Kevin J. Leahy

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Contact Information	781-690-3388 kevin@kjleahy.net

Research Interests

Robotics, formal methods, multi-agent systems

Education

Boston University, Boston MA

Ph.D., Mechanical Engineering, January 2017
- Thesis Topic: *Multi-Agent Persistent Surveillance under Temporal Logic Constraints*
- Advisors: Calin Belta, Ph.D and Mac Schwager, Ph.D

Boston University, Boston, MA

B.A., Economics, May 2009
- *Cum Laude*
- Study abroad at Stendhal University, Grenoble, France, 2008
- Study abroad at Boston University, Paris, France, 2008

Research Experience

Technical Staff   January 2017 to present
Advanced Capabilities and Systems Group,
M.I.T. Lincoln Laboratory

Research Assistant   January 2014 to December 2016
Department of Mechanical Engineering,
Boston University
Supervisor: Calin Belta, Ph.D and Mac Schwager, Ph.D

Summer Research Intern   May 2016 to August 2016
Intelligence and Decision Technologies Group,
MIT Lincoln Laboratory

Research Funding

Lincoln Laboratory Line and Allocated Funding as principal investigator:
- Inter- and intra-team coordination from high-level specifications ($409,000) 2020
- Micro air vehicle testbed ($500,000)   2020
- Inter- and intra-team coordination from high-level specifications ($200,000) 2019
- Micro air vehicle testbed ($200,000)   2019
- Multi-scale modeling of traffic with autonomous vehicles ($200,000)   2018

Skills and Interests

Computer Programming:
- ROS, Python, MATLAB, Julia, C++, VBA, SAS

Hardware:
- Motion capture systems, quadrotors, wheeled ground robots

Software:
- Solidworks, LaTeX, Unity, Microsoft Office

Languages:
- English (native), French (fluent)

Personal:
- Avid runner and cinephile
- Novice woodworker
- Former college curling national champion (2007)

Awards and Recognition	• Lincoln Laboratory Technology Office Challenge *Winner, Autonomous U.A.V. Race*	2017
	• LEAP Tuition Scholarship	2012 – 2014

Presentations	*Vision-Based Symbolic Control in GPS-Denied Environments*
	   MIT Lincoln Laboratory,
	   Lexington, MA
		July 2016

	Provably Correct Persistent Surveillance for Unmanned Aerial Vehicles Subject to Charging Constraints
	   Helping Hands Lab,
	   Northeastern University,
	   Boston, MA
		September 2016

In Press

- "Virtual environments provide a way to develop autonomous UAV technology," MIT Lincoln Laboratory, 2019. https://www.ll.mit.edu/news/virtual-environments-provide-way-develop-autonomous-uav-technology

- "Future delivery drones start learning how to fly on their own," *New Scientist*. Issue 3058, January 2016.

Teaching Experience	Instructor
	   Autonomous UAV Course
	   Beaver Works Summer Institute
	   Massachusetts Institute of Technology
		Summer 2017

	Teaching Fellow
	   ME 302 - Engineering Mechanics II
	   Instructor: Kamil Ekinci, Ph.D
	   College of Engineering,
	   Boston University
		Fall 2015

	Teaching Fellow
	   EK 102 - Linear Algebra
	   Instructor: Calin Belta, Ph.D
	   College of Engineering,
	   Boston University
		Spring 2015

Mentoring and Service

Summer intern supervisor at Lincoln Laboratory:
- Sabina Chen (Fall 2019)
- Izzy Crawford-Eng (Summer 2019)
- Ros Shinkle (Summer 2018)
- Anissa Benzaid (Summer 2018)
- Zack Serlin (Summer 2018)

Mentor:	
• Senior Capstone team – *Winners, best design*	Sep 2015 - May 2016
• Teddy Ni – RISE Internship Program	June 2014 - Aug 2014
• Ripple Patel – Summer Discovery Internships	June 2014 - Aug 2014
Curling:	Sept 2013 - Apr 2017
• Director of College Curling Program Broomstones Curling Club, Wayland, MA	

Publication Reviewing

Journal Reviewer for:
- European Journal of Control
- IEEE Transaction on Automatic Control (TAC)
- IEEE Transactions on Cybernetics
- IEEE Transactions on Human-Machine Systems
- IEEE Transaction on Robotics (T-RO)
- International Journal of Robotics Research (IJRR)
- MDPI Sensors
- Robotics and Automation Letters

Conference Reviewer for:
- The American Controls Conference (ACC)
- Hybrid Systems: Computation and Control (HSCC)
- IEEE Conference on Decision and Control (CDC)
- International Conference on Intelligent Robots and Systems (IROS)
- International Conference on Robotics and Automation (ICRA)
- International Symposium on Robotics Research (ISRR)
- Robotics: Science and Systems (RSS)

Journal Publications

1. Yazdani, K., Jones, A., **Leahy, K.**, and Hale, M. "Differentially Private LQ Control." *IEEE Transactions on Automatic Control*. **Submitted**.

