

## SANTOSH DEVASIA

Mechanical Eng. Dept., Box 352600

U of Washington (UW), Seattle, WA 98195-2600

Web: [www.me.washington.edu/faculty/devasia.html](http://www.me.washington.edu/faculty/devasia.html)

(206) 685 3401 (Work)

(206) 685 8047 (Fax)

Email: [devasia@uw.edu](mailto:devasia@uw.edu)

## EDUCATIONAL HISTORY

- Doctor of Philosophy (December 1993)  
Mechanical Engineering, University of California, Santa Barbara (UCSB)  
Thesis Title: Design, Dynamics and Control of Articulated Flexible Structures  
Major: Dynamic Systems, Controls and Robotics  
Minors: (1) Solid Mechanics and Structures (2) Mathematics
- Master of Science (December 1990)  
Mechanical Engineering, University of California, Santa Barbara
- Bachelor of Technology (June 1988)  
Mechanical Engineering, Indian Institute of Technology, Kharagpur, India

## EMPLOYMENT

- Director, Boeing Advanced Research Center, BARC, UW, (2018-2022)
- Founding Director, Advanced Composite Center, ACC, UW, (2019-2022)
- Associate-Director, Boeing Advanced Research Center, BARC, UW, (2014-17)
- Associate Dean College of Engineering (COE), UW:  
for Research and Faculty Affairs, (2014-17); for Research and Graduate Studies (2013-14).
- Associate Chair for Research and Infrastructure, UW Mech. Eng. Dept., (2010-2013)
- Professor, Mech. Eng. Dept., UW (2005 onwards)
- Associate Professor, Mech. Eng. Dept., UW (2000-2005)
- Associate Professor, Mech. Eng. Dept., U of Utah (2000)
- Assistant Professor, Mech. Eng. Dept., U of Utah (1994 - 2000)
- Post-Graduate Researcher, Mech. Eng. Dept., UCSB (Dec. 1993-July 1994)
- Research and Teaching Assistant, Mech. Eng. Dept., UCSB (Sept. 1988-Dec. 1993)

## AWARDS AND HONORS

- Minoru Taya Endowed Chair 2021-24 (Nabtesco Endowed Chair: 2019-21)
- UCSB 2020 Distinguished Alumnus Award, Mech. Eng. Dept.
- Fellow, Institute of Electrical and Electronics Engineers (IEEE), 2019
- Fellow, American Society of Mechanical Engineers (ASME), 2012
- Faculty of the Year Award, Mechanical Engineering, UW, 2009
- UW, College of Engineering's List of Highly Rated Courses (based on course evaluations):  
Sp'06, Aut'06, Aut'08, Sp'09, Sp'10, Aut'10, Win'11, Win'12, Sp'12, Win'13
- U. of Utah's Early Career Teaching Award (for excellence in teaching), 1999-2000
- Professor of the Year Award, from Mechanical Engineering Students, U of Utah, 97-98
- Dean's List of Top Instructors in the College of Engineering, U. of Utah (Six times)  
Autumn '96, Winter '97, Winter '98, Spring '98, Spring '99, and Spring '00
- Conference on Decision and Control (CDC) Best Student Paper Finalist Award (1994)
- Delco Electronics Corporation's Best Graduate Dissertation Award (1993)
- UCSB School of Engineering Dean's Fellowship (1993-94)

- Dean's Award for outstanding teaching assistant in Mech. Eng. Dept., UCSB (1992)
- University of California Special Regent's Fellowship (1988-92)
- National Merit Scholarship for undergraduate study, India (1984-88)

## AFFILIATIONS

- Adjunct Professor, Aeronautics & Astronautics, U. of Washington (2005 onwards)
- Adjunct Asso. Professor, Aeronautics & Astronautics, U. of Washington (2001-2005)
- Faculty, Center for Nanotechnology at the U. of Washington (2004 Onwards)

## VISITING APPOINTMENTS

- Visiting Professor, Mechanical Engineering Department, National Taiwan University of Science and Technology (NTUST), Taipei, Taiwan, December 2011.
- Visiting Professor, Mechanical Engineering Department, National Cheng Kung University (NCKU), Tainan, Taiwan, Jan-Mar 2008.
- Visiting Academic, ARC Center for Complex Dynamic Systems and Control, Faculty of Engineering and Built Environment, U. of Newcastle, Australia, Oct-Nov 2007.
- Research Associate, NASA Ames Research Center June-July 1997 and June-July 1998.

# PUBLICATIONS

## JOURNAL PUBLICATIONS

- 1 S. Devasia, T. Meressi, B. Paden and E. Bayo "Piezo-electric Actuator Design for Vibration Suppression: Placement and Sizing," *AIAA Journal of Guidance, Control and Dynamics*, Vol. 16 (5), pp. 859-864, 1993.
- 2 S. Devasia and E. Bayo "Inverse Dynamics of Articulated Flexible Structures: Simultaneous Trajectory Tracking and Vibration Reduction," *Journal of Dynamics and Control*, Vol. 4, pp. 299-309, 1994.
- 3 R. Ledesma, S. Devasia and E. Bayo "Inverse Dynamics of Spatial Open-Chain Flexible Manipulators with Lumped and Distributed Actuators," *Journal of Robotics Systems*, Vol. 11 (4), pp. 327-338, 1994.
- 4 S. Devasia and E. Bayo "Redundant Actuators to Achieve Minimal Vibration Tracking of Flexible Multibodies: Theory and Application," *Journal of Nonlinear Dynamics*, Vol. 6, pp. 419-431, 1994.
- 5 Ph. Martin, S. Devasia and B. Paden "A different look at output tracking: Control of a VTOL Aircraft," *Automatica*, Vol. 32 (1), pp. 101-107, January 1996.
- 6 S. Devasia, D. Chen and B. Paden "Nonlinear Inversion-Based Output Tracking," *IEEE Transactions on Automatic Control*, Vol. 41 (7), pp. 930-942, July 1996.
- 7 S. Devasia "Optimal Output-Trajectory Redesign for Invertible Systems," *AIAA J. of Guidance, Control, and Dynamics*, Vol. 19 (5), pp. 1189-1191, Sept.-Oct. 1996.
- 8 S. Devasia "Output Tracking with Non-Hyperbolic and Near Non-Hyperbolic Internal Dynamics: Helicopter Hover Control," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 20 (3), pp. 573-580, May-June 1997.
- 9 S. Devasia, B. Paden and C. Rossi "Exact-Output Tracking Theory for Systems with Parameter Jumps," *International Journal of Control*, Vol. 67 (1), pp. 117-131, May 1997.
- 10 S. Devasia and B. Paden "Stable Inversion for Nonlinear Nonminimum-Phase Time-Varying Systems," *IEEE Trans. on Automatic Control*, Vol. 43 (2), pp. 283-288, Feb. 1998.

- 11 E.A. Bailey, A.W. Dutton, M. Mattingly, S. Devasia and R.B. Roemer "A Comparison of Reduced-Order Modeling Techniques for Application in Hyperthermia Control and Estimation," *International Journal of Hyperthermia*, Vol. 12 (2), pp. 135-156, 1998.
- 12 M. Mattingly, R. B. Roemer and S. Devasia "Optimal Actuator Placement for Large Scale Systems: A Reduced-Order Modeling Approach," *International Journal of Hyperthermia*, Vol. 14 (4), pp. 331-345, July-August 1998.
- 13 D. Croft, D. Mcallister and S. Devasia "High-Speed Scanning of Piezo-Probes for Nanofabrication," *ASME Journal of Manufacturing Science and Engineering*, Vol. 120 (3), pp. 617-622, August 1998.
- 14 M. Mattingly, E. A. Bailey, A. W. Dutton, R. B. Roemer and S. Devasia "Reduced-Order Modeling for Hyperthermia: An Extended Balanced-Realization-Based Approach," *IEEE Transactions on Biomedical Eng.*, Vol. 45 (9), pp. 1154-1162, September 1998.
- 15 S. Devasia and G. Meyer "Recovery Guidance Satisfying Input and State Constraints: Rate Saturating Actuator Example," *AIAA J. of Guidance, Control, and Dynamics*, Vol. 21 (5), pp. 733-741, September-October 1998.
- 16 D. Croft and S. Devasia "Hysteresis and Vibration Compensation for Piezo Actuators", *AIAA J. of Guidance, Control, and Dynamics*, Vol. 21 (5), pp. 710-717, Sept.-Oct. 1998.
- 17 J.S. Dewey, K. K. Leang and S. Devasia "Experimental and Theoretical Results in Output-Trajectory Redesign for Flexible Structures," *ASME Journal of Dynamic Systems, Measurement, and Control*, Vol. 120 (4), pp. 456-461, December 1998.
- 18 D. Croft, S. Stilson and S. Devasia "Optimal Tracking of Piezo-based Nano Positioners," *Nanotechnology*, Vol. 10, pp. 201-208, June 1999.
- 19 S. Devasia "Approximated Stable Inversion for Nonlinear Systems with Nonhyperbolic Internal Dynamics," *IEEE Trans. on Automatic Control*, Vol. 44 (7), pp. 1419-1425, July 1999.
- 20 Q. Zou and S. Devasia "Preview-based Stable-Inversion for Output Tracking," *ASME J. of Dynamic Systems, Measurement and Control*, Vol. 121 (4), pp. 625-630, December 1999.
- 21 D. Croft and S. Devasia "Vibration Compensation for High Speed Scanning Tunneling Microscopy," *Review of Scientific Instruments* published by the American Institute of Physics, Vol. 70 (12), pp. 4600-4605, December 1999.
- 22 R. Brinkerhoff and S. Devasia "Output Tracking for Actuator Deficient/Redundant Systems: Multiple Piezoactuator Example," *AIAA J. of Guidance, Control, and Dynamics*, Vol. 23 (2), pp. 370-373, March-April 2000.
- 23 M. Mattingly, R. Roemer and S. Devasia "Exact Temperature Tracking for Hyperthermia: A Model-Based Approach," *IEEE Transactions on Control Systems Technology*, Vol. 8(6), pp. 979-992, November 2000.
- 24 D. Croft, G. Shedd and S. Devasia "Creep, Hysteresis, and Vibration Compensation for Piezoactuators: Atomic Force Microscopy Application," *ASME Journal of Dynamic Systems, Measurement and Control*, Vol. 123 (35), pp. 35-43, March 2001.
- 25 S. Stilson, A. McClellan and S. Devasia "High-Speed Solution Switching using Piezo-based Micro-Positioning Stages," *IEEE Trans. on Biomedical Engineering*, Vol. 48(7), pp. 806-814, July 2001.
- 26 H. Perez, B. Ogunnaike and S. Devasia "Output Tracking between Operating Points for Nonlinear Processes: Van de Vusse Example," *IEEE Transactions on Control Systems Technology*, Vol. 10(4), pp. 611-617, July 2002.
- 27 S. Devasia "Should Model-based Inverse Inputs be used as Feedforward under Plant Uncertainty?" *IEEE Trans. on Automatic Control*, Vol. 47(11), pp. 1865-1871, Nov 2002.
- 28 S. Meek, S. Field and S. Devasia "Mechatronics Education in the Department of Mechanical Engineering at the University of Utah," *Mechatronics*, Vol. 13(1), pp. 1-11, February 2003.

- 29 H. Perez and S. Devasia "Optimal Output Transitions for Linear Systems," *Automatica*, Vol. 39(2), pp. 181-192, February 2003.
- 30 H. Perez, Q. Zou and S. Devasia "Design and Control of Optimal Scan-Trajectories: Scanning Tunneling Microscope Example," *ASME Journal of Dynamics Systems Measurement and Control*, Vol. 126(1), pp. 187-197, March 2004.
- 31 Q. Zou and S. Devasia "Preview-based Optimal Inversion for Output Tracking: Application to Scanning Tunneling Microscopy," *IEEE Transactions on Control Systems Technology*, Vol. 12(3), pp. 375-386, May 2004.
- 32 D. Iamratanakul, H. Perez and S. Devasia "Minimum-Energy Output-Transitions for Linear Discrete-Time Systems: Flexible Structure Applications," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 27(4), pp. 572-585, July-August 2004.
- 33 Q. Zou, K. K. Leang, E. Sadoun, M. J. Reed and S. Devasia "Control Issues in High-Speed AFM for Biological Applications: Collagen Imaging Example," Special Issue on Advances in Nano-technology Control, *Asian Journal of Control*, Vol. 6(2), pp. 164-178, June 2004.
- 34 Q. Zou, C. Vander Giessen, J. Garbini and S. Devasia "Precision Tracking of Driving Waveforms for Inertial Reaction Devices," *Review of Scientific Instruments* published by the American Institute of Physics, Vol. 76(2), Article No. 023701 (Pages 1-9), Jan. 25, 2005.
- 35 G. Clayton and S. Devasia "Image-Based Control of Dynamic Effects in Scanning Tunneling Microscopes" *Nanotechnology*, Vol. 16(6), pp. 809-818, June 2005.
- 36 S. Tien, Q. Zou and S. Devasia "Iterative Control of Dynamics-Coupling-Caused Errors in Piezoscanners during High-Speed AFM Operation" *IEEE Transactions on Control Systems Technology*, Vol. 13 (6), pp. 921-931, November 2005.
- 37 K. K. Leang and S. Devasia "Design of Hysteresis-Compensating Iterative Learning Control: Application to Atomic Force Microscopes" *Mechatronics*, Vol. 16 (3-4), pp. 141-158, Apr.-May, 2006.
- 38 Q. Zou and S. Devasia "Precision Preview-based Stable-Inversion for Nonlinear Nonminimum-Phase Systems: The VTOL Example," *Automatica*, Vol. 43 (1), pp. 117-127, January, 2007.
- 39 G. M. Clayton and S. Devasia "Iterative image-based modeling and control for higher scanning probe microscope performance," *Review of Scientific Instruments*, published by the American Institute of Physics, Vol. 78 (8), Article No. 083704 (pp. 1-12), August, 2007.
- 40 S. Devasia, E. Eleftheriou and S. O. R. Moheimani "A Survey of Control Issues in Nanopositioning," *IEEE Transactions on Control Systems Technology*, Vol. 15 (5), pp. 802-823, September 2007, Special Issue on Dynamics and Control of Micro- and Nanoscale Systems.
- 41 K. K. Leang and S. Devasia "Feedback-Linearized Inverse Feedforward for Creep, Hysteresis, and Vibration Compensation in AFM Piezoactuators," *IEEE Transactions on Control Systems Technology*, Vol. 15 (5), pp. 927-935, September 2007, Special Issue on "Dynamics and Control of Micro- and Nanoscale Systems".
- 42 S. Devasia "Design of Feedforward Input for Output-Settling Control with Dual-Stage Actuators," *IEEE/ASME Transactions on Mechatronics*, Vol. 12 (6), pp. 670-679, December 2007.
- 43 S. S. Aphale, S. Devasia and S. O. R. Moheimani "High-bandwidth Control of a Piezoelectric Nanopositioning Stage in the Presence of Plant Uncertainties," *Nanotechnology*, Vol. 19 (12), Article number 125503, pp. 1-9, March 2008.
- 44 G. M. Clayton, S. Tien, A. J. Fleming, S. O. R. Moheimani and S. Devasia "Inverse-Feedforward of Charge-Controlled Piezopositioners," *Mechatronics*, Vol. 18 (5-6), pp. 273-281, June 2008.

