. Y. Pao, A. D. Wright, N. Kelley, and B. Jonkman, "The Use of Preview Wind Measurements for Blade Pitch Control," *Mechatronics*, 21(4): 668-681, June 2011.
- J47) F. Dunne, L. Y. Pao, A. D. Wright, B. Jonkman, and N. Kelley, "Adding Feedforward Blade Pitch Control to Standard Feedback Controllers for Load Mitigation in Wind Turbines," *Mechatronics*, 21(4): 682-690, June 2011.
- J46) L. Y. Pao and K. E. Johnson, "Control of Wind Turbines: Approaches, Challenges, and Recent Developments," *IEEE Control Systems Magazine*, 31(2): 44-62, April 2011. **Awarded the 2012 IEEE Control Systems Magazine Outstanding Paper Award.**
- J45) V. V. Kulkarni, L. Y. Pao, and M. Safonov, "Positivity Preservation Properties of the Rantzer Multipliers," *IEEE Trans. Automatic Control*, 56(1): 190-194, Jan. 2011.
- J44) B. P. Rigney, L. Y. Pao, and D. A. Lawrence, "Nonminimum Phase Adaptive Inverse Control for Settle Performance Applications," *Mechatronics*, 20(1): 35-44, Feb. 2010.
- J43) V. V. Kulkarni, V. Kareenhalli, P. Malakar, L. Y. Pao, M. G. Safonov, and G. A. Viswanathan, "Stability Analysis of the GAL Regulatory Network in *Saccharomyces Cerevisiae* and *Kluyveromyces Lactis*," *Bioinformatics*, Vol. 11, Suppl. 1, 8 pages, Jan. 2010.
- J42) B. P. Rigney, L. Y. Pao, and D. A. Lawrence, "Nonminimum Phase Dynamic Inversion for Settle Time Applications," *IEEE Trans. Control Systems Technology*, 17(5): 989-1005, Sept. 2009.
- J41) J. A. Butterworth, L. Y. Pao, and D. Y. Abramovitch, "A Comparison of Control Architectures for Atomic Force Microscopes," *Asian J. Control*, 11(2): 175-181, March 2009.
- J40) V. Yousefzadeh, A. Babazadeh, B. Ramachandran, E. Alarcon, L. Pao, and D. Maksimovic, "Proximate Time-Optimal Digital Control for Synchronous Buck DC-DC Converters," *IEEE Trans. Power Electronics*, 23(4): 2018-2026, July 2008.
- J39) M. D. Baumgart and L. Y. Pao, "Discrete Time-Optimal Command Shaping," *Automatica*, 43(8): 1403-1409, Aug. 2007.
- J38) M. D. Baumgart and L. Y. Pao, "Robust Control of Nonlinear Web-Winding Systems with and without Tension Sensors," *J. Dynamic Systems, Measurement, and Control*, 129(1): 41-55, Jan. 2007.

- J37) K. E. Johnson, L. Y. Pao, M. J. Balas, and L. J. Fingersh, "Control of Variable Speed Wind Turbines: Standard and Adaptive Techniques for Maximizing Energy Capture," *IEEE Control Systems Magazine*, 26(3): 70-81, June 2006.
- J36) C. La-orpacharapan and L. Y. Pao, "Fast and Robust Control of Systems with Multiple Flexible Modes," *IEEE/ASME Trans. Mechatronics*, 10(5): 521-534, Oct. 2005.
- J35) L. Trailović and L. Y. Pao, "Variance Estimation and Ranking of Target Tracking Position Errors Modeled Using Gaussian Mixture Distributions," *Automatica*, 41(8): 1433-1438, Aug. 2005.
- J34) M. D. Baumgart and L. Y. Pao, "Time-Optimal Control of Web-Winding Systems with Air Entrainment," *IEEE/ASME Trans. Mechatronics*, 10(3): 257-262, June 2005.
- J33) M. K. Kalandros and L. Y. Pao, "Covariance Control Strategies for Reducing Bias Effects in Interacting Target Scenarios," *IEEE Trans. Aerospace Electronic Systems*, 41(1): 153-173, Jan. 2005.
- J32) L. Y. Pao, "Research in Control Systems, Sensor Fusion, and Haptic Interfaces," *Acta Automatica Sinica*, Invited Paper, 31(1): 75-83, Jan. 2005.
- J31) K. E. Johnson, L. Fingersh, M. Balas, and L. Y. Pao, "Methods for Increasing Region 2 Power Capture on a Variable Speed HAWT," *J. Solar Energy Engineering*, 126(4): 1092-1100, Nov. 2004.
- J30) D. A. Lawrence, L. Y. Pao, C. D. Lee, and R. Y. Novoselov, "Synergistic Visual/Haptic Rendering Modes for Scientific Visualization," *IEEE Computer Graphics and Applications*, 24(6): 22-30, Nov.-Dec. 2004.
- J29) C. D. Lee, D. A. Lawrence, and L. Y. Pao, "Isotropic Force Control for Haptic Interfaces," *Control Engineering Practice*, 12(11): 1423-1436, Nov. 2004.
- J28) M. K. Kalandros and L. Y. Pao, "Covariance Control for Sensor Management in Cluttered Tracking Environments," *J. Guidance, Control, and Dynamics*, 27(3): 493-496, May-June 2004.
- J27) C. F. Cutforth and L. Y. Pao, "Adaptive Input Shaping for Maneuvering Flexible Structures," *Automatica*, 40(4): 685-693, April 2004.
- J26) L. Y. Pao and C. La-orpacharapan, "Shaped Time-Optimal Feedback Controllers for Flexible Structures," *J. Dynamic Systems, Measurement, and Control*, 126(1): 173-186, Mar. 2004.
- J25) C. La-orpacharapan and L. Y. Pao, "Shaped Time-Optimal Feedback Control for Disk Drive Systems with Back-Electromotive Force," *IEEE Trans. Magnetics*, 40(1): 85-96, Jan. 2004.
- J24) L. Trailović and L. Y. Pao, "Computing Budget Allocation for Efficient Ranking and Selection of Variances with Application to Target Tracking Algorithms," *IEEE Trans. Automatic Control*, 49(1): 58-67, Jan. 2004.
- J23) L. Y. Pao and C. F. Cutforth, "On Frequency-Domain and Time-Domain Input Shaping for Multi-mode Flexible Structures," *J. Dynamic Systems, Measurement, and Control*, 125(3): 494-497, Sept. 2003.
- J22) M. A. Lau and L. Y. Pao, "Input Shaping and Time-Optimal Control of Flexible Structures," *Automatica*, 39(5): 893-900, May 2003.
- J21) C. F. Cutforth and L. Y. Pao, "Control Using Equal Length Shaped Commands to Reduce Vibration," *IEEE Trans. Control Systems Technology*, 11(1): 62-72, Jan. 2003.

- J20) M. K. Kalandros and L. Y. Pao, "Covariance Control for Multisensor Systems," *IEEE Trans. Aerospace Electronic Systems*, 38(4): 1138-1157, Oct. 2002.
- J19) M. A. Lau and L. Y. Pao, "Characteristics of Time-Optimal Commands for Flexible Structures with Limited Fuel Usage," *J. Guidance, Control, and Dynamics*, 25(2): 222-231, Mar.-Apr. 2002.
- J18) L. Y. Pao and L. Trailović, "The Optimal Order of Processing Sensor Information in Sequential Multisensor Fusion Algorithms," *IEEE Trans. Automatic Control*, 45(8): 1532-1536, Aug. 2000.
- J17) D. A. Lawrence, L. Y. Pao, A. M. Dougherty, M. A. Salada, and Y. Pavlou, "Rate-Hardness: A New Performance Metric for Haptic Interfaces," *IEEE Trans. Robotics and Automation*, 16(4): 357-371, Aug. 2000.
- J16) L. Y. Pao and M. A. Lau, "Robust Input Shaper Control Design for Parameter Variations in Flexible Structures," *J. Dynamic Systems, Measurement, and Control*, 122(1): 63-70, March 2000.
- J15) L. Y. Pao and M. A. Lau, "The Expected Residual Vibration of Traditional and Hybrid Input Shaping Designs," *J. Guidance, Control, and Dynamics*, 22(1): 162-165, Jan.-Feb. 1999.
- J14) L. Y. Pao, "Multi-Input Shaping Design for Vibration Reduction," *Automatica*, 35(1): 81-89, Jan. 1999.
- J13) L. Y. Pao and W. E. Singhose, "Robust Minimum Time Control of Flexible Structures," *Automatica*, 34(2): 229-236, Feb. 1998.
- J12) C. W. Frei and L. Y. Pao, "Alternatives to Monte Carlo Simulation Evaluations of Two Multisensor Fusion Algorithms," *Automatica*, 34(1): 103-110, Jan. 1998.
- J11) L. Y. Pao, "An Analysis of the Frequency, Damping, and Total Insensitivities of Input Shaping Designs," *J. Guidance, Control, and Dynamics*, 20(5): 909-915, Sept.-Oct. 1997.
- J10) L. Y. Pao and W. E. Singhose, "Verifying Robust Time-Optimal Commands for Multi-Mode Flexible Spacecraft," *J. Guidance, Control, and Dynamics*, 20(4): 831-833, July-Aug. 1997.
- J9) W. E. Singhose and L. Y. Pao, "A Comparison of Input Shaping and Time-Optimal Flexible-Body Control," *Control Engineering Practice*, 5(4): 459-467, April 1997.
- J8) W. E. Singhose, L. Y. Pao, and W. P. Seering, "Slewing Multimode Flexible Spacecraft with Zero Derivative Robustness Constraints," *J. Guidance, Control, and Dynamics*, 20(1): 204-206, Jan.-Feb. 1997.
- J7) L. Y. Pao, "Measurement Reconstruction Approach for Distributed Multisensor Fusion," *J. Guidance, Control, and Dynamics*, 19(4): 842-847, July-Aug. 1996.
- J6) L. Y. Pao, "Minimum-Time Control Characteristics of Flexible Structures," *J. Guidance, Control, and Dynamics*, 19(1): 123-129, Jan.-Feb. 1996.
- J5) L. Y. Pao, "Multisensor Multitarget Mixture Reduction Algorithms for Tracking," *J. Guidance, Control, and Dynamics*, 17(6): 1205-1211, Nov.-Dec. 1994. Also selected for inclusion in *Studies in Probabilistic Multi-Hypothesis Tracking and Related Topics, Scientific and Engineering Studies*, Volume SES-98-01, United States Navy, pp. 329-337, Feb. 1998.
- J4) L. Y. Pao, "Centralized Multisensor Fusion Algorithms for Tracking Applications," *Control Engineering Practice*, 2(5): 875-887, Oct. 1994.

- J3) L. Y. Pao and G. F. Franklin, "The Robustness of a Proximate Time-Optimal Controller," *IEEE Trans. Automatic Control*, 39(9): 1963-1966, Sept. 1994.
- J2) L. Y. Pao and G. F. Franklin, "Proximate Time-Optimal Control of Third-Order Servomechanisms," *IEEE Trans. Automatic Control*, 38(4): 560-580, April 1993.
- J1) L. Y. Pao and G. F. Franklin, "A Comparative Study of Proximate Time-Optimal Controllers for Type-2 Third-Order Servomechanisms," *ASME Advances in Information Storage Systems*, Vol. 4, pp. 317-328, 1992.

Non-Technical Journal Papers

- 4) L. Y. Pao and D. Y. Abramovitch, "American Control Conference 2013," *IEEE Control Systems Magazine*, 33(6): 146-155, Dec. 2013.
- 3) L. Y. Pao and D. Y. Abramovitch, "An Invitation to Attend the 2013 American Control Conference in Washington, DC," *IEEE Control Systems Magazine*, 32(6): 130-138, Dec. 2012.
- 2) L. Y. Pao and M. Tomizuka, "Control Systems Research and Education in Vietnam," *IEEE Control Systems Magazine*, 20(5): 78-81, Oct. 2000.
- 1) L. Y. Pao and M. Tomizuka, "Control Education and Research in Vietnam," *IEEE Control Systems Magazine*, 18(6): 94-97, Dec. 1998.

Refereed Technical Conference Papers

- C170) R. A. Braker and L. Y. Pao, "An Application of the Fast Gradient Method to Model Predictive Control of an Atomic Force Microscope X-Y Stage," submitted for publication in the *Proc. IEEE Conf. Control Technology and Applications*, Kohala Coast, HI, Aug. 2017.
- C169) D. S. Zalkind, L. Y. Pao, D. P. Martin, and K. E. Johnson, "Models Used for the Simulation and Control of a Segmented, Ultralight Morphing Rotor," *Proc. IFAC World Congress*, Toulouse, France, July 2017, in press.
- C168) J. W. van Wingerden, L. Y. Pao, J. Aho, P. Fleming, "Active Power Control of Waked Wind Farms," *Proc. IFAC World Congress*, Toulouse, France, July 2017, in press.
- C167) K. Garifi, L. Pao, and B. Touri, "Model Predictive Control for Track Following and Disturbance Rejection in a Tape Drive System," *Proc. IFAC World Congress*, Toulouse, France, July 2017, in press.
- C166) D. P. Martin, K. E. Johnson, D. S. Zalkind, and L. Y. Pao, "LPV-Based Torque Control for an Extreme-Scale Morphing Wind Turbine Rotor," *Proc. American Control Conf.*, Seattle, WA, May 2017, in press.
- C165) B. M. Doekemeijer, S. Boersma, L. Y. Pao, and J. W. van Wingerden, "Ensemble Kalman Filtering for Wind Field Estimation in Wind Farms," *Proc. American Control Conf.*, Seattle, WA, May 2017, in press.
- C164) R. A. Braker and L. Y. Pao, "Fast Setpoint Tracking of an Atomic Force Microscope X-Y Stage via Optimal Trajectory Tracking," *Proc. American Control Conf.*, Seattle, WA, May 2017, in press.
- C163) B. M. Doekemeijer, J. W. van Wingerden, S. Boersma, and L. Y. Pao, "Enhanced Kalman Filtering for a 2D CFD NS Wind Farm Flow Model," *J. Physics: Conf. Series: Proc. Science of Making Torque from Wind*, Munich, Germany, 11 pages, Oct. 2016.

- C162) D. Zalkind and L. Y. Pao, "The Fatigue Loading Effects of Yaw Control for Wind Plants," *Proc. American Control Conf.*, Boston, MA, pp. 537-542, July 2016.
- C161) S. Shajiee, L. Y. Pao, A. Najafi, and R. McLeod, "Computational Closed-Loop Controller Design for Active De-Icing Using Distributed Resistive Heaters and Temperature Sensors," *Proc. American Control Conf.*, Boston, MA, pp. 3194-3199, July 2016.
- C160) P. Fleming, J. Aho, P. M. O. Gebraad, L. Y. Pao, and Y. Zhang, "Simulation Study of Active Power Control in Wind Plants," *Proc. American Control Conf.*, Boston, MA, pp. 1413-1420, July 2016.
- C159) F. Dunne, J. Aho, and L. Y. Pao, "Analysis of Gain-Scheduling Implementation for the NREL 5-MW Turbine Blade Pitch Controller," *Proc. American Control Conf.*, Boston, MA, pp. 3188-3193, July 2016.
- C158) R. A. Braker and L. Y. Pao, "Proximate Time-Optimal Reference Tracking of an Undamped Harmonic Oscillator," *Proc. American Control Conf.*, Boston, MA, pp. 6221-6226, July 2016.
- C157) J. Aho, P. Fleming, and L. Y. Pao, "Active Power Control of Wind Turbines for Ancillary Services: A Comparison of Pitch and Torque Control Methodologies," *Proc. American Control Conf.*, Boston, MA, pp. 1407-1412, July 2016.
- C156) R. A. Braker and L. Y. Pao, "Proximate Time-Optimal Control of a Second-Order Flexible Structure," *Proc. IEEE Multi-Conference on Systems and Control*, Sydney, Australia, pp. 840-845, Sep. 2015.
- C155) E. Simley and L. Y. Pao, "A Longitudinal Spatial Coherence Model for Wind Evolution based on Large-Eddy Simulation," *Proc. American Control Conf.*, Chicago, IL, pp. 3708-3714, July 2015.
- C154) D. Schlipf, E. Simley, F. Lemmer, L. Pao, and P. W. Cheng, "Collective Pitch Feedforward Control of Floating Wind Turbines Using Lidar," *Proc. Intl. Soc. Offshore and Polar Engineers*, Kona, HI, June 2015.
- C153) J. Aho, L. Pao, P. Fleming, and E. Ela, "Controlling Wind Turbines for Secondary Frequency Regulation: An Analysis of AGC Capabilities under New Performance Based Compensation Policy," *Proc. Wind Integration Workshop*, Berlin, Germany, Nov. 2014.
- C152) E. J. Simley, L. Y. Pao, P. M. O. Gebraad, and M. Churchfield, "Investigation of the Impact of the Upstream Induction Zone on LIDAR Measurement Accuracy for Wind Turbine Control Applications using Large-Eddy Simulation," *J. Physics: Conf. Series: Proc. Science of Making Torque from Wind*, Lyngby, Denmark, 10 pages, June 2014.
- C151) P. M. O. Gebraad, F. W. Teeuwisse, J. W. van Wingerden, P. A. Fleming, S. D. Ruben, J. R. Marden, and L. Y. Pao, "A Data-Driven Model for Wind Plant Power Optimization by Yaw Control," *Proc. American Control Conf.*, Portland, OR, pp. 3140-3146, June 2014.
- C150) F. Dunne and L. Y. Pao, "Importance of Lidar Measurement Timing Accuracy for Wind Turbine Control," *Proc. American Control Conf.*, Portland, OR, pp. 3728-3733, June 2014.
- C149) E. Simley and L. Y. Pao, "Design and Evaluation of a Wind Speed Estimator for Hub-Height and Shear Components," *Proc. 9th PhD Seminar on Wind Energy in Europe*, Gotland, Sweden, 5 pages, Sept. 2013.

