Paul Bovbel

Roboticist and Software Engineering Leader

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With a decade of engineering experience and five years in a leadership role, I specialize in helping teams bring complex systems from prototype to production. I prioritize building scalable and efficient solutions, whether they are physical robotic systems or cloud-based infrastructures. I am passionate about driving growth, optimizing processes, and leveraging open-source software and communities to enhance innovation and collaboration.

I currently work remotely from Kitchener, and I am authorised to work in the US via TN visa.

Technical Skills

While I've had the opportunity to explore various technologies, I have substantial experience with:

- C++ (Modern, Boost)
- Python
- Java (EE and Android)
- ROS1, ROS2, Gazebo and friends
- OpenCV and PCL
- Linux, systemd, and bash
- Docker, LXD, Ansible
- Jenkins and Github Actions
- PostgreSQL
- AWS

Employment

Locus Robotics – Boston, MA (Remote)

Principal Robotics Software Engineer, Planning and Controls Team Lead, *May 2023 - Present*
Staff Robotics Software Engineer, Planning and Controls Team Lead, *June 2021 - May 2023*

- Responsible for all aspects of robot navigation, between high level execution, through path planning and down to trajectory optimization. Large, dense fleets of mobile robots operating in semi-structured environments, collaborating with humans having limited training.
- Designed and developed a topological planning layer to handle efficient multi-robot routing in very large (1M+ sqft) warehouse environments.
- Leading a team of 7 engineers in a people management, architectural, and high-level development capacity.
- Shipped 3 new autonomous mobile robot platforms in 2 years, including systems with stringent safety requirements adhering to international standards.

Staff Robotics Software Engineer, Platform Team Lead, *May 2019 - June 2021*
Senior Roboticist, *March 2017 - May 2019*

- Formed a Platform Software team (3 engineers) with a wide purview - including CI/CD, cloud infrastructure, network comms, and developer tooling.
- Stood up solutions to fill gaps in software lifecycle management, including building out crash reporting, monitoring, build, and deployment automation.
- Developed a bespoke CI/CD system - wrangling hundreds of software packages into coherent build and image artifacts for testing, release, and deployment to battery-powered linux servers on wheels.
- Double duty as a robotics generalist, designing systems for 3D perception, navigation, robot control, and robot-to-robot comms.

Clearpath Robotics – Kitchener, ON

Senior Software Engineer, *Mar 2016 - Mar 2017*
Software Engineer, *Nov 2014 - Mar 2016*

- Designed a mission scheduling, execution, and monitoring system for fleets of autonomous mobile robots in a factory environment.
- Created tools for multi-robot simulation and testing of autonomy systems.
- Modernised and maintained drivers, demos, and documentation for research robot platforms (see Husky).
- Developed a suite of control, autonomy, and simulation software for quadcopters swarm research (see UAV Lab).

Autonomous Systems and Biomechatronics Lab – University of Toronto, ON

Graduate Research Assistant, *September 2012 - May 2014*

- Prototyped multiple robotic platforms for research use (see Casper, MARP, and Moverbot).

Projects

I've contributed to many projects within the ROS ecosystem, but I'm particularly proud of having worked on:

- frontier_exploration - a pluggable exploration framework on top of the navigation stack.
- aiorospy - a library to interface with ROS1 from within Python 3's asyncio framework.
- catkin_virtualenv - an infrastructure package to allow bundling a whole virtualenv of dependencies together with a ROS package.
- tailor - a turnkey CI system to quickly build large ROS distributions.
- vrpn_client_ros - a component to interface VRPN-compatible MOCAP systems with ROS1.
- perception_pcl/pointcloud_to_laserscan - pointcloud library bridge into ROS.

Education

- Master of Applied Science, Mechanical Engineering, University of Toronto, 2012 - 2015.
- Bachelor of Applied Science, Mechanical Engineering, University of Toronto, 2006 - 2011.

Publications, Patents, Talks

- "Tailor CI: How Locus Deploys Robots At Scale", ROSCon, Macau, *2019*. [video]
- Clearpath Robotics Patent US20190243384A1, "Communication Systems for Self-Driving Vehicles, and Methods of Providing Thereof", *2019*. [patent]
- Clearpath Robotics Patent US20180276595A1, "Systems and methods for autonomous lineside parts delivery to an assembly line process", *2018*. [patent]
- Bovbel, P., "A Person-search System for an Assistive Robot", Thesis, *2015*. [pdf]
- Bovbel, P. and Nejat, G., "Casper: An Assistive Kitchen Robot to Promote Aging in Place", Journal of Medical Devices, Transactions of the ASME, *2014*. [pdf]

Personal Interests

I enjoy volunteering as a mentor with FIRST Robotics, 3D printing, backcountry canoeing/camping, cycling, and board games. I'm also an adequate guitar player.