Raffaello D'Andrea

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EDUCATION

Ph.D., California Institute of Technology, Electrical Engineering. 1997.
M.S., California Institute of Technology, Electrical Engineering. 1992.
B.Sc., University of Toronto, Engineering Science. 1991.

APPOINTMENTS

Professor of Dynamic Systems and Control, ETH Zurich. Since 2007.
Technical Co-Founder and Chief Technical Advisor, Kiva Systems Inc. Since 2004.
Assistant/Associate Professor, Cornell University, Mechanical and Aerospace Engineering. 1997 - 2007.

AWARDS & HONORS

Best Paper Award Finalist, IEEE International Conference on Robotics and Automation. 2010.
IEEE Fellow. 2010.
IEEE-IFR Invention and Entrepreneurship Award in Robotics and Automation. 2008.
Prix Ars Electronica - Honorary Mention: The Robotic Chair. 2006.
Cornell University Provost Award for Distinguished Scholarship. 2006.
RoboCup Second Place Winners, F180 League, Systems Architect and Faculty Advisor. Osaka, Japan. 2005.
Robert '55 and Vanne '57 Cowie Excellence in Teaching Award, Cornell College of Engineering. 2005.
RoboCup World Champions, F180 League, Systems Architect and Faculty Advisor. Padova, Italy. 2003.
RoboCup World Champions, F180 League, Systems Architect and Faculty Advisor. Fukuoka, Japan. 2002.
Presidential Early Career Award for Scientists and Engineers (PECASE). 2001.
RoboCup Third Place Winners, F180 League, Systems Architect and Faculty Advisor. Seattle, USA. 2001.
Vida Life 4.0 Art & Artificial Life International Competition - Honorary Mention: The Table. 2001.
CAREER Award, National Science Foundation. 2000.
RoboCup World Champions, F180 League, Systems Architect and Faculty Advisor. Melbourne, Australia. 2000.
J.P. and Mary Berger '50 Excellence in Teaching Award, Cornell College of Engineering. 2000.
D. G. Shepherd Teaching Prize, Sibley School of Mechanical and Aerospace Engineering. 1999.
RoboCup World Champions, F180 League, Systems Architect and Faculty Advisor. Stockholm, Sweden. 1999.
Best Student Paper Award, Conference on Decision and Control. 1996.
O. Hugo Schuck Best Paper Award, American Control Conference. 1994.
Natural Sciences and Engineering Research Council of Canada 1967 Fellow. 1991-1996.
University of Toronto Wilson Medal. 1991.

KEYNOTES, PLENARIES, AND OTHER SPEAKING ENGAGEMENTS

Invited Speaker, 10th International Symposium on Distributed Autonomous Robotic Systems, 2010.
Plenary Speaker, IEEE International Conference on Robotics and Automation, 2010.
University of Dallas Center for Values in Medicine, Science, and Technology Lecture Series, 2010.
Invited Speaker, IFAC Workshop on Estimation and Control of Networked Systems, 2009.
Plenary Speaker, NIST Workshop on Performance Metrics for Intelligent Systems, 2009.
Invited Speaker, International Symposium of Robotics Research (ISRR), 2009.
Keynote Speaker, Philips Conference on Applications of Control Technology. 2009.
Presenter, DLD Conference 2009.
Distinguished Lecture Series, Electrical and Computer Engineering, University of Toronto. 2008.
Dean's Distinguished Lecture Series, Faculty of Engineering, Yale University. 2008.
Tetelman Lecture, Yale University. 2008.
Keynote Speaker, International Conference on Robot Communication and Coordination. 2007.
Plenary Speaker, Northeast Control Workshop. 2007.
Plenary Speaker, Conference on Cellular Automata for Research and Industry. 2006.
Presenter, ideaCity 2006.
Feature Speaker, Engineering Science Education Conference, University of Toronto. 2006.
Kate Gleason College of Engineering Distinguished Speaker Series, Rochester Institute of Technology. 2005.
Invited Speaker, the Engineering Academy of Japan International Symposium. 2004.
Plenary Speaker, Robot Motion Control Conference. 2004.
Air Force Rome Laboratories Information Institute's Frontiers in Information Sciences Distinguished Lecture Series. 2004.
Invited Speaker, Spoletoscienza, Spoleto Festival. 2003.
Plenary Speaker, American Control Conference. 2003.

Keynote Speaker, University of Toronto Engineering Science Annual Dinner. 2003.
Special Topic Invited Speaker, Mathematical Theory of Networks and Systems Conference. 2002.
Plenary Speaker, SIAM Conference on Control and its Applications. 2001.
Sigma Series public Lecture and Colloquium, NASA Langley Research Center. 2001.
Invited Speaker, National Science Foundation Research Highlight Series. 2001.
Evening Plenary Speaker, IEEE Conference on Decision and Control. 2000.