- 45 D. Iamratanakul, B. Jordan, K. K. Leang and S. Devasia "Optimal Output Transitions for Dual-Stage Systems," *IEEE Transactions on Control Systems Technology*, Vol. 16 (5), pp. 869-881, September 2008.
- 46 Kam Leang, Qingze Zou, and Santosh Devasia "Feedforward Control of Piezoactuators in Atomic Force Microscope Systems," *IEEE Control Systems Magazine*, Vol. 29 (1), pp. 70-82, Feb. 2009.
- 47 D. Iamratanakul and S. Devasia "Minimum-Time/Energy, Output Transitions for Dual-Stage Systems," *ASME Journal of Dynamic Systems, Measurement and Control*, Vol. 131 (2), pp. 1-8, March 2009, Article number 024503.
- 48 S. Tien and S. Devasia "Rapid AFM Imaging of Large Soft Samples in Liquid with Small Forces," *Asian Journal of Control*, Special Issue on Advanced Control Methods for Scanning Probe Microscopy, Vol. 11 (2), pp. 154-165, March, 2009.
- 49 K. Oh, J.-H. Chung, S. Devasia, and J. Riley "Bio-mimetic silicone cilia for microfluidic manipulation," *Lab on a Chip* by The Royal Society of Chemistry, Vol. 9 (11), pp. 1561-1566, 2009.
- 50 S. Devasia "Nonlinear Models for Relativity Effects in Electromagnetism," *Zeitschrift fur Naturforschung A*, Vol. 64a (5-6), pp. 327-340, May-June, 2009.
- 51 G. M. Clayton and S. Devasia "Conditions for image-based identification of SPM-nanopositioner dynamics," *IEEE/ASME Transactions on Mechatronics*, Vol. 14 (4), pp. 405-413, August, 2009.
- 52 G. M. Clayton, S. Tien, K. K. Leang, Q. Zou and S. Devasia "A Review of Feedforward Control Approaches in Nanopositioning for High Speed SPM," *ASME Journal of Dynamic Systems, Measurement and Control*, Special Issue on Dynamic Modeling, Control and Manipulation at the Nanoscale, Vol. 131 (6), Article number 061001, pp. 1-19, Nov. 2009.
- 53 J. Kongthon, B. McKay, D. Iamratanakul, K. Oh, J.-H. Chung, J. J. Riley and S. Devasia. "Added-mass effect in modeling of cilia-based devices for microfluidic systems," *Journal of Vibration and Acoustics – Transaction of the ASME*, Vol. 132 (2), Article number 024501, pp. 1-7, April 2010.
- 54 K. Oh, B. P. Smith, S. Devasia, J. J. Riley and J.-H. Chung "Characterization of Mixing Performance for Bio-mimetic Cilia," *Microfluidics and Nanofluidics*, Vol. 9 (4-5), pp. 645–655, October 2010.
- 55 S. Devasia "Lorentz Violation in High-Energy Ions," *The European Physical Journal C*, Vol. 69 (3-4), pp. 343-346, October 2010.
- 56 S. Devasia, D. Iamratanakul, G. Chatterji, and G. Meyer "Decoupled Conflict-Resolution Procedures for Decentralized Air Traffic Control," *IEEE Transactions on Intelligent Transportation Systems*, Vol. 12 (2), pp. 422-437, June 2011.
- 57 S. Devasia "Nonlinear Minimum-Time Control With Pre- and Post-Actuation," *Automatica*, Vol. 47 (7), pp. 1379-1387, July 2011.
- 58 J. Kongthon, J.-H. Chung, J. J. Riley and S. Devasia. "Dynamics of cilia-based microfluidic devices," *ASME Journal of Dynamic Systems Measurement and Control*, Vol. 133 (5), Article number 051012, pp. 1-11, Sept. 2011.
- 59 S. Devasia "Time-Optimal Control with Pre/Post Actuation for Dual-Stage Systems," *IEEE Transactions on Control Systems Technology*, Vol. 20 (2), pp. 323-334, March 2012.
- 60 S. Devasia and J. Borgford-Parnell "Integrating Nanopositioner Design Issues into an Existing Automatic Controls Course through Homework," *International Journal of Engineering Education*, Vol. 28 (5), pp. 995-1005, 2012, Special Issue on "Current Trends in Nanotechnology Education."

- 61 J. Kongthon and S. Devasia “Iterative Control of Piezoactuator for Evaluating Biomimetic, Cilia-Based Micromixing,” *IEEE/ASME Transactions on Mechatronics*, Vol. 18 (3), pp. 944-953, June 2013.
- 62 J. Yoo and S. Devasia “Provably Safe Conflict Resolution with Bounded Turn Rate for Air Traffic Control,” *IEEE Transactions on Control Systems Technology*, Vol. 21 (6), pp. 2280-2289, November 2013.
- 63 J. Yoo and S. Devasia “On-demand Conflict Resolution Procedures for Air Traffic Intersections,” *IEEE Transactions on Intelligent Transportation Systems*, Vol. 15 (4), pp. 1538-1549, August 2014.
- 64 S. Devasia “Ritz-type Variable Speed of Light (VSL) Cosmology,” *Physics Essays*, Vol. 27 (4), pp. 523-536, December 2014.
- 65 J. Realmuto, G. Klute, and S. Devasia “Nonlinear Passive Cam-based Springs for Powered Ankle Prostheses,” *ASME Journal of Medical Devices*, Vol. 9 (1), pp. 011007 1-10, March 2015.
- 66 S. Wilcox and S. Devasia “Stability of Velocity Control for a Piezoelectric Stepper,” *IEEE/ASME Transactions on Mechatronics*, Vol.20 (2), pp. 910-923, April 2015.
- 67 M. Ashrafi, S. Devasia, and M. E. Tuttle “Resistive Embedded Heating for Homogeneous Curing of Adhesively Bonded Joints,” *International Journal of Adhesion and Adhesives*, Vol. 57, pp. 34-39, 2015.
- 68 A. Boekfah and S. Devasia “Feedforward-based Output-Boundary Regulation for Nonminimum-Phase Systems,” *IEEE Transactions on Control Systems Technology*, Vol.24 (1), pp. 265-275, January 2016.
- 69 B. P. Smith, M. Ashrafi, M. E. Tuttle, and S. Devasia “Bondline Temperature Control for Joining Composites with an Embedded Heater,” *ASME Journal of Manufacturing Science and Engineering*, Vol.138 (2), Article number 021011, pp. 1-9, February 2016.
- 70 S. Devasia “Iterative Learning Control with Time-Partitioned Update for Collaborative Output Tracking,” *Automatica*, Vol. 69, pp. 258-264, July 2016.
- 71 S. Devasia, and A. Lee “Scalable Low-Cost-Unmanned-Aerial-Vehicle Traffic Network,” *AIAA Journal of Air Transportation*, Vol. 24 (3), pp. 74-83, July 2016.
- 72 R. Warrior, and S. Devasia “Iterative Learning from Novice Human Demonstrations for Output Tracking,” *IEEE Transactions on Human-Machine Systems*, Vol. 46 (4), pp. 510-521, August 2016.
- 73 S. Devasia “Iterative Control for Networked *Heterogeneous* Multi-Agent-Systems with Uncertainties,” *IEEE Transactions on Automatic Control*, Vol. 62 (1), pp. 431-437, Jan. 2017.
- 74 N. Banka, Y.-L. Ng, and S. Devasia “Individually Controllable Magnetic Cilia: Mixing Application,” *ASME Journal of Medical Devices*, Vol. 11(3), pp. 031003-031003-10, Sept. 2017.
- 75 M. Ashrafi, B. P. Smith, S. Devasia, and M. E. Tuttle “Embedded Resistive Heating in Composite Scarf Repairs,” *Journal of Composite Materials*, Vol. 51 (18), pp. 2575-2583, Aug. 2017.
- 76 R. Warrior, and S. Devasia “Inferring Intent for Novice Human-in-the-loop Iterative Learning Control,” *IEEE Transactions on Control Systems Technology*, Vol.25 (5), pp. 1698-1710, Sept. 2017.
- 77 N. Banka and S. Devasia “Nonlinear models for magnet placement in individually-actuated magnetic cilia devices,” *ASME Journal of Dynamic Systems Measurement and Control*, Accepted for publication, Sept 2017.  
<http://dynamicsystems.asmedigitalcollection.asme.org/article.aspx?articleid=2664707>

- 78 B. P. Smith, M. Ashrafi, M. E. Tuttle, and S. Devasia "Boundary Control of Embedded Heaters for Uniform Bondline Temperature during Composite Joining," *ASME Journal of Manufacturing Science and Engineering*, Vol. 140, Article number 091013, pp. 1-9, Sept. 2018.
- 79 J. Realmuto, R. Warriar, and S. Devasia "Data-Inferred Personalized Human-Robot Models for Collaborative Output Tracking," *Journal of Intelligent and Robotic Systems*, Vol. 91(2), pp. 137-153, August 2018, <https://doi.org/10.1007/s10846-017-0653-z>.
- 80 N. Banka and S. Devasia "Application of Iterative Machine Learning for Output Tracking with Soft Magnetic Actuators," *ASME/IEEE Transactions on Mechatronics*, Vol. 23(5), pp. 2186-2195, October 2018, <https://doi.org/10.1109/TMECH.2018.2855217>.
- 81 S. Devasia "Iterative Machine Learning for Output Tracking," *IEEE Transactions on Control Systems Technology*, Vol. 27 (2), pp. 516-526, March 2019, <https://ieeexplore.ieee.org/document/8167302>.
- 82 S. Devasia "Rapid Information Transfer in Swarms under Update-Rate-Bounds using Delayed Self Reinforcement," *ASME Journal of Dynamic Systems Measurement and Control*, Vol. 141(8), pp. 081009-081009-9, August, 2019. <http://dynamicsystems.asmedigitalcollection.asme.org/article.aspx?articleid=2726802>
- 83 B. Parsa, E. Samani, R. Hendrix, C. Devine, S. M. Singh, S. Devasia, and A. G. Banerjee "Toward Ergonomic Risk Prediction via Segmentation of Indoor Object Manipulation Actions Using Spatiotemporal Convolutional Networks," *IEEE Robotics and Automation Letters*, Vol. 4(4), pp. 3153-3160, October 2019, (& CASE 2019) <https://ieeexplore.ieee.org/document/8746140>
- 84 V. Tereshchuk, J. Stewart, N. Bykov, S. Pedigo, S. Devasia, and A. Banerjee "An Efficient Scheduling Algorithm for Multi-Robot Task Allocation in Assembling Aircraft Structures," *IEEE Robotics and Automation Letters*, Vol. 4(4), pp. 3844-3851, October 2019, (& IROS 2019) <https://ieeexplore.ieee.org/document/8767956>
- 85 S. Devasia. "Cohesive Networks using Delayed Self-Reinforcement," *Automatica*, Vol. 112, Page 108699, February 2020. <https://doi.org/10.1016/j.automatica.2019.108699>
- 86 P. Owan, J. Garbini, and S. Devasia. "Faster Confined Space Manufacturing Teleoperation through Dynamic Autonomy with Task Dynamics Imitation Learning," *IEEE Robotics and Automation Letters*, Vol. 5(2), pp. 2357-2364, April 2020, (& ICRA 2020) <https://doi.org/10.1109/LRA.2020.2970653>.
- 87 R. G. Landers, K. Barton, S. Devasia, T. Kurfess, P. R. Pagilla, and M. Tomizuka. "A Review of Manufacturing Process Controls," Accepted to *ASME Journal of Manufacturing Science and Engineering*, Vol. 142(11) paper no. 110814 (23 pages), November 2020. <https://doi.org/10.1115/1.4048111>.
- 88 Y. Gombo, A. Tiwari, and S. Devasia. "Accelerated-Gradient-based Flexible-Object Transport with Decentralized Robot Networks" *IEEE Robotics and Automation Letters*, Vol. 6(1), pp. 2377-3766, January 2021, <https://doi.org/10.1109/LRA.2020.3036569>.
- 89 V. Tereshchuk, N. Bykov, S. Pedigo, S. Devasia, and A. Banerjee, "A Scheduling Method for Multi-Robot Assembly of Aircraft Structures with Soft Task Precedence Constraints" *Robotics and Computer-Integrated Manufacturing*, Vol. 71, paper no. 102154 (10 pages), October 2021. <https://doi.org/10.1016/j.rcim.2021.102154>
- 90 L. Yan, N. Banka, P. Owan, W.T. Piaskowy, J. Garbini, and S. Devasia. "MIMO ILC using Complex-Kernel Regression and application to Precision SEA robots " *Automatica*, Vol. 127, Page 109550, May 2021. <https://doi.org/10.1016/j.automatica.2021.109550>

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<https://doi.org/10.1080/00207179.2019.1644537>
- 92 A. Tiwari, and S. Devasia. "Rapid Transitions with Robust Accelerated Delayed Self Reinforcement for Consensus-based Networks" Accepted to *IEEE Transactions on Control Systems Technology*, Oct. 2020. <https://doi.org/10.1109/TCST.2020.3032853>
- 93 A. Tiwari and S. Devasia. "Decentralized Cohesive Response during Transitions for Higher-order Agents under Network Delays," *IEEE Transactions on Automatic Control*, Vol 67(11), pp. 6303-6309, Nov. 2022. DOI: 10.1109/TAC.2022.3183035
- 94 Y. Lin, A. Tiwari, B. Fabien and S. Devasia. "Constant-Spacing Connected Platoons with Robustness to Communication Delays," Accepted to the *IEEE Transactions on Intelligent Transportation Systems*, Nov. 2022. DOI: 10.1109/TITS.2022.3224635



## JOURNAL PUBLICATIONS (TOP TEN IN CITATIONS)

Citations<sup>Ⓢ</sup> According to ISI Web of Knowledge, <http://apps.isiknowledge.com/>, Search: Aug 2022

	Article/ Authors/ Journal	Citations Web Science	Citations Google Scholar
1	S. Devasia, E. Eleftheriou and S. O. R. Moheimani "A Survey of Control Issues in Nanopositioning," <i>IEEE Transactions on Control Systems Technology</i> , Vol. 15 (5), pp. 802-823, September 2007.	805	1154
2	S. Devasia, D. Chen and B. Paden "Nonlinear Inversion-Based Output Tracking," <i>IEEE Trans. on Automatic Control</i> , 41(7), pp. 930-942, July 1996	524	908
3	D. Croft, G. Shedd and S. Devasia "Creep, Hysteresis, and Vibration Compensation for Piezoactuators: Atomic Force Microscopy Application," <i>ASME J. of Dynamic Sys., Measurement and Control</i> , Vol. 123 (35), pp. 35-43, March 2001.	488	903
4	<b>A Review of Feedforward Control Approaches in Nanopositioning for High-Speed SPM, G. M. Clayton, S. Tien, K. K. Leang, Q. Zou and S. Devasia, ASME J. of Dynamic Sys. Measurement and Control, 131(6), Article # 061101, Nov. 2009</b>	<b>299</b>	<b>397</b>
5	K. K. Leang and S. Devasia "Feedback-Linearized Inverse Feedforward for Creep, Hysteresis, and Vibration Compensation in AFM Piezoactuators," <i>IEEE Transactions on Control Systems Technology</i> , Vol. 15 (5), pp. 927-935, September 2007.	284	380
6	Ph. Martin, S. Devasia and B. Paden "A different look at output tracking: Control of a VTOL Aircraft," <i>Automatica</i> , Vol. 32 (1), pp. 101-107, January 1996	208	521
7	S. Devasia "Should Model-based Inverse Inputs be used as Feedforward under Plant Uncertainty?" <i>IEEE Trans. on Automatic Control</i> , Vol. 47(11), pp. 1865-1871, Nov 2002	212	319
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h-index = 30; Average # of Citations (for published journal articles) = 50

