

Jonathan A. DeCastro

CONTACT INFORMATION	1261 Warren Rd. Apt. A Ithaca, NY 14850 <i>github</i> : github.com/jadecastro	<i>t</i> : +1-585-425-7184 <i>e</i> : jad455@cornell.edu <i>w</i> : jadecastro.github.io
SUMMARY OF QUALIFICATIONS	I am a Ph.D. Candidate in Robotics with 8 years of prior industry experience and a proven ability to communicate to a variety of technical and non-technical audiences. I develop algorithms in C++, Python, and MATLAB for high-level control of robots featuring complex, nonlinear dynamics, and design and test robotic demonstrators for physical experimentation.	
EDUCATION	Cornell University , Ithaca, NY Ph.D., Mechanical and Aerospace Engineering Advisor: Prof. Hadas Kress-Gazit Graduate Minors: Computer Science, Computational Science and Engineering M.S., Mechanical and Aerospace Engineering Virginia Tech , Blacksburg, VA M.S., Mechanical Engineering B.S. (with Honors), Mechanical Engineering	2015– <i>Present</i> 2011–2014 2001–2003 1996–2001
RELEVANT COURSES	Applied Math and Optimization : Linear Systems, Probability, Mathematical Programming, Convex Optimization, Heuristic Methods for Optimization Controls and Systems : Hybrid Systems, Robust Control, Stochastic Control, Multivariable Control Robotics and Dynamics : Intermediate Dynamics, Robot Learning, Autonomous Mobile Robots, Robotic Manipulation	
HARDWARE AND SOFTWARE SKILLS	C, C++, Python, Robot Operating System (ROS), MATLAB/Simulink, Microsoft Visual Studio, gcc, LaTeX, Linux, Windows	
INDUSTRY AND RESEARCH EXPERIENCE	Graduate Research Assistant , Cornell University , Ithaca, NY <i>Verifiable Robotics Research Group</i> <ul style="list-style-type: none">Developed algorithms in C++, Python and MATLAB for automated, correct-by-construction synthesis of controllers for robots with nonlinear dynamics through application of formal methods and optimizationDeveloped a novel approach to automatically synthesize revisions to robot mission specifications that cannot be realized and explain these revisions to the user via auto-generated feedbackAuthored 7 publications featured in international conference proceedings, workshops and robotics journals Lead Engineer , Impact Technologies, LLC. , Rochester, NY <i>Control and Prediction Group</i> <ul style="list-style-type: none">Conducted independent research on control algorithms and simulation tools for flight control and diagnostic systems and submarine navigationAwarded four Phase 1 and two Phase 2 Small Business Innovation Research (SBIR) grants as PI totaling \$1.8M for DoD- and NASA-sponsored researchComposed technical reports and conference papers, presented to customers and stakeholders, and mentored co-op students Research Scientist , NASA Glenn Research Center , Cleveland, OH <i>Intelligent Control and Autonomy Branch</i> <ul style="list-style-type: none">Designed and coded Commercial Modular Aero-Propulsion System Simulation (C-MAPSS), a MATLAB-based “virtual” aircraft engine serving to extend accessibility of such models to a wide arena of researchersInvestigated control algorithms for in-flight aircraft control reconfiguration during emergenciesImplemented and tested various control techniques in scaled engine component test rigs	August 2011– <i>Present</i> July 2008–August 2011 July 2003–July 2008