- C148) I. Girsang, J. Dhupia, E. Muljadi, M. Singh, and L. Pao, "Gearbox and Drive-Train Models for Studying the Dynamic Effects of Modern Wind Turbines," *Proc. IEEE Energy Conversion Congress & Exposition*, Denver, CO, pp. 874-881, Sept. 2013.
- C147) H. Zhong and L. Y. Pao, " H_2 Model Matching Feedforward Control for Tape Head Positioning Servo Systems," *Proc. American Control Conf.*, Washington, D.C., pp. 4511-4516, June 2013.
- C146) E. Simley and L. Y. Pao, "Reducing Lidar Wind Speed Measurement Error with Optimal Filtering," *Proc. American Control Conf.*, Washington, D.C., pp. 621-627, June 2013.
- C145) S. Shajjee, L. Y. Pao, P. N. Wagner, E. D. Moore, and R. R. McLeod, "Direct Ice Sensing and Localized Closed-Loop Heating for Active De-icing of Wind Turbine Blades," *Proc. American Control Conf.*, Washington, D.C., pp. 634-639, June 2013.
- C144) J. H. Laks, E. J. Simley, and L. Y. Pao, "A Spectral Model for Evaluating the Effect of Wind Evolution on Wind Turbine Preview Control," *Proc. American Control Conf.*, Washington, D.C., pp. 3679-3685, June 2013.
- C143) F. Dunne and L. Pao, "Benefit of Wind Turbine Preview Control as a Function of Measurement Coherence and Preview Time," *Proc. American Control Conf.*, Washington, D.C., pp. 647-652, June 2013.
- C142) H. Chen, Y. Li, and L. Y. Pao, "Intersample Ripple Resulting from Discrete-Time Feedforward Control," *Proc. American Control Conf.*, Washington, D.C., pp. 4122-4127, June 2013.
- C141) A. D. Buckspan, L. Y. Pao, J. P. Aho, and P. Fleming, "Stability Analysis of a Wind Turbine Active Power Control System," *Proc. American Control Conf.*, Washington, D.C., pp. 1420-1425, June 2013.
- C140) J. P. Aho, L. Y. Pao, J. Hauser, and A. D. Wright, "Optimal Trajectory Tracking Control for Wind Turbines During Operating Region Transitions," *Proc. American Control Conf.*, Washington, D.C., pp. 1426-1431, June 2013.
- C139) E. Simley, F. Dunne, J. Laks, and L. Y. Pao, "Lidars and Wind Turbine Control – Part 2," *Proc. Summer School in Remote Sensing for Wind Energy*, Roskilde, Denmark, 38 pages, June 2013.
- C138) E. Simley and L. Y. Pao, "Correlation Between Rotating LIDAR Measurements and Blade Effective Wind Speed," *Proc. AIAA Aerospace Sciences Meeting*, Grapevine, TX, AIAA Paper 2013-0749, 15 pages, Jan. 2013.
- C137) J. Aho, A. Buckspan, L. Pao, and P. Fleming, "An Active Power Control System for Wind Turbines Capable of Primary and Secondary Frequency Control for Supporting Grid Reliability," *Proc. AIAA Aerospace Sciences Meeting*, Grapevine, TX, AIAA Paper 2013-0456, 13 pages, Jan. 2013.
- C136) D. Schlipf, L. Y. Pao, and P. W. Cheng, "Comparison of Feedforward and Model Predictive Control of Wind Turbines Using LIDAR," *Proc. IEEE Conf. Decision and Control*, Maui, HI, pp. 3050-3055, Dec. 2012.
- C135) J. R. Marden, H. P. Young, and L. Y. Pao, "Achieving Pareto Optimality through Distributed Learning," *Proc. IEEE Conf. Decision and Control*, Maui, HI, pp. 7419-7424, Dec. 2012.

- C134) J. H. Laks, L. Y. Pao, and S. Shajiee, "A Comparison of Multi-Blade Coordinate and Direct Techniques for Asymptotic Rejection of Simultaneous Blade Load and Speed Disturbances in Wind Turbines," *Proc. IEEE Conf. Decision and Control*, Maui, HI, pp. 2557-2562, Dec. 2012.
- C133) A. Buckspan, J. Aho, P. Fleming, Y. Jeong, and L. Y. Pao, "Combining Droop Curve Concepts with Control Systems for Wind Turbine Active Power Control," *Proc. IEEE Symp. Power Electronics and Machines in Wind Applications*, Denver, CO, 8 pages, July 2012.
- C132) M. J. Travers, T. D. Murphey, and L. Y. Pao, "Linear Time-Varying Impulse Optimization for Data Association," *Proc. American Control Conf.*, Montreal, Canada, pp. 1047-1052, June 2012.
- C131) J. Aho, A. Buckspan, J. Laks, P. Fleming, Y. Jeong, F. Dunne, M. Churchfield, L. Pao, and K. Johnson, "A Tutorial of Wind Turbine Control for Supporting Grid Frequency through Active Power Control," *Proc. American Control Conf.*, Montreal, Canada, pp. 3120-3131, June 2012.
- C130) S. B. Andersson and L. Y. Pao, "Non-Raster Sampling in Atomic Force Microscopy: A Compressed Sensing Approach," *Proc. American Control Conf.*, Montreal, Canada, pp. 2485-2490, June 2012.
- C129) E. J. Simley, L. Y. Pao, and E. G. Patton, "Simulation of LIDAR Wind Speed Measurements for Wind Turbine Control Applications in an Evolving LES Wind Field," *Proc. Int. Symp. Adv. Boundary-Layer Remote Sensing (ISARS)*, Boulder, CO, 4 pages, June 2012.
- C128) H. Zhong, L. Y. Pao, and R. de Callafon, "Feedforward Control for Disturbance Rejection: Model Matching and Other Methods," *Proc. Chinese Conf. Decision and Control*, Taiyuan, China, pp. 3528-3533, May 2012.
- C127) E. Simley, L. Y. Pao, N. Kelley, B. Jonkman, and R. Frehlich, "LIDAR Wind Speed Measurements of Evolving Wind Fields," *Proc. AIAA Aerospace Sciences Meeting*, Nashville, TN, AIAA Paper 2012-0656, 19 pages, Jan. 2012.
- C126) S. Shajiee, P. Wagner, L. Y. Pao, and R. McLeod, "Development of a Novel Ice Sensing and Active De-icing Method for Wind Turbines," *Proc. AIAA Aerospace Sciences Meeting*, Nashville, TN, AIAA Paper 2012-1153, 15 pages, Jan. 2012.
- C125) J. R. Marden, S. D. Ruben, and L. Y. Pao, "Surveying Game Theoretic Approaches for Wind Farm Optimization," *Proc. AIAA Aerospace Sciences Meeting*, Nashville, TN, AIAA Paper 2012-1154, 10 pages, Jan. 2012.
- C124) J. Laks and L. Y. Pao, "Preview-Enabled Global Set-point Scheduling for Model Predictive Control of Wind Turbines," *Proc. AIAA Aerospace Sciences Meeting*, Nashville, TN, AIAA Paper 2012-1017, 18 pages, Jan. 2012.
- C123) F. Dunne, D. Schlipf, L. Y. Pao, A. D. Wright, B. Jonkman, N. Kelley, and E. Simley, "Comparison of Two Independent Lidar-Based Pitch Control Designs," *Proc. AIAA Aerospace Sciences Meeting*, Nashville, TN, AIAA Paper 2012-1151, 19 pages, Jan. 2012.
- C122) A. Damle and L. Pao, "Simultaneous Numerical Optimization for Data Association and Parameter Estimation," *Proc. Joint IEEE Conf. Decision and Control and European Control Conf.*, Orlando, FL, pp.7800-7805, Dec. 2011.
- C121) J. A. Butterworth, L. Y. Pao, and D. Y. Abramovitch, "Fitting Discrete-Time Models to Frequency Responses for Systems with Transport Delay," *Proc. Int. Mech. Eng. Congress & Expo.*, Denver, CO, 8 pages, Nov. 2011.

- C120) M. P. Chaffe and L. Y. Pao, "Iterative Learning Control for Near-Field Scanning Optical Microscope Applications," *Proc. IEEE Multi-Conf. Systems and Control*, Denver, CO, pp. 1075-1080, Sept. 2011.
- C119) J. A. Butterworth, L. Y. Pao, and D. Y. Abramovitch, "Dual-Adaptive Feedforward Control for Raster Tracking with Applications to AFMs," *Proc. IEEE Multi-Conf. Systems and Control*, Denver, CO, pp. 1081-1087, Sept. 2011.
- C118) H. Zhong and L. Y. Pao, "Combined Feedforward/Feedback Control for Tape Head Track-Following Servo Systems," *Proc. IFAC World Congress*, Milan, Italy, pp. 4040-4045, Aug. 2011.
- C117) M. J. Travers, T. D. Murphey, and L. Y. Pao, "Trajectory Optimization Estimator for Impulsive Data Association," *Proc. American Control Conf.*, San Francisco, CA, pp. 4514-4519, June-July 2011.
- C116) J. Laks, L. Y. Pao, and A. Alleyne, "Comparison of Wind Turbine Operating Transitions through the Use of Iterative Learning Control," *Proc. American Control Conf.*, San Francisco, CA, pp. 4312-4319, June-July 2011.
- C115) J. A. Butterworth, L. Y. Pao, and D. Y. Abramovitch, "A Comparison of ILC Architectures for Nanopositioners with Applications to AFM Raster Tracking," *Proc. American Control Conf.*, San Francisco, CA, pp. 2266-2271, June-July 2011.
- C114) M. J. Travers, T. D. Murphey, and L. Y. Pao, "Impulsive Data Association with an Unknown Number of Targets," *Proc. Int. Conf. Hybrid Systems: Computation and Control*, Chicago, IL, pp. 261-270, Apr. 2011.
- C113) E. Simley, L. Y. Pao, R. Frehlich, B. Jonkman, and N. Kelley, "Analysis of Wind Speed Measurements Using Continuous Wave LIDAR for Wind Turbine Control," *Proc. AIAA Aerospace Sciences Meeting, Orlando, FL*, AIAA Paper 2011-263, 16 pages, Jan. 2011.
- C112) J. Laks, L. Y. Pao, E. Simley, A. D. Wright, N. Kelley, and B. Jonkman, "Model Predictive Control Using Preview Measurements from LIDAR," *Proc. AIAA Aerospace Sciences Meeting*, Orlando, FL, AIAA Paper 2011-813, 20 pages, Jan. 2011.
- C111) F. Dunne, L. Y. Pao, A. D. Wright, B. Jonkman, N. Kelley, and E. Simley, "Adding Feedforward Blade Pitch Control for Load Mitigation in Wind Turbines: Non-Causal Series Expansion, Preview Control, and Optimized FIR Filter Methods," *Proc. AIAA Aerospace Sciences Meeting*, Orlando, FL, AIAA Paper 2011-819, 17 pages, Jan. 2011.
- C110) M. J. Travers, T. D. Murphey, and L. Y. Pao, "Impulse Optimization for Data Association," *Proc. IEEE Conf. Decision and Control*, Atlanta, GA, pp. 2204-2209, Dec. 2010.
- C109) V. V. Kulkarni, L. Y. Pao, and M. G. Safonov, "On Stability Analysis of Systems Featuring a Multiplicative Combination of Nonlinear and Linear Time-Invariant Feedback," *Proc. IEEE Conf. Decision and Control*, Atlanta, GA, pp. 4036-4041, Dec. 2010.
- C108) M. J. Travers, T. D. Murphey, and L. Y. Pao, "Stochastic Sampling Based Data Association," *Proc. American Control Conf.*, Baltimore, MD, pp. 1386-1391, June 2010.
- C107) J. A. Butterworth, L. Y. Pao, and D. Y. Abramovitch, "Adaptive Delay Combined Feedforward/Feedback Control for Raster Tracking in Atomic Force Microscopes," *Proc. American Control Conf.*, Baltimore, MD, pp. 5738-5744, June 2010.

- C106) J. Laks, L. Y. Pao, A. D. Wright, N. Kelley, and B. Jonkman, "Blade Pitch Control with Preview Wind Measurements," *Proc. AIAA Aerospace Sciences Meeting*, Orlando, FL, AIAA Paper 2010-251, 24 pages, Jan. 2010.
- C105) F. Dunne, L. Y. Pao, A. D. Wright, B. Jonkman, and N. Kelley, "Combining Standard Feedback Controllers with Feedforward Blade Pitch Control for Load Mitigation in Wind Turbines," *Proc. AIAA Aerospace Sciences Meeting*, Orlando, FL, AIAA Paper 2010-250, 18 pages, Jan. 2010.
- C104) V. V. Kulkarni, V. Kareenhalli, P. Malakar, L. Y. Pao, M. G. Safonov, and G. A. Viswanathan, "Stability Analysis of the GAL Regulatory Network in *Saccharomyces Cerevisiae* and *K. Lactis*," *Asia Pacific Bioinformatics Conf.*, Bangalore, India, Jan. 2010.
- C103) H. Zhong and L. Y. Pao, "Regulating Web Tension in Tape Systems with Time-Varying Radii," *Proc. American Control Conf.*, St. Louis, MO, pp. 198-203, June 2009.
- C102) B. P. Rigney, L. Y. Pao, and D. A. Lawrence, "Adaptive Inverse Control for Settling Performance Improvements," *Proc. American Control Conf.*, St. Louis, MO, pp. 190-197, June 2009. **Ph.D. student B. P. Rigney selected as a conference-wide Student Best Paper Award Finalist.**
- C101) L. Y. Pao and K. E. Johnson, "A Tutorial on the Dynamics and Control of Wind Turbines and Wind Farms," *Proc. American Control Conf.*, St. Louis, MO, pp. 2076-2089, June 2009.
- C100) J. Laks, L. Y. Pao, and A. Wright, "Control of Wind Turbines: Past, Present, and Future," *Proc. American Control Conf.*, St. Louis, MO, pp. 2096-2103, June 2009.
- C99) J. H. Laks, L. Y. Pao, and A. Wright, "Combined Feedforward/Feedback Control of Wind Turbines to Reduce Blade Flap Bending Moments," *Proc. AIAA Aerospace Sciences Meeting*, Orlando, FL, AIAA Paper 2009-687, 16 pages, Jan. 2009.
- C98) H. Zhong and L. Y. Pao, "Disturbance Rejection in Parameter-Varying Web-Winding Systems," *Proc. IFAC World Congress*, Seoul, Korea, pp. 9284-9289, July 2008.
- C97) B. P. Rigney, L. Y. Pao, and D. A. Lawrence, "Discrete-Time Exact and Approximate Dynamic Inversion for Settle Performance," *Proc. IFAC World Congress*, Seoul, Korea, pp. 1778-1784, July 2008.
- C96) J. A. Butterworth, L. Y. Pao, and D. Y. Abramovitch, "Architectures for Tracking Control in Atomic Force Microscopes," **keynote paper**, *Proc. IFAC World Congress*, Seoul, Korea, pp. 8236-8250, July 2008.
- C95) H. Zhong and L. Y. Pao, "Feedforward Control to Attenuate Tension Error in Time-Varying Systems," *Proc. American Control Conf.*, Seattle, WA, pp. 105-110, June 2008.
- C94) M. J. Travers, T. D. Murphey, and L. Y. Pao, "Data Association with Ambiguous Measurements," *Proc. American Control Conf.*, Seattle, WA, pp. 1875-1880, June 2008.
- C93) J. A. Butterworth, L. Y. Pao, and D. Y. Abramovitch, "The Effect of Nonminimum-Phase Zero Locations on the Performance of Feedforward Model-Inverse Control Techniques in Discrete-Time Systems," *Proc. American Control Conf.*, Seattle, WA, pp. 2696-2702, June 2008.
- C92) L. Y. Pao, J. A. Butterworth, and D. Y. Abramovitch, "Combined Feedforward/Feedback Control of Atomic Force Microscopes," *Proc. American Control Conf.*, New York, NY, pp. 3509-3515, July 2007.