Google Scholar: h-index = 39

<https://scholar.google.com/citations?user=SQIBmd8AAAAJ&hl=en>

<sup>Ⓢ</sup> Data are extracted from the Science Citation Index Expanded, Social Sciences Index, and Arts & Humanities Citation Index Databases of the Institute for Scientific Information, Inc., ISI, Philadelphia, Pennsylvania, USA,

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- 76 A. Boekfah and S. Devasia. "Output-Boundary Regulation: High-Speed AFM Application", Presented at the 2013 ASME Dynamic Systems and Control Conference,



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  - 80 A. Boekfah and S. Devasia. "Output-boundary Regulation for Nonminimum-phase Systems," Presented at the 2015 American Control Conference, Chicago, IL, July 1-3, 2015.
  - 81 R. Warrier and S. Devasia. "Inverse Control for Inferring Intent in Novice Human-in-the-Loop Iterative Learning," Presented at the American Control Conference, Boston, MA, Sep. 2016.  
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  - 87 B. Smith, M. Ashrafi, M. Tuttle and S. Devasia. "Boundary Control on Embedded Heaters for Composites Joining," To be presented at the ASME Manufacturing Science and Engineering Conference (MSEC), USC, Los Angeles, CA, June 4-8, 2017.
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  - 90 P. Owan, J. Garbini and S. Devasia. "Addressing Agent Disagreement in Mixed-Initiative Traded Control for Confined-Space Manufacturing," Accepted to the 2017 IEEE International Conference on Advanced Intelligent Mechatronics (AIM), Munich, Germany, July 3-17, 2017.

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- 92 N. Banka, W. T. Piaskowy, J. Garbini and S. Devasia. "Iterative Machine Learning for Precision Tracking with Series Elastic Actuators," Accepted to the IEEE 15th International Workshop on Advanced Motion Control (AMC2018), Tokyo, Japan, March 9-11, 2018.
- 93 P. Owan, J. Garbini and S. Devasia. "Managing Off-Nominal Events in Shared Teleoperation with Learned Task Compliance," 2018 IEEE/RAS International Conference on Intelligent Robots and Systems (IROS 2018), Madrid, Spain.
- 94 R. Warrier and S. Devasia. "Kernel-based human-dynamics inversion for precision robot motion-primitives," 2018 IEEE/RAS International Conference on Intelligent Robots and Systems (IROS 2018), Madrid, Spain.
- 95 S. Devasia. "Rapid Information Transfer in Swarms under Update-Rate-Bounds using Delayed Self Reinforcement," ASME 2018 Dynamic Systems and Control Conference (DSCC), Sep. 30-Oct. 3, Atlanta, GA, USA.
- 96 R. Hendrix, P. Owan, J. Garbini and S. Devasia. "Context-Specific Separable Gesture Selection for Control of a Robotic Manufacturing Assistant," 2<sup>nd</sup> IFAC Conference on Cyber-Physical & Human-Systems (CPHS'18), Dec. 14-15, Miami, FL, USA.
- 97 S. Devasia. "Faster Response Discrete-Time Networks under Update-Rate Limits," Fifth Indian Control Conference, Jan. 9-11, 2019, IIT Delhi, India.
- 98 Jonathan Realmuto, Glenn Klute, and Santosh Devasia, "Preliminary Investigation of Symmetry Learning Control for Powered Ankle-Foot Prostheses", 2019 Wearable Robotics Association Conference (WearRAcon), March 26-28, 2019, Scottsdale, AZ, USA
- 99 Santosh Devasia, "Accelerated Consensus for Multi-Agent Networks through Delayed Self Reinforcement" 2019 IEEE International Conference on Industrial Cyber-Physical Systems (ICPS 2019), May 6-9, 2019, Taipei, Taiwan
- 100 Lance McCann, Chia-Ning Lee, Yoshua Gombo, Joseph Garbini, and Santosh Devasia, "Data-based Learning for Control of Elastic Interactions between Robot and Workpiece" 2019 ASME Dynamic Systems and Control Conference (DSCC), Park City, Utah.
- 101 B. Parsa, E. Samani, R. Hendrix, S. M. Singh, S. Devasia, and A. G. Banerjee "Predicting Ergonomic Risks during Indoor Object Manipulation Using Spatiotemporal Convolutional Networks," 2019 IEEE 15th International Conference on Automation Science and Engineering (CASE), August 22-26, Vancouver, Canada (Also accepted to RAL).
- 102 V. Tereshchuk, J. Stewart, N. Bykov, S. Pedigo, S. Devasia, and A. Banerjee "An Efficient Scheduling Algorithm for Multi-Robot Task Allocation in Assembling Aircraft Structures," 2019 IEEE/RAS International Conference on Intelligent Robots and Systems (IROS 2019), November 4-8, Macau, China (Also accepted to RAL).
- 103 Anuj Tiwari and Santosh Devasia, "Cohesive Velocity Transitions in Robotic Platoons Using Nesterov-type Accelerated Delayed Self Reinforcement (A-DSR)" Sixth Indian Control Conference (ICC), IIT-Hyderabad, India, Dec 18-20, 2019.
- 104 P. Owan, J. Garbini, and S. Devasia "Rapid Limited-Access Manufacturing through Dynamic Autonomy using Learned Task Models," IEEE International Conference on Robotics and Automation ICRA 2020, Paris, France, May 31-June 4, 2020. (Also accepted to RAL).
- 105 C. Devine, J. Garbini, and S. Devasia "Spatially-Constant Material Removal Control Under Variable-Speed Robotic Sanding," ASME 2020 Manufacturing Science and Engineering Conference, MSEC2020, Cincinnati, OH, June 22-26, 2020.



- 106 Y. Gombo, A. Tiwari, and S. Devasia. "Communication-free Cohesive Flexible-Object Transport using Decentralized Robot Networks" *2021 ACC*, May 2021 (Virtual).
- 107 A. Tiwari, Y. Gombo, and S. Devasia. "Improving network's transition cohesion by approximating strongly damped waves using delayed self-reinforcement" 2021 Seventh Indian Control Conference (ICC), IIT Bombay (Virtual), India.
- 108 L. Yan, and S. Devasia. "Precision Data-Enabled Koopman-type Inverse Operators for Linear Systems" 2022 IFAC Modeling, Estimation and Control Conference, MECC, April 2022.
- 109 Y. Lin, A. Tiwari, B. Fabien, and S. Devasia. Submitted to "Safely increasing capacity of traffic intersections with mixed autonomous vehicles using delayed self-reinforcement" Eighth Indian Control Conference, 2022 ICC, Chennai, India, 14-16 Dec 2022.

## TALKS AND SHORT COURSES

- 1 "High precision controls using inversion theory, and its applications," IIT Madras (India), December 1998.
- 2 "Inversion-based Output Tracking for Nonlinear Systems: Applications to Nanotechnology," Mechanical Engineering Department, U. of Michigan, Ann Harbor, April 1999.
- 3 "Inversion-Based Controllers for Precision Output Tracking: Theory and Applications," Mechanical Engineering Department, U. of Illinois at Urbana Champaign, March 2000.
- 4 "Inversion-Based High-Precision Output Tracking: Theory and Applications," Mechanical Engineering Department, U. of Washington, May 4<sup>th</sup> 2000.
- 5 "Network Server Paradigm for Automated Air Traffic Management," NASA Ames Research Center, Moffett Field, CA, August 15<sup>th</sup>, 2000.
- 6 "Presentation about research in Controls" to Mechanical Engineering Industrial Advisory Committee, U. of Washington, October 23, 2000.
- 7 "Applications from Large Space Structures to Nanosystems", Presentation about my research in the Mechanical Engineering Seminar, ME520, U. of Washington, October 24, 2000.
- 8 "Inversion-Based High-Precision Output Tracking: Theory and Applications", Graduate Robotics and Control Systems Colloquium, U. of Washington, October 27, 2000.
- 9 "Guidance for Transition Maneuvering of Multi-Agent Systems," DARPA Workshop on Human Control of Semi-Autonomous UAV Systems, U of Washington, Seattle, March 15-16, 2001.
- 10 "Ultra-High-Precision Positioning: Theory and Applications in Scanning Probe Microscopy", Seminar in the Materials Science Department, U. of Washington, April 2, 2001
- 11 "Ultra-High-Precision Positioning", Center for Applied Microtechnology (CAM) Seminar in the Electrical Engineering Department, U. of Washington, April 5, 2001
- 12 "Inverse Modeling of dynamic systems to find inputs for Precision Control: Application to Hyperthermia," Seminar in the Applied Physics Lab, U. of Washington, May 2, 2001
- 13 "Ultra-High-Precision Positioning", Robotics and Control Systems Seminar (ME/EE/AA/CHEM591), U. of Washington, October 12<sup>th</sup>, 2001

- 14 “Automation Issues in Air Traffic Management,” Air Traffic Management Seminar organized by NASA Ames Research Center, Moffet Field, CA, July 29<sup>th</sup> 2002.
- 15 “Token-based Approach to Air Traffic Management,” Boeing, Air Traffic Management Group, Bellevue, WA, October 17<sup>th</sup>, 2002.
- 16 “Optimal Seek Trajectories for High-speed Positioning: Application to Dual Stage Systems,” Presentation to the Information Storage Industry Consortium (INSIC) Program on Extremely High Density Storage Recording (EHDR), INSIC 2003 Annual Meeting, Servo Group, Double Tree Hotel, Monterey, CA, June 25<sup>th</sup>, 2003.
- 17 Should Model-based Inverse be used as Feedforward under Plant Uncertainties? Robotics and Control Systems Seminar (ME/EE/AA/CHEM591), U. of Washington, Oct. 3<sup>rd</sup>, 2003
- 18 “Optimal Seek Positioning for Disk Drives” Presentation to Storage System Division, Samsung Information Systems America, San Jose, CA, March 23<sup>rd</sup>, 2004.
- 19 “Automated Conflict Resolution Procedures,” NASA Ames Research Center, Moffet Field, CA, July 22<sup>nd</sup>, 2004.
- 20 “Precision Positioning Theory and Applications in Atomic Force Microscopy,” Controls Group, Indian Institute of Technology, Mumbai (Bombay), India, March 22<sup>nd</sup>, 2005.
- 21 “Precision Positioning Theory and Applications in Atomic Force Microscopy,” Graduate Seminar, Department of Mechanical Engineering, National Cheng-Kung University, Tainan, Taiwan, March 29<sup>th</sup>, 2005.
- 22 “Inversion-Based Feedforward Control for Precision Tracking in Non-minimum Phase Systems,” Short Course, ARC Center of Excellence for Complex Dynamic Systems and Control, The University of Newcastle, Callaghan, Australia, October 10<sup>th</sup> -12<sup>th</sup>, 2007.
- 23 Distributed Air Traffic Management, Graduate Robotics and Control Systems Colloquium, U. of Washington, February 23, 2007.
- 24 Seminar Presentation to Freshman and Sophomore students, in the COE Introductory Seminar Course “Engineering as a Humanitarian Pursuit”, GEN ST 197f, Dec 3<sup>rd</sup> 2008.
- 25 “A Survey of Control Issues in Nanopositioning,” Graduate Seminar, Department of Mechanical Engineering, National Cheng-Kung University, Tainan, Taiwan, March 11<sup>th</sup> 2008.
- 26 “Inversion-based Precision Control,” One Credit Graduate Course, Department of Mechanical Engineering, National Cheng-Kung University (NCKU), Tainan, Taiwan, February 18<sup>th</sup> to March 28<sup>th</sup>, 2008.
- 27 “Feedforward Control: Theory and Applications,” Distinguished Seminar Series, Mechanical Engineering Department, Iowa State University, Ames, Iowa, October 6<sup>th</sup> 2009.
- 28 Seminar Presentation to Freshman and Sophomore students, in the COE Introductory Seminar Course “Engineering as a Humanitarian Pursuit”, GEN ST 197, Sept 30<sup>th</sup>, 2009.
- 29 “Feedforward Control: Theory and Applications,” University of Michigan, Ann Arbor, MI, ME Seminar Series, October 14<sup>th</sup> 2010.
- 30 “Feedforward Control: Theory and Applications,” University of British Columbia (UBC), Canada, through the IEEE Control Systems Society, Vancouver Chapter, November 5<sup>th</sup> 2010.
- 31 Seminar Presentation on Nano-positioning to undergraduate students, Seminar Series in Nanoscience and Molecular Engineering, NME 221/321/421, April 14<sup>th</sup>, 2011. The

seminar is organized as part of the NSF Nanotechnology Undergraduate Education (NUE) Program (NSF 0938558).