INVITED LECTURES AND SEMINARS

University of Toronto, Systems Control Group Seminar Series. May 2010.
University of California, Santa Barbara, Department of Mechanical Engineering. February 2010.
ETHZ, Optimization and Applications Seminar, Switzerland. May 2009.
Google, Zurich, Switzerland. April 2009.
ABB Corporate Research, Baden, Switzerland. March 2009.
Eindhoven University of Technology, Department of Mechanical Engineering, the Netherlands. February 2009.
University of Illinois at Urbana Champaign, Electrical and Computer Engineering Department. December 2008.
ETHZ, Institute of Neuroinformatics, Switzerland. October 2008.
University of Waterloo, Electrical and Computer Engineering Department, Canada. October 2008.
Lund Institute of Technology, Department of Automatic Control, Sweden. September 2008.
Stuttgart University, Kolloquium Technische Kybernetik, Germany. June 2008.
University of Padova, Dipartimento di Ingegneria dell'Informazione, Italy. May 2008.
EPFL, Automatic Control Laboratory, Switzerland. April 2008.
Tufts University, Department of Mechanical Engineering, USA. November 2007.
Universidad ORT Uruguay, La Facultad de Ingeniera, Uruguay. December 2006.
Massachusetts Institute of Technology, Department of Aeronautics and Astronautics, USA. May 2006.
Cornell University, Computer Science Department, USA. February 2006.
ETHZ, Automatic Control Seminar, Switzerland. January 2006.
Massachusetts Institute of Technology, Laboratory for Information and Decision Systems, USA. September 2005.
Cornell University, Johnson School of Management, USA. April 2005.
Boston University, Electrical and Computer Engineering Department, USA. March 2005.
Charles Stark Draper Laboratory, USA. January 2005.
Tokyo Institute of Technology, Department of Control and Systems Engineering, Japan. October 2004.
Tokyo Denki University, Japan. October 2004.
ETHZ, Automatic Control Seminar, Switzerland. September 2004.
Lund Institute of Technology, Department of Automatic Control, Sweden. May 2004.
Cornelia Street Cafe, Roald Hoffmann's Entertaining Science Cabaret: The Engineer and the Artist, USA. May 2004.
NSF Workshop for High School Teachers and Students for Maui District, USA. December 2003.
University of Pennsylvania, Mechanical Engineering and Applied Mechanics Department, USA. November 2003.
Stanford University, Aerospace Engineering Department, USA. September 2003.
Charles River Analytics, USA. August 2003.
University of Padova, Dipartimento di Ingegneria dell'Informazione, USA. July 2003.
University of Illinois at Urbana Champaign, Aeronautical and Astronautical Engineering Department, USA. April 2003.
Vanderbilt Electrical Engineering and Computer Science Lecture Series, USA. November 2002.
National Gallery of Canada, Public Lecture (with artist Max Dean), Canada. October 2002.
Massachusetts Institute of Technology, The Center for Bits and Atoms, USA. October 2002.
University of Florida, Research Institute for Autonomous Precision Guided Systems, USA. May 2002.
GRASP Laboratory, University of Pennsylvania, Philadelphia, Pennsylvania. May 2002.
AFOSR Workshop on Future Directions in Control, Arlington, Virginia. April 2002.
Invited Speaker, National Science Foundation, National Engineers Week , Arlington, Virginia. February 2002.
University of California, Santa Barbara, Mechanical and Environmental Engineering. January 2001.
Lund Institute of Technology, Department of Automatic Control, Sweden. June 2000.
ETH Zurich, Automatic Control Seminar, Switzerland. June 2000.
EPFL Lausanne, Autonomous System Lab, Switzerland. June 2000.
NSF Workshop for High School Teachers of Mathematics and Science, Chicago, IL. June 2000.
Lucent Technologies, Murray Hill, New Jersey. May 2000.
University of California, San Diego, Mechanical and Aerospace Engineering. May 2000.
California Institute of Technology, Mechanical Engineering, Pasadena, CA. March 2000.
IEEE Industrial Robotics and Automation Seminar, Binghampton University, NY. February 2000.
California Institute of Technology, Control and Dynamical Systems, Pasadena, CA. November 1999.
Princeton University, Mechanical and Aerospace Engineering, Princeton, NJ. October 1999.
Yale University, Electrical Engineering, New Haven, CT. September 1999.
Universal Instruments Corporation, Binghamton, NY. September 1999.
Wright Patterson Air Force Base, Air Vehicles Directorate, Dayton, OH. July 1999.
University of Toronto, Canada, Electrical and Computer Engineering. April 1999.
Colorado State University, Electrical and Computer Engineering, Fort Collins, CO. March 1999.
University of California, Los Angeles, Mechanical and Aerospace Engineering. March 1999.
University of California, Santa Barbara, Center for Control Engineering and Computation. March 1999.
Massachusetts Institute of Technology, Laboratory for Information and Decision Systems, Boston, MA. February 1999.