- C91) D. Y. Abramovitch, S. B. Andersson, L. Y. Pao, and G. Schitter, "A Tutorial on the Mechanisms, Dynamics, and Control of Atomic Force Microscopes," *Proc. American Control Conf.*, New York, NY, pp. 3488-3502, July 2007.
- C90) V. Yousefzadeh, A. Babazadeh, B. Ramachandran, E. Alarcon, L. Pao, and D. Maksimovic, "Proximate Time-Optimal Digital Control for DC-DC Converters," *Proc. Power Electronics Specialists Conf.*, Orlando, FL, pp. 124-130, June 2007.
- C89) B. P. Rigney, L. Y. Pao, and D. A. Lawrence, "Model Inversion Architectures for Settle Time Applications with Uncertainty," *Proc. IEEE Conf. Decision and Control*, San Diego, CA, pp. 6518-6524, Dec. 2006.
- C88) B. P. Rigney, L. Y. Pao, and D. A. Lawrence, "Settle-Time Performance Comparisons of Stable Approximate Model Inversion Techniques," *Proc. American Control Conf.*, Minneapolis, MN, pp. 600-605, June 2006.
- C87) V. V. Kulkarni, L. Y. Pao, P. L. Falb, "Stability Multipliers for Memoryless Positive Nonlinearities: Parameterizations Based on the Nonlinearity Graph," *Proc. American Control Conf.*, Minneapolis, MN, pp. 74-81, June 2006.
- C86) R. M. Powers and L. Y. Pao, "Power and Robustness of a Track-Loss Detector Based on Kolmogorov-Smirnov Tests," *Proc. American Control Conf.*, Minneapolis, MN, pp. 3757-3764, June 2006.
- C85) N. L. Bernstein, D. A. Lawrence, and L. Y. Pao, "Sensor Modeling in Parallel Force Feedback Haptic Interfaces," *Proc. Int. Symp. Haptic Interfaces for Virtual Environments and Teleoperator Systems, IEEE Virtual Reality Conf.*, Arlington, VA, pp. 177-184, Mar. 2006.
- C84) D. A. Lawrence, L. Y. Pao, and S. Aphanuphong, "Unwarping Encoder Ripple in Low Cost Haptic Interfaces," *Proc. Int. Symp. Haptic Interfaces for Virtual Environments and Teleoperator Systems, IEEE Virtual Reality Conf.*, Arlington, VA, pp. 75-80, Mar. 2006.
- C83) R. M. Powers and L. Y. Pao, "Using Kolmogorov-Smirnov Tests to Detect Track-Loss in the Absence of Truth Data," *Proc. Joint IEEE Conf. Decision and Control and European Control Conf.*, Seville, Spain, pp. 3097-3104, Dec. 2005.
- C82) V. Kulkarni, H. Zhong, and L. Y. Pao, "Robust Rejection of Periodic and Almost Periodic Disturbances," *Proc. IFAC World Congress*, Prague, Czech Republic, pp. 133-138, July 2005.
- C81) H. Zhong, V. Kulkarni, and L. Y. Pao, "Adaptive Control for Rejecting Disturbances with Time-Varying Frequencies in Tape Systems," *Proc. American Control Conf.*, Portland, OR, pp. 533-538, June 2005.
- C80) V. Kulkarni and L. Y. Pao, "A Sensor Management Protocol for Tracking with Diverse Sensors," *Proc. American Control Conf.*, Portland, OR, pp. 5015-5020, June 2005.
- C79) D. A. Lawrence, L. Y. Pao, and S. Aphanuphong, "Bow Spring/Tendon Actuation for Low Cost Haptic Interfaces," *Proc. Joint EuroHaptics Conf. and Symp. on Haptic Interfaces for Virtual Environments and Teleoperator Systems*, Pisa, Italy, pp. 157-166, Mar. 2005. **Awarded the conference-wide Best Paper Award.**
- C78) N. L. Bernstein, D. A. Lawrence, and L. Y. Pao, "Friction Modeling and Compensation for Haptic Interfaces," *Proc. Joint EuroHaptics Conf. and Symp. on Haptic Interfaces for Virtual Environments and Teleoperator Systems*, Pisa, Italy, pp. 290-295, Mar. 2005.

- C77) K. E. Johnson, L. J. Fingersh, L. Y. Pao, and M. J. Balas, "Adaptive Torque Control of Variable Speed Wind Turbines for Increased Region 2 Energy Capture," *Proc. AIAA/ASME Wind Energy Symp.*, Reno, NV, pp. 66-76, Jan. 2005.
- C76) R. M. Powers and L. Y. Pao, "Detecting Track-Loss for the Probabilistic Data Association Filter in the Absence of Truth Data," *Proc. IEEE Conf. Decision and Control*, Paradise Island, Bahamas, pp. 4316-4323, Dec. 2004.
- C75) K. E. Johnson, L. Y. Pao, M. J. Balas, V. Kulkarni, and L. J. Fingersh, "Stability Analysis of an Adaptive Torque Controller for Variable Speed Wind Turbines," *Proc. IEEE Conf. Decision and Control*, Paradise Island, Bahamas, pp. 4087-4094, Dec. 2004.
- C74) M. D. Baumgart and L. Y. Pao, "Robust Control of Tape Transport Systems with No Tension Sensor," *Proc. IEEE Conf. Decision and Control*, Paradise Island, Bahamas, pp. 4342-4349, Dec. 2004.
- C73) C. La-orphacharapan and L. Y. Pao, "Robust Shaped Time-Optimal Servomechanism Control," *Proc. Japan-USA Symp. Flexible Automation*, Denver, CO, July 2004.
- C72) M. Mallick, L. Y. Pao, and K. C. Chang, "Multiple Hypothesis Tracking Based Distributed Fusion Using Decorrelated Pseudo Measurement Sequences," *Proc. American Control Conf.*, Boston, MA, pp. 4750-4751, June 2004.
- C71) C. La-orphacharapan and L. Y. Pao, "Nonlinear Control for Maneuvering Multiple Flexible Mode Systems," *Proc. American Control Conf.*, Boston, MA, pp. 1176-1182, June 2004.
- C70) W. Khawsuk and L. Y. Pao, "Distributed Multi-sensor Multi-target Tracking with Feedback," *Proc. American Control Conf.*, Boston, MA, pp. 5356-5362, June 2004.
- C69) M. K. Kalandros, L. Trailović, L. Y. Pao, and Y. Bar-Shalom, "Tutorial on Multisensor Management and Fusion Algorithms for Target Tracking," *Proc. American Control Conf.*, Boston, MA, pp. 4734-4748, June 2004.
- C68) V. Kulkarni, L. Y. Pao, and P. Falb, "Stability Multipliers for Stiction Nonlinearities," *Proc. IFAC Symp. Automatic Control in Aerospace*, St. Petersburg, Russia, 5 pages, June 2004.
- C67) M. Mallick, S. Schmidt, L. Y. Pao, and K. C. Chang, "Out-of-sequence Track (OOST) Filtering Using the Decorrelated Pseudo Measurement Approach," *Proc. SPIE*, Vol. 5428, Orlando, FL, April 2004.
- C66) D. A. Lawrence, L. Y. Pao, A. C. White, and W. Xu, "Low Cost Actuator and Sensor for High-Fidelity Haptic Interfaces," *Proc. Int. Symp. Haptic Interfaces for Virtual Environments and Teleoperator Systems, IEEE Virtual Reality Conf.*, Chicago, IL, pp. 74-81, Mar. 2004. **Awarded the conference-wide Best Commercial Potential Award.**
- C65) K. E. Johnson, L. J. Fingersh, M. J. Balas, and L. Y. Pao, "Methods for Increasing Region 2 Power Capture on a Variable Speed HAWT," *Proc. AIAA/ASME Wind Energy Symp.*, Reno, NV, pp. 103-113, Jan. 2004.
- C64) M. D. Baumgart and L. Y. Pao, "Robust Lyapunov-Based Feedback Control of Nonlinear Web-Winding Systems," *Proc. IEEE Conf. Decision and Control*, Maui, HI, pp. 6398-6405, Dec. 2003.
- C63) L. Trailović and L. Y. Pao, "Position Error Modeling Using Gaussian Mixture Distributions with Application to Comparison of Tracking Algorithms," *Proc. American Control Conf.*, Denver, CO, pp. 1272-1277, June 2003.

- C62) L. Y. Pao and R. M. Powers, "A Comparison of Several Different Approaches for Target Tracking with Clutter," *Proc. American Control Conf.*, Denver, CO, pp. 3919-3924, June 2003.
- C61) C. La-orpacharapan and L. Y. Pao, "Fast Seek Control for Flexible Disk Drive Systems with Back EMF and Inductance," *Proc. American Control Conf.*, Denver, CO, pp. 3077-3082, June 2003.
- C60) C. La-orpacharapan and L. Y. Pao, "Shaped Time-Optimal Control for Disk Drive Systems with Back EMF, Slew Rate Limits, and Different Acceleration and Deceleration Rates," *Proc. American Control Conf.*, Denver, CO, pp. 4788-4795, June 2003.
- C59) W. Khawsuk and L. Y. Pao, "Decorrelated State Estimation for Distributed Tracking Using Multiple Sensors in Cluttered Environments," *Proc. American Control Conf.*, Denver, CO, pp. 3208-3214, June 2003.
- C58) M. D. Baumgart and L. Y. Pao, "A Tension Observer for Nonlinear Web-Winding Systems with Air Entrainment," *Proc. American Control Conf.*, Denver, CO, pp. 4149-4154, June 2003.
- C57) N. L. Bernstein, D. A. Lawrence, and L. Y. Pao, "Design of a Uniactuated Bimanual Haptic Interface," *Proc. Int. Symp. Haptic Interfaces for Virtual Environments and Teleoperator Systems, IEEE Virtual Reality Conf.*, Los Angeles, CA, pp. 310-317, Mar. 2003.
- C56) L. Trailović and L. Y. Pao, "Variance Estimation and Ranking of Gaussian Mixture Distributions in Target Tracking Applications," *Proc. IEEE Conf. Decision and Control*, Las Vegas, NV, pp. 2195-2201, Dec. 2002.
- C55) C. La-orpacharapan and L. Y. Pao, "Shaped Control for Damped Flexible Structures with Friction and Slew Rate Limits," *Proc. IEEE Conf. Decision and Control*, Las Vegas, NV, pp. 3099-3105, Dec. 2002.
- C54) C. D. Lee, D. A. Lawrence, and L. Y. Pao, "Modeling of a 5-DOF Haptic Interface for Multivariable Force Control Design," *Proc. IFAC Conf. Mechatronic Systems*, Berkeley, CA, pp. 559-565, Dec. 2002.
- C53) M. D. Baumgart and L. Y. Pao, "Transient Control of Web-Winding Systems with Air Entrainment," *Proc. IFAC Conf. Mechatronic Systems*, Berkeley, CA, pp. 17-22, Dec. 2002.
- C52) C. La-orpacharapan and L. Y. Pao, "Shaped Phase-Plane Control for Flexible Structures with Friction," *Proc. American Control Conf.*, Anchorage, AK, pp. 1911-1916, May 2002.
- C51) W. Khawsuk and L. Y. Pao, "Decorrelated State Estimation for Distributed Tracking of Interacting Targets in Cluttered Environments," *Proc. American Control Conf.*, Anchorage, AK, pp. 899-904, May 2002.
- C50) C. F. Cutforth and L. Y. Pao, "Analysis and Design of an Adaptive Input Shaper for the Control of Flexible Structures," *Proc. American Control Conf.*, Anchorage, AK, pp. 1903-1910, May 2002.
- C49) M. D. Baumgart and L. Y. Pao, "Discrete Time-Optimal Command Shapers and Controls for Multi-Input Multi-Output Systems," *Proc. American Control Conf.*, Anchorage, AK, pp. 2279-2284, May 2002.

- C48) R. Y. Novoselov, D. A. Lawrence, and L. Y. Pao, "Haptic Rendering of Data on Unstructured Tetrahedral Grids," *Proc. Int. Symp. Haptic Interfaces for Virtual Environments and Teleoperator Systems, IEEE Virtual Reality Conf.*, Orlando, FL, pp. 193-200, Mar. 2002.
- C47) C. D. Lee, D. A. Lawrence, and L. Y. Pao, "Dynamic Modeling and Parameter Identification of a Parallel Haptic Interface," *Proc. Int. Symp. Haptic Interfaces for Virtual Environments and Teleoperator Systems, IEEE Virtual Reality Conf.*, Orlando, FL, pp. 172-179, Mar. 2002.
- C46) L. Trailović and L. Y. Pao, "Computing Budget Allocation for Optimization of Sensor Processing Order in Sequential Multi-sensor Fusion Algorithms," *Proc. American Control Conf.*, Arlington, VA, pp. 1841-1847, June 2001.
- C45) M. A. Lau and L. Y. Pao, "Comparison of Input Shaping and Time-Optimal Control of Flexible Structures," *Proc. American Control Conf.*, Arlington, VA, pp. 1485-1490, June 2001. **Ph.D. student M. A. Lau awarded the conference-wide Student Best Paper Award.**
- C44) C. La-orpacharapan and L. Y. Pao, "Control of Flexible Structures with a Projected Phase-Plane Approach," *Proc. American Control Conf.*, Arlington, VA, pp. 3817-3823, June 2001.
- C43) M. D. Baumgart and L. Y. Pao, "Cooperative Multi-Input Shaping for Arbitrary Inputs," *Proc. American Control Conf.*, Arlington, VA, pp. 275-280, June 2001.
- C42) C. D. Lee, D. A. Lawrence, and L. Y. Pao, "A High-Bandwidth Force-Controlled Haptic Interface," *Proc. ASME Dynamic Systems and Control Division, DSC-Vol. 69-2*, pp. 1299-1308, *Int. Mech. Eng. Cong. & Expo.*, Orlando, FL, Nov. 2000.
- C41) R. Y. Novoselov, D. A. Lawrence, and L. Y. Pao, "Haptic Rendering of Data on Irregular Grids," *Proc. ASME Dynamic Systems and Control Division, DSC-Vol. 69-2*, pp. 1199-1206, *Int. Mech. Eng. Cong. & Expo.*, Orlando, FL, Nov. 2000.
- C40) D. A. Lawrence, C. D. Lee, L. Y. Pao, and R. Y. Novoselov, "Shock and Vortex Visualization Using a Combined Visual/Haptic Interface," *Proc. IEEE Visualization Conf.*, Salt Lake City, UT, pp. 131-137 and p. 548 (color plate), Oct. 2000.
- C39) M. K. Kalandros and L. Y. Pao, "The Effects of Data Association on Sensor Manager Systems," *Proc. AIAA Guidance, Navigation, and Control Conf.*, Denver, CO, 10 pages, Aug. 2000.
- C38) C. F. Cutforth and L. Y. Pao, "Command Shaping Control for Vibration Reduction without Lengthening the Command," *Proc. AIAA Guidance, Navigation, and Control Conf.*, Denver, CO, 11 pages, Aug. 2000.
- C37) L. Y. Pao and W. Khawsuk, "Determining Track Loss Without Truth Information for Distributed Target Tracking Applications," *Proc. American Control Conf.*, Chicago, IL, pp. 4363-4367, June 2000.
- C36) M. A. Lau and L. Y. Pao, "Time-Optimal Commands with Specified Fuel Usage for Controlling Flexible Structures," *Proc. American Control Conf.*, Chicago, IL, pp. 3058-3063, June 2000.
- C35) M. K. Kalandros, L. Y. Pao, and Y. C. Ho, "Randomization and Super-Heuristics in Choosing Sensor Sets in Target Tracking Applications," *Proc. IEEE Conf. Decision and Control*, Phoenix, AZ, pp. 1803-1808, Dec. 1999.

