

Todd D. Murphey

Neuroscience and Robotics Laboratory
Mechanical Engineering
Physical Therapy and Human Movement Sciences
Master of Science in Robotics Program
Northwestern University Interdisciplinary Neuroscience Program
Northwestern Institute on Complex Systems
Center for Engineering and Health
Segal Design Institute
Northwestern University

Tel. (847)467-1041
Fax. (847)491-3915
t-murphey@northwestern.edu
twitter: @todd_murphey

EDUCATION

California Institute of Technology

Pasadena, CA

- Ph.D. in Control and Dynamical Systems, 2002
- Thesis: *Control of Multiple Model Systems*

University of Arizona

Tucson, AZ

- B.S. in Mathematics, *summa cum laude*, 1997

EMPLOYMENT

Northwestern University

2009-present

Charles Deering McCormick Associate Professor

2014-present

Director and Co-Founder of Master of Science in Robotics Program

2013-present

Associate Professor

2011-present

Assistant Professor

2009-2011

University of Colorado at Boulder

2004-2008

Assistant Professor

Aerospace Corporation

2003-2004

Senior Technical Staff

AWARDS AND HONORS

- Northwestern University Cole-Higgins Award for Excellence in Teaching (2015)
- Participant in National Academy of Engineering Frontiers of Engineering Symposium (2014)
- Defense Science Study Group (DSSG)—one of fifteen scientists/engineers nationwide selected to participate in the DARPA/IDA DSSG for the two year program in 2014-2015
- Invited speaker for National Academy of Engineering Frontiers of Engineering Education Symposium (2013)
- Invited speaker for panel *The Uncanny Valley Revisited: A Tribute to Masuhiro Mori* at IROS (2013)
- Created Massive Open Online Course (MOOC): *Everything Is The Same: Modeling Engineered Systems*; <http://www.coursera.org/course/modelsystems>. (2013-2014)

- Lecturer for *Differential-Geometric Methods in Computational Multibody Systems* at the International Centre for Mechanical Sciences (2013)
- Laboratory robots (including robotic marionettes and rehabilitation robotics) featured in National Robotics Week exhibit at the Chicago Museum of Science and Industry (2013)
- Northwestern University Cole-Higgins Award for Excellence in Advising (2013)
- Workshop keynote lecture at European Congress on Computational Mechanics, (2010)
- Participant in National Academy of Engineering Frontiers of Engineering Education Symposium (2009)
- Searle Fellow at Northwestern University (2009-2010)
- Bruce Holland Excellence in Teaching award (2007) (ECE Department at CU Boulder)
- National Science Foundation CAREER award (2006)

PUBLICATIONS,¹ PATENTS, AND SOFTWARE

Books

- [1] G. S. Chirikjian, H. M. Choset, M. A. Morales, and T. D. Murphey, eds., *Algorithmic Foundation of Robotics VIII*, vol. 57 of *Springer Tracts in Advanced Robotics*. Springer-Verlag, 2009.

Journal Articles

- [27] A. Ansari and T. D. Murphey, “Minimum sensitivity control for planning with parametric and hybrid uncertainty,” *International Journal of Robotics Research*, In Press.
- [26] E. Tzorakoleftherakis, A. Ansari, A. Wilson, J. Schultz, and T. D. Murphey, “Model-based reactive control for hybrid and high-dimensional robotic systems,” *IEEE Robotics and Automation Letters*, vol. 1, no. 1, pp. 431–438, 2016.
- [25] T. Caldwell and T. D. Murphey, “Sufficient descent and backtracking for optimal mode scheduling,” *Nonlinear Analysis: Hybrid Systems*, vol. 21, pp. 59–83, 2016.
- [24] L. Miller, Y. Silverman, M. A. MacIver, and T. Murphey, “Ergodic exploration of distributed information,” *IEEE Transactions on Robotics*, vol. 32, no. 1, pp. 36–52, 2016.
- [23] D. Pekarek and T. D. Murphey, “Discrete Lagrangian mechanics for nonsmooth nonseparable systems,” *International Journal for Numerical Methods in Engineering*, vol. 105, pp. 440–463, 2016.
- [22] R. Abbott, A. Pedler, M. Sterling, J. Hides, T. D. Murphey, M. Hoggarth, and J. Elliott, “The geography of fatty infiltrates within the cervical multifidus and semispinalis cervicis in individuals with chronic whiplash-associated disorders,” *Journal of Orthopaedic and Sports Physical Therapy*, vol. 45, no. 4, pp. 281–288, 2015.
- [21] E. Johnson, J. Schultz, and T. D. Murphey, “Linearizations of variational integrators for analysis and optimization,” *IEEE Transactions on Automation Science and Engineering*, vol. 12, no. 1, pp. 14–152, 2015.
- [20] A. Wilson, J. Schultz, and T. D. Murphey, “Trajectory optimization for well-conditioned parameter estimation,” *IEEE Transactions on Automation Science and Engineering*, vol. 12, no. 1, pp. 28–36, 2015.
- [19] A. Wilson, J. Schultz, and T. D. Murphey, “Trajectory synthesis for Fisher information maximization,” *IEEE Transactions on Robotics*, vol. 30, no. 6, pp. 1358–1370, 2014.

¹Reprints of many of these can be found at <http://nrx.northwestern.edu/people/todd-murphey>