Xerox Distinguished Lecture Series in Control and Diagnostics, Webster, NY. November 1998.
University of Michigan, Mechanical Engineering, Ann Arbor, MI. October 1998.
University of California, Berkeley, Mechanical Engineering. December 1996.
University of California, Los Angeles, Mechanical and Aerospace Engineering. December 1996.
University of California, Santa Barbara, Electrical Engineering. November 1996.
Massachusetts Institute of Technology, Laboratory for Information and Decision Systems, Boston, MA. August 1996.
Cornell University, Mechanical and Aerospace Engineering, May 1996.
Texas A & M University, Mechanical Engineering. April 1996.
University of Minnesota, Aerospace Engineering. April 1996.
University of Illinois at Chicago, Mechanical Engineering. March 1996.
McGill University, Canada, Electrical Engineering. May 1995.
University of Toronto, Canada, Electrical and Computer Engineering. May 1995.
University of Padova, Italy, Systems and Mathematics. October 1994.
University of Groningen, Mathematics Institute, System Theory Group, the Netherlands. September 1994.

PUBLICATIONS

JOURNALS AND BOOK CHAPTERS

[1] M. Sherback, F. J. Valero-Cuevas, and R. D'Andrea. Slower visuomotor corrections with unchanged latency are consistent with optimal adaptation to increased endogenous noise in the elderly. *PLoS Computational Biology*, To appear, 2010.

[2] R. S. Chandra, C. Langbort, and R. D'Andrea. Distributed control design with robustness to small time delays. *Systems and Control Letters*, 58(4):296–303, 2009.

[3] M. Sherback and R. D'Andrea. Visuomotor optimality and its utility in parametrization of response. *Biomedical Engineering, IEEE Transactions on*, 55(7):1783–1791, July 2008.

[4] M. R. Jovanović, J.M. Fowler, B. Bamieh, and R. D'Andrea. On the peaking phenomenon in the control of vehicular platoons. *Systems & Control Letters*, 57(7):528–537, 2008.

[5] O. Purwin and R. D'Andrea. Theory and implementation of path planning by negotiation for decentralized agents. *Robotics and Autonomous Systems*, 56(5):422–436, 2008.

[6] P. Wurman, R. D'Andrea, and M. Mountz. Coordinating hundreds of cooperative, autonomous vehicles in warehouses. *AI Magazine*, 29(1):9–19, 2008.

[7] K. Li and R. D'Andrea. Motion design and learning of autonomous robots based on primitives and heuristic cost-to-go. *Robotics and Autonomous Systems*, 56(8):658–669, 2008.

[8] Ramu S. Chandra, Sean H. Breheny, and Raffaello D'Andrea. Antenna array synthesis with clusters of unmanned aerial vehicles. *Automatica*, 44(8):1976–1984, 2008.

[9] V. G. Rao and R. D'Andrea. Patch models and their applications to multi-vehicle command and control. *IEEE Transactions on Systems, Man and Cybernetics, Part B*, 37(3):680–691, 2007.

[10] M. Earl and R. D'Andrea. A decomposition approach to multi-vehicle cooperative control. *Robotics and Autonomous Systems*, 55:276–291, 2007.

[11] J. Fowler and R. D'Andrea. Structured analysis of piecewise-linear interconnected systems. *International Journal of Robust and Nonlinear Control*, 17(18):1754–1770, 2007.

[12] M. G. Earl and R. D'Andrea. Multi-vehicle cooperative control using mixed integer linear programming. In J. S. Shamma, editor, *Cooperative Control of Distributed Multi-Agent Systems*. John Wiley and Sons, 2007.

[13] V. G. Rao, S. Goldfarb, and R. D'Andrea. Multi-vehicle command and control with patch models. In J. S. Shamma, editor, *Cooperative Control of Distributed Multi-Agent Systems*. John Wiley and Sons, 2007.

[14] M. Sherback, O. Purwin, and R. D'Andrea. Real-time motion planning and control in the 2005 Cornell RoboCup system. In *Lecture Notes in Control and Information Sciences*, number 335, pages 245–264. Springer, 2006.

[15] R. Chandra and R. D'Andrea. A scaled small gain theorem with applications to spatially interconnected systems. *IEEE Transactions on Automatic Control*, 51(3):465–469, 2006.

[16] M. Earl and R. D'Andrea. Design and implementation of a minimum time transition for an inverted pendulum. *International Journal for Manufacturing Science and Technology*, 8(2):11–16, 2006.

[17] O. Purwin and R. D'Andrea. Trajectory generation and control for four wheeled omnidirectional vehicles. *Robotics and Autonomous Systems*, 54:13–22, 2006.

[18] M. Earl and R. D'Andrea. Iterative MILP methods for vehicle control problems. *IEEE Transactions on Robotics*, 21(6):1158–1167, 2005.

[19] C. Langbort and R. D'Andrea. Distributed control of spatially reversible interconnected systems with boundary conditions. *SIAM Journal of Control and Optimization*, 44(1):1–28, 2005.

[20] R. D'Andrea. The Cornell RoboCup Soccer Team: 1999 - 2003. In B. Levine and D. Hristu, editors, *Handbook of Networked and Embedded Control Systems*, pages 793–804. Birkhauser, 2005.