- C34) F. Infed, S. W. Brown, C. D. Lee, D. A. Lawrence, A. M. Dougherty, and L. Y. Pao, "Combined Visual/Haptic Rendering Modes for Scientific Visualization," *Proc. ASME Dynamic Systems and Control Division*, DSC-Vol. 67, pp. 93-99, *Int. Mech. Eng. Cong. & Expo.*, Nashville, TN, Nov. 1999.
- C33) L. Y. Pao and L. Trailović, "On the Order of Processing Sensor Information in Sequential Implementations of Fusion Algorithms," *Proc. American Control Conf.*, San Diego, CA, pp. 2407-2411, June 1999.
- C32) L. Y. Pao and N. T. Baltz, "Control of Sensor Information in Distributed Multisensor Systems," *Proc. American Control Conf.*, San Diego, CA, pp. 2397-2401, June 1999.
- C31) C. F. Cutforth and L. Y. Pao, "A Modified Method for Multiple Actuator Input Shaping," *Proc. American Control Conf.*, San Diego, CA, pp. 66-70, June 1999.
- C30) C. F. Cutforth and L. Y. Pao, "An Analysis of Frequency-Domain Input Shaping Designs for Three-Mode Flexible Systems," *Proc. American Control Conf.*, San Diego, CA, pp. 4388-4392, June 1999.
- C29) C. D. Lee, D. A. Lawrence, and L. Y. Pao, "Guaranteed Convergence Rates for Five Degree of Freedom In-Parallel Haptic Interface Kinematics," *Proc. IEEE Int. Conf. Robotics and Automation*, Detroit, MI, pp. 3267-3274, May 1999.
- C28) D. A. Lawrence, L. Y. Pao, A. M. Dougherty, Y. Pavlou, S. W. Brown, and S. A. Wallace, "Human Perceptual Thresholds of Friction in Haptic Interfaces," *Proc. ASME Dynamic Systems and Control Division*, DSC-Vol. 64, pp. 287-294, *Int. Mech. Eng. Cong. & Expo.*, Anaheim, CA, Nov. 1998.
- C27) L. Y. Pao and M. A. Lau, "An Analysis of the Expected Residual Vibration of Input Shaping Designs," *Proc. AIAA Guidance, Navigation, and Control Conf.*, Boston, MA, pp. 354-364, Aug. 1998.
- C26) L. Y. Pao and M. K. Kalandros, "The Effects of Delayed Sensor Requests on Sensor Manager Systems," *Proc. AIAA Guidance, Navigation, and Control Conf.*, Boston, MA, pp. 1127-1135, Aug. 1998.
- C25) L. Y. Pao and M. A. Lau, "Input Shaping Designs to Account for Uncertainty in Both Frequency and Damping in Flexible Structures," *Proc. American Control Conf.*, Philadelphia, PA, pp. 3070-3071, June 1998.
- C24) L. Y. Pao and C. F. Cutforth, "An Analysis and Comparison of Frequency-Domain and Time-Domain Input Shaping," *Proc. American Control Conf.*, Philadelphia, PA, pp. 3072-3074, June 1998.
- C23) M. K. Kalandros and L. Y. Pao, "Controlling Target Estimate Covariance in Centralized Multisensor Systems," *Proc. American Control Conf.*, Philadelphia, PA, pp. 2749-2753, June 1998.
- C22) L. Y. Pao and M. K. Kalandros, "Algorithms for a Class of Distributed Architecture Tracking," *Proc. American Control Conf.*, Albuquerque, NM, pp. 1434-1438, June 1997.
- C21) L. Y. Pao, T. N. Chang, and E. Hou, "Input Shaper Designs for Minimizing the Expected Level of Residual Vibration in Flexible Structures," *Proc. American Control Conf.*, Albuquerque, NM, pp. 3542-3546, June 1997.
- C20) D. A. Lawrence, L. Y. Pao, M. A. Salada, and A. M. Dougherty, "Quantitative Experimental Analysis of Transparency and Stability in Haptic Interfaces," *Proc. ASME Dynamic Systems and Control Division*, DSC-Vol. 58, pp. 441-449, *Int. Mech. Eng. Cong. & Expo.*, Atlanta, GA, Nov. 1996.

- C19) W. E. Singhose and L. Y. Pao, "Comparison of Input Shaping Techniques for Speed-Critical Multi-Mode Flexible Systems," *Proc. IEEE Conf. on Control Applications*, Dearborn, MI, pp. 379-384, Sept. 1996.
- C18) N. C. Singer, L. Y. Pao, W. E. Singhose, and W. P. Seering, "An Efficient Algorithm for the Generation of Multiple-Mode Input Shaping Sequences," *Proc. IEEE Conf. on Control Applications*, Dearborn, MI, pp. 373-378, Sept. 1996.
- C17) W. E. Singhose, L. Y. Pao, and W. P. Seering, "Time-Optimal Rest-to-Rest Slewing of Multi-Mode Flexible Spacecraft Using ZVD Robustness Constraints," *Proc. AIAA Guidance, Navigation, and Control Conf.*, San Diego, CA, 9 pages, July 1996.
- C16) L. Y. Pao, "An Analysis of the Total Insensitivity of Input Shaping Designs," *Proc. AIAA Guidance, Navigation, and Control Conf.*, San Diego, CA, 11 pages, July 1996.
- C15) L. Y. Pao and W. E. Singhose, "Unity-Magnitude Input Shapers and Their Relation to Time-Optimal Control," *Proc. IFAC World Congress*, Vol. A (Robotics, Components, and Instruments), San Francisco, CA, pp. 385-390, July 1996.
- C14) L. Y. Pao, "Input Shaping Design for Flexible Systems with Multiple Actuators," *Proc. IFAC World Congress*, Vol. P (Aerospace and Transportation Systems), San Francisco, CA, pp. 267-272, July 1996. **L. Y. Pao awarded the IFAC World Congress Young Author Prize.**
- C13) C. W. Frei and L. Y. Pao, "Non-Simulation Performance Prediction Methods for Different Implementations of a Multisensor Fusion Algorithm," *Proc. IFAC World Congress*, Vol. J, (Identification II and Discrete Event Systems), San Francisco, CA, pp. 269-274, July 1996.
- C12) L. Y. Pao and W. E. Singhose, "On the Equivalence of Minimum Time Input Shaping with Traditional Time-Optimal Control," *Proc. IEEE Conf. on Control Applications*, Albany, NY, pp. 1120-1125, Sept. 1995.
- C11) L. Y. Pao and W. E. Singhose, "A Comparison of Constant and Variable Amplitude Command Shaping Techniques for Vibration Reduction," *Proc. IEEE Conf. on Control Applications*, Albany, NY, pp. 875-881, Sept. 1995.
- C10) L. Y. Pao and C. W. Frei, "A Comparison of Parallel and Sequential Implementations of a Multisensor Fusion Algorithm," *Proc. American Control Conf.*, Seattle, WA, pp. 1683-1687, June 1995.
- C9) L. Y. Pao, "Characteristics of the Time-Optimal Control of Flexible Structures with Damping," *Proc. IEEE Conf. on Control Applications*, Glasgow, Scotland, pp. 1299-1304, Aug. 1994.
- C8) L. Y. Pao, "Distributed Multisensor Fusion," *Proc. AIAA Guidance, Navigation, and Control Conf.*, Scottsdale, AZ, pp. 82-91, Aug. 1994.
- C7) L. Y. Pao, "Multisensor Multitarget Mixture Reduction Algorithms for Tracking," *Proc. AIAA Guidance, Navigation, and Control Conf.*, Monterey, CA, pp. 28-37, Aug. 1993.
- C6) S. D. O'Neil and L. Y. Pao, "Multisensor Fusion Algorithms for Tracking," *Proc. American Control Conf.*, San Francisco, CA, pp. 859-863, June 1993.
- C5) L. Y. Pao and S. D. O'Neil, "Sensor Fusion Algorithms for Tracking Applications," *Proc. IEEE Regional Conf. Aerospace Control Systems*, Westlake Village, CA, May 1993.

- C4) L. Y. Pao and G. F. Franklin, "Robustness Studies of a Proximate Time-Optimal Controller," *Proc. IEEE Conf. Decision and Control*, Tucson, AZ, pp. 3559-3564, Dec. 1992.
- C3) L. Y. Pao and G. F. Franklin, "Design for Robust Controls Having Almost Minimum Time Response," *Proc. American Control Conf.*, Chicago, IL, pp. 182-187, June 1992.
- C2) L. Y. Pao and G. F. Franklin, "Time-Optimal Control of Flexible Structures," *Proc. IEEE Conf. Decision and Control*, Honolulu, HI, pp. 2580-2581, Dec. 1990.
- C1) L. Y. Pao and T. H. Speeter, "Transformation of Human Hand Positions for Robotic Hand Control," *Proc. IEEE Int. Conf. Robotics and Automation*, Scottsdale, AZ, pp. 1758-1763, May 1989.

Invited (non-refereed) Technical Conference Papers

- W5) J. A. Butterworth, L. Y. Pao, and D. Y. Abramovitch, "GOALI: Control Architectures and Adaptive Model-Inverse Based Methods for Nonminimum-Phase Uncertain Systems, with Applications to Atomic Force Microscopes," *Proc. NSF Engineering Research and Innovation Conf.*, Honolulu, HI, 8 pages, June 2009.
- W4) D. Y. Abramovitch, S. B. Andersson, L. Y. Pao, and G. Schitter, "A Tutorial on the Control of Atomic Force Microscopes," *Proc. Agilent Technical Conf.*, pp. 132-136, Santa Clara, CA, Feb. 2007.
- W3) M. K. Kalandros and L. Y. Pao, "Sensor Management for Tracking Interacting Targets," *Proc. Workshop on Estimation, Tracking, Fusion, and Control: A Tribute to Yaakov Bar-Shalom*, Monterey, CA, pp. 221-248, May 2001.
- W2) L. Y. Pao, "Strategies for Shaping Commands in the Control of Flexible Structures," *Proc. Japan/USA/Vietnam Workshop on Research and Education in Systems, Computation, and Control Engineering*, Ho Chi Minh City, Vietnam, pp. 309-318, June 2000.
- W1) L. Y. Pao and D. A. Lawrence, "Synergistic Visual/Haptic Computer Interfaces," *Proc. Japan/USA/Vietnam Workshop on Research and Education in Systems, Computation, and Control Engineering*, Hanoi, Vietnam, pp. 155-162, May 1998.

Published Reviews

- R2) J. H. Laks and L. Y. Pao, "Review of *Optimal Control of Wind Energy Systems: Towards a Global Approach*, by I. Munteanu, A. I. Bratcu, N.-A. Cutululis, and E. Ceanga, Springer-Verlag, 2008," *IEEE Control Systems Magazine*, 29(3): 105-108, June 2009.
- R1) L. Y. Pao, "Review of *Computational Optimal Control*, R. Bulirsch & D. Kraft (Editors), *Int. Ser. Numer. Math.*, Vol. 115, Birkhauser, Basel, 1994," *AMS Mathematics of Computation*, Vol. 64, pp. 1758-1759, Oct. 1995.

Published Interviews

- M1) "People in Control: Rocky Mountain High," *IEEE Control Systems Magazine*, pp. 18-21, Dec. 2005.

Technical Reports

- T26) E. Simley and L. Y. Pao, "Blade Effective Wind Speed Estimates, Optimal Filtering Methods, and Spectral Models for Use in Wind Turbine Preview Control," National Renewable Energy Laboratory Technical Report, 81 pages, 2016.
- T25) F. Dunne and L. Y. Pao, "Benefit of Wind Turbine Preview Control as a Function of Measurement Coherence and Preview Time," National Renewable Energy Laboratory Technical Report, 39 pages, 2016.
- T24) D. Schlipf and L. Y. Pao, "Preview Control of Wind Turbines," in *IEEE Control Systems Society Impact of Control Technologies Report*, 2nd edition, T. Samad and A. Annaswamy (Eds.), 2014.
- T23) E. Ela, V. Gevorgian, P. Fleming, Y. C. Zhang, M. Singh, E. Muljadi, A. Scholbrock, J. Aho, A. Buckspan, L. Pao, V. Singhvi, A. Tuohy, P. Pourbeik, D. Brooks, and N. Bhatt, "Active Power Controls from Wind Power: Bridging the Gaps, National Renewable Energy Laboratory Technical Report, NREL/TP-5D00-60574, 154 pages, Jan. 2014. Report available at <http://www.nrel.gov/docs/fy14osti/60574.pdf>.
- T22) I. Girsang, J. Dhupia, E. Muljadi, M. Singh, and L. Pao, "Gearbox and Drive-Train Models for Studying the Dynamic Effects of Modern Wind Turbines," National Renewable Energy Laboratory Technical Report, NREL/CP-5500-58960, Oct. 2013. Report available at <http://www.nrel.gov/docs/fy14osti/58960.pdf>.
- T21) A. M. Annaswamy et al. (I am among 40 authors), *IEEE Vision for Smart Grid Controls: 2030 and Beyond*, 168 pages, July 2013, published by IEEE.
- T20) F. Dunne, D. Schlipf, and L. Y. Pao, "Comparison of Two Independent Lidar-Based Pitch Control Designs," National Renewable Energy Laboratory Technical Report, NREL/SR-5000-55544, 36 pages, Aug. 2012. Report available at <http://www.nrel.gov/docs/fy12osti/55544.pdf>.
- T19) E. Simley and L. Y. Pao, "LIDAR Wind Speed Measurements of Evolving Wind Fields," National Renewable Energy Laboratory Technical Report, NREL/SR-5000-55516, 41 pages, July 2012. Report available at <http://www.nrel.gov/docs/fy12osti/55516.pdf>
- T18) A. Buckspan, J. Aho, P. Fleming, Y. Jeong, and L. Y. Pao, "Combining Droop Curve Concepts with Control Systems for Wind Turbine Active Power Control," National Renewable Energy Laboratory Technical Report, NREL/CP-5000-55211, June 2012. Report available at <http://www.nrel.gov/docs/fy12osti/55211.pdf>.
- T17) J. Aho, A. Buckspan, J. Laks, P. Fleming, Y. Jeong, F. Dunne, M. Churchfield, L. Pao, and K. Johnson, "A Tutorial of Wind Turbine Control for Supporting Grid Frequency through Active Power Control," National Renewable Energy Laboratory Technical Report, NREL/CP-5000-54605, March 2012. Report available at <http://www.nrel.gov/docs/fy12osti/54605.pdf>.
- T16) F. Dunne, E. Simley, and L. Y. Pao, "LIDAR Wind Speed Measurement Analysis and Feedforward Blade Pitch for Load Mitigation in Wind Turbines," National Renewable Energy Laboratory Technical Report, NREL/SR-5000-52098, 53 pages, Oct. 2011. Report available at <http://www.nrel.gov/docs/fy12osti/52098.pdf>.
- T15) J. H. Laks, F. Dunne, and L. Y. Pao, "Feasibility Studies on Disturbance Feedforward Techniques to Improve Load Mitigation Performance in Wind Turbines," National Renewable Energy Laboratory Technical Report, NREL/SR-5000-48598, 52 pages, Dec. 2010. Report available at <http://www.nrel.gov/docs/fy11osti/48598.pdf>.

- T14) L. Y. Pao and M. K. Kalandros, "Computationally Efficient Algorithms for Managing Sensor Information that Incorporate Models of Data Association," Colorado Advanced Software Institute Technical Report, Nov. 2000.
- T13) L. Y. Pao, C. F. Cutforth, and M. A. Lau, "Precise Control of Elastic Components for Tape Systems," Colorado Advanced Software Institute Technical Report, CASI-TR-00-6, Nov. 1999.
- T12) L. Y. Pao, N. T. Baltz, and M. K. Kalandros, "Sensor Management in Centralized and Decentralized Multisensor Systems," Colorado Advanced Software Institute Technical Report, CASI-TR-99-7, Nov. 1998.
- T11) L. Y. Pao and M. K. Kalandros, "Control of Sensor Information in Centralized Multisensor Systems," Colorado Advanced Software Institute Technical Report, CASI-TR-98-10, Feb. 1998.
- T10) K. H. Kim, S. D. O'Neil, L. Y. Pao, and R. K. Saha, "Multisensor Fusion Algorithms for Tracking: Track-Level Algorithm Development," MITRE Technical Report, Sept. 1993.
- T9) L. Y. Pao, "Control of a Rigid Two-Link Planar Manipulator," MITRE Technical Report, Feb. 1993.
- T8) L. Y. Pao, S. D. O'Neil, S. Dhar, and D. J. Muder, "Multisensor Fusion Algorithms for Tracking: Algorithm Development," MITRE Technical Report, Feb. 1993.
- T7) K. R. King, S. D. O'Neil, L. Y. Pao, and K. H. Kim, "Multisensor Fusion Algorithms for Tracking: Parametric Studies," MITRE Technical Report, Feb. 1993.
- T6) L. Y. Pao and F. Hatch, "Test Report on an Anti-Lock Braking System Proportional Isolation Valve/Displacement Cylinder," Hughes Aircraft Company Report, Oct. 1987.
- T5) L. Y. Pao, "A Simple Servovalve and Actuator Model," Hughes Aircraft Company/General Motors Corporation Report, Aug. 1987.
- T4) F. Hatch and L. Y. Pao, "A Proportional Control System for an Anti-Lock Braking System," Hughes Aircraft Company/General Motors Corporation Report, Aug. 1987.
- T3) L. Y. Pao, "Tests for an Anti-Lock Braking System Modulator," Hughes Aircraft Company/General Motors Corporation Report, June 1987.
- T2) L. Y. Pao, "Preparation of Base Cases in Loss Calculation Studies," Pacific Gas & Electric Company Report, Sept. 1986.
- T1) L. Y. Pao, "A Study of the Effects of Different Annealing Conditions on the Coupling Factor of the Metallic Glass Alloy $Fe_{81}B_{13.5}Si_{3.5}C_2$," Naval Surface Warfare Center Report, Sept. 1984.

Tutorial and Invited Sessions (Refereed)

- S10) L. Fagiano and L. Y. Pao, co-organizers, Tutorial Session on "Systems and Control Aspects in Wind Energy: State of the Art and Future Challenges," *American Control Conf.*, Montreal, Canada, June 2012.
- S9) D. Y. Abramovitch, G. Clayton, A. Fleming, K. Leang, L. Y. Pao, and Q. Zou, co-organizers, Invited Session on "Control of Nanopositioning and Scanning Probe-Based Systems," *American Control Conf.*, San Francisco, CA, June 2011.