- [18] B. Quist, V. Seghete, L. Huet, T. D. Murphey, and M. J. Z. Hartmann, "Modeling forces and moments at the base of a rat vibrissa during non contact whisking and whisking against an object," *Journal of Neuroscience*, vol. 34, pp. 9828–9844, July 2014.
- [17] V. Seghete and T. D. Murphey, "Uniqueness conditions for simultaneous impact in locomotion: existence, uniqueness, and design consequences," *IEEE Transactions on Automation Science and Engineering*, vol. 11, no. 1, pp. 154–168, 2014.
- [16] L. Miller and T. D. Murphey, "Simultaneous optimal estimation of mode transition times and parameters applied to simple traction models," *IEEE Transactions on Robotics*, vol. 29, no. 6, pp. 1496–1503, 2013.
- [15] Y. P. Leong and T. D. Murphey, "Feature localization using kinematics and impulsive hybrid optimization," *IEEE Transactions on Automation Science and Engineering*, vol. 10, no. 4, pp. 957 – 968, 2013.
- [14] T. Caldwell and T. D. Murphey, "Single integration optimization of linear time-varying switched systems," *IEEE Transactions on Automatic Control*, vol. 57, no. 6, pp. 1592–1597, 2012.
- [13] E. Johnson and T. D. Murphey, "Second-order switching time optimization for nonlinear time-varying dynamic systems," *IEEE Transactions on Automatic Control*, vol. 56, no. 8, pp. 1953–1957, 2011.
- [12] P. Martin, E. Johnson, T. D. Murphey, and M. Egerstedt, "Constructing and implementing motion programs for robotic marionettes," *IEEE Transactions on Automatic Control*, vol. 56, no. 4, pp. 902–907, 2011.
- [11] T. Caldwell and T. D. Murphey, "Switching mode generation and optimal estimation with application to skid-steering," *Automatica*, vol. 47, no. 1, pp. 50–64, 2011.
- [10] T. D. Murphey and J. Falcon, "Programming from the ground up in controls laboratories," *International Journal of Engineering Education*, vol. 26, no. 5, pp. 1241–1248, 2010.
- [9] E. Jochum and T. D. Murphey, "A Robotic Pygmalion: Choreography for an automated marionette play," *Puppetry International*, vol. 27, pp. 22–24, 2010.
- [8] E. Johnson and T. D. Murphey, "Scalable variational integrators for constrained mechanical systems in generalized coordinates," *IEEE Transactions on Robotics*, vol. 25, no. 6, pp. 1249–1261, 2009.
- [7] B. Shucker, T. D. Murphey, and J. Bennett, "Convergence preserving switching for topology-dependent decentralized systems," *IEEE Transactions on Robotics*, vol. 24, no. 6, pp. 1405–1415, 2008.
- [6] T. D. Murphey and K. M. Lynch, "Case studies in planar part feeding and assembly based on design of limit sets," *International Journal of Robotics Research*, vol. 27, pp. 693–708, June 2008.
- [5] T. D. Murphey, "Teaching rigid body mechanics using student-created virtual environments," *IEEE Transactions on Education*, vol. 51, no. 1, pp. 45–52, 2008.
- [4] T. D. Murphey, "On multiple model control for multiple contact systems," *Automatica*, vol. 44, pp. 451–458, 2008.
- [3] T. D. Murphey, "Kinematic reductions for uncertain mechanical contact," *Robotica*, vol. 25, pp. 751–764, Nov 2007.
- [2] T. D. Murphey and J. W. Burdick, "The power dissipation method and kinematic reducibility of multiple model robotic systems," *IEEE Transactions on Robotics*, vol. 22, pp. 694–710, August 2006.
- [1] T. D. Murphey and J. W. Burdick, "Feedback control methods for distributed manipulation systems that involve mechanical contacts," *International Journal of Robotics Research*, vol. 23, pp. 763–782, July 2004.

Refereed Book Chapters

- [11] A. Mavrommati, A. Ansari, and T. D. Murphey, *Trends in Control and Decision-Making for Human-Robot Collaboration Systems*, ch. Assistive Optimal Control-on-Request with Application in Standing Balance Therapy and Reinforcement. Springer, 2016. Eds. Y. Wang and F. Zhang.
- [10] J. Schultz, E. Johnson, and T. D. Murphey, *Differential-Geometric Methods in Computational Multibody System Dynamics*, ch. Trajectory Optimization in Discrete Mechanics. CISM, 2015. Eds. Z. Terze and A. Mueller.
- [9] E. Jochum, J. Schultz, E. Johnson, and T. D. Murphey, *Art and Control*, ch. Robotic Puppets and the Engineering of Autonomous Theater. Springer-Verlag, 2013. Eds. A. LaViers and M. Egerstedt.
- [8] E. Jochum and T. D. Murphey, *New Scholarship on Puppetry and Performing Objects*, ch. Programming Play: Puppets, Robots, and Engineering. Springer-Verlag, 2012. Eds. D. Posner, J. Bell, and C. Orenstein.
- [7] M. Travers, T. D. Murphey, and L. Y. Pao, “Impulsive data association with an unknown number of targets,” in *Hybrid Systems: Computation and Control*, pp. 261 – 270, 2011.
- [6] E. Johnson, K. Morris, and T. D. Murphey, *Algorithmic Foundations of Robotics VIII*, ch. A Variational Approach to Strand-Based Modeling of the Human Hand, pp. 151–166. Springer-Verlag, 2010. Eds. G. Chirikjian, H. Choset, M. Morales, T. Murphey.
- [5] T. D. Murphey, *Algorithmic Foundations of Robotics VII*, ch. Mechanical Manipulation Using Reduced Models of Uncertainty, pp. 359–374. Springer-Verlag, 2008. Eds. S Akella, N. Amato, W. Huang, B. Mishra.
- [4] M. Egerstedt, T. D. Murphey, and J. Ludwig, *Hybrid Systems: Computation and Control*, ch. Motion Programs for Puppet Choreography and Control, pp. 190–202. Lecture Notes in Computer Science, Springer-Verlag, 2007. Eds. A. Bemporad, A. Bicchi, and G. C. Buttazzo.
- [3] T. D. Murphey, *Multi-point Interaction with Real and Virtual Objects*, ch. On Observing Contact States in Overconstrained Manipulation, pp. 151–164. Springer-Verlag, 2005. Eds. F. Barbagli, D. Prattichizzo, and K. Salisbury.
- [2] T. D. Murphey and J. W. Burdick, *Algorithmic Foundations of Robotics V*, ch. Feedback Control for Distributed Manipulation, pp. 487–503. Springer-Verlag, 2004. Eds. J. D. Boissonnat, J. Burdick, K. Goldberg, and S. Hutchinson.
- [1] K. M. Lynch and T. D. Murphey, *Control Problems in Robotics and Automation*, ch. Control of Nonprehensile Manipulation, pp. 39–57. Springer-Verlag, 2003. Eds. A. Bicchi and H. Christensen.

Refereed Conference Papers

- [94] G. Mamakoukas, M. MacIver, and T. D. Murphey, “Controlling simulated underactuated underwater vehicles with added mass and velocity drift using sequential action control,” in *American Controls Conf. (ACC)*, 2016.
- [93] G. De La Torre, K. Flaßkamp, A. Prabhakar, and T. D. Murphey, “Ergodic exploration with stochastic sensor dynamics,” in *American Controls Conf. (ACC)*, 2016.
- [92] K. Fitzsimons, E. Tzorakoleftherakis, and T. D. Murphey, “Optimal human-in-the-loop interfaces based on Maxwell’s demon,” in *American Controls Conf. (ACC)*, 2016.
- [91] T. Fan and T. D. Murphey, “Structured linearization of discrete mechanical systems on Lie groups: a synthesis of analysis and control,” in *IEEE Int. Conf. on Decision and Control (CDC)*, pp. 1092 – 1099, 2015.

