Xuning Yang

Ph.D. Candidate, Robotics Institute, Carnegie Mellon University   xuning@cmu.edu · xuningyang.com

Interests	Planning, Control, Human robot interaction and assistance, Intention representation, inference and modeling

Education

2017 – Dec 2021	**Robotics Institute, Carnegie Mellon University** Ph.D. in Robotics
	Proposal: Teleoperation via Intuition: Safe and Intent Oriented Navigation
	Advisors: Prof. Nathan Michael, Prof. Jean Oh
	Committee: Prof. Nathan Michael, Prof. Jean Oh, Prof. Henny Admoni, Dr. Sanjiban Choudhury (Aurora Innovation), Dr. Helen Oleynikova (Nvidia)
2015–2017	**Robotics Institute, Carnegie Mellon University** M.S. in Robotics
	Advisors: Prof. Nathan Michael, Prof. Koushil Sreenath
2010–2015	**University of Toronto** B.A.Sc. in Engineering Science with Honours
	Major in Aerospace Engineering, Minor in Robotics and Mechatronics
	Thesis: Control with Complex Specifications for a Flip Maneuver of a Quadrotor Helicopter
	Advisor: Prof. Mireille Broucke

Publications

X. Yang, J. Cheng, N. Michael, "An Intention Guided Hierarchical Trajectory Generation Framework for Trajectory-based Teleoperation of Mobile Robots". *International Conference on Robotics and Automation (ICRA)*, 2021. [pdf]

J. Cheng, **X. Yang**, N. Michael, "An imminent collision monitoring system with safe stopping interventions for autonomous aerial flights". *ICRA Workshop on "Resilient and Long-Term Autonomy for Aerial Robotic Systems" (Spotlight Talk)*, 2021. [pdf]

X. Yang, N. Michael, "Assisted Mobile Robot Teleoperation with Intent-aligned Trajectories via Biased Incremental Action Sampling". *International Conference on Intelligent Robots and Systems (IROS)*, 2020. [pdf]

A. E. Spitzer*, **X. Yang***, J. Yao, A. Dhawale, K. Goel, M. Dabhi, M. Collins, C. Boirum, N. Michael, "Fast and Agile Vision-Based Flight with Teleoperation and Collision Avoidance on a Multirotor". *International Symposium on Experimental Robotics (ISER)*, 2018. [pdf]

A. Dhawale, **X. Yang**, N. Michael, "Reactive Collision Avoidance using Real-Time Local Gaussian Mixture Model Maps". *International Conference on Intelligent Robots and Systems (IROS)*, 2018. [pdf]

X. Yang, A. Agrawal, K. Sreenath, N. Michael, "Online Adaptive Teleoperation via Motion Primitives for Mobile Robots". *Special Issue on Learning for Human-Robot Collaboration, Autonomous Robots*, 2018. [pdf]

X. Yang, K. Sreenath, N. Michael, "A Framework for Efficient Teleoperation via Online Adaptation". *International Conference on Robotics and Automation (ICRA)*, 2017. [pdf]

X. Yang, K. Sreenath, N. Michael, "Online Adaptive Teleoperation via Incremental Intent Modeling". *Late Breaking Report, Human-Robot Interaction (HRI)*, 2017. [pdf]

S.C.C. Shih, I. Barbulovic-Nad, **X. Yang**, R. Fobel, A.R. Wheeler, "Digital microfluidics with impedance sensing for integrated cell culture and analysis". *Biosensors and Bioelectronics*, 2013, vol.42, pp.314–320. [pdf]

Experience

2015–2021	**Robotics Institute at Carnegie Mellon University** Pittsburgh PA, USA

Graduate Research Assistant

Research focuses on intelligent teleoperation, intent representation, inference and prediction, and planning-based teleoperation architectures for mobile robots in unstructured environments.

· Designed and developed path prediction for teleoperation in known environments
· Designed and developed novel action selection and prediction for adaptive motion-based teleoperation
· Designed and developed novel planning-inspired trajectory-based teleoperation for unstructured environments
· Designed, built, implement and maintained full stack control/planning/teleoperation software architectures for simulation and hardware UAV flights
· Designed, built, implement and maintained quadrotor hardware vehicles including chassis build and component-wise trade studies and full system integration

2018	**Toyota Research Institute** Ann Arbor MI, USA
	Research Intern, Risk Aware Trajectory Planning and Control
	Developed FLUID planner, a planner that generates dynamically feasible trajectories via a learned model using a local flow field of directional intention for sequential motion planning.
2015	**Rapyuta Robotics Ltd.** Zürich, Switzerland; Tokyo, Japan
	Control Engineering Intern
	Simulated, implemented and tested an aggressive quadrotor hover-to-hover flip maneuver using a parameterized open-loop trajectory, improved using iterative learning scheme for real-time flip performance.
2014	**Autonomous Systems and Biomechatronics Lab, University of Toronto** Toronto ON, Canada
	Research Assistant
	Developed classification of traversable terrains for realtime terrain categorization for a search and rescue rover.
2013–2014	**IBM Canada Ltd.** Markham ON, Canada
	Software Developer Intern, Release Engineering

Talks

Feb 2021	CMU RI, Research Talk. Pittsburgh, PA
May 2019	Shield AI, Research Talk. Pittsburgh, PA
Apr 2019	CMU SCS, Guest Lecture. Pittsburgh, PA
Mar 2019	CMU RI, Field Robotics Center Seminar. Pittsburgh, PA
Oct 2018	IROS 2018 workshop on Vision Based Drones, Invited Talk. Madrid, Spain

Conference Orals

Jun 2021	ICRA 2021, Main conference presentation. Online
Aug 2020	IROS 2020, Main conference presentation. Online
Nov 2018	ISER 2018, Single-track main conference presentation. Buenos Aires, Argentina
Oct 2018	IROS 2018, Main conference presentation. Madrid, Spain
Jun 2017	ICRA 2017, Main conference presentation. Singapore
Mar 2017	HRI 2017, Poster session. Vienna, Austria

Peer Review Activities

2021	Frontiers in Robotics and AI
2021	Journal of Intelligent and Robotic Systems (JINT)
2020,19,18	IEEE International Conference on Robotics and Automation (ICRA)
2020	IEEE Access
2018	IEEE Transactions on Robotics (T-RO)

Patents

2019	"Efficient Teleoperation of Mobile Robots via Online Adaptation", U.S. Patent Application No. 16/291,610.

Activities

2019,18,17	Teaching Assistant, Introduction to Feedback Control Systems (16-299), CMU
2017–2019	RoboCzar (Chair), RoboOrg (Robotics Institute graduate student organization), CMU
2016–2017	Class Rep, RoboOrg, CMU
2013–2015	Executive Chair, Galbraith Society, University of Toronto

Systems	Linux/Unix	**Languages**	C++, Matlab, Python	**Software**	ROS, Git, LaTeX