- S8) D. Y. Abramovitch, G. Clayton, A. Fleming, K. Leang, L. Y. Pao, and Q. Zou, co-organizers, Two Invited Sessions on “Advances in Modeling and Control Methods for Nano-measurements,” *American Control Conf.*, Baltimore, MD, June 2010.
- S7) K. Leang, L. Y. Pao, Q. Zou, and A. Fleming, co-organizers, Three Invited Sessions on “Mechanism Dynamics, Design, and Control of Nanopositioning and Scanning Probe Microscopy Systems,” *American Control Conf.*, St. Louis, MO, June 2009.
- S6) L. Y. Pao and K. E. Johnson, co-organizers, Tutorial Session on “Dynamics and Control of Wind Turbines and Wind Farms,” *American Control Conf.*, St. Louis, MO, June 2009.
- S5) Q. Zou, L. Y. Pao, D. Y. Abramovitch, M. Steinbuch, K. Leang, and C. Su, co-organizers, Three Invited Sessions on “Modeling and Control of Scanning Probe Microscopes,” *American Control Conf.*, Seattle, WA, June 2008.
- S4) D. Y. Abramovitch, S. B. Andersson, L. Y. Pao, and G. Schitter, co-organizers, Tutorial Session on “A Tutorial on the Mechanisms, Dynamics, and Control of Atomic Force Microscopes,” *American Control Conf.*, New York, NY, July 2007.
- S3) L. Y. Pao and Y. Bar-Shalom, co-organizers, Tutorial Session on “Multisensor Management and Fusion Algorithms for Target Tracking,” *American Control Conf.*, Boston, MA, June-July 2004.
- S2) L. Y. Pao, organizer, Invited Session on “Haptic Interfaces,” *IFAC Conf. Mechatronic Systems*, Berkeley, CA, Dec. 2002.
- S1) L. Y. Pao, organizer, Invited Session on “Control of Flexible Structures,” *IFAC Conf. Mechatronic Systems*, Berkeley, CA, Dec. 2002.

Plenary Lectures

- P7) “Challenges and Opportunities in Integrating Large Amounts of Wind and Solar Energy into Utility Grids,” *Alpbach Technology Symposium*, Alpbach, Austria, Aug. 2016.
- P6) “Combined Feedforward/Feedback Control of Flexible Structures: Recurring Themes across Diverse Applications,” *American Control Conference*, Boston, MA, July 2016.
- P5) “Controlling Wind Energy for Utility Grid Reliability,” *IEEE Conference on Decision and Control*, Florence, Italy, Dec. 2013.
- P4) “Wind Energy Control and Grid-Related Issues,” *IEEE Power and Energy Conference at Illinois*, University of Illinois at Urbana-Champaign, Feb. 2013.
- P3) “Control of Wind Turbines: Accomplishments and Continuing Challenges,” *ASME Dynamic Systems and Control Conference*, Ft. Lauderdale, FL, Oct. 2012.
- P2) “Control of Wind Turbines: Accomplishments and Challenges,” *ASME International Mechanical Engineering Congress & Exposition*, Denver, CO, Nov. 2011.
- P1) “Control of Flexible Structures: From Large Space Structures to Disk Drive Read/Write Arms,” *IEEE Conference on Decision and Control*, San Diego, CA, Dec. 2006.

Keynote Lectures

- K5) “Wind Energy Control and Grid Integration Issues,” *Society of Instrumentation and Control Engineers Annual Conference*, Nagoya, Japan, Sept. 2013.

- K4) "Control of Wind Turbines: Accomplishments and Challenges," *Chinese Control and Decision Conference*, Taiyuan, China, May 2012.
- K3) "Architectures for Tracking Control in Atomic Force Microscopes," *IFAC World Congress*, Seoul, Korea, July 2008.
- K2) "Strategies for Shaping Commands in the Control of Flexible Structures," *Japan, USA, and Vietnam Workshop on Research and Education in Systems, Computation and Control Engineering*, Ho Chi Minh City, Vietnam, June 2000.
- K1) "Synergistic Visual-Haptic Computer Interfaces," *Japan, USA, and Vietnam Workshop on Research and Education in Systems, Computation and Control Engineering*, Hanoi, Vietnam, May 1998.

Invitations for Keynote Lectures

Invited to give keynote talks at the *IFAC Conference on Mechatronic Systems*, Sydney, Australia, Sept. 2004 and the *Australasian Universities Power Engineering Conference*, Bali, Indonesia, Sept. 2012. Declined due to too many other commitments.

Invited Presentations

- 109) *Closed-Loop Active Power Control of Wind Farms*, Swiss Federal Institute of Technology (ETH), Zurich, Switzerland, March 2017.
- 108) *Challenges and Opportunities in Integrating Large Amounts of Wind and Solar Energy into Utility Grids*, Fellow Lecture, Hanse-Wissenschaftskolleg, Institute of Advanced Study, Delmenhorst, Germany, Jan. 2017.
- 107) *Integration of Large Amounts of Wind Energy While Maintaining Utility Grid Reliability*, Institute of Physics Colloquium, Oldenburg University, Germany, Jan. 2017.
- 106) *Active Power Control of Wind Turbines and Wind Farms*, Delft Center for Systems and Control, Technical University of Delft, The Netherlands, Dec. 2016.
- 105) *Control of Wind Turbines and Wind Farms*, ForWind Center for Wind Energy Research, Oldenburg University, Germany, Nov. 2016.
- 104) *Control of Atomic Force Microscopes to Achieve Faster Imaging*, Boston University, Oct. 2016.
- 103) *Controlling Wind Turbines and Wind Farms for Utility Grid Reliability*, Boston University, Sept. 2016.
- 102) *Combined Feedforward/Feedback Control of Flexible Structures: Recurring Themes across Diverse Applications*, University of Colorado Boulder, Apr. 2016.
- 101) *Integration of Large Amounts of Wind Energy While Maintaining Utility Grid Reliability*, Swiss Federal Institute of Technology (ETH), Zurich, Switzerland, March 2016.
- 100) *Integration of Large Amounts of Wind Energy While Maintaining Utility Grid Reliability*, Japan Science and Technology Agency (JST) Creating Revolutionary Engineering and Science Technology (CREST) Workshop on *Principle Design, Experimental Proof, Implementation and Policy Recommendation to Establish Energy Supply-Demand Networks based on Integration of Economic Models and Physical Models*, Keio University, Nov. 2015.

- 99) *Controlling Wind Energy for Utility Grid Reliability: Demonstrated Capabilities and Continuing Challenges*, Universität Stuttgart, June 2015.
- 98) *Controlling Wind Turbines to Reduce the Cost of Wind Energy and to Increase Utility Grid Reliability*, Princeton University, Feb. 2015.
- 97) *Control of Wind Turbines to Reduce the Cost of Wind Energy and to Increase Utility Grid Reliability*, **Annual Kurtz Lecture**, University of Iowa, Oct. 2014.
- 96) *Control of Flexible Structures: From Atomic Force Microscopes to Megawatt Wind Turbines*, The Beauty of Controls Workshop for Middle and High School Students and Teachers, held at the American Control Conference, Portland, OR, June 2014
- 95) *Control of Wind Turbines to Reduce the Cost of Wind Energy and to Increase Utility Grid Reliability*, **Mercer Distinguished Lecture**, Rensselaer Polytechnic Institute, Mar. 2014.
- 94) *Control of Wind Turbines with Preview Measurements of Upstream Wind Speeds*, Risø National Laboratory for Sustainable Energy at the Technical University of Denmark, Dec. 2013.
- 93) *Combined Feedforward and Feedback Control of Wind Turbines*, Lund Center for Control of Complex Engineering Systems, Lund University, Dec. 2013.
- 92) *Controlling Wind Energy for Utility Grid Reliability*, University of Colorado Boulder, Dec. 2013.
- 91) *Control of Wind Turbines: Accomplishments and Continuing Challenges*, Tokyo Institute of Technology, Sept. 2013.
- 90) *Control of Flexible Structures: From Atomic Force Microscopes to Megawatt Wind Turbines*, IBM Research – Zurich, July 2013.
- 89) *Wind Energy Control and Grid Integration Challenges*, University of Denver, April 2013.
- 88) *Wind Energy Control and Grid-Related Issues*, University of Colorado Boulder Alumni Breakfast Series, held at the National Renewable Energy Laboratory, April 2013.
- 87) *Control of Wind Turbines: Accomplishments and Continuing Challenges*, University of Colorado Boulder, Oct. 2012.
- 86) *Control of Wind Turbines and Wind Farms*, Boston University, Sept. 2012.
- 85) *Game Theoretic Approaches for Wind Farm Control*, Center for Research and Education in Wind Annual Symposium, Fort Collins, CO, Aug. 2012.
- 84) *Combined Feedforward/Feedback Control of Wind Turbines*, Chinese Academy of Sciences, May 2012.
- 83) *Control of Wind Turbines: Accomplishments and Challenges*, Tsinghua University, May 2012.
- 82) *Wind Turbine Control Research*, Singapore Workshop on Offshore Renewables, Feb. 2012.
- 81) *Control of Wind Turbines: Accomplishments and Challenges*, Technical University – Eindhoven, Dec. 2011.
- 80) *Control of Wind Turbines: Accomplishments and Challenges*, Universität Stuttgart, Nov. 2011.
- 79) *Control of Wind Turbines: Accomplishments and Challenges*, **Distinguished Lecture**, IEEE Denver Section, Nov. 2011.

- 78) *Control of Wind Turbines: Accomplishments and Challenges*, **Distinguished Lecture**, IEEE Control Systems Society Webinar, Nov. 2011.
- 77) *Development of Novel Ice Sensing and Active De-Icing Method for Wind Turbines*, Center for Research and Education in Wind Annual Symposium, Golden, CO, Aug. 2011.
- 76) *Control of Wind Turbines: Accomplishments and Challenges*, Agilent Technologies, June 2011.
- 75) *Control of Wind Turbines: Accomplishments and Challenges*, University of California at Los Angeles, Apr. 2011.
- 74) *Control of Wind Turbines: Accomplishments and Challenges*, University of Minnesota, Mar. 2011.
- 73) *Control of Wind Turbines: Accomplishments and Challenges*, University of California at Santa Barbara, Feb. 2011.
- 72) *Feasibility Study of Control of Novel Active Coating Materials for Preventing Icing on Wind Turbine Blades*, Center for Research and Education in Wind Annual Symposium, Golden, CO, Aug. 2010.
- 71) *Combined Feedforward/Feedback Control of Flexible Structures: from Atomic Force Microscopes to Megawatt Wind Turbines*, **Distinguished Lecture**, University of British Columbia, Vancouver, Canada, Mar. 2010.
- 70) *A Tutorial on the Control of Wind Turbines and Wind Farms*, **Distinguished Lecture**, IEEE Centennial Section, Fort Collins, CO, Jan. 2010.
- 69) *A Tutorial on the Control of Wind Turbines and Wind Farms*, **Distinguished Lecture**, IEEE Illinois Section, Nov. 2009.
- 68) *What do Imaging at the Nanoscale and Megawatt Wind Turbines Have in Common*, **CU Seminar**, University of Colorado Boulder, Oct. 2009.
- 67) *Haptic Interfaces: Making Touch Interfaces More Interactive*, **Distinguished Lecture**, Andres Bello University, Chile, Oct. 2009.
- 66) *Combined Feedforward/Feedback Control of Flexible Structures, with Applications Ranging from Atomic Force Microscopes to Megawatt Wind Turbines*, **Distinguished Lecture**, University of Santiago, Chile, Oct. 2009.
- 65) *A Tutorial on the Control of Wind Turbines and Wind Farms*, **Distinguished Lecture**, Catholic University of Valparaiso, Chile, Oct. 2009.
- 64) *Control of Flexible Structures: From Atomic Force Microscopes to Megawatt Wind Turbines*, **Inaugural Mechanical Engineering Department Seminar**, University of Texas at Dallas, Sept. 2009.
- 63) *Combined Feedforward and Feedback Control Architectures for Maneuvering Flexible Structures*, Department of Mechanical Engineering, University of California at Berkeley, Oct. 2008.
- 62) *Control of Flexible Structures*, Stanford University, Oct. 2008.
- 61) *Interesting Connections in the Control of Systems Across Multiple Scales: From Megawatt Wind Turbines down to Atomic Force Microscopes*, Miller Institute for Basic Research in Science, University of California at Berkeley, Oct. 2008.
- 60) *Control of Flexible Structures: From Atomic Force Microscopes to Megawatt Wind Turbines*, Iowa State University, Mar. 2008.

- 59) *Reliable Track Loss Detection in Multisensor Fusion Algorithms*, Pennsylvania State University, Oct. 2007.
- 58) *Combined Feedforward/Feedback Control of Flexible Structures*, University of Illinois at Urbana-Champaign, Apr. 2007.
- 57) *Control of Flexible Structures: From Large Space Structures to Disk Drive Read/Write Arms*, University of Colorado Boulder, Dec. 2006.
- 56) *Feedback and Feedforward Control Techniques for Flexible Structures*, Colorado School of Mines, Nov. 2006.
- 55) *Multisensor Fusion Algorithms for Tracking Applications*, University of Wyoming, Apr. 2006.
- 54) *An Overview of Selected Research in Multisensor Fusion and Haptic Interfaces*, National Taiwan University, Nov. 2005.
- 53) *Haptic Interfaces*, US-Japan Workshop on Sensors, Smart Structures, and Mechatronic Systems, Tokyo, Japan, Nov. 2005.
- 52) *Haptic Interfaces: Making Touch Interfaces More Interactive*, IEEE Presents – Innovation and Technology in Colorado, Colorado Tech Week, Denver, CO, Oct. 2005.
- 51) *Multisensor Data Fusion Techniques for Effectively Tracking Multiple Targets Using Multiple Sensors*, **Eminent Speaker Series**, University of Virginia, Apr. 2005.
- 50) *Low-Cost Haptic Interfaces for Enhancing Spatial Understanding and Communication*, Accessing Higher Ground Conference: Assistive Technology and Accessible Media in Higher Education, Boulder, CO, Nov. 2004.
- 49) *Tracking Protocols and Sensor Management for Active Safety Technologies*, University of Colorado Technology Transfer Office Proof-of-Concept Workshop, Sept. 2004.
- 48) *Multisensor Fusion Algorithms for Tracking Applications*, Kirtland Air Force Base, July 2004.
- 47) *Haptic Interfaces for Spatial Learning*, Accessing Higher Ground Conference: Assistive Technology and Accessible Media in Higher Education, Boulder, CO, Nov. 2003.
- 46) *Speed and Tension Control in Tape Systems*, Carnegie Mellon University, Oct. 2003.
- 45) *Distributed Multisensor Tracking of Interacting Targets in Cluttered Environments*, Orincon Corporation, Apr. 2003.
- 44) *Variance Estimation and Ranking with Applications to Target Tracking Algorithms*, George Mason University, Apr. 2003.
- 43) *Scientific Visualization Using Visual/Haptic Rendering Modes*, Catholic University of America, Mar. 2003.
- 42) *Haptic Interfaces for Conveying Spatial Ideas*, Joint Annual Meeting of the National Science Foundation's Human Resources Division, Arlington, VA, Mar. 2003.
- 41) *Using Combined Visual/Haptic Rendering Modes for More Effective Scientific Visualization*, University of Southern California, Oct. 2002.
- 40) *Multisensor Fusion Algorithms for Target Tracking*, Harvard University, Apr. 2002.
- 39) *Enhancing Scientific Visualization by Combining Traditional Graphical Interfaces with Haptic Interfaces*, Harvard University, Mar. 2002.