- [90] A. Prabhakar, K. Flaßkamp, and T. D. Murphey, “Symplectic integration for optimal ergodic control,” in *IEEE Int. Conf. on Decision and Control (CDC)*, pp. 2594 – 2600, 2015.
- [89] E. Tzorakoleftherakis and T. D. Murphey, “Controllers as filters: Noise-driven swing-up control based on Maxwell’s demon,” in *IEEE Int. Conf. on Decision and Control (CDC)*, pp. 4368 – 4374, 2015.
- [88] A. Wilson, J. Schultz, A. Ansari, and T. D. Murphey, “Real-time trajectory synthesis for information maximization using sequential action control and least-squares estimation,” in *IEEE Int. Conf. on Intelligent Robots and Systems (IROS)*, 2015.
- [87] T. Caldwell and T. D. Murphey, “Power network regulation benchmark for switched-mode optimal control,” in *Analysis and Design of Hybrid Systems (ADHS)*, 2015.
- [86] A. Ansari, K. Flaßkamp, and T. D. Murphey, “Sequential action control for tracking of free invariant manifolds,” in *Analysis and Design of Hybrid Systems (ADHS)*, 2015.
- [85] L. Miller and T. D. Murphey, “Optimal planning for target localization and coverage using range sensing,” in *IEEE Int. Conf. on Automation Science and Engineering (CASE)*, pp. 501–508, 2015.
- [84] A. Mavrommati, A. Ansari, and T. D. Murphey, “Optimal control-on-request: An application in real-time assistive balance control,” in *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pp. 5928 – 5934, 2015.
- [83] E. Tzorakoleftherakis, M. C. Bengtson, F. A. Mussa-Ivaldi, R. A. Scheidt, and T. D. Murphey, “Tactile proprioceptive input in robotic rehabilitation after stroke,” in *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pp. 6475 – 6481, 2015.
- [82] A. D. Wilson and T. D. Murphey, “Maximizing Fisher information in discrete-time mechanical systems using projection-based trajectory optimization,” in *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pp. 2403 – 2409, 2015.
- [81] A. Ansari and T. D. Murphey, “Control-on-request: Short-burst assistive control for long time horizon improvement,” in *American Controls Conf. (ACC)*, pp. 1173 – 1180, 2015.
- [80] A. Ansari and T. D. Murphey, “A variational derivation of LQR for piecewise time-varying systems,” in *American Controls Conf. (ACC)*, pp. 2260 – 2265, 2015.
- [79] K. Flaßkamp and T. D. Murphey, “Variational integrators in linear optimal control and filtering,” in *American Controls Conf. (ACC)*, pp. 5140 – 5145, 2015.
- [78] T. Murphey and B. Argall, “Towards software-enabled rehabilitation,” in *IROS Workshop on Workshop on Rehabilitation & Assistive Robotics*, 2014.
- [77] I. D. Neveln, L. M. Miller, M. A. MacIver, and T. Murphey, “Improving object tracking through distributed exploration of an information map,” in *IEEE Int. Conf. on Intelligent Robots and Systems (IROS)*, pp. 3441 – 3447, 2014.
- [76] A. Mavrommati and T. D. Murphey, “Single-integration mode scheduling for linear time-varying switched systems,” in *American Controls Conf. (ACC)*, pp. 430 – 436, 2014.
- [75] E. Tzorakoleftherakis, F. Mussa-Ivaldi, R. Scheidt, and T. D. Murphey, “Effects of optimal tactile feedback in balancing tasks: a pilot study,” in *American Controls Conf. (ACC)*, pp. 778 – 783, 2014.
- [74] V. Seghete and T. D. Murphey, “Continuous-time optimal control of impacting mechanical systems via a projected Hamilton’s principle,” in *American Controls Conf. (ACC)*, pp. 2438 – 2444, 2014.
- [73] J. Schultz and T. D. Murphey, “Extending filter performance through structured integration,” in *American Controls Conf. (ACC)*, pp. 261 – 270, 2014.

- [72] A. Wilson and T. D. Murphey, “Local E-optimality conditions for trajectory design to estimate parameters in nonlinear systems,” in *American Controls Conf. (ACC)*, pp. 443 – 450, 2014.
- [71] E. Jochum, J. Schultz, and T. Murphey, “Engineering autonomous theatre: The impact of culture on mobile robots and automated systems,” in *AAMAS Workshop on Culture Aware Robotics*, 2014.
- [70] E. Jochum, G. Borggreen, and T. Murphey, “INTERACT: Applying theory and methods from the visual and performing arts to robots,” in *HRI-Workshop on Culture Aware Robotics*, 2014.
- [69] T. Caldwell and T. D. Murphey, “Projection-based optimal mode scheduling,” in *IEEE Int. Conf. on Decision and Control (CDC)*, pp. 5307 – 5314, 2013.
- [68] L. Miller and T. D. Murphey, “Trajectory optimization for continuous ergodic exploration on the motion group $SE(2)$,” in *IEEE Int. Conf. on Decision and Control (CDC)*, pp. 4517 – 4522, 2013.
- [67] D. Pekarek and T. D. Murphey, “A projected Lagrange-d’Alembert principle for forced nonsmooth mechanics and optimal control,” in *IEEE Int. Conf. on Decision and Control (CDC)*, pp. 7777 – 7784, 2013.
- [66] A. Ansari and T. Murphey, “Minimal sensitivity control for hybrid environments,” in *IEEE Int. Conf. on Intelligent Robots and Systems (IROS)*, pp. 3023 – 3028, 2013.
- [65] Y. Silverman, L. Miller, M. MacIver, and T. D. Murphey, “Optimal planning for information acquisition,” in *IEEE Int. Conf. on Intelligent Robots and Systems (IROS)*, pp. 5974 – 5980, 2013.
- [64] A. D. Wilson and T. D. Murphey, “Optimal trajectory design for well-conditioned parameter estimation,” in *IEEE Int. Conf. on Automation Science and Engineering (CASE)*, pp. 13–19, 2013. Finalist for ABB Best Conference Paper Award.
- [63] K. Flaßkamp, T. D. Murphey, and S. Ober-Blöbaum, “Discretized switching time optimization problems,” in *European Control Conference (ECC)*, pp. 3179–3184, 2013.
- [62] Y. P. Leong and T. D. Murphey, “Second-order switching time and magnitude optimization for impulsive hybrid systems,” in *American Controls Conf. (ACC)*, pp. 6213–6218, 2013.
- [61] L. M. Miller and T. D. Murphey, “Trajectory optimization for continuous ergodic exploration,” in *American Controls Conf. (ACC)*, pp. 4196–4201, 2013.
- [60] J. Schultz and T. D. Murphey, “Embedded control synthesis using one-step methods in discrete mechanics,” in *American Controls Conf. (ACC)*, pp. 5293–5298, 2013.
- [59] A. Ansari and T. D. Murphey, “Minimal parametric sensitivity trajectories for nonlinear systems,” in *American Controls Conf. (ACC)*, pp. 5011–5016, 2013.
- [58] D. Pekarek and T. D. Murphey, “Global projections for variational nonsmooth mechanics,” in *IEEE Int. Conf. on Decision and Control (CDC)*, pp. 5572–5579, 2012.
- [57] L. Miller and T. D. Murphey, “Optimal contact decisions for ergodic exploration,” in *IEEE Int. Conf. on Decision and Control (CDC)*, pp. 5091–5097, 2012.
- [56] T. Caldwell and T. D. Murphey, “Projection-based switching system optimization: Absolute continuity of the line search,” in *IEEE Int. Conf. on Decision and Control (CDC)*, pp. 699–706, 2012.
- [55] K. Flaßkamp, T. D. Murphey, and S. Ober-Blöbaum, “Switching time optimization in discretized hybrid dynamical systems,” in *IEEE Int. Conf. on Decision and Control (CDC)*, pp. 707–712, 2012.
- [54] L. Miller and T. D. Murphey, “Simultaneous optimal parameter and mode transition estimation,” in *IEEE Int. Conf. on Intelligent Robots and Systems (IROS)*, pp. 719–724, 2012.