- 32 “Feedforward Control: Theory and Applications,” National Taiwan University (NTU), Taipei, Taiwan, December 5<sup>th</sup>, 2011.
- 33 “Feedforward Control: Theory and Applications,” National Taiwan University of Science and Technology (NTUST), Taipei, Taiwan, December 6<sup>th</sup>, 2011.
- 34 “Inversion-based Feedforward Control for Precision Tracking,” Short Course, Department of Mechanical Engineering, National Taiwan University of Science and Technology (NTUST), Taipei, Taiwan, December 7<sup>th</sup> to 9<sup>th</sup>, 2011.
- 35 “Feedforward Control: Theory and Applications,” National Cheng Kung University (NCKU), Tainan, Taiwan, December 20<sup>th</sup>, 2011.
- 36 “Feedforward Control: Theory and Applications,” National Chiao Tung University (NCTU), Hsinchu, Taiwan, December 26<sup>th</sup>, 2011.
- 37 “Feedforward Control: Theory and Applications in Nanopositioning,” Norwegian University of Science and Technology (NUST), Trondheim, Norway, November 27, 2012.
- 38 “Feedforward for Precision Control: Theory and Applications,” University of Central Florida, Orlando, FL, Oct 17 2014.
- 39 “Convergence of Iterative Co-Learning Control,” University of Michigan, Ann Arbor, MI, ME Seminar Series, November 4, 2014.
- 40 “Convergence of Iterative Co-Learning Control,” Northeastern University, Boston, MA, MIE Seminar, February 20, 2015.
- 41 “Iterative Control for Networked Heterogeneous Multi-Agent Systems with Uncertainties,” The University of Texas at Austin, Mechanical Engineering Seminar, Oct 28<sup>th</sup>, 2016.
- 42 “Iterative Control for Networked Heterogeneous Multi-Agent Systems with Uncertainties,” The University of Texas at Dallas, Mechanical Engineering Seminar, Oct 31<sup>st</sup>, 2016.
- 43 “Convergence of iterative co-learning for output tracking,” The University of California at San Diego, Cymer Center for Control Systems and Dynamics Seminar, Jan 27<sup>th</sup>, 2017.
- 44 “Convergence of iterative co-learning for output tracking,” New York University Tandon School of Engineering, ME Seminar, March 22, 2017.
- 45 “Convergence of iterative co-learning for output tracking,” Rutgers, ME Dept. Seminar, March 23, 2017.
- 46 “Convergence of iterative co-learning for output tracking,” IIT Gandhinagar, India, Sept 1, 2017.
- 47 “Inversion-based Feedforward Control for Precision Tracking,” Short Course, IIT Gandhinagar, India, August 28<sup>th</sup> to September 1<sup>st</sup>, 2017.
- 48 “Inversion-based Feedforward Control for Precision Tracking,” Short Course, IIT Madras, Chennai, India, September 6-7, 2017.
- 49 “Synchronized networks using delayed self-reinforcement,” U. of Connecticut, Institute for Advanced Systems Engineering, October 22, 2018.
- 50 “Synchronized networks using delayed self-reinforcement,” U. of Nevada, Mech. Eng. Dept., Reno, November 30, 2018.
- 51 S. Devasia. “Boeing Advanced Research Center at the University of Washington,” Presented at the 12<sup>th</sup> Annual Pacific Northwest AIAA Technical Symposium, Nov 10<sup>th</sup> 2018, Museum of Flight, Seattle, WA, USA.

- 52 “Boeing Advanced Research Center at the University of Washington,” at the Gifu-Kakamigahara Air & Space Museum, for Gifu University, Japan, March 26<sup>th</sup>, 2019.
- 53 “Synchronized networks using delayed self-reinforcement,” at Gifu University, Japan, March 27<sup>th</sup>, 2019.
- 54 “Synchronized networks using delayed self-reinforcement,” Plenary talk at the International Workshop on Frontiers of Autonomous Systems and Applications (IWFASA 2019), Chengdu, China, May 11, 2019.
- 55 “Cohesive networks using delayed self-reinforcement,” Plenary talk at the ASME Dynamic Systems and Control Conference, Park City, Utah, October 8-11, 2019.
- 56 “Synchronized networks using delayed self-reinforcement,” Plenary talk at the International Automatic Control Conference, Keelung, Taiwan, November 13-16, 2019.
- 57 “Cohesive networks using delayed self-reinforcement,” Mechanical Engineering Department, National Cheng Kung University (NCKU), Tainan, Taiwan, November 19<sup>th</sup>, 2019.
- 58 “Cohesive networks using delayed self-reinforcement,” Robotics Control and Dynamical Systems Seminar, University of Colorado, Boulder, January 28, 2020.
- 59 “Cohesive networks using delayed self-reinforcement,” Missouri University of Science and Technology, Rolla, February 27, 2020.
- 60 “Research at Mechanical Engineering at University of Washington,” Indonesian Embassy, September 10, 2020.
- 61 “Cohesive Networks,” UC Santa Barbara, ME Dept. Convocation, October 14, 2020.
- 62 “Iterative Control for Networked Heterogeneous Multi-Agent Systems with Uncertainties,” Plenary talk, 2021 IEEE International Conference on Mechatronics (IEEE ICM 2021), Kashiwa, Japan, March 7-9, 2021.
- 63 “Cohesive Decentralized Networks,” Wisconsin Robotics Seminar, University of Wisconsin, Madison, April 7, 2021.
- 64 “Cohesive Decentralized Networks,” Michigan State University, April 8, 2021.
- 65 “Rapid Optimal Multi-Robot Task Allocation,” Saturday Afternoon Talks, Centre of Excellence in Advanced Manufacturing Technology, IIT Kharagpur, July 3, 2021
- 66 “Cohesive Networks,” Keynote talk, 2021 IEEE Conference on Control Systems Technology and Applications (CCTA2021), August 9-11, 2021.
- 67 “Feedforward Control for Precision Tracking and Cohesive Decentralized Networks,” Short Course with Anuj Tiwari, IIT Madras, Chennai, India, July 11-13, 2022.
- 68 “Feedforward Control for Precision Tracking and Cohesive Decentralized Networks,” Short Course with Anuj Tiwari, IIT Gandhinagar, India, July 14-15, 2022
- 69 ASME Dynamic Systems and Control Division Podcast Series, Hosted by Hao Su, July 2022 <https://www.youtube.com/watch?v=BRBVq3tzSMI>

## **OTHER CONFERENCE AND POSTER PRESENTATIONS \***

- 1 M. Mattingly, E. Bailey, A. Dutton, R. B. Roemer\* and S. Devasia “Reduced Order Modeling for Hyperthermia: A Balanced Realization Based Approach,” Poster Presentation at IMECE96, Atlanta, GA, 1996.
- 2 S. Meek\* and S. Devasia “Mechatronics Education at the University of Utah.” Proceedings published as Proceedings of *Mechatronics '96*, Sponsored by NSF, Division of Undergraduate Education, pp. 92-96, San Francisco, June 1996.

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\* *In case of multiple authors, the person presenting the work is marked with \**

- 3 S. Devasia "Piezo probe Design for Nanofabrication," Annual Conference of the Utah Academy of Sciences, Arts and Letters, Weber State University, Utah, April 11, 1997.
- 4 M. Mattingly\*, R. B. Roemer and S. Devasia "Optimal Actuator Placement for Hyperthermia: A Reduced-Order Modeling Approach," 14th Conference of the North American Hyperthermia Society, Providence, RI, 1997.
- 5 S. Devasia "High-Speed High-Precision Piezo Actuators for Nanofabrication," Proceedings of the NSF Design and Manufacturing Grantees Conference, Monterrey, Mexico, 1998.
- 6 D. Croft, S. Stilson and S. Devasia\* "Optimal Tracking of Piezo-based Nano-Positioners," Proceedings of the 6<sup>th</sup> Foresight Conference on Molecular Nanotechnology, Palo Alto, CA, November 14-15, 1998.
- 7 M. Mattingly\*, R. Roemer and S. Devasia "Application of a Fast Iterative Learning Controller to Achieve Desired Hyperthermia Treatment Temperatures," Presentation at the 18<sup>th</sup> Conference of the North American Hyperthermia Society, Philadelphia, PA '99.
- 8 S. Devasia "Design Issues in High-Throughput Nanofabrication Equipment," Poster presentation at the Seventh Foresight Conference on Molecular Nanotechnology, Santa Clara, CA, October 15 -17, 1999.
- 9 D. Croft and S. Devasia\* "High-Speed SPM for Nanofabrication," Proceedings of NSF Design and Manufacturing Grantees Conference, Long Beach, CA, Jan. 5-8, 1999.
- 10 D. Croft and S. Devasia\* "High-Throughput Scanning Probe Microscopy," Proceedings of the 2000 NSF Design and Manufacturing Grantees Conference, Vancouver.
- 11 S. Field, S. Meek\* and S. Devasia "Mechatronics Education in the Department of Mechanical Engineering at the University of Utah," 7<sup>th</sup> Mechatronics Forum International Conference, Atlanta, Georgia, September 6-8, 2000.
- 12 P. Labossiere\*, S. Devasia, A. Kobayashi and M. Ramulu "Time-Dependent Nanodamage Evolution Measurements using High-Speed Scanning Probe Microscopy," Proc. of the 2001 SEM Annual Conf. and Expo. on Exp. and Applied Mechanics, Portland, Oregon, pp. 514-516.
- 13 D. Iamratanukul\*, S. K. Sundaram and S. Devasia "Phase Transition Characterization of BaTiO<sub>3</sub> Surface by High Speed Atomic Force Microscopy," Joint Institute of Nanotechnology, Richland, WA, February 21, 2002.
- 14 S. Devasia "Optimal Trajectory Design for Dual-Stage Servos," INSIC EHDR Meeting, University of California San Diego, La Jolla, February 4, 2004.
- 15 S. Devasia "Optimal Seek Trajectories for Dual Stage Servos," INSIC EHDR Meeting, Monterey, CA, July 21, 2004.
- 16 S. Devasia "Optimal Trajectory Design for Dual Stage Actuators," INSIC 2005 Annual Meeting, EHDR Session, Monterey, CA, July 20, 2005.
- 17 D. Iamratanukul\* and S. Devasia "Nano-precision high-speed head positioning using dual-stage actuators," INSIC 2005 Meeting, EHDR Session, U. of Minnesota, Minnesota, Nov 17, 2005.
- 18 D. Iamratanukul\*, Y. Hatano\* and S. Devasia "Optimal Trajectory Design for Dual Stage Actuators," INSIC EHDR Meeting, San Diego, CA, Thursday, March 9<sup>th</sup>, 2006.

- 19 S. Devasia "Finite Pre- and Post-actuation for Optimal Output Transition with Dual-Stage Systems," INSIC EHDR Meeting, Monterey, CA, July 13<sup>th</sup> 2006.
- 20 D. Iamratanukul\*, Y. Hatano\* and S. Devasia "Finite Pre- and Post-actuation for Optimal Output Transition with Dual-Stage Systems," INSIC EHDR Meeting, Ft. Collins, CO, Tuesday, November 14<sup>th</sup>, 2006.
- 21 S. Devasia\* and S. Tien. "High-Speed AFM Imaging of Soft Samples in Liquid with Small Forces " Symposium on 25 Years of Biointerface Science, August 24-27, 2008, U. of Washington, Seattle.
- 22 J. Kongthon, K. Oh, J.-H. Chung, J. Riley and S. Devasia\*. "High-Speed AFM Imaging of Soft Samples in Liquid with Small Forces " ASME 1<sup>st</sup> Global Congress on NanoEngineering for Medicine and Biology (NEMB), February 7-10, 2010, Houston.
- 23 J. Kongthon, S. Devasia\*, J. Chung and J. Riley. "Modeling and Control of Biomimetic Cilia," NSF CMII Research and Innovation Conference, Jan 4-7. Atlanta, GA, 2011.
- 24 N. Banka and S. Devasia\*. "Control of Distributed Nanopositioners," NSF CMII Research and Innovation Conference, Jan 4-7. Atlanta, GA, 2011.
- 25 S. Wilcox and S. Devasia\*. "Vibration Mitigation in Nanosteppers," NSF CMII Research and Innovation Conference, Jan 4-7. Atlanta, GA, 2011.
- 26 S. Devasia\*. "Integrating Nanopositioner Design Issues into an Existing Automatic Controls Course," 82<sup>nd</sup> Annual ASEE Pacific North-West Spring Conference, U. of Portland, Portland, Oregon, March 15-17 2012.
- 27 Peter R. Cavanagh, Molly D. Glauberman, Karl T. Manner, Kara Sawyer and Santosh Devasia. "Insights into the Footstrike Patterns of Women Distance Runners," 2012 American Society of Biomechanics, August 15-18, Gainesville, FL, 2012.
- 28 Parker Owan\*, Joseph Garbini, and Santosh Devasia. "Regulating Priority in Mixed Initiative Human-Robot Collaboration," IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Vancouver, Canada, 2017.
- 29 Rahul Warriar\* and Santosh Devasia. "Inferring Intent in Human-in-the-loop Output-Tracking Tasks," IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Vancouver, Canada, 2017.
- 30 W. Tony Piaskowy\*, Cameron Devine, Lance O. McCann, Jack Aubin, Santosh Devasia, and Joseph Garbini. "Data Driven Teleoperated Sanding for Health Risk Management," IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Vancouver, Canada, 2017.
- 31 R. Warriar and S. Devasia. "Intent Estimation of Human-in-the-loop Operators by Data-based Inversion," 2<sup>nd</sup> IFAC Conference on Cyber-Physical & Human-Systems (CPHS'18), Dec. 14-15, Miami, FL, USA.
- 32 Anuj Tiwari\* and Santosh Devasia, "Cohesive Velocity Transitions in Platoons without Centralized Communication using Delayed Self Reinforcement," 2019 ASME Dynamic Systems and Control Conference (DSCC), October 8-11, Park City, Utah.
- 33 Anuj Tiwari\* and Santosh Devasia, "Rapid Robust State Transitions in Consensus-Based Robotic Networks with A-DSR," 2020 American Control Conference (ACC), July 1-3, Denver, CO, USA.
- 33 Yoshua Gombo\*, Anuj Tiwari and Santosh Devasia, "Accelerated-Gradient-Based Flexible-Object Transport with Decentralized Robot Networks," 2020 American Control Conference (ACC), July 1-3, Denver, CO, USA.

- 34 Ben Wong, Kyle Schultz, Lucky Singh, Derek Loy, Wade Marquette, Santosh Devasia, Joe Garbini, Shuonan Dong, Jerry Chungbin, John Fuller, and Sam Pedigo “Mechanically actuated pneumatic avatar for out-of-tank teleoperated control: Confined Space Shop Aid” 2020 Boeing Technical Excellence Conference (BTEC 2020). [The presentation won the Best of BTEC award in Manufacturing, Materials & Safety](#)

## **BOOK CHAPTERS / PROFESSIONAL MAGAZINES**

- 1 Kam Leang, Qingze Zou, and Santosh Devasia “Continuous- and Discrete-time State-Space Models,” The Mechatronics Handbook, CRC Press, Boca Raton, FL, Editor: R. Bishop, 2002, Section IV, pages 40 to 54 in Chapter 23.
- 2 Rahul B. Warrier and Santosh Devasia “How to Train Your Robot: Inferring Intent During Human-in-the-Loop Robot Learning for Output Tracking,” Mechanical Engineering Magazine, Dynamic Systems & Control, ASME, June 2017, Vol. 5(2), Pages 19-23.
- 3 Nathan Banka and Santosh Devasia “Blinking-Vortex Inspired Mixing with Cilia,” Invited Chapter in the ATLAS OF CILIA BIOENGINEERING & BIOCOMPUTATION (River Publishers, 2018) Eds. Dr. Richard Mayne (Univ. West of England, Bristol, UK) & Prof. Jaap den Toonder (Technische Universiteit Eindhoven, NL).

