Xiao Li

(410) 340-9733
xli87@bu.edu

Education

09/2015-present **PhD Candidate in Mechanical Engineering, BU Robotics Laboratory**, *Boston University*, Boston, USA.

09/2012-05/2014 **MSE in Robotics, Laboratory for Computational Sensing and Robotics**, *Johns Hopkins University*, Baltimore, USA.

09/2009-04/2012 **B.Sc. in Mechanical Engineering**, *University of British Columbia*, Vancouver, Canada.
Dean's Honour List Junior and Senior Year

Awards and Achievements

05/2014 **Johns Hopkins Creel Family Teaching Assistant Award**.

05/2012 **UBC Mechanical Engineering Graduate with Distinction**.

04/2011 **NSERC(Natural Sciences and Engineering Research Council of Canada) Undergraduate Student Research Award**.

Related Technical Skills

Programming C/C++, Python, Matlab

Software Tensorflow, ROS/Gazebo, V-REP Robotics Simulator

Employment

06/2017-09/2017 **Huawei Noah's Ark Laboratory**, *Research Engineer Intern*.
- Take part in cognitive computing research including real-time motion learning and decision making for novel driver assistance applications.
- Develop machine learning techniques for safe and comfortable user experience in environments with dynamic obstacles.
- Implement prototypes to validate key technologies and perform vehicle data analytics.

05/2014-08/2015 **JHU Sensing, Manipulation and Real-Time Systems Laboratory**, *Research Technologist*.
- Integrate the Da Vinci surgical robot and Barrett WAM to develop a telemanipulation environment for on-orbit satellite servicing tasks.
- Design an adaptive contact force estimator and implement under the ROS/CISST environment.
- Design and implement safety protocols on a UR5 (Universal Robot) manipulator for autonomous ultrasound guidance used in radiation therapy

05/2011-09/2011 **UBC Neuromotor Control Laboratory**, *System Development Intern*.
- Develop a stereo-vision based smart steering system for C-arm fluoroscopes, its control software and user interface.
- Develop an Inertial Measurement Unit and its data analysis software for motion documentation of C-arms used in surgical procedures.
- Take the system through pre-clinical trials.

Research

09/2015-present **Integration of Formal Methods with (Deep) Reinforcement Learning**, *BU Robotics Laboratory*, Advisor: Prof. Calin Belta.

- Develop methods to apply reinforcement learning to logically complicated tasks specified by formal languages.
- Apply techniques in formal methods to address common problems in reinforcement learning such as reward engineering, task-space transfer, value-alignment, etc.
- Apply proposed methods to learning robotics skills.

09/2013-05/2014 **Distributed Collaborative Sensor Fusion in Exponential Coordinates**, *JHU Robot and Protein Kinematics Laboratory*, Advisor: Prof. Gregory Chirikjian.

- Develop a novel technique for distributed multi-sensor fusion with probabilistic uncertainties
- Apply the technique on multi-robot localization tasks using Matlab and ROS/Gazebo.

09/2011-07/2012 **Bilateral Teleoperational System Integration and Control**, *UBC Industrial Automation Laboratory*, Advisor: Prof. Clarence De Silva.

- Perform system identification for the 6 DOF PHANToM Haptic Device and build its dynamics model for inverse dynamics control.
- Perform system integration for the Barrett WAM/PHANToM Bilateral Teloperation System.
- Conduct experiments with real-time impedance control algorithms under Xenomai RTOS and ROS/CISST-SAW environment.

Publications

X, Li, M. Yao and C.Belta, *Automata Guided Hierarchical Reinforcement Learning for Zero-shot Skill Composition*, 2018. online access at *arXiv:1711.00129*.

X, Li, M. Yao and C.Belta, *A Policy Search Method For Temporal Logic Specified Reinforcement Learning Tasks*, *American Control Conference*, 2018. online access at *arXiv:1709.09611*.

X, Li, C.I.Vasile and C.Belta, *Reinforcement Learning With Temporal Logic Rewards*, *International Conference on Intelligent Robot and Systems*, 2017.
online access at *arXiv:1612.03471*

X. Li and C. Belta, *A Hierarchical Reinforcement Learning Method for Persistent Time-Sensitive Tasks*, *arXiv:1606.06355v1*, 2016.

X, Li and P, Kazanzides, *Task Frame Estimation during Model-Based Teleoperation for Satellite Servicing*, *International Conference on Robots and Automation*, 2016.

X, Li and P, Kazanzides, *Adaptive Parameter Estimation and Anomaly Detection while Cutting Insulation during Telerobotic Satellite Servicing*, *International Conference on Intelligent Robot and Systems*, 2015.

X. Li and G. S. Chirikjian (2015), *Lie Theoretic Multi-Robot Localization*, Riemannian Computing in Computer Vision, Springer.

X. Li and G. S. Chirikjian(2014), *Distributed Multi-Robot Cooperative Localization Using Bayesian Fusion on the Special Euclidean Group*, MSE Thesis, Johns Hopkins University.