- [53] D. Pekarek and T. D. Murphey, "Variational nonsmooth mechanics via a projected Hamilton's principle," in *American Controls Conf. (ACC)*, pp. 1040–1046, 2012.
- [52] M. Travers, T. D. Murphey, and L. Y. Pao, "Linear time-varying impulse optimization for data association," in *American Controls Conf. (ACC)*, pp. 1047–1052, 2012.
- [51] T. Caldwell and T. D. Murphey, "Projection-based switching time optimization," in *American Controls Conf. (ACC)*, pp. 4552–4557, 2012.
- [50] T. D. Murphey and B. Argall, "Making robotic marionettes perform," in *ICRA Workshop on Robotics and Performance Arts: Reciprocal Influences*, 2012.
- [49] B. Tovar and T. D. Murphey, "Trajectory tracking among landmarks and binary sensor beams," in *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pp. 2121–2127, 2012.
- [48] V. Seghete and T. D. Murphey, "Conditions for uniqueness in simultaneous impact with application to mechanical design," in *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pp. 5006–5011, 2012.
- [47] J. Schultz and T. D. Murphey, "Trajectory generation for underactuated control of a suspended mass," in *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pp. 123–129, 2012.
- [46] D. Pekarek and T. D. Murphey, "A backwards error analysis approach for simulation and control of nonsmooth mechanical systems," in *IEEE Int. Conf. on Decision and Control (CDC)*, pp. 6942–6949, 2011.
- [45] T. Caldwell and T. D. Murphey, "Single integration optimization of linear time-varying switched systems," in *American Controls Conf. (ACC)*, pp. 2024–2030, 2011.
- [44] M. Travers, T. D. Murphey, and L. Y. Pao, "Trajectory optimization estimator for impulsive data association," in *American Controls Conf. (ACC)*, pp. 4514–4519, 2011.
- [43] T. D. Murphey and E. Johnson, "Control aesthetics in software for automated marionettes," in *American Controls Conf. (ACC)*, pp. 3825 – 3830, 2011.
- [42] A. Long, T. D. Murphey, and K. M. Lynch, "Optimal motion planning for a class of hybrid dynamical systems with impacts," in *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pp. 4220 – 4226, 2011.
- [41] T. Caldwell and T. D. Murphey, "An adjoint method for second-order switching-time optimization," in *IEEE Int. Conf. on Decision and Control (CDC)*, pp. 2155–2162, 2010.
- [40] M. Travers, L. Pao, and T. D. Murphey, "Data association with impulse optimization," in *IEEE Int. Conf. on Decision and Control (CDC)*, pp. 2204–2209, 2010.
- [39] K. Snyder and T. D. Murphey, "Second-order DMOC using projections," in *IEEE Int. Conf. on Decision and Control (CDC)*, pp. 1872–1878, 2010.
- [38] E. Johnson and T. D. Murphey, "Local planning using switching time optimization," in *IEEE Int. Conf. on Automation Science and Engineering (CASE)*, pp. 828–834, 2010.
- [37] C. Gibson and T. D. Murphey, "Geometric integration of impact during an orbital docking procedure," in *IEEE Int. Conf. on Automation Science and Engineering (CASE)*, pp. 928–932, 2010.
- [36] E. Johnson and T. D. Murphey, "Linearizations for mechanical systems in generalized coordinates," in *American Controls Conf. (ACC)*, pp. 629–633, 2010.
- [35] M. Travers, T. D. Murphey, and L. Y. Pao, "Stochastic sampling-based data association," in *American Controls Conf. (ACC)*, pp. 1386–1391, 2010.
- [34] V. Seghete and T. D. Murphey, "Variational solutions to simultaneous collisions between multiple rigid bodies," in *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pp. 2731–2738, 2010.
- [33] T. Caldwell and T. D. Murphey, "Relaxed optimization for mode estimation in skid steering," in *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pp. 5423–5428, 2010.