2. **Leahy, K.**, Cristofalo, E., Vasile, C.-I., Jones, A., Montijano, E., Schwager, M., and Belta, C. "Control in Belief Space with Temporal Logic Specifications using Vision-based Localization." *International Journal of Robotics Research*, 38(6): 702–722, 2019.

3. **Leahy, K.**, and Schwager, M. "Tracking a Markov Target in a Discrete Environment with Multiple Sensors." *IEEE Transactions on Automatic Control*, 64(6): 2396–2411, 2018.

4. **Leahy, K.**, Zhou, D., Vasile, C.-I., Oikonomopoulos, K., Schwager, M., and Belta, C."Persistent Surveillance for Unmanned Aerial Vehicles Subject to Charging and Temporal Logic Constraints." *Autonomous Robots*, 2015.

5. Phelps, C., O'Sullivan, A., Ladapo, J., Weinstein, M.C., **Leahy, K.**, and Douglas, P. "Cost effectiveness of a gene expression score and myocardial perfusion imaging for diagnosis of coronary artery disease." *American Heart Journal*, 167(5):697–706, 2014.

6. Lawrence, D., Maschio, M., **Leahy, K.**, Yunger, S., Easaw, J., and Weinstein, M.C. "Economic analysis of bevacizumab, cetuximab, and panitumumab with fluoropyrimidine based chemotherapy in the first line treatment of KRAS wild-type metastatic colorectal cancer (mCRC)." *Journal of Medical Economics*, 16(12):1387–1398, 2013.

7. Parthan, A., **Leahy, K.**, O'Sullivan, A., Iakoubova, O., Bare, L., Devlin, J., and Weinstein, M.C. "Cost-effectiveness of targeted high-dose atorvastatin therapy following genotype testing in patients with acute coronary syndrome." *Pharmacoeconomics*, 31(6):519–531, 2013.

Conference Proceedings

1. Jones, A., **Leahy, K.**, Vasile, C.-I., Sadraddini, S., Serlin, Z., Tron, R., and Belta, C. "ScRATCHS: Scalable and Robust Algorithms for Task-based Coordination from High-level Specifications." In *Proc. of the International Symposium on Robotics Research (ISRR 10)*, Hanoi, Vietnam, October 2019.

2. Jones, A., **Leahy, K.**, and Hale, M. "Towards Differential Privacy for Symbolic Systems." In *Proc. of the American Control Conference (ACC)*, Philadelphia, Pennsylvania, 2019.

3. Serlin, Z., **Leahy, K.**, Tron, R., and Belta, C. "Distributed Sensing Subject to Temporal Logic Constraints ." In *Proc. of the International Conference on Robotics and Automation (ICRA)*, Melbourne, Australia, 2018.

4. Hale, M., Jones, A., and **Leahy, K.** "Privacy in Feedback: The Differentially Private LQG." In *Proc. of the American Control Conference (ACC)*, Milwuakee, Wisconsin, 2018.

5. **Leahy, K.**, Aksaray, D., and Belta, C. "Informative Path Planning under Temporal Logic Constraints with Performance Guarantees", In *Proc. of the American Control Conference (ACC)*, Seattle, Washington, 2017.

6. Haghighi, I., **Leahy, K.**, Ivison, R., and Belta, C. "Semi-supervised Pattern Synthesis in Spatially Distributed Dynamical Systems", In *Proc. of the American Control Conference (ACC)*, Seattle, Washington, 2017.

7. Vasile, C.-I., **Leahy, K.**, Cristofalo, E., Jones, A., Schwager, M. and Belta, C. "Control in Belief Space with Temporal Logic Specifications", In *Proc. of the IEEE Conference on Decision and Control (CDC)*, Las Vegas, Nevada, 2016.

8. Cristofalo, E., **Leahy, K.**, Vasile, C.-I., Montijano, E., Schwager, M. and Belta, C. "Localization of a Ground Robot by Aerial Robots for GPS-deprived Control with Temporal Logic Constraints." In *Proc. of the International Symposium on Experimental Robotics (ISER 16)*, Tokyo, Japan, 2016.

