

# Kentaro Barhydt

kbarhydt@mit.edu • (518) 937-1822  
[kentarobarhydt.mit.edu](mailto:kentarobarhydt.mit.edu)

## EDUCATION

---

**Massachusetts Institute of Technology (MIT)**, Ph.D. in Mechanical Engineering (*advisor: Harry H. Asada*) 2025 (expected)  
**Tufts University**, M.S. in Mechanical Engineering (*advisors: William Messner & Karen Panetta*) May 2020  
**Union College**, B.S. in Mechanical Engineering (*advisors: John Rieffel & William Keat*) June 2018

## RESEARCH EXPERIENCE

---

**d'Arbeloff Lab, MIT, Cambridge, MA** *Sept. 2021 – Present*

### Graduate Research Assistant

- Researching design and control principles for novel Supernumerary Robotic Limb (SRL) morphologies.

**Terrain Robotics Advanced Control & Experimentation Lab (TRACE), UMass Lowell, Lowell, MA** *Nov. 2020 – Aug. 2021*

### Visiting Researcher

- Designed and implemented a novel trajectory tracking controller for multi-domain hybrid models of bipedal walking based on control Lyapunov functions and quadratic programming.
- Developed custom simulation tools for the Digit humanoid robot platform using the MuJoCo physics library and C/C++.

**Robot Locomotion and Biomechanics Lab, Tufts University, Medford, MA** *Jan. 2020 – June 2020*

### Graduate Research Assistant

- Developed a modular jumping robot test rig for high-energy/velocity experiments in natural and controlled environments.
- Established initial investigation and formulation of a milli-scale robotics project on morphological intelligence in foot design.

**Prof. William Messner Research Group, Tufts University, Medford, MA** *Sept. 2018 – May 2020*

### Graduate Research Assistant

- Designed and developed a novel assistive robotic platform to help persons with high-level spinal cord injury (SCI) gain independence in performing activities of daily living in home environments.
- Formulated and implemented a minimal-DoF design approach for mobile manipulators to maximize the teleoperator's agency over the platform's operation through a direct-manipulation control scheme.
- Designed and conducted experimental user-studies involving participants with C4-C7 SCI to validate our design approach.

**Evolutionary Robotics Group, Union College, Schenectady, NY** *Feb. 2017 – June 2018*

### Undergraduate Research Assistant

- Designed, manufactured, programmed, instrumented, and evaluated the first wireless vibrating tensegrity robot, to enable genetic algorithm experiments on rapidly fabricated physical platforms.
- Developed and experimentally tested a resonant model of single strut vibration.

**GE Global Research, Niskayuna, NY** *June 2016 – Jan. 2017*

### Research and Development Intern

- Researched and synthesized cutting-edge VR/AR technologies for new applications in engineering design and manufacturing.
- Developed interactive VR simulations using Unity3D and C# to establish proof-of-concept for client-relevant use cases.

## PUBLICATIONS & REVIEWS

---

### Publications:

- **K. Barhydt**, A. Adu-Bredu, S. Everhart-Skeels, G. Bedell, K. Panetta and W. Messner, "Cartbot: A Direct-Manipulation Minimal Degrees-of-Freedom Mobile Assistive Robot to Maximize User Agency," 2020 IEEE International Conference on Human-Machine Systems (ICHMS), pp. 1-6, Rome, Italy, 2020.
- J. Kimber, Z. Ji, A. Petridou, T. Sipple, **K. Barhydt**, J. Boggs, L. Dosiek, and J. Rieffel, "Low-cost wireless modular soft tensegrity robots", 2019 2nd IEEE International Conference on Soft Robotics (RoboSoft), pp. 88-93, 2019.
- **Barhydt, Kentaro**, "Development of a Fully Instrumented, Resonant Tensegrity Strut" (2018). *Honors Theses*. 1627.

**Reviewer:** IEEE IROS (2021); IEEE ICRA (2021); IEEE Transactions on Systems, Man, and Cybernetics (2020, 2019)

## LEADERSHIP EXPERIENCE

---

**Project Lead & Supervisor;** TRACE Lab, UMass Lowell, Lowell, MA *March 2021 – Sept. 2021*

- Supervised 1-3 undergraduate students by administering trainings and delegating/managing their short- and long-term tasks.

**Lab/Project Manager;** Prof. William Messner Research Group, Tufts University, Medford, MA *June 2019 – May 2020*

- Directed the lab's research directions, managed lab funding, and led 2-4 students working on our projects by delegating responsibilities and providing guidance both during and outside of lab meetings.

## SKILLS

---

**Technical Skills:** SolidWorks, AutoDesk Inventor, mechatronic design & fabrication, rapid prototyping, machining

**Programming Skills:** Python, MATLAB, C/C++, MuJoCo, Arduino, Unity3D, Git