- [32] E. Johnson and T. D. Murphey, "Second order switching time optimization for time-varying nonlinear systems," in *IEEE Int. Conf. on Decision and Control (CDC)*, pp. 5281 – 5286, 2009.
- [31] V. Seghete and T. D. Murphey, "Multiple instantaneous collisions in a variational framework," in *IEEE Int. Conf. on Decision and Control (CDC)*, pp. 5015 – 5020, 2009.
- [30] E. Johnson and T. D. Murphey, "Automated trajectory morphing for marionettes using trajectory optimization," in *IEEE Int. Conf. on Automation Science and Engineering (CASE)*, pp. 274–279, 2009.
- [29] T. Caldwell and T. D. Murphey, "Second-order optimal estimation of slip state for a simple slip-steered vehicle," in *IEEE Int. Conf. on Automation Science and Engineering (CASE)*, pp. 133–139, 2009.
- [28] E. Johnson and T. D. Murphey, "Dangers of two-point holonomic constraints for variational integrators," in *American Controls Conf. (ACC)*, pp. 4723–4728, 2009.
- [27] K. Nichols and T. D. Murphey, "Variational integrators for constrained cables," in *IEEE Int. Conf. on Automation Science and Engineering (CASE)*, pp. 802–807, 2008.
- [26] T. D. Murphey, "Filtering of interaction rules in cooperation," in *American Controls Conf. (ACC)*, pp. 3733–3739, 2008.
- [25] M. Travers, T. D. Murphey, and L. Pao, "Data association with ambiguous measurements," in *American Controls Conf. (ACC)*, pp. 1875–1880, 2008.
- [24] E. Johnson and T. D. Murphey, "Discrete and continuous mechanics for tree representations of mechanical systems," in *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pp. 1106–1111, 2008.
- [23] T. D. Murphey and M. Horowitz, "Adaptive cooperative manipulation with intermittent contact," in *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pp. 1483–1488, 2008.
- [22] T. D. Murphey, "Geometric derived information spaces in manipulation with mechanical contact," in *IEEE Int. Conf. on Automation Science and Engineering (CASE)*, pp. 338–345, 2007.
- [21] E. Johnson and T. D. Murphey, "Dynamic modeling and motion planning for marionettes: Rigid bodies articulated by massless strings," in *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pp. 330–335, 2007.
- [20] T. D. Murphey, "Teaching rigid body mechanics using student-created virtual environments," in *American Controls Conf. (ACC)*, pp. 2503–2508, 2007.
- [19] B. Shucker, T. D. Murphey, and J. Bennett, "Switching rules for decentralized control with simple control laws," in *American Controls Conf. (ACC)*, pp. 1485–1492, 2007.
- [18] T. D. Murphey and J. Falcon, "Programming from the ground up in controls laboratories using graphical programming," in *Proceedings of the IFAC Advances in Control Education (ACE)*, p. 6 pages, 2006.
- [17] T. D. Murphey, "Modeling and control of multiple-contact manipulation without modeling friction," in *American Controls Conf. (ACC)*, pp. 3227–3234, 2006.
- [16] B. Shucker, T. D. Murphey, and J. Bennett, "An approach to switching control beyond nearest neighbor rules," in *American Controls Conf. (ACC)*, pp. 5959–5965, 2006.
- [15] T. D. Murphey, "Motion planning for kinematically overconstrained vehicles using feedback primitives," in *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pp. 1643–1648, 2006.
- [14] B. Shucker, T. D. Murphey, and J. Bennett, "Cooperative control using occasional non-local interactions," in *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pp. 1324–1329, 2006.

- [13] T. D. Murphey, J. Bernheisel, D. Choi, and K. M. Lynch, “An example of parts handling and self-assembly using stable limit sets,” in *IEEE Int. Conf. on Intelligent Robots and Systems (IROS)*, pp. 1624–1629, 2005.
- [12] T. D. Murphey, “Application of supervisory control methods to uncertain multiple model systems,” in *American Controls Conf. (ACC)*, pp. 774–780, 2005.
- [11] T. D. Murphey, D. Choi, J. Bernheisel, and K. M. Lynch, “Experiments in the use of stable limits sets for parts handling,” in *Proc. Int. Conf. MEMS, NANO, and Smart Systems (ICMENS)*, pp. 218–224, 2004.
- [10] T. D. Murphey and J. W. Burdick, “Kinematic reducibility for multiple model systems,” in *IEEE Int. Conf. on Decision and Control (CDC)*, pp. 5307–5313, 2003.
- [9] T. D. Murphey and J. W. Burdick, “Experiments in nonsmooth control of distributed manipulation,” in *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pp. 3600–3606, 2003.
- [8] T. D. Murphey and J. W. Burdick, “Smooth feedback control algorithms for fully actuated distributed manipulators,” in *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pp. 3619–3623, 2003.
- [7] T. D. Murphey and J. W. Burdick, “Nonsmooth controllability theory and an example,” in *IEEE Int. Conf. on Decision and Control (CDC)*, pp. 370–376, 2002.
- [6] T. D. Murphey and J. W. Burdick, “Global exponential stabilizability for distributed manipulation,” in *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pp. 1210–1216, 2002.
- [5] T. D. Murphey and J. W. Burdick, “A local controllability test for nonlinear multiple model systems,” in *American Controls Conf. (ACC)*, pp. 4657–4661, 2002.
- [4] T. D. Murphey and J. W. Burdick, “Global stability for distributed systems with changing contact states,” in *IEEE Int. Conf. on Intelligent Robots and Systems (IROS)*, pp. 214–219, 2001.
- [3] T. D. Murphey and J. W. Burdick, “A controllability test and motion planning primitives for overconstrained vehicles,” in *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pp. 2716–2722, 2001.
- [2] T. D. Murphey and J. W. Burdick, “On the stability and design of distributed systems,” in *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pp. 2686–2691, 2001.
- [1] T. D. Murphey and J. W. Burdick, “Issues in controllability and motion planning for overconstrained wheeled vehicles,” in *Proc. Int. Conf. Math. Theory of Networks and Systems (MTNS)*, p. 8 pages, 2000.

Unrefereed Papers, Abstracts, and Posters

- [13] T. D. Murphey, “Sequential action control for nonlinear and hybrid systems,” in *Proceedings of the Annual Meeting of the International Association of Applied Mathematics and Mechanics (GAMM)*, 2015.
- [12] J. Schultz and T. Murphey, “Real-time trajectory generation for a planar crane using discrete mechanics,” in *IROS Workshop on Real-Time Systems*, 2014.
- [11] R. Abbott, A. Pedler, M. Sterling, J. Hides, T. Murphey, M. Hoggarth, and J. Elliott, “The distribution of muscle fat infiltration within the deep extensor muscles in whiplash-associated disorders,” in *American Physical Therapy Association Combined Sessions Meeting: Orthopaedics*, 2015.
- [10] B. Argall and T. Murphey, “Computable trust in human instruction,” in *AAAI Symposium on AI for Human-Robot Interaction*, 2014.

- [9] K. Flaßkamp, T. D. Murphey, and S. Ober-Blöbaum, “Optimization for discretized switched systems,” in *Annual Meeting of the International Association of Applied Mathematics and Mechanics*, 2013.
- [8] T. D. Murphey, D. Pekarek, and V. Seghete, “Variational methods for contact mechanics,” in *Robotics Science and Systems Workshop: Toward High-Performance Computing Support for Simulation and Planning of Robot Contact Tasks*, 2011.
- [7] B. Quist, V. Seghete, T. D. Murphey, and M. Hartmann, “Modeling forces and moments at the vibrissal base during natural motion and collisions,” in *The Royal Society*, 2011.
- [6] G. S. Chirikjian, H. M. Choset, M. A. Morales, and T. D. Murphey, “Editorial: Special issue on eighth international workshop on the algorithmic foundations of robotics,” *International Journal of Robotics Research*, 2010.
- [5] T. D. Murphey, “Topology-based variational integration of degenerate interconnected mechanical systems,” in *European Conference on Computational Mechanics (ECCM)*, 2010.
- [4] T. D. Murphey, “Poster: Hybrid sensing with physical sensors,” in *Int. Conf. on Chaos and Nonlinear Dynamics*, 2010.
- [3] K. L. Snyder and T. D. Murphey, “Abstract: Mathematical tools for tracking uncertainty through gait,” in *Dynamic Walking: Principles and Concepts of Legged Locomotion*, 2009. 1 page.
- [2] E. Johnson and T. D. Murphey, “The automated marionette project,” in *AAAI Robotics and Creativity Workshop*, 2008.
- [1] T. D. Murphey and M. E. Egerstedt, “Choreography for marionettes: Imitation, planning, and control,” in *IEEE Int. Conf. on Intelligent Robots and Systems Workshop on Art and Robotics*, 2007. 6 pages.