9. **Leahy, K.**, and Schwager, M. "Always Choose Second Best: Tracking a Moving Target on a Graph with a Noisy Binary Sensor", In *Proc. of the European Control Conference (ECC)*, Aalborg, Denmark, 2016.

10. **Leahy, K.**, Kannappan, P., Jardine, A., Tanner, H., Heinz, J., and Belta, C. "Integration of Deterministic Inference with Formal Synthesis for Control under Uncertainty". In *Proc. of the American Control Conference (ACC)*, Boston, Massachusetts, 2016.

11. **Leahy, K.**, Jones, A., Schwager, M., and Belta, C. "Distributed Information Gathering Policies under Temporal Logic Constraints", In *Proc. of the IEEE Conference on Decision and Control (CDC)*, Osaka, Japan, 2015.

12. Aksaray, D., **Leahy, K.**, and Belta, C. "Distributed Multi-Agent Persistent Surveillance Under Temporal Logic Constraints", 5th IFAC Workshop on Distributed Estimation and Control in Networked Systems, Philadelphia, USA, 2015.

13. Svoreňová, M., Chmelík, M., **Leahy, K.**, Ferit Eniser, H., Chatterjee, K., Černá, I., and Belta, C. "Temporal Logic Motion Planning using POMDPs with Parity Objectives", Hybrid Systems: Computation and Control (HSCC) 2015

14. **Leahy, K.**, Zhou, D., Vasile, C.-I., Oikonomopoulos, K., Schwager, M., and Belta, C. "Provable correct persistent surveillance for unmanned aerial vehicles subject to charging constraints." In *Proc. of the International Symposium on Experimental Robotics (ISER 14)*, Marrakech, Morocco, June 2014.

15. Phelps, C., Douglas, P., O'Sullivan, A., Deflin, M., **Leahy, K.**, Elashoff, M., and Ladapo, J. "Cost-effectiveness of a gene expression score and myocardial perfusion imaging for diagnosis of coronary artery disease." The 34th Annual

Meeting of the Society for Medical Decision Making. Phoenix, AZ, USA, October 2012.

16. Parthan, A., Iakoubova, O., **Leahy, K.**, O'Sullivan, A., Bare, L., Devlin, J., Weinstein, M.C., and Luke, M. "Cost-effectiveness of targeted statin therapy following genotype testing among acute coronary syndrome patients." The 16th World Congress on Heart Disease. Vancouver, BC, Canada, July 2011.

17. Taylor, D., **Leahy, K.**, and Weinstein, M.C. "Representing uncertainty in calibrated cancer treatment models: a practical approach." The International Society for Pharmacoeconomics and Outcomes Research 16th Annual International Meeting. Baltimore, MD, USA, May 2011.

18. Campbell, J., Tao, C., Keith, M., **Leahy, K.**, and Russo, L. "The pharmacy budget impact of extending reimbursement of lanthanum carbonate to treatment of hyperphosphatemia (> 1.78 mmol/L) in patients with chronic kidney disease pre-dialysis in France and the United Kingdom." The International Society for Pharmacoeconomics and Outcomes Research 13th Annual European Congress. Prague, Czech Republic, November 2010.

Workshops and Poster Sessions

1. **Leahy, K.**, Fishberg, A., Dougherty, C., and Chen, S. "Virtual-Physical Environment for Autonomy Research." Poster at *Recent Advances in AI for National Security (RAAINS)*, MIT Lincoln Laboratory, 2019.

2. Jones, A., **Leahy, K.**, Vasile, C.-I., Sadraddini, S., Serlin, Z., Tron, R., and Belta, C. "Scalable and Robust Algorithms for Task-based Coordination from High-level Specifications." Poster at *Northeast Robotics Colloquium (NERC)*, University of Pennsylvania, 2019.

3. **Leahy, K.**, Jones, A., Schwager, M., and Belta, C. "Distributed Information Gathering Policies under Temporal Logic Constraints." Poster at *Symposium on Control of Network Systems (SCONES)*, Boston University, 2014.

4. Ni, T., **Leahy, K.**, Cristofalo, E., Patel, R., and Belta, C. "Experimentation and Implementation of Partially Observable Markov Decision Processes." Poster at *RISE Symposium*, Boston University, 2014.

5. Patel, R., Cristofalo, E., **Leahy, K.**, and Belta, C. "Design of Color and Location Sensor for Hovering Aircraft." Poster at *RISE Symposium*, Boston University, 2014.

Last updated on December 1, 2019.