- 38) *Combined Feedforward/Feedback Methods for Effectively Slewing Flexible Structures*, Harvard University, Feb. 2002.
- 37) *Strategies for Effectively Controlling Flexible Structures*, Massachusetts Institute of Technology, Feb. 2002.
- 36) *Sensor Fusion Techniques for Tracking Multiple Targets in Cluttered Environments*, Alphatech, Inc., Feb. 2002.
- 35) *Efficient and Effective Ways of Processing Sensor Information for Tracking Targets in Cluttered Environments*, University of Connecticut, Nov. 2001.
- 34) *Exploring Complex Data Sets More Efficiently and Naturally Using Combined Visual/Haptic Interfaces*, Harvard University, Sept. 2001.
- 33) *Managing Sensor Information in Tracking Applications*, DARPA Sensor Fusion Workshop, Providence, RI, Sept. 2001.
- 32) *Visual/Haptic Scientific Visualization of Complex Multi-Dimensional Data*, Purdue University, Aug. 2001.
- 31) *Effectively Allocating and Using Sensor Resources in Target Tracking Applications*, Air Force Research Laboratories, Dayton, OH, Mar. 2001.
- 30) *Enhancing Scientific Visualization by Augmenting Traditional Graphical Rendering with Haptic Rendering Modes*, Colorado School of Mines, Feb. 2001.
- 29) *Synergistic Visual/Haptic Computer Interfaces for Scientific Visualization*, Brigham Young University, Oct. 2000.
- 28) *Combined Visual/Haptic Rendering Modes for Scientific Visualization*, University of California at Berkeley, Sept. 2000.
- 27) *Reducing Vibration in Flexible Structures by Altering the Control Command*, Quantum Corporation, Shrewsbury, MA, May 2000.
- 26) *Sensor Fusion and Management Algorithms for Target Tracking*, Harvard University, May 2000.
- 25) *Input Shaping Methods for Vibration Reduction in Flexible Structures*, Swiss Federal Institute of Technology (ETH), Zurich, Switzerland, April 2000.
- 24) *Distributed Multisensor Multitarget Tracking Algorithms*, ONR Winter Unmanned Autonomous Vehicles Workshop, Arlington, VA, Jan. 2000.
- 23) *Multisensor Fusion and Sensor Management Algorithms*, ONR Summer Unmanned Autonomous Vehicles Workshop, Berkeley, CA, Aug. 1999.
- 22) *Multisensor Fusion Algorithms for Tracking Applications*, ONR Winter Unmanned Autonomous Vehicles Workshop, Monterey, CA, Jan. 1999.
- 21) *Distributed Multisensor Fusion Algorithms for Tracking Applications*, ONR Summer Unmanned Autonomous Vehicles Workshop, Los Angeles, CA, July 1998.
- 20) *Multisensor Multitarget Tracking*, Computational Sciences Branch, Naval Air Warfare Center, China Lake, CA, July 1998.
- 19) *Strategies for Shaping Commands for Rapid and Robust Control of Flexible Structures*, University of Washington, Jan. 1998.
- 18) *Effectively Managing and Using Sensor Information in Tracking Applications*, University of Minnesota, Jan. 1998.
- 17) *Altering Control Inputs to Reduce Residual Vibration in Flexible Structures*, University of Minnesota, Jan. 1998.

- 16) *Minimizing Residual Vibration in the Control of Flexible Structures*, University of California at Irvine, Sept. 1997.
- 15) *Input Shaping Strategies in the Control Flexible Structures*, University of Colorado Boulder, Sept. 1997.
- 14) *Input Shaping Design for Flexible Systems with Multiple Actuators*, Massachusetts Institute of Technology, May 1996.
- 13) *Current Research in the Areas of Control of Flexible Structures and Multisensor Data Fusion*, University of Colorado Boulder, Oct. 1995.
- 12) *Rapid and Robust Control of Flexible Structures*, New Jersey Institute of Technology, Sept. 1995.
- 11) *Robust Near Time-Optimal Control of Flexible Structures*, University of Colorado Boulder, Apr. 1995.
- 10) *Multisensor Fusion Algorithms for Tracking Applications*, University of Colorado Boulder, Mar. 1995.
- 9) *Measurement-Level Multisensor Fusion Algorithms*, University of Illinois, Apr. 1993.
- 8) *Design for Robust Controls Having Almost Minimum Time Response*, Northwestern University, Mar. 1993.
- 7) *Design for Rapid and Robust Controllers*, Princeton University, Feb. 1993.
- 6) *Multisensor Mixture Reduction Algorithms for Tracking Multiple Objects*, Wayne State University, Jan. 1993.
- 5) *Near Time-Optimal Servomechanisms*, Draper Laboratories, July 1991.
- 4) *Proximate Time-Optimal Controllers for Higher-Order Systems*, The MITRE Corporation, June 1991.
- 3) *Proximate Time-Optimal Feedback Controllers*, Massachusetts Institute of Technology, May 1991.
- 2) *Robust Time-Optimal Feedback Systems*, Integrated Systems, Inc., Apr. 1991.
- 1) *A Comparative Study of Proximate Time-Optimal Controllers for Type-2 Third-Order Servomechanisms*, ASME Winter Annual Meeting, Dec. 1991.

Short Course Taught

"Design of High-Performance Disk Drive Servo Systems," to servo system engineers and managers of Industrial Member Companies of the Colorado Center for Information Storage, co-taught with Dale A. Lawrence, July 2001.

Best Presentations of the Session Awards Received

For my presentations:

- American Control Conference, San Diego, CA, June 1999
- AIAA Guidance, Navigation, and Control Conference, Monterey, CA, Aug. 1993
- American Control Conference, San Francisco, CA, June 1993

For my students' presentations of our joint papers:

- F. Dunne, American Control Conference, Portland, OR, June 2014
- B. P. Rigney, American Control Conference, St. Louis, MO, June 2009

- H. Zhong, American Control Conference, Seattle, WA, June 2008
- J. A. Butterworth, American Control Conference, New York, NY, July 2007
- W. Khawsuk, American Control Conference, Boston, MA, July 2004
- L. Trailović, American Control Conference, Denver, CO, June 2003
- C. La-orphacharapan, 2 best presentation awards, American Control Conference, Denver, CO, June 2003
- M. D. Baumgart, American Control Conference, Denver, CO, June 2003
- M. D. Baumgart, American Control Conference, Arlington, VA, June 2001
- L. Trailović, American Control Conference, San Diego, CA, June 1999
- N. T. Baltz, American Control Conference, San Diego, CA, June 1999
- C. F. Cutforth, American Control Conference, Philadelphia, PA, June 1998

Sessions Chaired at Technical Conferences

- American Control Conference, June 2013
 - Chaired/Co-chaired 2 semi-plenary, 1 plenary, and 1 public lecture sessions
 - Gave introductory and brief remarks (as General Chair of the overall conference) at numerous meetings, receptions, and workshops
- IEEE Conference on Decision and Control, Dec. 2012
 - “Energy Systems II” (chair)
- American Control Conference, June 2012
 - “Systems and Control Aspects in Wind Energy” (co-chair)
- Joint IEEE Conference on Decision and Control and European Control Conference, Dec. 2011
 - “Optimization II” (chair)
- ASME International Mechanical Engineering Congress and Exposition, Nov. 2011
 - “Symposium on Servo and Control in Mechatronic Applications” (chair)
- AIAA Aerospace Sciences Meeting, Jan. 2011
 - “Wind Turbine Controls” (co-chair)
- IEEE Conference on Decision and Control, Dec. 2010
 - “Optimization III” (co-chair)
 - “Nonlinear Systems II” (co-chair)
- American Control Conference, June 2010
 - “Filtering” (chair)
- American Control Conference, June 2009
 - “Feedforward Control of Nanopositioning and SPM Systems” (co-chair)
 - “A Tutorial on the Control of Wind Turbines and Wind Farms” (chair)

- IFAC Triennial World Congress, July 2008
 - “Estimation and Control of States and Disturbances in Mechatronic Systems” (chair)
- American Control Conference, June 2008
 - “Control of Atomic Force Microscopes” (chair)
- American Control Conference, July 2007
 - “Command Shaping to Reduce Residual Vibration” (co-chair)
- American Control Conference, June 2006
 - “Adaptive Systems II” (co-chair)
- American Control Conference, June 2005
 - “New Techniques in Command Shaping for Vibration Suppression” (chair)
 - “Mechanical Systems and Robotics” (chair)
- IEEE Conference on Decision and Control, Dec. 2004
 - “Nonlinear Control Applications” (co-chair)
- IEEE Conference on Decision and Control, Dec. 2003
 - “Noise and Vibration Control” (chair)
- American Control Conference, June 2003
 - “Concurrent Feedback Control Design and Command Shaping” (co-chair)
- IEEE Conference on Decision and Control, Dec. 2002
 - “Stochastic Systems” (chair)
 - “Systems with Nonlinear Dynamics” (chair)
- IFAC Conference on Mechatronic Systems, Dec. 2002
 - “Control of Flexible Structures I” (chair)
 - “Control of Flexible Structures II” (chair)
 - “Haptic Interfaces” (chair)
- American Control Conference, May 2002
 - “Estimation” (chair)
 - “Aerospace and Flexible Structures” (chair)
 - “Time-Varying Estimation” (chair)
- American Control Conference, June 2001
 - “Applications of Optimization II” (chair)
 - “Control of Disk Drives II” (chair)

- American Control Conference, June 2000
 - “Control of Flexible Structures” (chair)
 - “Target Tracking” (chair)
- Japan/USA/Vietnam Workshop on Research and Education in Systems, Computation, and Control Engineering, June 2000
 - “Research and Education in Control Engineering & Mechatronics” (chair)
- American Control Conference, June 1999
 - “Estimation Applications II” (co-chair)
 - “Control of Structures” (chair)
- AIAA Guidance, Navigation, and Control Conference, Aug. 1998
 - “Innovative Approaches to Flexible Structure Control” (co-chair)
- American Control Conference, June 1998
 - “Flexible Structures” (chair)
- American Control Conference, June 1997
 - “Robotic Systems Control” (chair)
 - “Flexible Structures II” (chair)
- IEEE Conference on Control Applications, Sept. 1995
 - “Robotics: Software and Modelling” (chair)
- American Control Conference, June 1995
 - “Estimation and Tracking” (chair)
 - “Flexible Structures” (chair)
 - “Multisensor Fusion” (co-chair)
- American Control Conference, June 1993
 - “H-infinity for Discrete/Sampled Data Systems” (chair)

Grants Awarded

55. Envision Energy
Model Predictive Control of Wind Turbines
 10/2016 – 10/2017, \$104,995
54. Sponsor has requested to remain anonymous
Combined Feedforward and Feedback Control of Tape Systems using a Data-Driven Model for Predicting Lateral Tape Motion
 (Co-PI: B. Touri)
 9/2016 – 9/2017, \$75,000

53. Department of Energy/Advanced Research Projects Agency – Energy
50 MW Segmented Ultralight Morphing Rotors for Wind Energy
 (PI: E. Loth; Co-PIs: D. Griffith, K. Johnson, P. Moriarty, L. Pao, M. Selig)
 4/2016 – 3/2019, \$3,569,580 (CU-Boulder share is \$525,048)

52. US-Israel Binational Science Foundation
Previewed Disturbance Rejection with Application to the Control of Wind Turbines
 (with M. Kristalny at Technion – Israel Institute of Technology)
 9/2013 – 9/2016, \$109,800 (CU-Boulder share is \$51,818)

51. Department of Energy/National Renewable Energy Laboratory
Development and Evaluation of Wind Turbine Lidar-Based Feedforward Controls
 5/2013 – 9/2017, \$296,273

50. National Science Foundation
Collaborative Research: High-Speed Atomic Force Microscopy through Compressed Sensing
 (with S. B. Andersson at Boston University)
 9/2012 – 8/2017, \$233,708 (CU-Boulder share), with \$10,000 REU supplement

49. Department of Energy/National Renewable Energy Laboratory
Studying the Ability of Wind Turbines to Provide Advanced Power Control
 1/2012 – 3/2016, \$292,983

48. Sponsor has requested to remain anonymous
Lidar-Based Control of Wind Turbines
 10/2011 – 12/2012, \$251,196

47. Air Force Research Laboratory
Data Association and Sensor Management Algorithms for Tracking Applications
 (Co-PI: T. D. Murphey)
 10/2008 – 9/2011, \$250,000,
 with an additional \$300,000 supplement received for *Space-Based Search-Detect-Track*
 for 9/2011 – 9/2013, (Co-PIs on supplement: G. Born, H. Schaub, and P. Axelrad)

46. Center for Research and Education in Wind
An Innovative Approach to the Design and Control of Wind Farms
 (PI: J. R. Marden; Co-PI: L. Y. Pao)
 8/2011 – 5/2013, \$25,000

45. Department of Energy/National Renewable Energy Laboratory
Development and Evaluation of Advanced Feedforward Controls for Wind Turbines
 1/2011 – 7/2013, \$220,000

44. Center for Research and Education in Wind/Colorado Center for Information Storage
Feasibility Study of Control of Novel Active Coating Materials for Preventing Icing on Wind Turbine Blades
 (PI: L. Y. Pao; Co-PI: R. R. McLeod)
 8/2010 – 7/2013, \$52,000

43. Department of Energy/National Renewable Energy Laboratory
Windplant Systems Engineering Analysis and Optimization
4/2010 – 1/2011, \$60,000
42. Department of Energy/National Renewable Energy Laboratory
Offshore Wind Energy Technology and Challenges
9/2009 – 6/2010, \$20,000
41. Sponsor has requested to remain anonymous
Lidar-Based Control of Wind Turbines: Feasibility Study
(Co-PIs: R. G. Frehlich and K. E. Johnson)
7/2009 – 7/2011, \$287,849
40. Department of Defense, SBIR
A Novel and Integrated Framework for Sensor Registration and Sensor Management
(PI: C. Kwan, Co-PIs: L. Y. Pao and H. Leung)
3/2009 – 9/2009, \$100,000
39. Information Storage Industries Consortium/Sun Microsystems/Colorado Center for Information Storage/Oracle Corporation
High-Bandwidth, High-Precision Tape System Control
1/2009 – 12/2012, \$220,500
38. Department of Energy/National Renewable Energy Laboratory
Advanced Controls for Wind Turbines
1/2009 – 7/2011, \$219,358
37. University of Colorado Innovative Seed Grant Program
High-Speed Precision Motion Control for Near-Field Optical Microscopy and Lithography
(Co-PI: R. R. McLeod)
9/2008 – 6/2011, \$43,500
36. National Science Foundation
GOALI: Control Architectures and Adaptive Model-Inverse Based Methods for Nonminimum Phase Uncertain Systems, with Applications to Atomic Force Microscopes
(Co-PI: D. Y. Abramovitch)
7/2007 – 6/2012, \$250,000,
with an additional \$50,728 Graduate Research Supplement received for 8/2009 – 6/2012
35. University of Colorado/National Renewable Energy Laboratory Energy Initiative
Design of Lidar, Data Processing, and Control Algorithms for Optimal Wind Farm Performance
(PI: R. G. Frehlich; Co-PI: L. Y. Pao)
7/2007 – 12/2008, \$60,000
34. Air Force Office of Scientific Research/Air Force Research Laboratories
Data Association Algorithms for Tracking Satellites
3/2007 – 9/2008, \$100,000

33. Agilent Technologies, Inc.
Control of Atomic Force Microscopes to Achieve Faster Sample Measurements
11/2006 – 10/2009, \$139,964 (plus an atomic force microscope testbed equipment loan of approximately \$180,000)
32. Department of Education
Graduate Assistance in Areas of National Need (GAANN): Disaster-Tolerant and Interoperable Communications
(Director: M. Varanasi; Co-Director: L. Y. Pao; Co-PIs: Y. Liu and T. X Brown)
8/2006 – 8/2009, \$1,097,829
31. Sentina Systems, Inc.
Sensor Management Protocol for a Class of Hybrid Sensor Suites
5/2005 – 4/2007, \$60,000
30. University of Colorado College of Engineering Engineering Excellence Fund, with matching from National Instruments Corporation and the Electrical & Computer Engineering and Aerospace Engineering Sciences Departments
Development of Hardware Control Experiments
(PI: T. D. Murphey; Co-PIs: L. Y. Pao and D. A. Lawrence)
5/2005 – 8/2006, \$85,000
29. Maxtor Corporation
Time Optimal Repetitive Control Algorithms
(Co-PI: D. A. Lawrence)
12/2004 – 11/2007, \$75,600
28. Colorado Center for Information Storage/Quantum Corporation
Rapid Slewing of Flexible Components
9/2004 – 8/2006, \$47,000
27. Colorado Center for Information Storage/Quantum Corporation
Control of Tape Systems Accounting for Reel Eccentricities
3/2004 – 8/2005, \$123,400
26. Lockheed Martin Federal Systems, Inc.
SBIRS (Space Based Infrared System) Analysis and Algorithm Development
(PI: G. Born; Co-PI: L. Y. Pao)
11/2003 – 2/2004, \$60,000
25. National Science Foundation
Projected Phase-Plane Control of Flexible Structures with Applications to Hard Disk Drives
6/2002 – 5/2007, \$222,310
24. Office of Naval Research
Sensor Management and Multisensor Fusion Algorithms for Tracking Applications
10/2001 – 9/2005, \$219,953

23. Council on Research and Creative Work, University of Colorado
Grants-In-Aid: Rapid Motion Control of Flexible Structures
8/2001 – 7/2002, \$5,000
22. University of Colorado College of Engineering Engineering Excellence Fund, with matching from the Electrical & Computer Engineering and Aerospace Engineering Sciences Departments
Development of Hardware Control Laboratories
(Co-PIs: D. A. Lawrence and J. Hauser)
5/2001 – 8/2002, \$25,575
21. National Science Foundation
Haptic Interfaces for Spatial Learning
(Co-PIs: D. A. Lawrence and H. Kramer)
4/2001 – 3/2005, \$449,866
20. Colorado Center for Information Storage/Storage Technology Corporation
Speed and Tension Control in Tape Systems
3/2001 – 10/2003, \$117,560
19. Colorado Advanced Software Institute/Data Fusion Corporation
Computationally Efficient Algorithms for Managing Sensor Information that Incorporate Models of Data Association
9/1999 – 8/2000, \$33,000
18. Colorado Advanced Software Institute/Storage Technology Corporation
Precise Control of Elastic Components for Tape Systems
7/1998 – 8/1999, \$30,000
17. National Science Foundation
Research Experiences for Undergraduates: Synergistic Visual-Haptic Rendering Modes for Scientific Visualization
(Co-PI: D. A. Lawrence)
3/1998 – 7/2003, \$20,000
16. National Science Foundation
Synergistic Visual/Haptic Computer Interfaces
(PI: D. A. Lawrence; Co-PI: L. Y. Pao)
8/1997 – 7/2003, \$438,252
15. Colorado Advanced Software Institute/Data Fusion Corporation
Control of Sensor Information in Distributed Multisensor Systems
7/1997 – 8/1998, \$39,972
14. University of Colorado Council on Research and Creative Work
Junior Faculty Development Award: Control of Flexible Structures with Multiple Actuators
7/1997 – 6/1998, \$5,000