Patents

- [1] A. Ansari and T.D. Murphey. Sequential Action Control. Provisional Patent Submitted.

Publicly Available Software

- [1] E. Johnson, J. Schultz, and T.D. Murphey. The `trep` environment is a computation package for simulation and control of constrained mechanical systems. The `trep` environment is available at <https://github.com/MurpheyLab/trep>.

MEDIA AND ARTS

- Panelist for the Northwestern Master of Project Management Program Symposium *Robotics in the Built Environment*.
- Panelist for Volkenburg Puppetry Symposium *The Uncanny Valley: Real Fakeness and Fake Realness*.
- Op-Ed: “Creating Content for Many to Access a Few” in *Pacific Standard Magazine*, March, 2014.
- Talk: “Context and Liveness” at panel *The Uncanny Valley Revisited: A Tribute to Masuhiro Mori* at IROS (2013)
- Exhibit: laboratory robots (including robotic marionettes, Kinect interfaces, and rehabilitation robotics) featured in National Robotics Week exhibit at the Chicago Museum of Science and Industry (2013)
- Talk: “Robotic Puppets and Resisting Control” at the *ICRA Workshop on Art and Robotics: Freud’s Unheimlich and the Uncanny Valley, Germany, May, 2013*

- Talk: “Robotic Puppets and the Engineering of Autonomous Theater” at the *Science Cafe, Evanston, IL, April, 2013*
- Talk “Walk this Way!” (Primarily Andy Ruina’s talk, with my participation) at the *Science Caberet, Ithaca, NY, Feb. 2013*
- Talk: “Physical Animation: Control Design for Animatronic Marionettes” at the *IDETC/CIE panel on Entertainment Engineering, August, 2012*
- Exhibit: laboratory robots (including robotic marionettes and humanoid robots) featured in National Robotics Week exhibit at the Chicago Museum of Science and Industry (2012)
- Talk: “Making Marionettes Move” at the *Museum of Science and Industry, National Robotics Week, April, 2012*
- Talk: “The Reality of Robotics: Challenges of Everyday Robots.” at the *Museum of Science and Industry, Rosenwald Society Luncheon, Chicago, August, 2011*

Invited Talks

- COMPUTATIONAL CONTROL ENGINES FOR ROBOTIC SYSTEMS. *University of Illinois, IL, Feb. 2016*
- CONTROL FOR INFORMATION ACQUISITION. *University of North Carolina, Charlotte, NC, Jan. 2014 — Air Force Research Laboratory, NM, Aug. 2014 — Feinberg School of Medicine, Northwestern University, July, 2015 — Georgia Institute of Technology, GA, Aug. 2015*
- OPEN OPERATING SYSTEMS IN LOW-INFRASTRUCTURE TESTBEDS. *NSF Workshop on Accessible Remote Testbeds, NSF, Nov., 2015*
- HIGH PERFORMANCE CONTROL USING LOW PERFORMANCE INFRASTRUCTURE. *Los Alamos National Laboratory, NM, Jan., 2015 — Georgia Institute of Technology, GA, Feb., 2015 — Ohio State University, October, 2015 —*
- SEQUENTIAL ACTION CONTROL: CLOSED-FORM FEEDBACK CONTROL FOR NONLINEAR SYSTEMS. *Georgia Institute of Technology, GA, Oct., 2014*
- MOOCs AND ONLINE COURSES IN ENGINEERING EDUCATION. *National Academy of Engineering Frontiers of Engineering Education Workshop, Irvine, CA, Oct., 2013 — ASME Congress Workshop, San Diego, CA, Nov., 2013 — University of Maryland, MD, Jan. 2014 — Notre Dame, IN, Sept. 2014*
- TOPOLOGY SCHEDULING FOR POWER NETWORK STABILITY. *Argonne National Laboratory, IL, March, 2013 — Argonne National Laboratory, IL, April, 2013 — Northwestern Institute for Complex Systems, IL, May, 2013*
- CONTROL SYNTHESIS FOR DISCRETE MECHANICAL SYSTEMS *Complex Systems Seminar, Northwestern University, Jan., 2012 — Michigan Institute of Technology, Sept., 2012 — Cornell University, NY, Feb., 2013*
- HYBRID CONTROL FOR MECHANICAL SYSTEMS. *University of Paderborn, Germany, Aug., 2011 — University of New Mexico, Albuquerque, Dec., 2011*
- CHOREOGRAPHY AND CONTROL FOR ROBOTIC SYSTEMS. *Robotics Institute, Carnegie Mellon University, Pittsburgh, PA, Oct., 2010. Available at <https://www.youtube.com/watch?v=i3jWwwISNPY>.*
- TOPOLOGY-BASED VARIATIONAL INTEGRATION OF DEGENERATE INTERCONNECTED MECHANICAL SYSTEMS. *Northwestern University, Evanston, Illinois, March, 2008 — ICRA Workshop on Modeling Contact in Manipulation and Locomotion, Pasadena, California, May, 2008 — AAAI Robotics Workshop: Creativity and Robotics, Chicago, Illinois, July, 2008 — University of Wyoming, Oct. 2008 —*

Structured Integrator Workshop, May, 2009 — RSS Workshop on Algorithmic Automation, June, 2009 — Rehabilitation Institute of Chicago, Aug., 2009 — University of California, Berkeley, Feb. 2010 — Keynote Lecture: European Congress on Computational Mechanics - Symposium on Advanced Numerical Methods in Multibody Systems and Control, Apr. 2010

- MODE ESTIMATION USING RELAXATIONS OF PROJECTIONS. *Applied Mathematics, Northwestern University, Oct. 2009 — Illinois Institute of Technology, Nov. 2009 — University of Illinois, Urbana-Champaign, Nov. 2009 — University of Pennsylvania, Jan. 2010*
- AUTOMATIC SYNTHESIS OF MOTION IMITATION IN MARIONETTES. *Northwestern University, Evanston, Illinois, May 2007 — IROS Workshop on Art and Robots, San Diego, California, Nov., 2007*