[21] G. E. Dullerud and R. D'Andrea. Distributed control of heterogeneous systems. *IEEE Transactions on Automatic Control*, 49(12):2113–2128, 2004.

[22] C. Beck and R. D'Andrea. Noncommuting multi-dimensional realization theory: Minimality, reachability, and observability. *IEEE Transactions on Automatic Control*, 49(10):1815–1820, 2004.

[23] C. Langbort, R. Chandra, and R. D'Andrea. Distributed control of heterogeneous systems interconnected over an arbitrary graph. *IEEE Transactions on Automatic Control*, 9(49):1502–1519, 2004.

[24] B. Recht and R. D'Andrea. Distributed control of systems over discrete groups. *IEEE Transactions on Automatic Control*, 49(9):1446–1452, 2004.

[25] T. K. Nagy, R. D'Andrea, and P. Ganguly. Near-optimal dynamic trajectory generation and control of an omnidirectional vehicle. *Robotics and Autonomous Systems*, 46:47–64, 2004.

[26] J. M. Fowler and R. D'Andrea. A formation flight experiment: Constructing a test-bed for research in control of interconnected systems. *Control Systems Magazine*, 23(5):35–43, 2003.

[27] R. D'Andrea and G. E. Dullerud. Distributed control design for spatially interconnected systems. *IEEE Transactions on Automatic Control*, 48(9):1478–1495, 2003.

[28] R. D'Andrea, C. Langbort, and R. Chandra. A state space approach to control of interconnected systems. In J. Rosenthal and D. S. Gilliam, editors, *Mathematical Systems Theory in Biology, Communication, Computation and Finance*, pages 157–182. Springer, IMA Book Series, 2003.

[29] M. Thothadri, R. Casas, F. C. Moon, R. D'Andrea, and R. Johnson. Nonlinear system identification of multi-degree-of-freedom systems. *Nonlinear Dynamics*, 32(3):307–322, 2003.

[30] O. Purwin and R. D'Andrea. Cornell Big Red 2003. In D. Polani, A. Bonarini, B. Browning, and K. Yoshida, editors, *RoboCup 2003: Robot Soccer World Cup VII*, Lecture Notes in Computer Science. Springer, 2003.

[31] M. Jun and R. D'Andrea. Path planning for unmanned aerial vehicles in uncertain and adversarial environments. In S. Butenko, R. Murphey, and P. Pardalos, editors, *Cooperative Control: Models, Applications and Algorithms*, chapter 6, pages 95–111. Kluwer, 2002.

[32] R. D'Andrea and R. S. H. Istepanian. Design of full state feedback finite precision controllers. *International Journal of Robust and Nonlinear Control*, (12):537–553, 2002.

[33] P. Stone, M. Asada, T. Balch, R. D'Andrea, M. Fujita, B. Hengst, G. Kraetzschmar, P. Lima, N. Lau, H. Lund, D. Polani, P. Scerri, S. Tadokoro, T. Weigel, and G. Wyeth. RoboCup-2000: The fourth robotic soccer world championships. *AI Magazine*, 22(1):11–38, 2001.

[34] R. D'Andrea. Linear matrix inequality conditions for robustness and control design. *International Journal of Robust and Nonlinear Control*, (11):541–554, 2001.

[35] R. D'Andrea. Convex and finite dimensional conditions for controller synthesis with dynamic integral constraints. *IEEE Transactions on Automatic Control*, 46(2):222–234, 2001.

[36] R. D'Andrea, P. Ganguly, T. Nagy, and M. Babish. The Cornell robot soccer team. In P. Stone, T. Balch, and G. Kraetzschmar, editors, *RoboCup-00: Robot Soccer World Cup IV*, Lecture Notes in Computer Science. Springer, 2001.

[37] R. D'Andrea and J. C. Doyle. Full information and full control in a behavioral setting. *Systems and Control Letters*, 41(2):85–93, 2000.

[38] R. D'Andrea and J.W. Lee. Cornell Big Red: Small Size League Winner. *AI Magazine*, 21(3):41–44, 2000.

[39] R. D'Andrea. Extension of Parrott's theorem to non-definite scalings. *IEEE Transactions on Automatic Control*, 45(5):937–940, 2000.

[40] R. D'Andrea. Robot soccer: A platform for systems engineering. *Computers in Education Journal*, 10(1):57–61, 2000.

[41] R. D'Andrea and J.W. Lee. The Cornell robot soccer team. In M. Veloso, E. Pagello, and H. Kitano, editors, *RoboCup-99: Robot Soccer World Cup III*, Lecture Notes in Computer Science. Springer, 2000.

[42] R. D'Andrea and J.C. Doyle. Full information and full control in a behavioral setting. In J. W. Polderman and H. L. Trentelman, editors, *the Mathematics of Systems and Control*. University of Groningen, 1999.

[43] R. D'Andrea. Generalized l2 synthesis. *IEEE Transactions on Automatic Control*, 44(6):1145–1156, 1999.