13. Office of Naval Research
Young Investigator Award: Distributed Multisensor Fusion Algorithms for Tracking Applications
6/1997 – 5/2000, \$317,500
12. Office of Naval Research (Defense University Research Instrumentation Program)
Instrumentation for Research on the Synergism between Haptic and Visual Communication Channels in Human-Machine Interfaces
(Co-PI: D. A. Lawrence)
3/1997 – 8/1998, \$94,841 (equipment only), plus \$40,130 matching from the University of Colorado Boulder
11. Colorado Advanced Software Institute/Data Fusion Corporation
Control of Sensor Information in Centralized Multisensor Systems
1/1997 – 2/1998, \$28,614
10. University of Colorado's Optoelectronic Computing Systems Center (funded by the National Science Foundation)
Development and Application of New Optical Sensors for Teleoperation of Multifingered Robotic Hands
(PI: D. Z. Anderson; Co-PI: L. Y. Pao)
10/1996 – 4/1998, \$133,177
9. University of Colorado's Optoelectronic Computing Systems Center (funded by the National Science Foundation)
Haptic Communication in Human/Computer Interfaces
(Co-PI: D. A. Lawrence)
10/1996 – 4/1998, \$112,158
8. Wind River Systems, Inc.
Donation of Real-Time Operating System Software Licenses for Robotics and Control Experiments
8/1996 – 7/1997, market value of \$128,000
7. University of Colorado College of Engineering Undergraduate Excellence Fund
Development of Simulation Laboratories for Teaching Control Systems Concepts
7/1996 – 6/1997, \$9,248
6. National Science Foundation
CAREER Award: Rapid and Robust Control of Flexible Structures
6/1996 – 11/2001, \$210,000 base award plus \$90,000 matching for successful collaborations with industry
5. Council on Research and Creative Work, University of Colorado
Grants-In-Aid: Distributed Multisensor Fusion Algorithms
12/1995 – 11/1996, \$5,000

4. GM Foundation
Operator-Assistive Devices for Vehicle Assembly
(PIs: A. H. Haddad and J. Edward Colgate; Co-PIs: M. Mavrovouniotis, L. Y. Pao, M. A. Peshkin, and M. Van Oyen)
2/1995 – 1/2000, \$500,000
3. Northwestern University Research Grant
Teleoperation Control of Multifingered Robotic Hands
7/1994 – 6/1995, \$5,000
2. AT&T Bell Laboratories
Computer and Robotic Equipment Loan (Utah/MIT Dextrous Hand and Sun Workstation)
6/1994 – current, estimated value of \$100,000
1. AT&T Foundation
Development of an Instructional Control Laboratory
11/1993 – 6/1995, \$60,000

Postdoctoral Research Associates and Students Supervised

Postdoctoral Research Associates

4. Dr. David Schlipf, 2015. Now a Postdoctoral Research Associate at the Universität Stuttgart.
3. Dr. Shalom D. Ruben, 2011 – 2012. Now an Instructor in the Mechanical Engineering Department at the University of Colorado Boulder.
2. Dr. Vishwesh Kulkarni, 2003 – 2006. Now an Assistant Professor at the University of Warwick, UK, 2014 – . Was a Research Professor at the University of Minnesota, 2011–2014. Was an Assistant Professor at the Indian Institute of Technology, Mumbai, India, 2006–2011.
1. Dr. Lidija Trailović, 2003 – 2004. Now at Northrop Grumman Corp., Denver, CO, 2004 – .

Ph.D. Students

Primary advisor for:

25. Michael Sinner, 2016 – , in progress.
24. Kaitlyn Garifi, 2016 – , in progress, (co-advised with Behrouz Touri). Recipient of an ECEE Department Graduate Teaching Award in April 2016.
23. D. Zalkind, 2014 – , in progress.
22. R. Arnold Braker, 2014 – , in progress. Recipient of an ECEE Department Graduate Research Award in April 2016.
21. Jacob P. Aho, 2011 – , in progress, expected to complete PhD degree requirements in 2017. Recipient of an ECEE Department Graduate Community Award in April 2016.
20. Fiona M. Dunne, 2009 – 2016, *Optimizing Blade Pitch Control of Wind Turbines with Preview Measurements of the Wind*. Now a Control Engineer at Siemens Wind Power, 2016 – . Recipient of an ECEE Department Graduate Research Award in April 2016.

19. Shervin Shajjee, 2010 – 2015, *Direct Optical Ice Sensing and Closed-Loop Controller Design for Active De-icing of Wind Turbines Using Distributed Heating*. Now at Western Digital Corporation, 2015 – .
18. Eric J. Simley, 2010 – 2015, *Wind Speed Preview Measurement and Estimation for Feedforward Control of Wind Turbines*. **Recipient of Fulbright Fellowship (2013-2014) and 3rd Place in the 2014 IEEE New Faces of Engineering Program**. Now a Wind Turbine Controls Research Engineer at Envision Energy, Houston, TX, and Menlo Park, CA, 2015 – .
17. Hua Zhong, 2004 – 2014, *Advanced Controller Designs for Head Positioning and Tension Regulation in Tape Drive Systems*. Now a Senior Servo Engineer at Oracle Corporation, Broomfield, CO, 2014 – .
16. Andrew D. Buckspan, 2011 – 2014, left program without completing PhD. Now a Project Engineer at CNJV, Golden, CO, 2014 – .
15. Jason H. Laks, 2008 – 2013, *Preview Scheduled Model Predictive Control for Horizontal Axis Wind Turbines*. Was a Postdoctoral Research Associate at the National Renewable Energy Laboratory, Golden, CO, 2013 – 2014. Now a Senior Servo Engineer at Western Digital Corporation, 2014 – .
14. Matthew J. Travers, 2007 – 2011, *Impulse Smoothing for Data Association*. Now a Postdoctoral Research Associate at Carnegie Mellon University, Pittsburgh, PA, 2011 – .
13. Jeffrey A. Butterworth, 2006 – 2011, *Combined Feedback and Adaptive Feedforward Control for Tracking Applications in Atomic Force Microscopes*. Now a Wind Turbine Controls Research Engineer at Envision Energy, Boulder, CO, 2016 – . Formerly a Control Systems Engineer at Frontier Wind LLC, Rocklin, CA, 2011 – 2016.
12. Brian P. Rigney, 2004 – 2009, *Adaptive Settle-Optimal Control of Servomechanisms*, (co-advised with Dale A. Lawrence). Now an Engineering Program Director at Western Digital Corporation, 2008 – .
11. Nicholas L. Bernstein, 2001 – 2007, *Force Sensor Modeling and Friction Compensation for Haptic Interfaces*, (co-advised with Dale A. Lawrence). Now a Senior Systems Analysis at Intuitive Surgical, Inc., San Francisco, CA, 2011 – . Formerly at Touch of Life Technologies, Inc., Aurora, CO, 2006 – 2011.
10. Richard M. Powers, 1999 – 2007, *Track-Loss Detection in the Absence of Truth Data for Target Tracking in Clutter*. Research Engineer at Vestas Wind Systems A/S, 2011 – 2012. Formerly Vice President of Research & Development at RavenBrick LLC, Denver, CO, 2005 – 2011.
9. Kathryn E. Johnson, 2002 – 2004, *Adaptive Torque Control of Variable Speed Wind Turbines*, (co-advised with Mark J. Balas). Now an Associate Professor in the Department of Electrical Engineering and Computer Science (EECS) at the Colorado School of Mines (CSM), Golden, CO, with a joint appointment at the National Renewable Energy Laboratory (NREL), 2012 – . Was the Clare Boothe Luce Assistant Professor in the Division of Engineering at CSM, 2005 – 2012. Formerly a Postdoctoral Research Associate at the National Renewable Energy Laboratory, Golden, CO, 2004 – 2005.
8. Chanat La-orpacharapan, 1999 – 2004, *Shaped Time-Optimal Closed-Loop Servomechanisms*. Now at Hitachi Global Storage Technologies, San Jose, CA, 2004 – . Formerly also with the Control Engineering Department, King Mongkut's Institute of Technology Ladkrabang, Thailand, 2004 – 2007.

7. Weerawat Khawsuk, 1998 – 2004, *Decorrelated State Estimation for Distributed Tracking in Cluttered Environments*. Now on the faculty at the Chulachomkiao Royal Military Academy, Thailand, 2004 – . **Recipient of the Electrical & Computer Engineering Outstanding Teaching Assistant Award for Academic Year 2001 – 2002.**
6. Matthew D. Baumgart, 2000 – 2003, *Control of Web-Winding Systems*. Now at Blue Canyon Technologies, Boulder, CO, 2014 – . Formerly at Ball Aerospace, Boulder, CO, 2003 – 2014.
5. Lidija Trailović, 1997 – 2002, *Ranking and Optimization of Target Tracking Algorithms*. Now at Northrop Grumman Corp., Denver, CO, 2004 – . Formerly a Lecturer in Applied Math and a Postdoctoral Research Associate in Electrical & Computer Engineering at the University of Colorado, Boulder, CO, 2003 – 2004.
4. Christopher D. Lee, 1998 – 2002, *Modeling Mechanism and Hand Impedances for Improved Control of Parallel Haptic Interfaces*, (co-advised with Dale A. Lawrence). Now at Algae Lab Systems, Boulder, CO as well as at Medical Simulation Corp., Denver, CO, 2002 – .
3. Craig F. Cutforth, 1999 – 2002, *Analysis and Design of Fast Input Shapers for the Control of Flexible Structures*. Now a Senior Servo Engineer at Seagate Technology, Longmont, CO, 2002– .
2. Michael K. Kalandros, 1998 – 2001, *Managing Multiple Sensor Resources using Covariance Control Techniques for Tracking Systems with Data Association*. Now a Senior Staff Member at the Johns Hopkins University Applied Physics Laboratory, Laurel, MD, 2001 – .
1. Mark A. Lau, 1997 – 2000, *Input Shaping and Time-Optimal Control of Flexible Structures*. Now an Associate Professor at Turabo University, Puerto Rico, 2008 – . Was an Assistant Professor at Turabo University, Puerto Rico, 2002 – 2008. Formerly a Visiting Assistant Professor at the University of West Florida, Pensacola, FL, 2001-2002.

Member of dissertation committee for:

27. Sachin Navalkar, 2016, Technical University of Delft (The Netherlands).
26. Róbert Ungurán, 2016 – , PhD exchange student from Oldenburg University (Germany), worked in my research laboratory during 2016.
25. Scott Rowe, 2015 – .
24. Andrew Hoke, 2012 – 2016.
23. Doug Weibel, 2014 – 2015.
22. David Schlipf, 2012 – 2015, PhD exchange student from Universität Stuttgart (Germany), worked in my research laboratory during 2014-2015. David received the **European Academy of Wind Energy's 2016 Excellent Young Wind Doctor Award**.
21. Joshua Traube, 2012 – 2013.
20. Ivo Houtzager, 2011, Technical University of Delft (The Netherlands).
19. M. Elizabeth Saade, 2010 – 2013.
18. Kira Barton, 2009 – 2010, Mechanical Engineering, Univ. of IL at Urbana-Champaign.
17. Mariko Shirazi, 2007 – 2009.
16. Jason Jonkman, 2005 – 2007.
15. Yang Zhang, 2004 – 2007.
14. Richard A. Santos, 2004 – 2006.
13. Alex L. Matras, 2004 – 2005.

12. Sitthipong Angkititrakul, 2003 – 2006.
11. Maureen Hand, 2002 – 2003.
10. Jack T. Chow, 1999 – 2003.
9. Matthew K. Tucker, 1995 – 1998.
8. Richard E. Hindman, 1995 – 1998.
7. Gabriel Gruener, 1995 – 1998.
6. Adam D. Bennett, 1995 – 1998.
5. Gary Kalmanovich, 1995, Northwestern University.
4. Mary Beth Hribar, 1994, Northwestern University.
3. Li Jing He, 1994, Northwestern University.
2. Asad Khan, 1994, Northwestern University.
1. Michael Brokowski, 1994, Northwestern University.

M.S. Thesis Students

Primary advisor for:

3. Roman Y. Novoselov, 1999 – 2002, *Haptic Rendering of Data on Irregular and Unstructured Grids*, (co-advised with Dale A. Lawrence). Now at Numerica Corporation, Fort Collins, CO, 2002 – . Formerly at CDM Optics, Boulder, CO, 2001 – 2002.
2. Nathan T. Baltz, 1997 – 1999, *Allocation of Sensing Resources in Distributed Multiprocessor Systems*. Now President of Photosense, Boulder, CO, 1999 – .
1. Christian W. Frei, 1994 – 1995, *A Comparison of Parallel and Sequential Implementations of a Multisensor Multitarget Tracking Algorithm*. Now a Partner and Head of Risk Management at Swiss Capital Alternative Investments AG, Zurich, Switzerland, 2004 – . Formerly Head of Quantitative Research at BT&T Asset Management, Urdorf, Switzerland, 2000 – 2004. Received Ph.D. in April 2000 from the Swiss Federal Institute of Technology (ETH), Zurich, Switzerland.

Member of thesis committee for:

7. Bart Doekemeijer, 2015 – 2016, MS exchange student from Delft University of Technology (Netherlands), working in my research laboratory during 2015 – 2016.
6. Floris Teeuwisse, 2012 – 2013, MS exchange student from Delft University of Technology (Netherlands), worked in my research laboratory during 2012 – 2013.
5. Andrew Scholbrock, 2011.
4. Sutha Aphanuphong, 2006-2008.
3. UnKyong Hand, 1999-2000.
2. J. Michael Brown, 1995, Northwestern University.
1. Beeling Chang, 1994, Northwestern University.

M.S. Project Students

Primary advisor for:

22. Anil Damle, 2010 – 2011, Project topic: “Impulse Optimization for Data Association in Impulsive Hybrid Systems.” **Recipient of the 2011 CU-Boulder College of Engineering and Applied Science Outstanding Graduate for Research Award.** Completed Ph.D. in the Institute for Computational & Mathematical Engineering at Stanford University, 2011 – 2016. Now a Post-Doctoral Fellow at the University of California at Berkeley, 2016 – .
21. Eric J. Simley, 2010, Project topic: “Lidar Modeling for Preview Control of Wind Turbines.”
20. Marian P. Chaffe, 2009 – 2011, Project topic: “High-Bandwidth Precision Control of Near Field Scanning Optical Microscopes.”
19. Fiona M. Dunne, 2009, Project topic: “Combined Feedforward/Feedback Control of Wind Turbines.”
18. Mathew A. Merkow, 2007, Project topic: “Pitch Control for Horizontal Axis Wind Turbines.”
17. Sutha Aphanuphong, 2004-2005, (co-advised with Dale A. Lawrence), Project topic: “Precision Control of Low-Cost Stepper Motors with Hysteresis Nonlinearities.”
16. Weibin Xu, 2003 – 2004, (co-advised with Dale A. Lawrence), Project topic: “Low-Cost Real-Time Control of Multi-Degree-of-Freedom Haptic Interfaces.”
15. Aleksandr M. Arustamyan, 2002 – 2003, (co-advised with Dale A. Lawrence), Project topic: “Synergistic Visual/Haptic Rendering Modes for Tensor Data.”
14. Yegor Plam, 2002 – 2003 (co-advised with Dale A. Lawrence), Project topic: “Performing Three-Dimensional Tasks Using a Combined Visual/Haptic/Audio Interface.”
13. Brian P. Reichenberger, 2001 – 2002 (co-advised with Dale A. Lawrence), Project topic: “Three-Dimensional Drawing Using a Combined Visual/Haptic/Audio Interface.”
12. Kathryn E. Johnson, 2000 – 2002, Project topic: “Comparison of Control Techniques for Wind Turbines.” Completed Ph.D. degree in July 2004 (see Ph.D. Students above).
11. Farid Infed, 1998 – 1999 (co-advised with Dale A. Lawrence), Project topic: “Combined Visual/Haptic Rendering Modes for Understanding Stress Data.”
10. Shane W. Brown, 1997 – 1999 (co-advised with Dale A. Lawrence), Project topic: “Combined Visual/Haptic Rendering Modes for Understanding Fluid Flow Data.”
9. Craig F. Cutforth, 1997 – 1999, Project topic: “A Comparison of Time-Domain and Frequency-Domain Input Shaping Control Methods for Flexible Structures.” Completed Ph.D. degree in May 2002 (see Ph.D. Students above).
8. Weerawat Khawsuk, 1997 – 1998, Project topic: “An Analysis of Distributed Multisensor Fusion Algorithms.” Completed Ph.D. degree in Feb. 2004 (see Ph.D. Students above).
7. Yiannis Pavlou, 1996 – 1998 (co-advised with Dale A. Lawrence), Project topic: “Perceptual Studies of Hardness and Friction in Haptic Interfaces.” Now an engineer at National Instruments, Austin, TX, 1998 – .
6. Neil A. Duchane, 1996 – 1998, Project topic: “Hybrid Force and Position Control of a Multi-fingered Robotic Hand.” Now at Raytheon in El Segundo, CA, 2002 – . Worked at Raytheon in Marlboro, MA, 2001 – 2002. Formerly an engineer at the Laboratory for Atmospheric and Space Physics (LASP) in Boulder, CO from 1998 – 2000.
5. Vimal Patel, 1996, Project topic: “Force Control of the Utah/MIT Robotic Hand.” Now a principal at Sierra Ventures, Menlo Park, CA.