FUNDING

- Todd D. Murphey (PI), Eva Kanso, Yasamin Mostofi, Evangelos Theodorou. Army Research Office: *Study Proposal: Transforming Terrestrial Agility At All Scales.* \$60,000.
- Mitra Hartmann (PI), Todd Murphey, John Rudnicki, Sara Solla. National Institutes of Health: *Coding properties of Vibrissal-Responsive Trigeminal Ganglion Neurons.* \$1,800,000.
- Todd D. Murphey. Army Research Office: *Ergodic Control for Optimal Information Acquisition.* \$360,000.
- Todd D. Murphey (PI, 50%), J. Edward Colgate (Co-PI, 50%). National Science Foundation–National Robotics Initiative: *Autonomous Synthesis of Haptic Languages.* \$585,000.
- Malcolm A. MacIver (PI, 40%), Michael Peshkin (Co-PI, 30%), Todd D. Murphey (Co-PI, 30%). Office of Naval Research: *A Bio-Inspired Underwater Robot for Station Keeping with Omnidirectional Disturbances.* \$1,000,000.
- Todd D. Murphey (PI, 35%), Brenna Argall (Co-PI, 35%), and Magnus Egerstedt (Co-PI, 30%). National Science Foundation–Civil and Mechanical Systems: *Collaborative Research: Mutually stabilized correction in physical demonstration.* \$1,000,000.
- Todd D. Murphey (PI, 50%) and Melvin Leok (Co-PI, 50%). National Science Foundation–Civil and Mechanical Systems: *Ergodic Trajectories in Discrete Mechanics.* \$430,000.
- Todd D. Murphey. National Institute of Health–R24: *Exoskeleton Evaluation for Hemiplegia Therapy.* \$50,000.
- Todd D. Murphey. National Science Foundation–Civil and Mechanical Systems: *Physical Design and Feedback Control of Hybrid Mechanical Systems.* \$350,000.
- Kevin Lynch (PI), Brenna Argall, J. Edward Colgate, Todd D. Murphey, and Ying Wu (Co-PIs). National Science Foundation: *MRI: Equipment Development: Bimanual Robotic Manipulation and Sensory Workspace.* \$400,000.
- Todd D. Murphey (PI, 50%) and Kevin Lynch (Co-PI, 50%). National Science Foundation–Robust Intelligence: *Hierarchical Planning, Estimation, and Control for Hybrid Mechanical Systems.* \$450,000.
- W. Murray (PI, 50%), T. D. Murphey (Co-PI, 50%), National Institutes of Health: *Prosthesis Control by Forward Simulation of the Intact Biomedical System.* (Northwestern portion) \$550,000.

- Todd D. Murphey (Consultant to Kinea, 10%) DARPA: *SBIR Phase I: Tactile Detection Robotic Hand System*. Murphey's portion is \$10,000
- Todd D. Murphey (PI, 50%) and Magnus Egerstedt (Co-PI, 50%). National Science Foundation–CreativeIT: *Collaborative Research: Major: Puppet Choreography and Automated Marionettes*. \$800,000.
- Magnus Egerstedt (Co-PI, 50%) and Todd D. Murphey (PI, 50%). National Science Foundation–Software for Real-World Systems: *Collaborative Proposal: Abstraction-Based Motion Programs for Complex, Interconnected Systems*. \$450,000.
- Lucy Y. Pao (PI, 50%) and Todd D. Murphey (Co-PI, 50%). Air Force Research Laboratory: *Data Association and Sensor Management Algorithms for Tracking Applications*. \$250,000.
- Todd D. Murphey. National Science Foundation–Advanced Learning Technology: *Assessment of Controls Laboratory*. \$24,591.
- Todd D. Murphey. National Science Foundation–Civil and Mechanical Systems: *CAREER: Planning and Control for Overconstrained Mechanisms*. \$400,000.
- Other support from Disney/Imagineering, the Aerospace Corporation, and the National Instruments Foundation in excess of \$100,000.

TEACHING

Coursera

2013-present, www.coursera.org

- Created and taught course: *Everything Is The Same: Modeling Engineered Systems*; available at <http://www.coursera.org/course/modelsystems>.

International Centre for Mechanical Sciences (CISM)

2013, Udine, Italy

- Lecturer for *Differential-Geometric Methods in Computational Multibody Systems*. (My portion of the lectures focused on engineering applications of structured integration and optimal control in the context of structured integration.)

Northwestern University

2009-present, Evanston, IL

- Created and taught course: *Stochastic Systems in Robotics* (Spring, 2011)
- Created and taught course: *Theory of Machines: Dynamics ME 314* (2009-2014)
- Taught course: *Systems Dynamics, EA-3* (2009-2014)
- Created and taught course: *Introduction to Optimal Control, ME 454* (2009-2014)

University of Colorado

2004-2008, Boulder, CO

- Created and taught course: *Engineering Freshman Honors Colloquium: Everything and More—A History of Limits and the Development of Modern Calculus* (Spring 2008)
- Created and taught course: *Engineering Freshman Projects: Algorithms in Robotics, GEEN 1400* (Fall 2007, 2008)
- Created and taught course: *Introduction to Geometric Mechanics and Control ECEN 4028/5028* (Spring 2006)
- Created and taught course: *Robot Dynamics and Motion Planning ECEN 4028/5028* (Spring 2006)
- Taught course: *Control Systems Analysis ECEN 4138* (Fall 2005, 2006)

- Created and taught laboratory: *Control Systems Lab ECEN 4638* (Fall 2005, 2006, 2007, 2008)
- Created and taught course: *Robot Control ECEN 5438* (Spring 2005, 2007)