LEADERSHIP AND COMMUNICATION EXPERIENCE	Teaching Assistant , Autonomous Mobile Robots, Cornell University <ul style="list-style-type: none"> • Taught lab sessions, delivered occasional lectures, graded code and reports (36 students) Spring 2015
	Mentor , Undergraduate Research, Cornell University <ul style="list-style-type: none"> • Mentored seven undergraduates for two entries in the 2015 Soft Robotics Design Competition • Earned First Prize (out of 82 teams) and Honorable Mention for outstanding project idea Spring 2015
	Workshop Organizer , “Command Your Own Robot” <ul style="list-style-type: none"> • Organized and lead a hands-on robotics workshop as part of the Expanding Your Horizons (EYH) conference for middle-school girls interested in math and science • Supervised a team of four to lead the activities and introduce students to opportunities for further education and careers in STEM fields 2014, 2015
	Voting Member , Cornell Graduate and Professional Student Assembly <ul style="list-style-type: none"> • Organized several events for facilitating discussion of issues of interest (e.g. student life, compensation), between graduate students and university administration 2013–2014
	Instructor , System Modeling, Rochester Institute of Technology <ul style="list-style-type: none"> • Administered, lectured and graded a senior- and graduate-level course Winter 2010–2011
JOURNAL PUBLICATIONS	J. A. DeCastro and H. Kress-Gazit. Synthesis of nonlinear continuous controllers for verifiably-correct high-level, reactive behaviors. <i>International Journal of Robotics Research</i> , 34(3):378–394, 2015. doi: 10.1177/0278364914557736
	J. A. DeCastro , R. Ehlers, M. Rungger, A. Balkan, P. Tabuada, and H. Kress-Gazit. Dynamics-based reactive synthesis and automated revisions for high-level robot control. (submitted) <i>CoRR</i> , abs/1410.6375, 2014. arXiv: http://arxiv.org/abs/1410.6375 .
	X. Zhang, L. Tang and J. A. DeCastro . Robust fault diagnosis of aircraft engines: a nonlinear adaptive estimation-based approach. <i>IEEE Trans. on Control Systems Technology</i> , 21(3):861–868, 2013. doi: 10.1109/TCST.2012.2222222
	J. A. DeCastro . Rate-based model predictive control of turbofan engine clearance. <i>AIAA Journal of Propulsion and Power</i> . 23(4):804–813, 2007. doi: 10.2514/1.25846
	AIAA NOS Best Young Professional Paper
SELECTED CONFERENCE PUBLICATIONS	J. A. DeCastro , J. Alonso-Mora, V. Raman, D. Rus and H. Kress-Gazit. Collision-free reactive mission and motion planning for multi-robot systems. To appear in: <i>Proceedings of the 17th International Symposium on Robotics Research (ISRR)</i> , Sestri Levante, Italy, September 12–15, 2015.
	J. A. DeCastro , V. Raman and H. Kress-Gazit. Dynamics-driven adaptive abstraction for reactive high-level mission and motion planning. In: <i>Proceedings of the IEEE/RSJ International Conference on Robotics and Automation (ICRA 2015)</i> , Seattle, WA, USA, May 26–30, 2015.
	J. A. DeCastro and H. Kress-Gazit. Guaranteeing reactive high-level behaviors for robots with complex dynamics. In: <i>Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2013)</i> , Tokyo, Japan, November 3–8, 2013.
	J. A. DeCastro , L. Tang, B. Zhang and G. Vachtsevanos. A safety verification approach to fault-tolerant aircraft supervisory control. In: <i>Proceedings of the AIAA Guidance, Navigation, and Control Conference</i> , Portland, OR, USA, August 8–11, 2011.
	J. A. DeCastro , L. Tang, C. S. Byington and D. E. Culley. Analysis of fault-tolerance and decentralization concepts for distributed engine control. In: <i>Proceedings of the 45th AIAA Joint Propulsion Conference & Exhibit</i> , Denver, CO, USA, August 2–5, 2009. ASME Propulsion Best Paper
WORKSHOP PUBLICATIONS	J. A. DeCastro , J. S. Litt, and D. K. Frederick. A modular aero-propulsion system simulation of a large commercial aircraft engine. In: <i>Proceedings of the 44th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit</i> , Hartford, CT USA, July 21–23, 2008.
	J. A. DeCastro . Mission possible: guaranteeing reactive missions for complex robots. In: <i>ICRA 2015 Ph.D. Forum</i> , Seattle, WA, USA, May 26, 2015.

INVITED TALKS	Generalized Collision-free reactive mission and motion planning for multi-robot systems, NSF ExCAPE Annual Meeting, MIT, June 20–21, 2015.	
	Abstractions and revisions for synthesis for non-linear robots, NSF ExCAPE Annual Meeting, U. C. Berkeley, March 10–11, 2014.	
	Reactive high-level robot controller synthesis: optimality, environment, and dynamics, NSF ExCAPE Robotics Workshop, Rice University, November 20–22, 2013.	
	Automated contingency management for flight control, Aerospace Control and Guidance Systems Committee Meeting 106, San Diego, CA, October 2010.	
PUBLICATION AND	IEEE Conf. on Event-Based Control, Communication, and Signal Processing (EBCCSP)	2015
PAPER REVIEWING	International Conference on Robotics and Automation (ICRA)	2014, 2015
EXPERIENCE	American Control Conference (ACC)	2014
	IEEE Transactions on Industrial Electronics	2011, 2012, 2013
	ASME Turbo Expo	2005, 2007, 2010
HONORS AND AWARDS	Travel Grant to ICRA in Seattle, WA; sponsored by IEEE RAS and NSF	2015
	Cornell MAE Fellowship , a merit-based award to incoming Ph.D. students	2011–2012
	ASME Propulsion Best Paper Award	2009
	NASA Group Achievement Award for outstanding group accomplishment (C-MAPSS Team)	2009
	NASA Space Act Award for an outstanding technical contribution	2007
	AIAA Best Young Professional Paper awarded by the Northern Ohio Section of AIAA	2007