

# Ben Kolligs

## Senior Robotics Software Engineer

*I am a passionate roboticist with expertise in motion planning, simulation, and high-level behavior. If there's no evidence to say I can't do it, then I believe I can.*

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## Skills

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- C++
- Python
- Rust
- Robotics
- Software Architecture
- Research and Development
- Computer Graphics
- Vulkan/OpenGL
- Motion Planning
- Simulation
- Machine Learning
- Linux

## Work Experience

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### Senior Engineer - Robotics Software, Maven Robotics

01/2025 - Present, Santa Clara, CA

- Implementing techniques for post training manipulation policies to enhance overall performance.
- Created a vector database to organize training data from private and public datasets
- Trained grasping policies with HIL-SERL RL framework and MJX-accelerated MuJoCo Playground for internal demonstrations.
- Created WebGPU-based asset viewer in Rust/WASM along with asset onboarding Blender pipelines for photogrammetry and simulation asset preparation
- Developed vision-guided manipulation pipeline with YOLOv11 segmentation, point cloud processing, and custom grasp prediction networks along with synthetic data generation pipeline.
- Delivered production-ready dual-arm robotic kitting system with coordinated motion planning, collision avoidance, and multi-object tracking for manufacturing demonstration

### Senior Robotics Software Engineer, Ambi Robotics

06/2022 - 01/2025, Berkeley, CA

- Supervised and delegated the deployment of an ML based optical character recognition system to our production machines, resulting in 5% better scanning success.
- Developed and deployed a high performance motion planning stack for one of Ambi's upcoming projects, that involved a complex configuration space and required tweaking the custom driver I developed previously to function in line with the new requirements. This involved a literature review, design and implementation of various motion planning algorithms.
- Developed and deployed a high-performance motion planning stack for the Ambisort A series' Gantry Robot. This included literature review, design and implementation of a control system using Yaskawa motors, custom robot driver in Rust, and advanced real-time motion planning algorithm. Achieved a 15% increase in average speed, significantly enhancing maximum throughput and reducing support incidences.
- Advised on the design and performed implementation of a proprietary rendering and simulation system in C++, utilizing extensive experience in graphics programming and parallel rendering engine design. Provided technical support and mentorship to a new project lead, enhancing their understanding and skills in rendering system development. Used this system to generate simulated data for our manipulation foundation model.
- Designed an improved multi-threaded software architecture for the Ambisort A series, focusing on maintainability, scalability, and reliability. The new architecture resulted in a 10% increase in machine throughput, reduced support incidents, and higher developer productivity as measured by pull requests (PRs).
- Led the design of the software architecture for the Ambisort B series product line in Python, which included the implementation of the Alpha build's sortation application and the creation of a reliable hardware driver in Rust for the Modsort conveyors.
- Managed and developed projects using Agile Sprint Methods for both our 2023 and 2024 Robotics Software summer interns.

## Software Technical Lead, State Estimation, Moonranger Lunar Rover

*CMU was awarded a NASA contract to develop the Moonranger rover for an autonomous lunar mission to explore polar ice.*

*11/2020 - 05/2022, Pittsburgh, PA*

- Designed and implemented a kinematics model that successfully estimated slip on soil and GRC-1 lunar regolith simulant.
- Led the state estimation team for the Moonranger rover project, which involved implementing a Kalman Filter for orientation estimation and developing a scheme to use visual odometry and solar ephemeris data to correct the pose estimate.
- Designed flight software architecture in collaboration with software team leads and evaluated options for the flight software IPC middleware, resulting in the selection of C++ and NASA cFS.

## Robotics Software Engineering Intern, ProtoInnovations

*Internship during my Master's Degree. ProtoInnovations performs R&D work on spacefaring robotics in collaboration with NASA.*

*05/2021 - 08/2021, Pittsburgh, PA*

- Performed research and development on planetary rover terrain manipulation behavior planning and control in GRC-1 lunar simulant, successfully completing a subset of SBIR deliverables.
- Designed and wrote perception, controls, and planning software in Python and C++ to enable terrain manipulation actions and demonstrated development for NASA.
- Worked with the business team to identify key technological strengths and what would allow for future growth.

## Robotics Engineer, Keen Footwear

*02/2018 - 02/2020*

- Programmed ABB robots and analyzed data using Python and C++ scripts to test the commercial viability of the UNEEKBOT, as the lead engineer for robotics innovation.
- Designed an electromechanical device that reduced UNEEKBOT's error rate by 50%.
- Acted as the main field engineer for the UNEEKBOT Tour, collaborating with marketing and sales teams to create marketing activations attracting over a million new fans.
- Trained staff in the US, Japan, and Hong Kong to use the UNEEKBOT system with confidence, enabling three three-week marketing events to occur where up to 80,000 potential customers interacted with the brand.

## Education

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### Masters of Robotics Systems Development, Carnegie Mellon University

*08/2020 - 05/2022*

### BA Physics and Math, Lewis & Clark College

*08/2014 - 05/2018*