PROFESSIONAL ACTIVITIES

- Senior Editor for *IEEE Transactions on Robotics* (2014-present)
- Associate Editor for
 - *IEEE Transactions on Automation Science and Engineering* (2010-present)
 - *IEEE Transactions on Robotics* (2008-2012)
 - *Robotica* (2007-2011)
- Chair: Northwestern University Faculty Distance Learning Workgroup
- Member: Northwestern University Task Force on the Undergraduate Academic Experience
- Member: Northwestern University Segal Design Institute Research Council
- Member: Northwestern University Segal Design Institute Education Council
- Member: Feinberg School of Medicine DPT/PhD T32 Steering Committee
- Member: University of Copenhagen *Robot Culture and Aesthetics* Advisory Board
- Participant in 2013 Kellogg School of Management Executive Education Program *Management Skills for Innovative University Leaders*.
- Conference Organization
 - Local Arrangements Chair for the 2014 *IEEE International Conference on Intelligent Robots and Systems (IROS)*
 - Publication Chair for the 2010 *IEEE International Conference on Automation Science and Engineering (CASE)*
 - Co-Organizer (with Greg Chirikjian, Howie Choset, and Marco Morales) of 2008 *Workshop on the Algorithmic Foundations of Robotics (WAFR)*
- Workshop Organization
 - Co-Organizer (with Ken Goldberg, Vijay Kumar, and Frank van der Stappen) of 2009 *RSS Workshop on Algorithmic Automation*
 - Co-Chair (with Ken Goldberg, Jean-Paul Laumond, and Vijay Kumar) of CASE 2008 workshop: *Workshop on Algorithmic Automation*
 - Co-Organizer (with Vijay Kumar) of ICRA 2008 workshop: *Contact Models for Manipulation and Locomotion*
 - Co-Organizer (with Francisco Valero-Cuevas and Yoky Matsuoka) of ICRA 2008 workshop: *Is human-like dextrous manipulation within our robotic grasp?*
- Participant in the National Science Foundation and Computing Community Consortium (CCC) *Workshop on Robotics in Manufacturing and Automation*
- Member of the ASME Entertainment Engineering Sub-Committee
- Conference Program committees
 - 2016 *Robotics: Science and Systems*: Area Chair
 - 2016 *Workshop on the Algorithmic Foundations of Robotics*
 - 2015 *IFAC Conference on Analysis and Design of Hybrid Systems*
 - 2012 *Workshop on the Algorithmic Foundations of Robotics*
 - 2009 *Robotics: Science and Systems*
 - 2008 *Hybrid Systems: Computation and Control*
 - 2008 *Robotics: Science and Systems*
 - 2008 *IEEE International Conference on Robotics and Automation*

- 2008 *IEEE Conference on Automation Science and Engineering*
- 2007 *IEEE/RSJ International Conference on Intelligent Robots and Systems*
- 2007 *International Conference on Advanced Robotics*
- 2007 *International Conference on Networked Robots*
- 2007 *IEEE International Conference on Robotics and Automation*
- 2006 *IEEE/RSJ International Conference on Intelligent Robots and Systems*
- 2006 *IEEE International Conference on Robotics and Automation*
- 2005 *Robotics: Science and Systems*
- 2005 *IEEE/RSJ International Conference on Intelligent Robots and Systems*
- 2001 *IEEE/RSJ International Conference on Intelligent Robots and Systems*
- Other Conference Committees
 - ICRA Best Student Paper 2012 (Chair)
 - CASE Best Paper 2010
 - ICRA Best Student Paper 2008
- Member of IEEE Robotics and Automation Society chapter award committee
- National Science Foundation Panelist for four panels in 2006, 2009, and 2010 for panels in computer science, control theory, and engineering education.
- Member of IEEE Robotics and Automation Society Conference Review board in 2004
- Reviewer for most of the significant journals in Robotics and Control
- Member, IEEE, and ASME
- Industrial Consulting and Research Partnerships
 - Disney R&D and Imagineering
 - National Instruments

STUDENTS AND POSTDOCS ADVISED

- Postdocs
 - Dr. Gerardo de la Torre (ME at Northwestern University)
 - Dr. Kathrin Flaßkamp (ME at Northwestern University)
 - Dr. David Pekarek (ME at Northwestern University), now at Data Tactics
 - Dr. Benjamin Tovar (ME at Northwestern University), now at Notre Dame
- Ph.D. Students
 - Brian Shucker (CS at University of Colorado), 2006 Ph.D. thesis: *Control of Distributed Robotic Macrosensors*, now at MIT Lincoln Laboratories.
 - Matt Travers (ME at Northwestern University), 2011 Ph.D. thesis: *Impulse Smoothing for Data Association*, now a researcher at Carnegie Mellon University.
 - Elliot Johnson (ME at Northwestern University), 2012 Ph.D. thesis: *Trajectory Optimization and Regulation for Constrained Discrete Mechanical Systems*, now at the Southwester Research Institute.
 - Elizabeth Jochum (Performance Studies at the University of Colorado), 2013 Ph.D. thesis: *Deux Ex Machina: Towards an Aesthetics of Autonomous and Semi-Autonomous Machines*, now faculty at Aalborg University.

- Tim Caldwell (ME at Northwestern University), 2013 Ph.D. thesis: *Iterative Methods in Switched System Optimal Control*, previously a postdoc at the University of Colorado at Boulder and now at Zoox (a driverless car startup company).
- Vlad Seghete (ME at Northwestern University), 2014 Ph.D. thesis: *Numerical Methods for Simulation and Control of Impacting Mechanical Systems*. Now at DataScope Analytics.
- Jarvis Schultz (ME at Northwestern University), 2014 Ph.D. thesis: *Discrete Mechanics Computation for Real-Time Embedded Control*, now at Northwestern University.
- Andrew Wilson (ME at Northwestern University) 2015 Ph.D. thesis: *Information-based Trajectory Optimization for Active Estimation in Mechanical Systems*.
- Alex Ansari (ME at Northwestern University), 2015 Ph.D. thesis: *Sequential Action Control: Closed-Form Optimal Feedback for Nonlinear and Hybrid Systems*. Now a postdoc at Carnegie Mellon University.
- Lauren Miller (ME at Northwestern University), 2015 Ph.D. thesis: *Optimal Ergodic Control for Active Search and Information Acquisition*. Now a postdoc at UC Berkeley.
- Rebecca Abbott (ME/Physical Therapy at Northwestern University)
- Anastasia Mavrommati (ME at Northwestern University)
- Emmanouil Tzorakoleftherakis (ME at Northwestern University)
- Ahalya Prabhakar (ME at Northwestern University)
- Kathleen Fitzsimons (ME at Northwestern University)
- Giorgos Mamakoukas (ME at Northwestern University)
- Taosha Fan (ME at Northwestern University)
- Ian Abraham (ME at Northwestern University)
- Undergraduate Students
 - Kirk Nichols (ECE at University of Colorado), now a graduate student at Stanford
 - Corrina Gibson (Aerospace at University of Colorado), now at the Jet Propulsion Laboratory
 - Matanya Horowitz (ECE at University of Colorado), now a graduate student at Caltech
 - Yoke Peng Leong (ME at Northwestern University), now a graduate student at Caltech
 - Katy Powers (ME at Northwestern University), now a graduate student at the University of Pennsylvania
 - Henry Hung (ME at Northwestern University, current)
 - Camaria Lehman (BME at Northwestern University, current)
 - Elliot Hevel (ME at Northwestern University, current)
- Visiting Students

- Amy LaViers (Georgia Institute of Technology, USA)
- Rowland O'Flaherty (Georgia Institute of Technology, USA)
- Kathrin Flaskamp (Univ. of Paderborn, Germany)
- Peter Kingston (Georgia Institute of Technology, USA)