## **PROFESSIONAL SOCIETY MEMBERSHIPS**

American Society of Mechanical Engineers (ASME), Fellow 2012, (joined in 1994)  
 Institute of Electrical and Electronics Engineers (IEEE), Fellow 2019, (joined in 1994)  
 American Institute of Aeronautics and Astronautics (AIAA), Senior Member (joined in 1996)  
 American Society for Engineering Education (ASEE), Member (Re-joined in 2011)

## GRADUATE STUDENTS

### CHAired DOCTORAL DEGREES

#### Past PhD Students

- 1 Marshall Mattingly      Ph. D., December 1998, U. of Utah, Mechanical Engineering  
 “Modeling and Control: Theoretical Development with Application to Hyperthermia Cancer Therapy.”  
 R. Roemer was Co-Chair  
 Joined Raytheon Systems Company, Tucson (AZ) in 1999
- 2 Hector Perez      Ph. D., May 2002, U. of Utah, Mechanical Engineering  
 “Optimal Output-Trajectories for Output Transitions”  
Research Professor (2003)  
 Electronic Engineering Department  
 Research Chair (General Director of Research), Aug 2004  
 Universidad Pontificia Bolivariana, Bucaramanga, Colombia
- 3 Donald E. Croft      Ph. D., December 2003, U. of Utah, Mechanical Engineering  
 “High-Speed High-Precision Piezoactuators with Applications to Scanning Probe Microscopy.”  
 Joined Raytheon Systems Company, Tucson (AZ) in 1999
- 4 Qingze Zou      Ph. D., July 2003, U. of Washington, Mechanical Engineering  
 “Preview-based System Inversion for Output-Tracking: Theory and Application”  
 Current Position (2017): Professor  
 Mechanical and Aerospace Engineering, Rutgers, New Jersey
- 5 Kam K. Leang      Ph. D., Sept. 2004, U. of Washington, Mechanical Engineering  
 “Iterative Learning Control of Hysteresis in Piezo-based Nano-Positioners: Theory and Application in Atomic Force Microscopy”  
 Current Position (2020): Professor  
 Mechanical Engineering Department, U. of Nevada, Reno
- 6 Szuchi Tien      Ph. D., July 2007, U. of Washington, Mechanical Engineering  
 “High-Speed Nano-Precision Positioning: Theory and Application to AFM Imaging of Soft Samples”  
 Current Position (2015): Associate Professor  
 Mechanical Engineering Department  
 National Cheng Kung University (NCKU), Tainan, Taiwan



- 7 Dhanakorn Iamratanakul Ph. D., July 2007, U. of Washington, AA Dept.,  
“Pre-actuation and Post-actuation in Control Applications”  
Joined Western Digital Inc, California  
as a Senior Firmware Engineer in Fall 2007
- 8 Garrett Clayton Ph.D., 2007, U. of Washington, Mechanical Engineering  
“Image-based Methods for Scanning Tunneling Microscopy”  
Current Position (2014): Associate Professor  
Department of Mechanical Engineering  
Villanova University, Villanova, Pennsylvania
- 9 Jiradech Kongthon Ph.D., 2011, U. of Washington, Mechanical Engineering  
“Modeling and Control of Biomimetic Cilia-Based Devices for  
Microfluidic Applications” Faculty Position at SIIT, Thailand.
- 10 Jeff Dong-Suk Yoo Ph.D. 2014, U. of Washington, Mechanical Engineering  
“Flow-Capacity-Maintaining, Decoupled Conflict Resolution  
Procedures for Air Traffic Control.” Joined Boeing, WA
- 11 Scott Wilcox Ph.D. 2015, U. of Washington, Mechanical Engineering  
“Stability and Precision Positioning of Piezoelectric  
Stepper Systems.” Joined Amazon Prime Air, WA.
- 12 Mahdi Ashrafi Ph.D. 2016, U. of Washington, Mechanical Engineering  
“Resistive Embedded Heating for Homogenous Curing  
of Composites Damage Repair.”  
Co-motion Commercialization Fellows Award, 2015-  
Co-Chair, Mark Tuttle was Chair
- 13 Arom Boekfah Ph.D. 2016, U. of Washington, Mechanical Engineering  
“Output-Boundary Regulation Using Event-Based  
Feedforward for Nonminimum-Phase Systems.” Spring  
2016. Faculty of Mahidol University, Thailand.
- 14 Nathan Banka Ph.D. 2017, U. of Washington, Mechanical Engineering  
“Individually-controllable magnetic artificial cilia for  
microfluidic manipulation tasks.”  
Joined Amazon Robotics in 2017.
- 15 Jonathan Realmuto Ph.D. 2017, U. of Washington, Mechanical Engineering  
“Towards personalized powered ankle-foot prostheses.”  
Glenn Klute was co-Chair, Joined USC as PostDoc.
- 16 Brandon P. Smith Ph.D. 2017, U. of Washington, Mechanical Engineering  
“Bondline temperature control using carbon fiber  
embedded resistive heaters.” Mark Tuttle was co-Chair  
Joined Tethers Unlimited in 2017.
- 17 Rahul Warriar Ph.D. 2018, U. of Washington, Mechanical Engineering  
“Inferring human intent in novice human-in-the-loop  
control tasks.” Joined Amazon Robotics in 2018.
- 18 Parker Owan Ph.D. 2019, U. of Washington, Mechanical Engineering  
“Improved assistive tele-robotics via task dynamics  
learning with application to limited-access manufacturing.”  
Joined Amazon Robotics.
- 19 Rose Hendrix Ph.D., 2020, U. of Washington, Mechanical Engineering  
“Separability and Systematic Design of  
Gestural Human-Robot Interaction.”  
Joe Garbini is co-Chair. Joined Vulcan.

- |    |                              |  |
|----|------------------------------|--|
| 20 | Veniamin (Ben)<br>Tereshchuk | Ph.D., 2020, U. of Washington, Mechanical Engineering<br>“Multi-Robot Task Allocation and Scheduling for Efficient Aircraft Structure Assembly.”<br>Ashis Banerjee is Co-Chair. Joined Boeing. |
| 21 | Cameron Devine               | Ph.D., 2022, U. of Washington, Mechanical Engineering<br>“Material Removal Control for Teleoperated Robotic Sanding.”<br>Co-Chair, Joe Garbini is Chair. Joined St. Martin’s University        |
| 22 | Anuj Tiwari                  | Ph.D., 2022, U. of Washington, Mechanical Engineering<br>“Cohesive Transitions in Decentralized Networks with Delays.”<br>Chair. Joining IIT Gandhinagar, India as Asst. Prof in Mech Eng.     |

### **Current PhD Students (Advisor), Anticipated Graduation, and Research Topic**

- |    |                    |   |
|----|--------------------|---|
| 1  | Yoshua Gombo       | Ph.D., Started Fall 2019, Passed Qualifying Exam 2020,<br>U. of Washington, Mechanical Engineering                            |
| 2  | Yudong Lin         | Ph.D., Passed Qualifying Exam 2021,<br>U. of Washington, Mechanical Engineering<br>Brian Fabien is Co-Chair.                  |
| 3  | Leon Yan           | Ph.D., Started Fall 2019, Passed Qualifying Exam 2021<br>U. of Washington, Mechanical Engineering                             |
| 4  | Lance O McCann     | Ph.D., U. of Washington, Mechanical Engineering<br>Co-Chair, Joe Garbini is Chair, Passed Gen. Exam 2022.                     |
| 5  | Kyle Schultz       | Ph.D., Started Fall 2019,<br>U. of Washington, Mechanical Engineering   |
| 6  | Wade Marquette     | Ph.D., Started Fall 2021,<br>U. of Washington, Mechanical Engineering   |
| 7  | Benjamin Wong      | Ph.D., Started Winter 2022, Passed Qualifying Exam<br>U. of Washington, Mechanical Engineering<br>Ashis Banerjee is Co-Chair. |
| 8  | Henry Chang        | Ph.D., Started Fall 2022,<br>U. of Washington, Mechanical Engineering   |
| 9  | Mohamed Safawat    | Ph.D., Started Fall 2022,<br>U. of Washington, Mechanical Engineering   |
| 10 | Ken Latimer        | Ph.D., Re-Started Fall 2022,<br>U. of Washington, Mechanical Engineering  |
| 11 | Aaron Robert Weber | Ph.D., Starting Spring 2023,<br>U. of Washington, Mechanical Engineering  |
| 12 | Michael Bi         | Ph.D., Starting Fall 2023,<br>U. of Washington, Mechanical Engineering  |
| 13 | William Beaman     | Ph.D., Starting Spring 2023,<br>U. of Washington, Mechanical Engineering  |

### **International PhD Student Thesis Evaluation Committees**

- |   |                     |  |
|---|---------------------|--|
| 1 | Iskandar A. Mahmood | Ph.D. 2009, U. of Newcastle, Australia “Vibration and Position Control of Piezoelectric Tube Scanners for Fast Atomic Force Microscopy.” |
|---|---------------------|--|

- |   |                     |   |
|---|---------------------|---|
| 2 | Arnfinn Aas Eielsen | Ph.D. 2012, Norwegian University of Science and Technology, Trondheim, Norway “Topics in Control of Nanopositioning Devices.”   |
| 3 | Mathew W. Fairbairn | Ph.D. 2013, U. of Newcastle, Australia<br>“Feedback Control of the Atomic Force Microscope Cantilever for Improved Imaging.”  |
| 4 | MD. Sohel Rana      | Ph.D. 2014, New South Wales, Canberra, Australia<br>“High Performance Control of an Atomic Force Microscope for Faster Image Scanning.”   |
| 5 | Habibullah          | Ph.D. 2016, New South Wales, Canberra, Australia<br>“High-Precision Nanopositioning Control of a Piezoelectric Tube Scanner: Atomic Force Microscopy.”  |
| 6 | Pradeep Raj KB      | Ph.D. 2019, Indian Institute of Technology, Gandhinagar<br>“Towards the design of multi-user Virtual Reality based interactive social communication platform for individuals with autism and its implications on eye gaze.” |

## CHAired MASTERS DEGREES

### Masters (Thesis/Project Options) Past Students

- |   |                  |  |
|---|------------------|--|
| 1 | Seonghoon Lee    | M.E., June 1996, U. of Utah, Mechanical Engineering<br>“Design of Inverted Pendulum Linkage for Demonstrating Stable Inversion Technique.”         |
| 2 | Mark Yampanis    | M.S., June 1996, U. of Utah, Mechanical Engineering<br>“A Mechatronics Laboratory Design.”   |
| 3 | Rong Ye          | M.S., September 1996, U. of Utah, Mechanical Engineering<br>“Exact Output Tracking for Linear Time-Varying Systems in Discrete Time Domain.”       |
| 4 | Willver Redroven | M.S., March 1997, U. of Utah, Mechanical Engineering<br>“Vibration Control Using Piezo-Electric Actuators.”  |
| 5 | David McAllister | M.S., May 1997, U. of Utah, Mechanical Engineering<br>“Piezo-Probe Design and Vibration Isolation Table Design for Scanning Tunneling Microscopy.” |
| 6 | Jason Dewey      | M.E., December 1997, U. of Utah, Mechanical Engineering<br>“Inversion Based Tracking Control of a Nonminimum Phase Flexible Structure.”            |
| 7 | Arturo L. Rivera | M.E., June 1998, U. of Utah, Mechanical Engineering<br>“Autonomous Pipe Crawler.”  |
| 8 | Shane Stilson    | M.S., December 1999, U. of Utah, Mechanical Engineering<br>“Vibration Compensation for High-Speed Control of Piezo-based Micro-Positioning Stage.” |
| 9 | Sujuan Li        | M.S., December 1999, U. of Utah, Mechanical Engineering  |

- “Integrated Modeling of Hysteresis and Vibration in a Piezo Probe Actuator.”
- 10 Robert Brinkerhoff M.S., December 1999, U. of Utah, Mechanical Engineering  
“Output Tracking in Actuator Deficient/Redundant Systems: Theoretical and Experimental Results.”
- 11 Kam Leang M.S., December 1999, U. of Utah, Mechanical Engineering  
“Design of Robotic Kit for Mechatronics.”
- 12 Vegard Lund M.S., August 2000, U. of Utah, Mechanical Engineering  
“Automated Conflict Resolution for Air Traffic Management.”
- 13 Clint Vander Giessen M.S., December 2002, U. of Washington, Mechanical Engineering  
“Inversion-Based Dynamic Compensation of Inertial Reaction Devices”
- 14 Eric B. Howell M.S., Spring 2004, U. of Washington, Mechanical Engineering  
“Design of Shock Absorbing Transtibial Prosthesis with a Controls Approach,” G. Klute (from VA Rehab R&D Center, Seattle) was Co-Chair
- 15 Benjamin B. Jordan M.S., Spring 2005, U. of Washington, Mechanical Engineering  
“Fast Positioning of Disk Drives with Dual Stage Systems”
- 16 Brandon Smith M.S., Fall 2009, U. of Washington, Mechanical Engineering  
“An Experimental Examination of Improved Micromixing using Bio-mimetic Synthetic Cilia”
- 17 Scott Wilcox M.S., Spring 2011, U. of Washington, Mechanical Engineering  
“Modeling and Control of a Large-Range, Piezo Nano-stepper”
- 18 Tony Piaskowy M.S., Winter 2016, U. of Washington, Mechanical Engineering  
“Variable-Impedance-Based Human-Machine Control for Docking of Manufacturing Fixtures,”  
Co-Chair (Chair was J. Garbini)
- 19 Benjamin Janicki M.S., Winter 2016, U. of Washington, Mechanical Engineering  
“A Hand-Placed End-Effector for Confined Space Drilling Operations,” Co-Chair (Chair was J. Garbini)
- 20 Alexi Ehrlich M.S., Spring 2016, U. of Washington, Mechanical Engineering  
“The Inverse Jacobian Control Method Applied to a Four Degree of Freedom Confined Space Robot.” Co-Chair (Chair was J. Garbini)
- 21 Casey Carte M.S. 2017, U. of Washington, Mechanical Engineering  
“Evaluating Embedded Heater Bonding for Composites,”  
Mark Tuttle was Co-Chair

#### **Masters (Advisor, No Projects, Non-thesis, at UW) Past Students**

- |   |                          |                                      |
|---|--------------------------|--------------------------------------|
| 1 | Ray Adler                | M.S. 2018, UW, BARC, Mechanical Eng. |
| 2 | Grant Anderson           | M.S. 2018, UW, BARC, Mechanical Eng. |
| 3 | Joshua Babst             | M.S. 2018, UW, BARC, Mechanical Eng. |
| 4 | Ricardo Fritzke          | M.S. 2018, UW, BARC, Mechanical Eng. |
| 5 | Sam Marriott-Green       | M.S. 2018, UW, BARC, Mechanical Eng. |
| 6 | Mitchell Scott Middleton | M.S. 2018, UW, BARC, Mechanical Eng. |
| 7 | Stefan Zelenovic         | M.S. 2019, UW, Mechanical Eng.       |

8	Shayna N Levenson	M.S. 2019, UW, Mechanical Eng.
9	Ting-Yang Chen	M.S. 2019, UW, Mechanical Eng.
10	Tharm Sribhibhadh	M.S. 2019, UW, BARC, Mechanical Eng.
11	Christopher Woodruff	M.S. 2019, UW, BARC, Mechanical Eng.
12	Kevin Hsu	M.S. 2020, UW, Mechanical Eng.
13	Lukas Wavrin	M.S. 2020, UW, Mechanical Eng.
14	Wade Marquette	M.S. 2021, UW, Mechanical Eng.
15	Benjamin Wong	M.S. 2021, UW, Mechanical Eng.