4. Matthew Leoni, 1996, Project topic: "A Modified Approach for Multi-Input Command Shaping for Flexible Structures."
3. Michael K. Kalandros, 1995 – 1998, Project topic: "Control of Sensor Information in Centralized Multisensor Systems." Completed Ph.D. degree in May 2001 (see Ph.D. Students above).
2. Mark A. Salada, 1995 – 1997 (co-advised with Dale A. Lawrence), Project topic: "Haptic Exploration of Mammography Data." Now a Senior Engineer at BMT WBM, 2007 – . Formerly a postdoctoral researcher at Boston University, Boston, MA, 2004-2006. Ph.D. student at Northwestern University, Evanston, IL, 1999-2004.
1. Robert N. Itschner, 1994 – 1995, Project topic: "Development of a Control System for the Utah/MIT Dextrous Robotic Hand." Now a division leader at Asea Brown Boveri (ABB), Zurich, Switzerland.

B.S. Project Students

Primary Advisor for:

17. Michael Fromandi, 2016 – 2017, co-advised by PhD student R. Arnold Braker, Project topic: "Fast Set-Point Tracking of an Atomic Force Microscope."
16. Matthew Spydell, 2016, co-advised by PhD student R. Arnold Braker, Project topic: "Embedded Control of an Atomic Force Microscope."
15. Benjamin Spencer, 2016, co-advised by PhD student R. Arnold Braker, Project topic: "Tutorial Animation of Time-Optimal Control of a Harmonic Oscillator."
14. Cassandra Noice, 2015 – 2016, co-advised by PhD student R. Arnold Braker, Project topic: "Real-time Control of an Atomic Force Microscope."
13. Alec C. Martin, 2015, advised by PhD student R. Arnold Braker during Spring Break for Research program, Project topic: "Analog Circuit Emulators for Atomic Force Microscopy System."
12. Daniel B. Kopelove, 2006 – 2007, (co-advised with Dale A. Lawrence), Project topic: "Integration of a High-Performance, Low-Cost Haptic Interface."
11. Jeffrey Swetnam, 2004, Project topic: "Luenberger Observer Design and Simulation Studies for Automobile Advance Warning System Applications."
10. Andrew C. White, 2003 – 2004, (co-advised with Dale A. Lawrence), Project topic: "Actuator Design and Calibration for a New Six Degree-of-Freedom Haptic Interface."
9. Aleksandr M. Arustamyan, 2001 – 2002, (co-advised with Dale A. Lawrence), Project topic: "Synergistic Visual/Haptic Rendering Modes for Fluid Flow Data." Completed M.S. degree in May 2003 (see M.S. Students above).
8. Bryan A. Montross, 1999 – 2000 (co-advised with Dale A. Lawrence), Project topic: "Efficient Data Formats for Real-Time Interpolation of Finite Element Model Data on Irregular Grids."
7. Flor Shirzadian, 1998 – 1999 (co-advised with Dale A. Lawrence), Project topic: "Combined Visual/Haptic Rendering Modes for Understanding Gradients." Now an engineer at Hewlett Packard, 1999 – .
6. Roman Y. Novoselov, 1998 – 1999 (co-advised with Dale A. Lawrence), Project topic: "Interfacing Visualization Software to Enable Combined Visual/Haptic Rendering Modes for Understanding Multi-dimensional Data." Completed M.S. thesis in Aug. 2002 (see M.S. Thesis Students above).

5. Craig S. Lindqvist, 1996, Project topic: "Evaluations of a Modified Approach for Multi-Input Shaping for the Control of Flexible Structures." Now an engineer at Boeing, Seattle, WA, 1996- .
4. Darrell L. Barnhart, 1996, Project topic: "Real-Time Position Control of a Robotic Hand." Received Ph.D. from the University of Utah, Salt Lake City, UT in 2002.
3. Radu C. Frangopol, 1995 – 1996, Project topic: "A Comparison of Multi-Input Shaping with Traditional Single-Input Shaping for the Control of Flexible Structures." Now an engineer at Motorola, Ft. Lauderdale, FL, 1998 – . Completed M.S. in ECE at the University of Colorado Boulder in 1998.
2. Nathan V. Le, 1995, Project topic: "Multi-Input Command Shaping for Flexible Structures." Now an engineer at Motorola, Phoenix, AZ, 1995 – .
1. Kheong S. Chan, 1995, Project topic: "A Greedy Algorithm for Efficiently Evaluating the Time-Optimal Control Solutions of High-Order Systems." Received Ph.D. from the National University of Singapore in 2001.

Summary of Evaluations of Courses Taught

Spring 2016: ECEN 5458, Sampled-Data and Digital Control Systems, Instructor rating: 5.9/6.0, Course rating: 5.5/6.0

Fall 2015: ECEN 4138/5138, Control Systems Analysis, Instructor rating: 5.1/6, Course rating: 4.6/6

Spring 2015: ECEN 5458, Sampled-Data and Digital Control Systems, Instructor rating: 4.8/6, Course rating: 4.7/6

Fall 2014: ECEN 1500, Sustainable Energy, Instructor rating: 4.6/6, Course rating: 4.1/6. (These are above average ratings for this service course for Arts and Sciences.)

Spring 2014: ECEN 5458, Sampled-Data and Digital Control Systems, Instructor rating: 5.9/6, Course rating: 5.4/6

Fall 2013: ECEN 1500, Sustainable Energy, Instructor rating: 3.8/6, Course rating: 3.8/6. (These are average ratings for this service course for Arts and Sciences.)

Fall 2012: ECEN 5458, Sampled-Data and Digital Control Systems, Instructor rating: 5.3/6, Course rating: 5.2/6

Spring 2012: ECEN 5458, Sampled-Data and Digital Control Systems, Instructor rating: 5.7/6, Course rating: 5.7/6

Spring 2011: ECEN 5418, Automatic Control Systems, Instructor rating: 5.7/6, Course rating: 5.6/6

Spring 2010: ECEN 5458, Sampled-Data and Digital Control Systems, Instructor rating: 4.6/6, Course rating: 4.5/6

Fall 2007: ECEN 5458, Sampled-Data and Digital Control Systems, Instructor rating: A, Course rating: A

Spring 2007: ECEN 5418, Automatic Control Systems, Instructor rating: A+, Course rating: A

Fall 2006: ECEN 5458, Sampled-Data and Digital Control Systems, Instructor rating: A+, Course rating: A

Fall 2005: ECEN 5458, Sampled-Data and Digital Control Systems, Instructor rating: A, Course rating: A

Spring 2005: ECEN 3300, Linear Systems, Instructor rating: A, Course rating: A- (These are very high ratings for this junior-level core required course.)

Fall 2004: ECEN 5458, Sampled-Data and Digital Control Systems, Instructor rating: A+, Course rating: A+

Spring 2004: ECEN 5418, Automatic Control Systems, Instructor rating: A+, Course rating: A+

Fall 2003: ECEN 5448, Advanced Linear Systems, Instructor rating: A, Course rating: A+

Fall 2002: ECEN 3300, Linear Systems, Instructor rating: B-, Course rating: B- (These are average ratings for this junior-level core required course.)

Spring 2001: ECEN 4138, Control Systems Analysis, Instructor rating: A, Course rating: A

Fall 2000: ECEN 5458, Sampled-Data and Digital Control Systems, Instructor rating: A, Course rating: A

Fall 1999: ECEN 5448, Advanced Linear Systems, Instructor rating: A+, Course rating: A+

Fall 1998: ECEN 3300, Linear Systems, Instructor rating: A-, Course rating: B (These are high ratings for this junior-level core required course.)

Spring 1998: ECEN 5418, Automatic Control Systems, Instructor rating: A-, Course rating: A-

Fall 1997: ECEN 5458, Sampled-Data and Digital Control Systems, Instructor rating: A+, Course rating: A

Fall 1996: ECEN 4138, Control Systems Analysis, Instructor rating: A+, Course rating: A

Spring 1996: ECEN 4138, Control Systems Analysis, Instructor rating: A+, Course rating: A

Professional Society Involvement

IEEE Control Systems Society

- Nominating Committee, 2017
- Fellow Nominations Chair, 2016 –
- Distinguished Lecturer, 2008 – 2014
- Member on the Board of Governors, 2003 (Appointed), 2005 – 2007 (Elected), 2011 – 2013 (Elected), and 2015 (Appointed)
- Associate Editor on the Conference Editorial Board, 1995 – 1997

(Invited in 2002 to be an Associate Editor for the IEEE Control Systems Magazine; invited in 2003 and 2005 to be an Associate Editor for the IEEE Transactions on Automatic Control; invited in 2005 and 2007 to be an Associate Editor for the IEEE Transactions on Control Systems Technology; invited in 2004 and 2005 to be a Corresponding Editor for the IEEE Control Systems Magazine; invited in 2004 and 2007 to be on the IEEE Control Systems Society (CSS) Executive Committee as Vice President for Member Activities and in 2005 to be on the IEEE CSS Executive Committee as a member of the Long Range Planning Committee; invited in 2015 to be the IEEE CSS Vice President for Technical Activities; declined these invitations due to numerous other commitments.)

Organizing Committees

- IFAC Symposium on Mechatronic Systems, Los Angeles, CA, 2022
- American Control Conference, General Chair, Washington, DC, 2013
- American Control Conference, Program Chair, Boston, MA, 2004

- American Control Conference, Vice Chair for Invited Sessions, Denver, CO, 2003
- International Symposium on Motion and Vibration Control, Las Vegas, NV, 1999
- Pioneering International Symposium on Motion and Vibration Control in Mechatronics, Tokyo, Japan, 1999

American Automatic Control Council (AACC)

- IFAC2023 Steering Committee, 2014 – 2016
- IFAC2020 Steering Committee, 2011 – 2013
- Editor of the AACC Newsletter, 1995 – 2001

Associate Editorships

- International Journal of Control, Automation, and Systems, 2003 – 2010

International Program Committees

- WindTech 2017, Boulder, Colorado, October 2017
- IFAC World Congress, Toulouse, France, July 2017
- IFAC Symposium on Mechatronic Systems, Loughborough, UK, September 2016
- Indian Control Conference, January 2016
- International Conference on Information Fusion, July 2006
- IFAC Symposium on Mechatronic Systems, Berkeley, CA, December 2002
- IEEE Conference on Decision and Control, Sydney, Australia, 2000
- Japan/USA/Vietnam Workshop on Research and Education in Systems, Computation, and Control Engineering, Ho Chi Minh City, Vietnam, June 2000

Program Committees

- American Control Conference, Boston, MA, 2004
- American Control Conference, Denver, CO, 2003
- American Control Conference, Arlington, VA, 2001
- American Control Conference, Chicago, IL, 2000
- American Control Conference, Albuquerque, NM, 1997
- American Control Conference, Seattle, WA, 1995

International Federation of Automatic Control Committees

- Member of the International Federation on Automatic Control (IFAC) Committee on the Past, Present, and Future of Control Education, 2003 – 2005
- Member of the IFAC Young Author Prize Committee, 2006 – 2008
- Chair of the IFAC Young Author Prize Committee, 2008 – 2011
- Member, IFAC Fellow Selection Committee, 2014 – 2017

Technical Committees:

- Primary member of the ASME Dynamic Systems and Control Division (DSCD) Mechatronics Technical Committee, 2005 – .
- IFAC Technical Committee on Mechatronics, 2006 – .

Publication Reviews: Regularly review papers for:

Journals:

- AIAA Journal of Guidance, Control, and Dynamics
- AMS Mathematics of Computation
- ASME Journal of Dynamic Systems, Measurement, and Control
- ASME Press Series on Advances in Information Storage Systems
- Asian Journal of Control
- Automatica
- Control Engineering Practice
- IEE Proceedings – Control Theory and Applications
- IEEE Control Systems Magazine
- IEEE/ASME Transactions on Mechatronics
- IEEE Transactions on Aerospace and Electronic Systems
- IEEE Transactions on Automatic Control
- IEEE Transactions on Automation Science and Engineering
- IEEE Transactions on Control of Network Systems
- IEEE Transactions on Control Systems Technology
- IEEE Transactions on Education
- IEEE Transactions on Energy Conversion
- IEEE Transactions on Magnetics
- IEEE Transactions on Nanotechnology
- IEEE Transactions on Robotics/ IEEE Transactions on Robotics and Automation
- IEEE Transactions on Systems, Man, and Cybernetics
- International Journal of Robotics Research
- Journal of Control Theory and Advanced Technology
- Journal of Optimal Control Applications & Methods
- Journal of Renewable and Sustainable Energy
- Journal of Sound and Vibration
- Journal of Vibration and Control
- Meteorologische Zeitschrift
- Remote Sensing
- Systems and Control Letters
- Wind Energy

Conferences:

- American Control Conference
- AIAA Guidance, Navigation, and Control Conference
- AIAA Aerospace Sciences Meeting
- AIAA/ASME Wind Energy Symposium
- ASME Dynamic Systems and Control Conference
- ASME International Mechanical Engineering Congress and Exposition
- European Control Conference
- IEEE Conference on Decision and Control
- IEEE Conference on Control Applications
- IEEE International Conference on Robotics and Automation
- IEEE Multi-Conference on Systems and Control
- IEEE Virtual Reality Conference
- International Conference on Information Fusion
- IFAC Conference on Mechatronic Systems
- IFAC World Congress
- The Science of Making Torque from Wind

Book Review:

- Feedback Control of Dynamic Systems, 4th edition, by G. F. Franklin, J. D. Powell, and A. Emami-Naeini, published by Prentice-Hall in 2002.

Funding Agency Reviews:

- NSF Panel Reviews in March 1994, April 1995, July 1996, December 1997, May 2000, April 2002, April 2003, May 2005, August 2006, June 2008, November 2009, and May 2011
- NSF Dynamic Systems and Control Workshop, 9/95
- NSF, ARO, AFOSR, and ONR Mail Reviews

Panels:

- Invited panelist, "Writing a Winning NSF CAREER Proposal," American Control Conference, May 2002.
- Invited panelist, "Women as Leaders: The Challenges, the Opportunities, and the Rewards," IEEE Conference on Decision and Control, Dec. 2003.
- Invited participant in study on "Making the Implicit Explicit: An Approach for Assessing the Outcomes of Doctoral Education," funded by the Alfred P. Sloan Foundation, Jan. 2004.
- Invited panelist, "Math, Science, and Technology in Control Education," an evening round table panel session on Control Education, American Control Conference, June 2006.

(Invited panelist, "After Graduation: Women in Control around the Globe Take Leadership Roles," special session at the IEEE Conference on Decision and Control, December 2015. Unfortunately had to decline to participate due to travel conflict.)

Society Memberships:

- IEEE (Student Member, 1987 – 1991, Member, 1991 – 1998; Senior Member, 1998 – 2011; Fellow, 2012 –)
- AIAA (1993 – 2010, Lifetime Member 2010 –)
- Tau Beta Pi
- Phi Beta Kappa

Consulting Activities:

- Institute for Defense Analysis
US Defense Science Study Group
1/2010 – 12/2011
- Signal Processing, Inc.
Sensor Management Technologies
3/2009 – 9/2009
- CACI, Inc., Defense Advanced Research Projects Agency (DARPA)
Sensor Resource Allocation and Sensor Fusion Techniques for Homeland Defense
9/2001 – 12/2001
- John A. Levin & Co., Inc.
Command Shaping Technologies
8/2000
- Integral Peripherals, Inc.
Input Shaping Control of Disk-Drive Servomechanisms
11/1995 – 5/1997
- Prentice Hall, Inc.
Simulation Laboratory Development
11/1995 – 1/1996

Outreach Activities:

- Math Olympiads coach at Bear Creek Elementary School, Boulder, CO, 2005 – 2009.
- Volunteer Alumni Interviewer for Prospective Freshmen at Stanford University, 2009 – 2012.
- Host family for high school exchange student from Alajuela, Costa Rica, 2012 – 2013.

Languages:

- Chinese (fluent)
- Russian (good)
- French (fair)
- German (beginner)