[44] R. D'Andrea, R. L. Behnken, and R. M. Murray. Rotating stall control of an axial flow compressor using pulsed air injection. *Journal of Turbomachinery*, 119(4):742–752, 1997.

[45] R. D'Andrea. H-Infinity optimal interconnections. *Systems and Control Letters*, 32(5):313–322, 1997.

REFEREED PROCEEDINGS

[46] A. Schöllig, F. Augugliaro, and R. D'Andrea. Synchronizing the motion of a quadrocopter to music. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, 2010. to appear.

[47] S. Lupashin, A. Schoellig, M. Sherback, and R. D'Andrea. A simple learning strategy for high-speed quadrocopter multi-flips. In *International Conference on Robotics and Automation*, 2010. To appear.

[48] R. Oung, F. Bougault, M. Donovan, and R. D'Andrea. The distributed flight array. In *IEEE International Conference on Robotics and Automation*, 2010. To appear.

[49] S. Trimpe and R. D'Andrea. Accelerometer-based tilt estimation of a rigid body with only rotational degrees of freedom. In *International Conference on Robotics and Automation*, 2010. To appear.

[50] S. Trimpe and R. D'Andrea. A limiting property of the matrix exponential with application to multi-loop control. In *IEEE Conference on Decision and Control*, pages 6419–6425, 2009.

[51] R. Oung, A. Ramezani, and R. D'Andrea. Feasibility of a distributed flight array. In *IEEE Conference on Decision and Control*, pages 3038–3044, 2009.

[52] A. Schoellig and R. D'Andrea. Optimization-based iterative learning control for trajectory tracking. *Proceedings of the European Control Conference*, pages 1505–1510, 2009.

[53] P. Reist and R. D'Andrea. Bouncing an unconstrained ball in three dimensions with a blind juggling robot. In *International Conference on Robotics and Automation*, pages 1774–1781, 2009.

[54] O. Purwin and R. D'Andrea. Performing aggressive maneuvers using iterative learning control. In *International Conference on Robotics and Automation*, pages 1731 – 1736, 2009.

[55] K. Li and R. D'Andrea. An order-based approach to mission-oriented autonomous robot control: Managing complexity, merging multiple plans, and performance analysis given partial probabilistic information. In *Proc. IFAC World Congress*, 2008.

[56] P. Wurman, R. D'Andrea, and M. Mountz. Coordinating hundreds of cooperative, autonomous vehicles in warehouses. In *Prof. Conference on Innovative Applications of Artificial Intelligence*, pages 1752–1757, 2007.

[57] M. Sherback and R. D'Andrea. An optimal control approach to sensorimotor parametrization. In *Proc. American Control Conference*, pages 2036– 2041, 2007.

[58] O. Purwin and R. D'Andrea. Path planning by negotiation for decentralized agents. In *Proc. American Control Conference*, pages 5296–5301, 2007.

[59] K. Li and R. D'Andrea. Trajectory design of autonomous vehicles based on motion primitives and heuristic cost-to-go functions. In *Proc. IEEE Conference on Decision and Control*, 2006.

[60] K. Chung, V. G. Rao, and R. D'Andrea. Predictable motion in unpredictable domains: The spotlight tracking problem. In *AIAA Guidance, Navigation and Control Conference*, 2006. AIAA-2006-6247.

[61] S. Goldfarb, V. G. Rao, and R. D'Andrea. Agent-based modeling with polygon primitives for aerospace applications. In *AIAA Guidance, Navigation and Control Conference*, 2006. AIAA-2006-6469.

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[63] V. G. Rao, T. Wongpiromsarn, T. Ho, K. Chung, and R. D'Andrea. Encapsulated path planning for abstraction-based control of multi-vehicle systems. In *Proc. American Control Conference*, pages 2995–3000, 2006.

[64] R. Chandra and R. D'Andrea. Antenna array synthesis with clusters of unmanned aerial vehicles. In *Proc. American Control Conference*, pages 3575–3580, 2006.

[65] S. Farahmand, G. Giannakis, Z.Q. Luo, and R. DAndrea. An affine approximation to the robust beamforming problem. In *IEEE Workshop on Computational Advances in Multi-Sensor Adaptive Processing*, pages 117–120, 2005.

[66] M. G. Earl and R. D'Andrea. Phase transitions in the multi-vehicle task assignment problem. In *ASME International Mechanical Engineering Congress and Exposition*, 2005.

[67] R. Chandra, C. Langbort, and R. D'Andrea. Distributed control design with robustness to small time delays. In *Proc. American Control Conference*, pages 4850–4855, 2005.

[68] O. Purwin and R. D'Andrea. Trajectory generation for four wheeled omnidirectional vehicles. In *Proc. American Control Conference*, pages 4979–4984, 2005.

[69] T. Wongpiromsarn, V. G. Rao, and R. D'Andrea. Two approaches for dynamic refinement in hierarchical motion planning. In *AIAA Guidance, Navigation and Control Conference*, San Jose, CA, August 2005. AIAA-2005-6194.