## CURRENT EXTERNAL RESEARCH FUNDING

- **NSF Dynamics, Control and Systems Diagnostics (DCSD) Program:** “Data-based Iterative Control using Complex-Kernel Regression for Precision SEA Robots” (PI), NSF Grant CMMI 1824660, 9/15/18-7/31/23, \$454,580.  
NSF REU CMMI 1824660-001, \$8,000.
- **Navy Undersea Research Program (NURP)** “Investigation of an Autonomous Cooperating Robot System for Maintenance of Naval Platforms” (Investigator, PI is Ashis Banerjee), 01/15/2021 – 01/14/2024, \$225,000
- **Naval Engineering Education Consortium (NEEC):** “Investigation of a Human-Assisted Multi-Robot System for Inspection of Hazardous Confined Spaces,” co-PI, Ashis Banerjee is PI), 04/13/22-04/12/25, \$316,969.
- **Boeing** “Machine Supervisory Control” (Co-PI, Ashis Banerjee is PI), through the UW Boeing Advanced Research Center, 4/1/21-3/30/23, 2021-BRT-PA-055, \$300,000
- **Boeing** “Adjacent Wing Bay Remote Inspection” (PI, Joe Garbini is co-PI), through the UW Boeing Advanced Research Center, 9/1/22-8/30/23, 2022-BRT-PA-260, \$247,619
- **Boeing** “Uncured Stringer Elastic Characteristics” (PI, Steve Brunton is co-PI), through the UW Boeing Advanced Research Center, 12/1/22-10/15/23, 2022-PD-PA-313, \$228,571,
- **Boeing** “Large Assembly Adaptive Tooling” (co-PI, Krithika Manohar is PI), through the UW Boeing Advanced Research Center, 12/1/22-10/15/23, 2022-PD-PA-312, \$228,571,
- **Boeing** “Bladder Assembly Preparation for Stinger Fabrication” (co-PI, Joe Garbini is PI), through the UW Boeing Advanced Research Center, 1/1/23-12/15/23, 2022-PD-PA-348, \$259,143,
- **GE Research** “Agile Automated Visual Inspection” (Senior Personnel, Xu Chen is PI), GE Research, 10/01/22-10/31/23, \$300,000.

## TEACHING

### LIST OF GRADUATE AND UNDERGRADUATE COURSES

#### **Classes Taught at U. of Washington (Evaluated by Students)**

<b>Class</b>		<b>Quarter</b>	<b>Credits</b>	<b>Students</b>
<b>Year 2001</b>				
Digital Controls I	ME581 (EE/AA/EDGE)	Winter	3.0	21
High Precision Positioning Systems				
Special Topics	ME599/ME498	Spring	3.0	13
<b>Year 2002</b>				
Digital Controls I	ME581 (EE/AA/EDGE)	Winter	3.0	28
Digital Controls II	ME582 (EE/AA)	Spring	3.0	17
Instrumentation	ME473	Fall	4.0	23
<b>Year 2003</b>				
Embedded Computing	ME477	Winter	4.0	19
ME Design	ME495M	Spring	4.0	13
Automatic Control	ME471	Fall	4.0	30
<b>Year 2004</b>				
Digital Control I	ME581	Winter	4.0	17
Feedforward Control				
Special Topics	ME599/ME498	Spring	3.0	14
Instrumentation	ME473	Fall	4.0	22
<b>Year 2005</b>				
Kinematics and Dynamics	ME230	Winter	4.0	79
ME Design	ME495M	Spring	4.0	15
Exp. Stress Analysis	ME556	Fall	3.0	19
<b>Year 2006</b>				
Kinematics and Dynamics	ME230	Winter	4.0	65
Feedforward Control	ME/AA/EE593	Spring	3.0	21
Kinematics and Dynamics	ME230	Fall	4.0	36
<b>Year 2007</b>				
ME Design	ME495M	Spring	4.0	7
<b>Year 2008</b>				
Automatic Control	ME471	Fall	4.0	31
<b>Year 2009</b>				
Kinematics and Dynamics	ME230	Winter	4.0	98
ME Design	ME495M	Spring	4.0	19
<b>Year 2010</b>				
Mechanical Vibrations	ME470	Winter	4.0	30
Feedforward Control	ME/AA/EE593	Spring	3.0	13
Automatic Control	ME471	Fall	4.0	31
<b>Year 2011</b>				
Mechanical Vibrations	ME470	Winter	4.0	29
ME Design	ME495M	Spring	4.0	22
<b>Year 2012</b>				
Mechanical Vibrations	ME470	Winter	4.0	29

Feedforward Control	ME/AA/EE593	Spring	3.0	17
ME Seminar	ME520	Fall	1.0	52
<b>Year 2013</b>				
ME Seminar	ME520	Winter	1.0	41
Mechanical Vibrations	ME470	Winter	4.0	29
Mechatronics Prep	ME494	Winter	1.0	26
ME Design	ME495M	Spring	4.0	26
<b>Year 2014</b>				
Feedforward Control	ME/AA/EE593	Spring	3.0	19
<b>Year 2015</b>				
Mechatronics Prep	ME494	Winter	1.0	27
ME Design	ME495/M/P	Spring	4.0	27
<b>Year 2016</b>				
Feedforward Control	ME/AA/EE593	Spring	3.0	23
<b>Year 2017</b>				
ME Design	ME495M	Spring	4.0	25
<b>Year 2018</b>				
Linear Systems Theory	ME/AA/EE 547	Fall	3.0	69
<b>Year 2019</b>				
Mechanical Vibrations	ME 470	Winter	4.0	45
ME Design	ME495M	Spring	4.0	25
<b>Year 2020</b>				
Mechanical Vibrations	ME 470	Winter	4.0	31
Feedforward Control	ME/AA/EE593	Spring	3.0	29
Nonlinear Control Sys.	ME/AA/EE583	Fall	3.0	37



## SERVICE

### DEPARTMENTAL SERVICE

#### DEPARTMENTAL COMMITTEES: U. of Washington

- Undergraduate Education Committee, Dept. of Mechanical Engineering, UW, Member (2000-01). The committee is involved in undergraduate educational issues in Mechanical Engineering Department. Helped to handle the issue of a joint program between Construction Management and Mechanical Engineering.
- Graduate Program Coordinator (GPC), Dept. of Mechanical Engineering, UW, May 2001-May 2002. This involved coordinating department activities in Graduate Student Recruiting, Admissions, Qualifying Exams, Graduate Seminars and Academic Guidance for Graduate Students.
- Graduate Education Committee (Ex-Officio Member from May 2001- June 2002). Dept. of Mechanical Engineering, UW, May 2001. The committee is involved in graduate educational issues in Mechanical Engineering Department.
- Graduate Admission Committee (Member), Dept. of Mechanical Engineering, UW, November 2001 to June 2002. The committee was involved in admission of Graduate Students.
- Energy & Fluids Faculty Search Committee (Member), Dept. of Mechanical Engineering, UW, 2002-03. Search resulted in the hiring of a Professor in Heat Transfer, Fluids, and Bio-applications.
- ME Department Faculty Council (Member), 2004-2007 Representative of the Systems and Dynamics Group to the Department's faculty council, which advises the Department Chairperson. Areas of counsel include: faculty needs and recruitment, special needs related to areas of curriculum and teaching, and allocation of Department resources.
- ME Staff Search Committee (Member), Dept. of Mechanical Engineering, UW, 2004-05. Search resulted in the hiring of a Fiscal Specialist 1.
- ME Faculty Search Committee (Member), Dept. of Mechanical Engineering, UW, 2004-05. Search resulted in hiring two Tenure-Track Assistant Professors.
- Ad hoc Awards Subcommittee (Member) under the Faculty Affairs Committee, Dept. of Mechanical Engineering, UW, 2005-07. Goal is to identify awards and facilitate the nomination of ME faculty members for these awards.
- ME Faculty Merit Advisory Committee (Member), UW, 2005-06. Committee recommends salary increases for ME full Professors.
- ME Faculty Search Committee (Chair), UW, 2006-07  
General search resulted in the hiring of one Tenure-Track Assistant Professor.
- ME Faculty Affairs Committee (Member), UW, 2008-2011, This standing committee considers and recommends policy regarding faculty development.
- Ad hoc ME Committee on Emerging Research Trends (Chair), UW, 2009  
Goal is to identify emerging trends in research and funding in areas related to the ME discipline, in order to drive future UW ME growth and hiring. The report generated was presented to the ME faculty (Nov 5th 2009), as well as to the ME External Advisory Board (Nov 10th 2009)

- ME Faculty Promotions Advisory Committee (Member), UW, 2010  
This standing committee considers and recommends faculty promotions.
- ME Associate Chair for Research and Infrastructure, UW, 2010-2013  
Activities include: promotion of collaborative research, provide input on hiring and strategic trends, develop a high-impact seminar series, manage departmental space and infrastructure, and supervise associated personnel.
- Health and Energy Faculty Search Committee (Member), Dept. of Mechanical Engineering, UW, 2010-11. Search resulted in the hiring of one Associate Professor.
- ME Research and Resources Committee (Member), UW, 2011. This standing committee considers and recommends policy regarding faculty and departmental resources.
- Health and Energy Faculty Search Committee (Member), Dept. of Mechanical Engineering, UW, 2011-12. Search resulted in the hiring of two Assistant Professors.
- Ad hoc Awards Subcommittee (Chair) under the Faculty Affairs Committee, Dept. of Mechanical Engineering, UW, 2011-12. Goal is to identify awards and facilitate the nomination of ME faculty members for these awards.
- ME Staff Search Committee (Member), Dept. of Mechanical Engineering, UW, 2012. Hired a Senior Computer Specialist.
- Ad hoc Committee for UW ME Dept. Website Design (Chair), 2012.  
Goal is to improve the content on UW ME website.
- Ad hoc Committee for UW ME National Rankings 2012.  
Consider issues in enhancing national visibility of the department.
- Ad hoc Committee for Review of Design Projects for ABET, UW ME 2012.  
Review student reports and make recommendations to department.
- ME Staff Search Committee (Member), Dept. of Mechanical Engineering, UW, 2012-13. Hired Senior Computer Specialist, Engineering Technician, & Program Operation Specialist.
- ME Ad-hoc Committee on Design Education (Member), UW, 2018-19  
Goal: review and update undergraduate capstone design education.
- ME Faculty Search Committee (Member), UW, 2018-21.
- Founding the Advanced Composite Center (ACC), UW, 2019-2022,  
Led the development of human and facilities infrastructure for the ACC

#### **OTHER DEPARTMENTAL SERVICE ACTIVITIES: U. of Washington**

- Organized the Mechanical Engineering Seminar Series (ME520), Autumn 2001
- Ad hoc committee to review and Establish Accounting System Guidelines for RSA and Departmental Gifts, Dept. of Mech. Engineering, UW, Member (one month, March 2001). Reviewed the format of reporting such accounts for John Piety.
- Systems and Dynamics Group Co-Ordinator (2004-2007), Dept. of Mechanical Engineering, UW. Coordinated monthly group meeting to discuss and review teaching-related activities within the group.
- Current Mechatronics Research and Opportunities, September 20<sup>th</sup> 2006, Presentation to ME faculty during annual ME Advance
- Department Strategic Plan, September 19<sup>th</sup> 2008, Helped to lead the discussion on the Department's Strategic Plan during the annual ME Advance

- Founding Director, Advanced Composites Center, ACC, UW, (2019-2022): Led the development of space, equipment, facilities, people and industrial collaborations to create the ACC.

### **DEPARTMENTAL COMMITTEES: U. of Utah**

- Undergraduate Curriculum Committee, U. of Utah, Member (1996-2000).  
A key issue in the committee for the 96-97 year was to develop the curriculum for semester system and to develop a plan for the transition from quarters to semesters. Monitored and developed evaluation criterion to satisfy the ABET 2000 requirements.
- Faculty Search Committee, U. of Utah, Member (1997).  
The search was successful and was aimed at hiring a person in any of the sub-fields in Mechanical Engineering, who would also be the SWE director.
- Thermo-fluid Sciences Faculty Search Committee, U. of Utah, Member, (1995-96).  
The search was successful and involved reviewing around 250 applications.
- Committee to Hire a Part time Technician for the ME Department, U. of Utah, (Efforts started in 1996). Member with Dr. William Van Moorhem and Dr. Larry DeVries. Candidate was selected and hired in August 1999.
- Committee to check whether students have completed requirements for the Mechatronics Certificate, U. of Utah, (with Dr. Sanford Meek, 1998-2000).

### **OTHER DEPARTMENTAL SERVICE AT UTAH**

- Graduate Seminar Organizer for two years, U. of Utah. This involved inviting speakers for these weekly seminars, which are attended by faculty and graduate students (1994-1996).
- Monitoring (with Dr. Sanford Meek) the Mechanical Engineering, U. of Utah, Part of the NSF Traineeship in Human/Computer Interface and Intelligent Control. Traineeship amounts up to \$22,500 are offered to recruit new, exceptional, graduate students to the Mechanical Engineering Department. This involved canvassing and evaluation of new graduate-applications to offer the Traineeship to attract the best students (96-99).
- Played a significant role in creating a new Undergraduate Mechatronics Certificate Program, in the Mechanical Engineering Department, U. of Utah.

### **COLLEGE SERVICE**

- Interim Associate Dean of Research and Graduate Studies, College of Engineering, U. of Washington (UW) (2013-14)
- Associate Dean of Research and Graduate Studies, College of Engineering, U. of Washington (UW) (2014)
- Associate Dean of Research and Faculty Affairs, College of Engineering, U. of Washington (UW) (2014-2017)

## UW COLLEGE COMMITTEES

- EE Dept Chair Search Committee: (2003-2005: Two Years) College committee member with eight others to search for a new Chairperson, Electrical Engineering Department, U. of Washington.
- EE Dept Chair Search Committee: (2007) College committee member with eight others to search for a new Chairperson, Electrical Engineering Department, U. of Washington.
- College Council, (2009-2010) College of Engineering, UW: This council considers and recommends policies and procedures to the Dean of the College of Engineering.
- AA Faculty Search Committee (Member), UW, 2011-12. General search aimed hiring one Tenure-Track Associate/Full Professor in the Controls area.
- Review Committee for Faculty “The Community of Innovators Award,” College of Engineering (COE), UW (Member) 2012: This council recommends faculty for the award to the Dean.
- COE Center Review Committee (Chair), 2104. Review vision, mission, impact and funding for four COE Centers: ADVANCE, the Center for Engineering Learning and Teaching (CELT), the Center for Workforce Development (CWD), and Disabilities, Opportunities, Internetworking, and Technology (DO-IT).
- Search Committee for COE Associate Dean (AD) for Academic Affairs (Chair), 2104.
- Search Committee for the COE Director of Research (Chair), 2106.
- Search Committee for the COE Director of Finance and Administration (Chair), 2106.
- COE Promotion & Tenure Committee to recommend strategies for managing substantial increase in Mandatory and non-mandatory cases in the COE, 2016.
- MSE Faculty Search Committee (external member) in Composites area in the Material Science and Engineering Department, UW, 2108-19.
- Council on Promotion and Tenure, College of Engineering, UW, 2018-onwards.
- COE Strategic Planning Subcommittee, College of Engineering, UW, 2020. Subcommittee to “Increase and Diversify CoE’s Partnerships.”

