Zachary Serlin

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DoD Secret Final Clearance Holder

Education

Present — **Ph.D., Boston University** in Mechanical Engineering.
4th Year - Doctoral Candidate
Dissertation title: *Distributed Formal Methods and Sensing for Autonomous Systems*.

2016 — **M.Sc., Tufts University** in Mechanical Engineering.
Honor Dual B.SC./M.Sc. Program
Thesis title: *A Novel Approach for the Simulation of Xenopus laevis Tail Regeneration*.

2015 — **B.Sc., Tufts University** in Mechanical Engineering
Magna Cum Laude
Deans List all Semesters.

Experience

MIT Lincoln Laboratory | BMDS Student Technical Assistant | 9/2018 – Present
- Developed novel heterogeneous multi-robot planning algorithms.
- Created a multi-robot planning algorithm for safety critical applications.
- Tested novel algorithms with hardware-in-the-loop full scale experiment of 13 heterogeneous robots.

MIT Lincoln Laboratory | Surveillance Systems Summer Analyst | 5/2018 – 8/2018
- Developed novel multi-robot search algorithms.
- Created a software-in-the-loop simulation environment to test novel algorithms.
- Tested novel algorithms with hardware-in-the-loop full scale experiment in the field.

BU - Schlumberger-Doll Research Collaboration | Student Team Leader | 9/2016 – Present
- Explored combining Time-Window Temporal Logic planning and sampling based reactive planning.
- Expanded capabilities of UWSIM simulation environment.
- Team of 3 developed a reinforcement learning based algorithm for underwater vehicle autonomous operation.

Barrett Technology | Mechanical Engineering Intern | 6/2016 – 9/2016
- Designed components for FDA approved, Class II medical robot - BURT.
- Generated process routers for construction of novel robot designs.
- Worked with a team to design a patient interface based on client feedback.

Research

Boston University Robotics Lab | Graduate Researcher | 9/2016 – Present
- Current research focuses on the intersection between distributed image semantic segmentation and temporal logic inference.
- Past research has focused on the intersection between temporal logic, objective function optimization for multi-agent path planning, and multi-image feature matching.

Tufts Soft Robotics Lab | Design, Actuation, & Control Lead | 9/2015 – 9/2017
- Designed a novel tendon-based, caterpillar inspired, soft material robot.
- Built and tested a prototype of the system with a team of 7 peers.
- Competed at the first Robosoft Grand Challenge in Livorno, Italy.

Research (continued)

- **Tufts Autonomous Systems and Robotics Lab | Lead Researcher | 5/2013 – 5/2016**
  - Developed a level set approach to model cell growth and regeneration with a novel control algorithm.
  - Model is capable of simulating growth and regeneration of large and dynamic biological structures.

Teaching Experience

- **BU EK 131: Introduction to Robotics | Instructor | 1/2019 – 5/2019**
  - Taught freshmen students concepts from mechatronics, basic circuits theory, and sensor theory.
  - Taught a series of labs that introduced students to coding in C and C++ to solve challenges on a small, low cost robotic platform (M3pi).

- **BU ME 310: Instrumentation | Graduate Teaching Fellow | 9/2016 – 5/2017**
  - Taught undergraduate students instrumentation techniques spanning fluid mechanics, heat transfer, mechanics, uncertainty analysis, circuit theory, and statistics.
  - Led a set of 4 hour labs twice a week and held office hours for students.

Skills

Coding	Python • Matlab • ROS • LaTeX • C++
Software	Solidworks • Gazebo • Comsol • LabVIEW • RViz
Machining	TIG Welding (Steel, Aluminum & Titanium) • Milling • Latheing • Casting • CNC Machining
Prototyping	FDM • Multi-Material 3D Printing • Laser Cutting • Silicone Molding • Polyurethane Casting
Misc.	Concert Level Jazz Saxophonist • Street Performer • Expert Skier • Charter Boat Fishing Captain • Tufts Admissions Tour Guide

Publications

[1] A. Jones, K. Leahy, C. Vasile, S. Sadraddini, **Z. Serlin**, R. Tron and C. Belta, 'Scratchs: Scalable and robust algorithms for task-based coordination from high-level specifications', in *International Symposium of Robotics Research*, 2019.

[2] G. Yang, B. Vang, **Z. Serlin**, C. Belta and R. Tron, 'Sampling-based motion planning via control barrier functions', in *Proceedings of the 3rd International Conference on Automation, Control and Robots (ICACR)*, 2019.

[3] **Z. Serlin**, K. Leahy, R. Tron and C. Belta, 'Distributed sensing subject to temporal logic constraints', in *International Conference on Intelligent Robots and Systems 2018 (IROS)*, Madrid, Spain: IEEE/RJS, 2018.

[4] **Z. Serlin**, B. Sookraj, C. Belta and R. Tron, 'Consistent multi-robot object matching via quickmatch', in *International Symposium on Experimental Robotics (ISER)*, Buenos Aires, Argentina: IFRR, 2018.

[5] C. Donatelli, **Z. Serlin**, P. Echols-Jones, A. Scibelli, A. Cohen, J.-M. Musca, S. Rozen-Levy, D. Buckingham, R. White and B. Trimmer, 'Soft foam robot with caterpillar-inspired gait regimes for terrestrial locomotion', in *International Conference on Intelligent Robots and Systems (IROS)*, Vancouver, BC, Canada: IEEE/RJS, 2017, pp. 476–481, ISBN: 978-1-5386-2681-8/17.

[6] **Z. Serlin**, J. Rife and M. Levin, 'A level set approach to simulating xenopus laevis tail regeneration', in *Proceedings of the Artificial Life Conference*, Cancun, Mexico: MIT Press, 2016, pp. 528–535, ISBN: 978-0-262-33936-0.