[70] M. G. Earl and R. D'Andrea. Iterative MILP methods for vehicle control problems. In *Proc. IEEE Conference on Decision and Control*, pages 4369–4374, 2004.

[71] M. G. Earl and R. D'Andrea. Real-time attitude estimation techniques applied to a four rotor helicopter. In *Proc. IEEE Conference on Decision and Control*, pages 3956–3961, 2004.

[72] A. Chaudhry, K. Misovec, and R. D'Andrea. Low observability path planning for an unmanned air vehicle using mixed integer linear programming. In *Proc. IEEE Conference on Decision and Control*, pages 3823–3829, 2004.

[73] C. Langbort, L. Xiao, R. D'Andrea, and S. Boyd. A decomposition approach to distributed analysis of networked systems. In *Conference on Decision and Control*, pages 3980–3985, 2004.

[74] R. Chandra, C. Langbort, and R. D'Andrea. Distributed control design for spatially interconnected systems with robustness to small communication delays. In *Mathematical Theory of Networks and Systems*, 2004.

[75] M. Jovanovic, J. Fowler, B. Bamieh, and R. D'Andrea. On avoiding saturation in the control of vehicular platoons. In *Proc. American Control Conference*, pages 2257–2262, 2004.

[76] M. Campbell, R. D'Andrea, J. Lee, and E. Scholte. Experimental demonstrations of semi-autonomous control. In *Proc. American Control Conference*, pages 5338 – 5343, 2004.

[77] C. Langbort and R. D'Andrea. Distributed control of heterogeneous systems interconnected over arbitrary graphs. In *Conference on Decision and Control*, pages 2835–2840, 2003.

[78] R. Chandra and R. D'Andrea. Necessity of the small gain theorem for multidimensional systems. In *Proc. IEEE Conference on Decision and Control*, pages 2859–2864, 2003.

[79] S. Breheny, R. D'Andrea, and J. C. Miller. Using airborne vehicle-based antenna arrays to improve communications with UAV clusters. In *Conference on Decision and Control*, pages 4158–4162, 2003.

[80] B. Recht and R. D'Andrea. Exploiting symmetry for the distributed control of spatially interconnected systems. In *Conference on Decision and Control*, pages 598–603, 2003.

[81] R. D'Andrea and R. M. Murray. The RoboFlag competition. In *American Control Conference*, pages 650–655, 2003.

[82] R. D'Andrea and M. Babish. The RoboFlag testbed. In *American Control Conference*, pages 656 – 660, 2003.

[83] C. Langbort and R. D'Andrea. Imposing boundary conditions for a class of spatially interconnected systems. In *Proc. American Control Conference*, pages 107–112, 2003.

[84] E. Scholte and R. D'Andrea. Active vibro-acoustic control of a flexible beam using distributed control. In *Proc. American Control Conference*, pages 2640 – 2645, 2003.

[85] M. Jun and R. D'Andrea. Probability map building of uncertain dynamic environments with indistinguishable obstacles. In *Proc. American Control Conference*, pages 3417 – 3422, 2003.

[86] M. Campbell, R. D'Andrea, D. Schneider, A. Chaudhry, S. Waydo, J. Sullivan, J. Veverka, and A. Klochko. Roboflag games using systems based, hierarchical control. In *Proc. American Control Conference*, pages 661 – 666, 2003.

[87] J. Kulkarni, R. D'Andrea, and B. Brandl. Application of distributed control techniques to the adaptive secondary mirror of Cornell's Large Atacama Telescope. In *SPIE Astronomical Telescopes and Instrumentation Conference*, volume 4839, pages 750–756, 2002.

[88] R. S. Chandra, J. Fowler, and R. D'Andrea. Control of interconnected systems of finite spatial extent. *IEEE Conference on Decision and Control*, pages 238 – 239, 2002.

[89] R. D'Andrea and R. S. Chandra. Control of discrete time interconnected systems. *IEEE Conference on Decision and Control*, pages 240–245, 2002.

[90] J. M. Fowler and R. D'Andrea. Distributed control of close formation flight. In *Proc. IEEE Conference on Decision and Control*, pages 2972–2977, 2002.

[91] M. G. Earl and R. D'Andrea. Modeling and control of a multi-vehicle system using mixed integer linear programming. In *Proc. IEEE Conference on Decision and Control*, pages 107–111, 2002.

[92] M. Jun, A. Chaudhry, and R. D'Andrea. The navigation of autonomous vehicles in uncertain dynamic environments: A case study. In *Proc. IEEE Conference on Decision and Control*, 2002.

[93] M. G. Earl and R. D'Andrea. A study in cooperative control: the RoboFlag drill. In *Proc. American Control Conference*, pages 1811–1812, 2002.

[94] T. K. Nagy, P. Ganguly, and R. D'Andrea. Real-time trajectory generation for omnidirectional vehicles. In *Proc. American Control Conference*, pages 286–291, 2002.

[95] K. V. Madanagopal, R. D'Andrea, and N. C. Tien. Real time, software control of spring suspended micro-electro-mechanical devices for precision optical positioning applications. In *IEEE/LEOS International Conference on Optical MEMS*, pages 41–42, 2002.