## OTHER COLLEGE SERVICE (U. of Washington)

- Helped present research project on Prosthesis Testing (with Paul Labossiere) to visiting high-school students during the College Open House, U. of Washington, 2002.
- Visited Lockheed Martin (San Jose, CA) with Lorena McLaren (the Director of Corporate and Foundation Relations at the College of Engineering, U. of Washington) to explore potential research collaborations with UW, April 4<sup>th</sup> 2003.
- Community Outreach: Guided the summer research (2003) of Axum Aragawit; she is an African American student who is a senior at Ballard High. This summer research was conducted as part of the Genomics Outreach for Minorities: (The UW GenOM Project) that is funded by NIH (supplement to the UW Center of Excellence in Genomic Studies, <http://www.life-on-a-chip.org>). Her results were published in the following “A. Aragawit, Science of Cell Migration, *U. of Washington’s Journal of Pre-College and Undergraduate Research in Genomics*, Vol (1) No (1), Fall 2003, pp. 16-19.”
- Cross Department Cultural Change Program (CDCCP): (2004-05) Member in the College of Engineering group under the NSF funded ADVANCE Center for Institutional Change.

The meetings were organized by Joyce W. Yen from the College of Engineering, ADVANCE Program, U. of Washington.

- College of Engineering NIH Workshop June 2, 2004, Guest Speaker (along with Prof. Blake Hannaford, EE Faculty Member) to discuss NIH submittal and panel review process. The main speaker was Associate Dean Mary Lidstrom (who organized the workshop).
- College of Engineering Workshop by the UW ADVANCE Center for Institutional Change, June 21, 2005, Speaker (along with Prof. Susan Eggers, CSE Faculty Member and Prof. Eve Riskin, EE department) to talk about “the promotion to full professor process.”
- Workshop by the UW ADVANCE Center for Institutional Change, May 22, 2006, Speaker (along with Prof. Steve Buck, Chair, Psychology) to talk about “the promotion to full professor process”
- Dean’s Boot Camp, August 16<sup>th</sup>, 2006, Speaker. Presented ME Research Efforts in the Mechatronics Area to the new dean of the College of Engineering, Dean Matthew O’Donnell
- Met with Visitor from Hitachi Global Storage Technologies, October 26<sup>th</sup>, 2006. Organized by Lorena McLaren, Development and External Relations, College of Engineering
- Community Outreach: Guided the summer research (2007) of two high-school juniors (seniors in the 2007-08 academic year). The two students, Ian Cairns and Alex Lee, designed and built a Shape Memory Alloy (SMA) based positioners for manipulating fingers on a “robotic arm.”
- Met with Eric Hill, Visitor from Proctor & Gamble Company (P&G), October 7<sup>th</sup>, 2008. Organized by Lorena McLaren, Development and External Relations, College of Engineering
- Met with Visitors from Johnson Controls, December 2<sup>nd</sup>, 2010. Organized by Lorena McLaren, Development and External Relations, College of Engineering
- Led UW Delegation to Global Grand Challenges Summit, March 12-13, 2013, London, UK organized by the National Academies of Engineering in the UK, US, and China
- UW Lead for the Charles M Vest, NAE Grand Challenges for Engineering International Scholarships, <http://vestscholars.org>, launched in March 2013. This scholarship program provides a new opportunity for graduate students at selected international universities to pursue research addressing a global Grand Challenge at a leading United States university
- Organized the NASA-Industry-UW Workshop on Manufacturing Innovation, October 2<sup>nd</sup>, 2014. The workshop identified needs and gaps for a potential industry-focused center.

### **OTHER COLLEGE SERVICE (U. of Utah)**

- Helped the 1996 Engineering Career Fair, U. of Utah, by demonstrating the Mechatronics Laboratories on Saturday, November 2<sup>nd</sup> 1996.
- Served as a mentor for the 1997 Summer Research Opportunity Program (SROP), U. of Utah, co-sponsored by the Graduate School. SROP aims to increase the number of under-represented minority and low-income undergraduate students to enter graduate school, and

complete it. It is also co-sponsored by the NSF sponsored Western Alliance to Expand Student Opportunities, which is based at Arizona State University.

## UNIVERSITY SERVICE

- University Graduate Council, U. of Utah, Member (2000) The graduate council is responsible for approval of new graduate degree and certificate programs; evaluation of new and existing centers, institutes and bureaus; and subject to approval by the academic senate, the establishment of policies and procedures for the Graduate School.
- U. of Washington (UW), Faculty Council on Instructional Quality (Member), October 2001-2004. The committee is involved in university-wide instructional quality issues.
- UW, Faculty Council on University Facilities and Services (Member), September 2002-2005. The committee is involved in issues related to university-wide facilities.
- UW Program Review Committee (Member), 2006-07. Review of the Department of Construction Management, UW, under the auspices of the Graduate School, the College of Architecture and Urban Planning, the Office of Undergraduate Education, and the Office of the Provost at UW.
- UW Research Advisory Board (Member), 2013-17. Review of the university-wide research issues such as Master agreements, and issues with national funding agencies.
- UW Academic Advisory Group (Member), 2013-17. This group serves under the UW Vice-Provost for research.
- UW Postdoc Affairs Committee (Member) 2013-14. This committee developed recommendations on common issues to consider in the hiring and mentoring of Postdoctoral researchers, and the development of dispute resolution procedures.
- UW Provost's Limited Submissions Committee (Member) 2013-. This committee helps to select proposals that are to be submitted to funding agencies when the number of submissions from UW is limited.
- UW Industry Relations Review Committee (Member) 2013-14. This committee reviewed the current Industry Relations Program at UW and make recommendations to the Provost about its future operational and financial structure.
- UW Advisory Council to the Office of Postdoc Affairs (Member) 2014-17. This committee advises on how to support Postdoc experience at UW.
- UW College of the Environment, Associate Dean for Research Search Advisory Committee (Member) 2015. This committee down-selects the pool of applications and advises the Dean, College of the Environment to hire a new Associate Dean.
- UW Open Access Initiative Advisory Group (Member) 2015-2016. This committee provides advice and guidance on the development of a UW Open Access policy.
- UW Advisory Review Committee on the Dean of the College of the Environment (2016). This committee evaluates the performance of the Dean as part of a periodic 5-year review.



- UW College of the Environment, Associate Dean for Research Search Advisory Committee (Member) 2017. This committee down-selects the pool of applications and advises the Dean, College of the Environment to hire a new Associate Dean.

## PROFESSIONAL SOCIETY SERVICE

### Society Leadership

- Journal Management Committee, IEEE/ASME Transactions on Mechatronics, 2014-17, representative from ASME to the joint IEEE/ASME committee
- ASME Dynamic Systems and Control Division DSCD Honors and Awards Committee  
2015-18. Member (2015); Vice-Chair (2016, 2017, 2018); Chair (2019)
- ASME Dynamic Systems and Control Division (DSCD) Executive Committee.  
July 2017 onwards; 2017 (Junior member); 2018 (Senior member); 2019 (Vice Chair)
- American Automatic Control Council (AACC) Board of Directors.  
ASME Alternate Director, 2017-19; Director 2020 onwards
- American Automatic Control Council (AACC) Nominating Committee.  
Member, 2018 to 2020 (January). The Nominating Committee will seek and refer candidates to the BoD for AACC Officers and AACC Committee Chairs.

### Journal Editorial Positions

- 1 Journal Associate Editor, Journal of Dynamic Systems Measurement and Control by the ASME, 2003-2009.
- 2 Journal Associate Editor, Transactions on Control Systems Technology by the IEEE, 2003-2009.
- 3 Journal Guest Editor, Special Issue on “Dynamics and Control of Micro- and Nano-scale Systems” Transactions on Control Systems Technology by the IEEE, Volume 15, Issue 5, September 2007.
- 4 Journal Guest Editor, Focused Section on “Human-centered Robotics” International Journal of Intelligent Robotics and Applications, for 2018.

### Society Technical Committees

- 1 Technical Panel on Systems Theory (Member) in the ASME Dynamic Systems and Control Division, 2002-04
- 2 Technical Panel on Biomechanical Systems (Chair) in the ASME Dynamic Systems and Control Division, 2004-05.
- 3 Technical Committee on Mechatronics (Member) in the ASME Dynamic Systems and Control Division (DSCD), 2006-15.

### Conference Organizing Committees

- 1 Publications Chair, Conference Operating Committee for the 2010 American Control Conference Baltimore, June-July 2010.
- 2 Publicity Chair, Conference Operating Committee for the 2013 American Control Conference to be held in Washington DC, June-July 2013.
- 3 Publicity Chair, Conference Operating Committee for the 2014 ASME Dynamic Systems and Control Conference (DSCC), San Antonio, TX, 2014.
- 4 Finance Chair, Conference Operating Committee for the 2016 American Control Conference to be held in Boston, MA, 2016.
- 5 General Chair, Conference Operating Committee for the 2020 American Control Conference, to be held in Denver, CO, 2020.
- 6 General Co-Chair, Conference Operating Committee for the IEEE/ASME International Conference on Advanced Intelligent Mechatronics, to be held in Sapporo, Japan, 2022.
- 7 General Chair, Conference Operating Committee for the IEEE/ASME International Conference on Advanced Intelligent Mechatronics, to be held in Seattle, WA, 2023.
- 8 General Co-Chair, Conference Operating Committee for the IEEE/ASME International Conference on Advanced Intelligent Mechatronics, to be held in Boston, WA, 2024.
- 9 Chair, Best Paper Committee for the 2024 IEEE International Conference on Advanced Intelligent Mechatronics (AIM 2024), Boston July 2024.

### Conference Editorial Positions & Committees

- 1 Member, Technical Program Committee, 2001 IEEE Conference on Control Applications, Sept. 2001, Mexico City, Mexico. Helped to get papers reviewed.
- 2 Associate Editor for the 2004 American Control Conference, Boston, Massachusetts. Helped to manage reviews of contributed papers submitted through ASME.
- 3 Associate Editor for the 2005 American Control Conference, Portland, Oregon. Helped to manage reviews of contributed papers submitted through ASME.
- 4 Associate Editor for the 2006 American Control Conference, Minneapolis, Minnesota. Helped to manage reviews of contributed papers submitted through ASME.
- 5 Member, Technical Program Committee for the 2007 American Control Conference, New York City, New York. Tasks include managing reviews of invited sessions, theme sessions, session chair and co-chair nominations, selection of best student papers, and finalize the technical program.
- 6 Associate Editor for the 2007 American Control Conference, New York City, New York. Helped to manage reviews of contributed papers submitted through ASME.
- 7 Mechatronics Journal, Paper Awards Committee, Selection of awards for the 2011 IFAC World Congress.
- 8 Member, Best Paper Committee for the 2017 IEEE International Conference on Advanced Intelligent Mechatronics (AIM 2017), Munich, Germany, July 2017.
- 9 Member, Best Paper Committee for the 2022 IEEE International Conference on Advanced Intelligent Mechatronics (AIM 2022), Japan, July 2022.



### Other Conference and Workshops Activities

- 1 Technical Session Organizer, Organized an invited Session on "Control of Nonminimum Phase Systems" American Control Conference, Chicago, June 2000.
- 2 Panelist to moderate (and report on) the breakout discussion on the "Control" theme in the NSF workshop on "Control and System Integration of Micro- and Nano-Scale Systems." March 29-30, 2004 Arlington, Virginia.
- 3 Session Organizer for *ASME International Mechanical Engineering Congress and Exposition (IMECE)* Orlando, Florida, Nov 5-11, 2005. Oversee the technical content; and monitor the review/acceptance of papers for the Session on "Control and Dynamics Issues in Emerging Bio-Medical Applications."

### Hosting Visiting International Researchers

- 1 Dr. Atul Bhaskar Visiting Faculty at U. of Utah, June-July 1998.  
Currently, Senior Lecturer at School of Engineering Sciences, University of Southampton, UK  
<http://www.soton.ac.uk/ses/people/staff/BhaskarA.html>
- 2 Dr. Martin Kozek Visiting Scholar at U. of Utah, July 1997 to June 1998.  
Currently, Assistant Professor at the Institute for Mechanics and Mechatronics, Vienna University of Technology, Austria.  
<http://www.mechanik.tuwien.ac.at/>
- 3 Dr. Hunmo Kim Visiting Scholar at U. of Washington, July 2002 to June 2003.  
Currently, Professor of Mechanical Engineering, Sungkyunkwan University, Korea. <http://control.skku.ac.kr/>
- 4 Dr. Ming-Shaung Ju Visiting Scholar at U. of Washington, Aug 2009 to October 2009. Currently, Professor of Mechanical Engineering, National Cheng Kung University, Taiwan.  
<http://www.me.ncku.edu.tw/>
- 5 Cheng-Tao Chang Visiting Scholar at U. of Washington, Aug 2009 to October 2009. Visiting from National Cheng Kung University, Taiwan.
- 6 Dr. SangJoo Kwon Visiting Scholar at U. of Washington, Aug 2010 to July 2011.  
Visiting from Korea Aerospace University, Korea.  
<http://mercury.kau.ac.kr/sjkwon>
- 7 Dr. Takehiko Ogawa Visiting Scholar at U. of Washington, Aug 2014 to July 2015.  
Visiting from Dept. of Electronics and Computer Systems, Takushoku University, Hachioji, Tokyo, Japan.
- 8 Sujay Kadam Visiting Scholar at U. of Washington, May 2019 to October 2019. Visiting from IIT Gandhinagar.

## COMMUNITY SERVICE

- Taught mathematics to Juveniles, through the Bennion Center, U. of Utah, for one quarter, evening classes, twice each week, 1995
- Served as a mentor for the School-to Careers program that aims to provide high-school students with hands-on look at their chosen career.
- One high-school student from Brighton High, Eight weeks, Fall Semester, 1998
- Volunteer to help students in High School, who live in buildings owned by the Housing Authority of Salt Lake (HASL). Helped with homework in Math and English, Two Hours each week at Granite Park Junior High School, 450E 3700S, SLC, Utah 84106, Spring Semester, 1999.
- Served as a judge in the First Annual Western Washington State, First Lego League Tournament, Held in the International School Gymnasium, Dec 7<sup>th</sup> 2002.
- Served as a judge for evaluating Student Presentations at the CH2M HILL Mock Project Management Contest organized by CH2M HILL and the UW Diversity and Student Services, at UW, 5.30pm-8.00pm, Feb 27<sup>th</sup> 2006. Student Teams included: (a) Society of Women Engineers; (b) Civil Engineering Student Group, (c) Society of Hispanic Professional Engineers; and (d) American Indian Science and Technology Society.
- Served as a science, technology, engineering, and mathematics (STEM) professional advisor for the Partnership for Science & Engineering Practices program with Seattle Public Schools, Renton School District, the Institute for Systems Biology (ISB) and the University of Washington's College of Education. A core component of the project is to adapt the school districts' current science instructional materials to align with the national Next Generation Science Standards. Issues included integrating the claim, evidence, reasoning (CER) model and Engineering Design into the classroom. Summer 2013.