[96] T. K. Nagy, P. Ganguly, and R. D'Andrea. Real time, near-optimal trajectory control of an omnidirectional vehicle. In *ASME International Mechanical Engineering Congress and Exposition*, 2002.

[97] M. Asada, R. D'Andrea, A. Birk, H. Kitano, and M. Veloso. Robotics in edutainment. In *IEEE International Conference on Robotics and Automation*, pages 795–800, 2000.

[98] M. A. Turnquist, R. D'Andrea, A. R. George, P. Jackson, L. K. Nozick, D. Rhodes, R. Roundy, B. Selman, C. A. Shoemaker, and R. J. Thomas. Designing a systems engineering educational program using academic/industry collaboration. In *International Council on Systems Engineering*, 2000.

[99] R. D'Andrea and C. Beck. Temporal discretization of spatially distributed systems. In *Proc. IEEE Conference on Decision and Control*, pages 197–202, 1999.

[100] R. D'Andrea. Convex and finite dimensional conditions for controller synthesis with dynamic integral constraints. In *Proc. IEEE Conference on Decision and Control*, pages 976–981, 1999.

[101] G. Dullerud and R. D'Andrea. Distributed control of inhomogeneous systems, with boundary conditions. In *Proc. IEEE Conference on Decision and Control*, pages 186–190, 1999.

[102] C. L. Beck and R. D'Andrea. Simplification of spatially distributed systems. In *Proc. IEEE Conference on Decision and Control*, pages 620–625, 1999.

[103] R. D'Andrea. Software for modeling, analysis, and control design for multidimensional systems. In *IEEE International Symposium on Computer-Aided Control System Design*, pages 24–27, 1999.

[104] R. D'Andrea. Linear matrix inequalities, multidimensional system optimization, and control of spatially distributed systems: An example. In *Proc. American Control Conference*, pages 2713–2717, 1999.

[105] R. D'Andrea. Experimental model-based control design using multibody codes. In *American Society for Engineering Education Annual Conference*, volume 2259, 1999. Instrumentation Design and Applications.

[106] R. D'Andrea. Robot soccer: A platform for systems engineering. In *American Society for Engineering Education Annual Conference*, volume 2220, 1999. Mobile Robots and Interdisciplinary Design.

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PATENTS

1. INVENTORY SYSTEM WITH MOBILE DRIVE UNIT AND INVENTORY HOLDER. U.S. Patent Application 10/965,523. Issued 2008.
2. METHOD AND SYSTEM FOR TRANSPORTING INVENTORY ITEMS. U.S. Patent Application 11/423,294. Filed 2006.
3. SYSTEM AND METHOD FOR MANAGING MOBILE DRIVE UNITS. U.S. Patent Application 11/425,042. Filed 2006.
4. SYSTEM AND METHOD FOR POSITIONING A MOBILE DRIVE UNIT. U.S. Patent Application 11/425,049. Filed 2006.
5. SYSTEM AND METHOD FOR GENERATING A PATH FOR A MOBILE DRIVE UNIT. U.S. Patent Application 11/425,057. Filed 2006.
6. SYSTEM AND METHOD FOR TRANSPORTING INVENTORY ITEMS. U.S. Patent Application 11/425,066. Filed 2006.
7. SYSTEM AND METHOD FOR COORDINATING MOVEMENT OF MOBILE DRIVE UNITS. U.S. Patent Application 11/425,073. Filed 2006.
8. SYSTEM AND METHOD FOR MANEUVERING A MOBILE DRIVE UNIT. U.S. Patent Application 11/425,076. Filed 2006.

SELECTED ART EXHIBITIONS

THE ROBOTIC CHAIR (Max Dean, Matt Donovan, and Raffaello D'Andrea, limited edition of 6)

Ronald Feldman Gallery, New York, USA. January - February 2010.
Red Deer Museum and Art Gallery, Red Deer, Canada. February - April 2010.
Cabaret Voltaire, Zurich, Switzerland. March 2009.
London Art Fair, London, England. January 2009.
National Gallery of Canada, Ottawa, Canada (**added to permanent collection, #1**). October 2008 - February 2009.
Ottawa Art Gallery, Ottawa, Canada. November 2008.
Flowers Gallery, London, England (**private purchase, #2**). July - August 2008.
Contemporary Art Gallery, Vancouver, Canada. June - August 2008.
Mois Multi, Quebec City, Canada. February 2008.
Yale School of Art, Yale University, New Haven, USA. January 2008.
Open Spaces, Toronto International Art Fair, Canada. October 2007.
Luminato Festival, Toronto, Canada. June 2007.
International Contemporary Art Fair of Madrid (ARCO), Spain. February 2007.
Ars Electronica, Linz, Austria. September - October 2006.
ideaCity, Toronto, Canada. June 2006.