## NATIONAL OR GOVERNMENTAL SERVICE

### **Panel Member** to Review proposals:

- 1 NSF ENG/DMII Division, 1997.
- 2 NSF ENG/DMII, 2000.
- 3 NSF ENG/DMII Division 2000.
- 4 NSF CMS Division, 2001.
- 5 NSF ENG/DMII Division 2001.
- 6 NIH Tissue Engineering Panel for SBIR/STTR Proposals from NHLBI, 2001.
- 7 NSF DUE, 2002.
- 8 NSF SBIR Proposals, ENG Division, 2002.
- 9 NIH Musculo-skeletal and Dental Sciences Special Emphasis Panel, ZRG1 SSS-M, 2002.
- 10 NSF CMS Division, 2003.
- 11 NIH Microscopic Imaging Study Section, ZRG1 M1 01, July, 2004.
- 12 NSF, CMS Division, Winter Quarter, 2006.
- 13 NIH, Confocal Microscopy Shared Instrumentation Panel, ZRG1-CB-F, September 2006.
- 14 NSF, CMII Division, Fall Quarter, 2006.
- 15 NSF, DGE Division, Spring Quarter, 2007.
- 16 NSF, CMII Division, Spring Quarter, 2007.
- 17 NIH, I-START Program, Summer Quarter, 2008.
- 18 NSF, CMII Division, Fall Quarter, 2008.
- 19 NSF, CMII Division, Spring Quarter, 2010.
- 20 NSF, EEC Division, Spring Quarter, 2011
- 21 NSF, CMII Division, Fall Quarter, 2012.
- 22 NSF, CMII Division, Spring Quarter, 2016.
- 23 NSF, Committee of Visitors (COV), EEC Division, Summer Quarter, 2016.
- 24 NSF, CMII Division, Fall Quarter, 2016.
- 25 NSF, CMII Division, Fall Quarter, 2017.
- 26 NSF, CMII Division, Fall Quarter, 2018.
- 27 NSF, CMII Division, Fall Quarter, 2019.
- 28 NSF, DGE Division, Spring Quarter, 2020.
- 29 NSF, CMII Division, Summer Quarter, 2020.
- 30 NSF, FW-HTF, Directorate of Engineering, Spring Quarter, 2021.
- 31 NSF, Future Manufacturing, Summer Quarter, 2021.
- 32 NSF, NRT, Division of Graduate Education, Fall Quarter, 2021.
- 33 NSF, FW-HTF Panel 1, Directorate of Engineering, Spring Quarter, 2022.
- 34 NSF, FW-HTF Panel 2, Directorate of Engineering, Spring Quarter, 2022.

## KEY ACTIVITIES IN ADMINISTRATIVE ROLES

### GRADUATE PROGRAM CO-ORDINATOR (GPC) AT UW

UW, Mech, Eng, Dept., May 2001-May 2002.

- Student Fellowships: Worked to increase the number of students applying for national fellowships from the ME department. This was done through the following:
  - (a) Generated a list of fellowships (with fellowship amounts, timelines, and web-pages for more information) , which was provided to entering graduate students.
  - (b) Met with and encouraged newly admitted graduate students in Autumn 2001 to apply for these fellowships.
  - (c) Met with (and provided the list of fellowships to) seniors who are interested in graduate school. Encouraged them to apply for Fellowships.
- Admission Process: Revived the Graduate Admissions Committee: Members included W. Li, J. Riley and S. Devasia who helped to make the admissions and fellowships decisions.
- Recruitment: Worked with faculty to increase RA offers to incoming graduate students. Students were made RA offers in combination with TA offers.

### ASSOCIATE CHAIR FOR RESEARCH AND INFRASTRUCTURE

UW Mech. Eng. Dept., (2010-2013)

- New Research Collaborations: Faculty research exchange with the medical school (Dental school), which led to new research collaborations. Developed handouts of faculty research in main research thrusts for the department, i.e., in Energy and Health.
- Graduate Seminars: Developed a weekly departmental graduate seminar series that is well attended by graduate students. Brought top researchers to UW to increase visibility.
- Visibility: Helped to organize and upgrade research-related webpages for the Department. Helped to develop a unified format to display departmental research in the ME building's main hallways, and worked with faculty to update the displays.
- Faculty Awards: Reinitiated the departmental awards committee and successfully nominated faculty to national awards to increase departmental visibility.
- Other Tasks: Updated a database of faculty space usage. Consolidated printer rooms and storage rooms to free office spaces in department. Upgraded the departmental seminar room and student lounges. Managed staff associated with infrastructure such as the machine shop, and departmental labs.
- Professional Masters: Brainstormed with the Chair and Associate Chair for Academic Affairs in initial stages of designing a professional master's program for the department.

## **ASSOCIATE DEAN FOR COLLEGE OF ENGINEERING**

UW, College of Engineering (COE), UW, (2013-17)

- Faculty Hiring: Developed a streamlined process for speedy review and approval of faculty offers, and worked to leverage departmental, college, and university funds for startups.
- Student Recruitment: Developed a new process to substantially increase the number of successful top students recruitment with multi-year Department/COE fellowships.
- Center Organization: Worked with the center director of the UW Joint Center for Aerospace Technology Innovation (JCATI) to develop a rigorous review process that addressed potential conflict of interests, and included feedback to proposal writers.
- Industry Relations: COE lead for developing a Boeing Master Agreement to promote research projects with industry. Worked on a range of issues that included timely publications, and managing (background and project-related) intellectual property.
- Boeing Center Development: Worked with Boeing and Per Reinhall (ME Chair) to put together the Boeing Advanced Research Center (BARC) in Mechanical Engineering.
- Pre-packaged IP: COE lead to develop, with the UW Center for Commercialization, a pre-packaged Intellectual Property (IP) Agreement to foster industry-funded research. UW officially launched this program in 2015.
- College of Engineering (COE) Research Thrusts: Planned and held a UW COE leadership retreat to determine strategic thrust areas for the college. These were identified to be: (i) Engineering and Health; (ii) Engineering and Environment; (iii) Infrastructure and Smart Cities; (iv) Engineering and Energy; and (v) Manufacturing/Aerospace.
- COE Strategic Research Teams, 2014-15: Brought together key faculty in research thrust areas to identify and launch COE-level strategic initiatives in five major thrust areas: Energy, Environment, Health, Infrastructure, and Manufacturing. These initiatives include: (i) multi-departmental cluster hiring of faculty; and (ii) a COE-level Strategic Initiatives Fund for seeding funding high-impact faculty-led research initiatives.
- Industry-focused Center Development 2014-15: Organized the NASA-Industry-UW Workshop on Manufacturing Innovation, October 2nd, 2014. The workshop identified needs and gaps for a potential industry-focused center at UW. Developed a white paper for this center. We submitted a request for information (RFI) towards a potential center.
- Nano Engineering and Sciences Visioning Committee 2015-16: Ex-officio-member. Develop a vision for the new NanoES facilities to enable UW faculty to take the lead in and make an impact on areas of strategic interest to the college such as health care, energy, and manufacturing.

## **FOUNDING DIRECTOR, ADVANCED COMPOSITES CENTER (ACC) 2019-2022**

Led the development of space at Sand Point (Magnuson Park Building 5A, 7561 63rd Ave NE, Seattle, WA, 98115), facilities improvements (e.g., building infrastructure, power), equipment (e.g., robotic automated fiber placement system, robotic inspection system), people (faculty and advisory committees) and industrial collaborations and

partnerships (e.g., Blue Origin, Boeing, Kawasaki, ElectroImpact, and CGTech) to launch the ACC.

#### **DIRECTOR, BOEING ADVANCED RESEARCH CENTER (BARC) 2018-2022**

Led the development of master agreement for the UW-BARC research collaboration (including Intellectual Property issues). Led BARC administration and advisory committees as well as research projects. Launched faculty mentorships at Boeing and Boeing-UW seminar series to promote collaborations.

## **Under-Graduate Student Research**

1. Summer research of Axum Aragawit (2003); an African American senior at Ballard High School. Her results were published in A. Aragawit, Science of Cell Migration, U. of Washington's Journal of Pre-College and Undergraduate Research in Genomics. This was part of the Genomics Outreach for Minorities: the UW GenOM Project is funded by NIH as a supplement to the UW Center of Excellence in Genomic Studies.
2. Brandon Brown (a Filipino-American student) brandon.bbrandon@gmail.com started an independent study as a freshman (in Spring 2006) to see the connection between his math courses and ongoing research efforts in the P.I.'s research group. This was through the University of Washington's MSEP program (Minority Science and Engineering Program), which supports minority student participation in engineering. The next summer, Brandon continued as a research intern in the P.I.'s laboratory as part of an NSF REU project. In the following year, Brandon entered the Industrial Engineering program, which he completed, and is now working as a Mechanical Engineer at Boeing, Long Beach.
3. Alex Ching was funded through NSF REU. As a sophomore majoring in Mechanical and Electrical Engineering with a focus in robotics, investigated the use of fluid waves to actuate a bio-mimetic swimmer as part of his summer research project in 2010. His research can be found at <http://faculty.washington.edu/devasia/teaching.html>.
4. Kurt J. Stalsberg (a Mexican/Chicano Student): research funded through NSF REU from 2010 onwards. He joined our research group as a pre-engineering student through the MSEP program. He is evaluating the design of excitation patterns for legged locomotion in different insects, and is currently using the analysis to design gait patterns for a multi-legged robot (made of leggos). He finished his ME BS program in 2013. Kurt presented his research findings at the following research symposiums.
  - K. J. Stalsberg, Comparison of Gaits of Animal Locomotion, 14th Annual University of Washington Undergraduate Research Symposium, May 20th 2011, U. of Washington, Seattle.
  - K. J. Stalsberg, Comparison and Implementation of Multi-Legged Gait Patterns, 15th Annual University of Washington Undergraduate Research Symposium, May 18th 2012, U. of Washington, Seattle.
  - K. J. Stalsberg, Mechanical Linkage-Based Leg Mechanism, 16th Annual University of Washington Undergraduate Research Symposium, May 17<sup>th</sup> 2013, U. of Washington, Seattle.

5. Minyao (Cheryl) Tan (a female undergraduate student): research funded through NSF REU from 2013 onwards and graduated in 2015. She joined our research group as a pre-engineering student, and worked on bearing design for distributed positioning systems.
  - M. Tan, Design of a Multi-Actuator Piezoelectric Stepper System, 16th Annual University of Washington Undergraduate Research Symposium, May 17<sup>th</sup> 2013, U. of Washington, Seattle.
  - M. Tan, Human-Machine Interface: Human-Intent Estimation Using EMG Sensor Control, 17th Annual University of Washington Undergraduate Research Symposium, May 16th 2014, U. of Washington, Seattle
  - M. Tan, Control of multifunctional robotic hand using surface EMG signals , 18th Annual University of Washington Undergraduate Research Symposium, May 15th 2015, U. of Washington, Seattle
6. Yau Luen (Michael) Ng. He is an undergraduate researcher, who is investigating chaotic mixing using cilia-type actuators. He is finished his ME BS program in 2015. Micahel presented his research findings at the following research symposium.
  - Y. L. Ng, Gentle cilia mixer using rotating magnetic wheel, 18th Annual University of Washington Undergraduate Research Symposium, May 15th 2015, U. of Washington, Seattle.
- Jesse Anthony Hernandez. He was an undergraduate researcher from Physics BS program, who investigated sensors for impact and gait analysis. He presented his research findings at the following research symposium.
  - J. A. Hernandez, Low-cost Flexible Three-dimensionally Printed Insoles with Embedded Sensors, 19th Annual University of Washington Undergraduate Research Symposium, May 20th 2016, U. of Washington, Seattle
- Nini Hong (a female undergraduate student): research funded through NSF REU from 2016 onwards. She joined our research group during her first year in the BS program in Mechanical Engineering.
  - J. A. Hernandez and N. T. Hong, Swarm Robotics, 20<sup>th</sup> Annual University of Washington Undergraduate Research Symposium, May 19<sup>th</sup> 2017, U. of Washington, Seattle
- Alexandra (Lexi) Leo Rohrer (a female undergraduate student from the Department of Human Centered Design and Engineering): research funded through NSF REU from 2017 onwards. She joined our research group during her freshman year in the BS program.  
She is working on human-centered issues in using augmented reality in manufacturing.
  - Lexi L. Rohrer, Principles for applying augmented reality to manufacturing, 21<sup>th</sup> Annual University of Washington Undergraduate Research Symposium, May 18<sup>th</sup> 2018, U. of Washington, Seattle
  - Alexandra Rohrer and Rose Hendrix, Principles for applying augmented reality in manufacturing, MIT IEEE Undergraduate Research Technology Conference (URTC), October 5-7, 2018, MIT, Cambridge, MA, USA



- Maxfield Naoyuki (Maxx) Yamasaki started as a Junior in Computer Science and Engineering with funding from the UW-Boeing BARC lab
  - Maxfield Naoyuki (Maxx) Yamasaki, Noise Impeded Communication Echo, 21<sup>th</sup> Annual University of Washington Undergraduate Research Symposium, May 18<sup>th</sup> 2018, U. of Washington, Seattle
  - Maxfield Naoyuki (Maxx) Yamasaki, Wearable Gesture Sensing in an Industrial Setting, 22nd Annual University of Washington Undergraduate Research Symposium, May 17<sup>th</sup> 2019, U. of Washington, Seattle
- Cato Cannizzo is a Sophomore in Human Centered Design and Engineering with funding from the UW-Boeing BARC lab
  - Cato Cannizzo, Supraspinatus Tear Meta Analysis, 22nd Annual University of Washington Undergraduate Research Symposium, May 17<sup>th</sup> 2019, U. of Washington, Seattle
- Megan Naomi Inouye is a Female Senior in Mechanical Engineering Department with funding from the UW-Boeing BARC lab
  - Megan Naomi Inouye, Modelling Moments in Shoulder Joint to Assess Fatigue Damage, 22nd Annual University of Washington Undergraduate Research Symposium, May 17<sup>th</sup> 2019, U. of Washington, Seattle
- Karli Justine Berger (a female undergraduate student from the Mechanical Engineering Department): research funded through NSF REU from 2018 onwards. She joined our research group during her senior year in the BS program. She is working on human-centered issues in controlling multi-agent systems.
  - Karli Berger, Human-Swarm Interface Design, 22nd Annual University of Washington Undergraduate Research Symposium, May 17<sup>th</sup> 2019, U. of Washington, Seattle.
- Harshavardhan Sameer Raje. He joined our research group as a Junior. Decentralized 2D platoon, 23<sup>rd</sup> Annual University of Washington Undergraduate Research Symposium, May 15<sup>th</sup> 2020, U. of Washington, Seattle.
- Andrew Thomas McCartney. He joined our research group as a Senior in Mechanical Engineering.
- Aaliyah Wu. She joined our research group as a Junior in Mechanical Engineering
- Harvey Ko. He joined our research group as a Junior in Electrical Engineering
  - Andrew Thomas McCartney, Aaliyah Wu, Harvey Ko, *Restricted Area Examination Apparatus*, 26th Annual University of Washington Undergraduate Research Symposium, May 19<sup>th</sup>, 2023, U. of Washington, Seattle.