THE TABLE (Max Dean and Raffaello D'Andrea, limited edition of 3)

National Gallery of Canada, Ottawa, Canada. October 2008 - February 2009.
National Gallery of Canada, Ottawa, Canada (**added to permanent collection, #1**). October 2002 - February 2003.
Biennale di Venezia, Venice, Italy. June - October 2001.

MAJOR RESEARCH GRANTS

PRINCIPAL INVESTIGATOR

RoboEarth: Robots Sharing a Knowledge Base for World Modeling and Learning of Actions
European Research Council. January 2010 - December 2013.

Distributed Estimation and Control of Mechatronic Systems
Swiss National Science Foundation. November 2009 - October 2012.

Design of Robust, Networked Control Systems via Convex Optimization
National Science Foundation. November 2003 - October 2006.

Control of Vehicle Swarms
Air Force Office of Scientific Research, PECASE Award. May 2002 - December 2007.

Mixed Initiative Control of Automa-Teams
DARPA. September 2001 - December 2003. Cornell Principal Investigator D'Andrea, Alphatech lead institution.

Cooperative Control in Uncertain, Adversarial Environments
Air Force Office of Scientific Research Multi-Disciplinary University Research Initiative. May 2001 - April 2006. Cornell Principal Investigator D'Andrea, MURI Principal Investigator J. Shamma, UCLA.

Control of Spatially Interconnected Systems, with Application to Coordinated Vehicle Control
Air Force Office of Scientific Research. October 2000 - September 2003.

Robust and Optimal Control of Interconnected Systems
National Science Foundation. July 2000 - June 2004.

Synthesis Methods for Distributed and Time Varying Controlled Systems
Air Force Office of Scientific Research. April 1998 - November 2000.

Reduced Order Modeling and Control of Systems Subject to Fluid-Structure Interactions
Air Force Office of Scientific Research. March 1998 - August 1999.

Mechatronics Systems Engineering Projects
Cornell College of Engineering laboratory and personnel funds. September 1998 - May 2005.

CO-PRINCIPAL INVESTIGATOR

Human Centered, Variable Initiative Control of Complex Automa-Teams
PI M. Campbell. DARPA. September 2001 - September 2003.

High Speed and High Precision Measurement and Simulation Design Laboratory
Cornell College of Engineering. January 2000.

DOCTORAL AND POST-DOCTORAL ADVISING

Ph.D.

Sergei Lupashin, Ph.D., Mechanical Engineering. Since 2010.
Nico Huebel, Ph.D., Mechanical Engineering. Since 2010.
Gajamohan Mohanarajah, Ph.D., Mechanical Engineering. Since 2010.
Markus Hehn, Ph.D., Mechanical Engineering. Since 2009.
Philipp Reist, Ph.D., Mechanical Engineering. Since 2009.
Raymond Oung, Ph.D., Mechanical Engineering. Since 2008.
Angela Schoellig, Ph.D., Mechanical Engineering. Since 2008.
Sebastian Trimpe, Ph.D., Mechanical Engineering. Since 2008.
Michael Sherback, Ph.D., Mechanical Engineering. Graduated 2009.
Oliver Purwin, Ph.D., Mechanical Engineering. Graduated 2008.
Ramu Chandra, Ph.D., Mechanical Engineering. Graduated 2005.
Jeffrey Fowler, Ph.D., Mechanical Engineering. Graduated 2005.
Cedric Langbort, Ph.D, Theoretical and Applied Mechanics. Graduated 2004.
Matthew Earl, Ph.D., Theoretical and Applied Mechanics. Graduated 2004.

Post-Doctoral

Dr. Markus Waibel. 2010 - present.
Dr. Michael Sherback. 2009 - 2010.
Dr. Frederic Bourgault. 2008 - 2010.
Dr. Guillaume Ducard. 2008 - 2009.
Dr. Keyong Li. 2005 - 2007.
Dr. Venkatesh Rao. 2004 - 2006.
Dr. JinWoo Lee. 1998 - 1999, 2001 - 2006.
Dr. Myungsoo Jun. 2001 - 2004.
Dr. Tama's Kalma'r Nagy. 2001 - 2002.

TEACHING

ETH Zurich

Introduction to Recursive Filtering and Estimation. 2009 - present.
Signals and Systems. 2009 - present.
Dynamic Programming and Optimal Control. 2008 - present.
!And Yet It Moves. 2007 - 2009.

Cornell University

Feedback Control Systems. 1997 - 2005.
Mechatronics Systems Engineering Projects. 1998 - 2005.
Robust and Optimal Control. 1998 - 2002.
Applied Systems Engineering. 1998.
Freshman Engineering Seminar. 1997.
Robotics and Control. 1997.

California Institute of Technology

Introduction to Robust Control. 1995.

CONSULTING AND ADVISORY BOARDS

Technical consulting, Disney Research. Since 2010.
Advisory Board, IEEE Spectrum. Since 2008.
Advisory Board, Maestro Solutions. Since 2002.
Advisory Board, Quanser Consulting Inc. Since 2000.
Litigation consulting, Covington & Burling. 2000.
Technical consulting, BEAM Technologies. 1998 - 2000.