Michael J. Miles II

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Education

University of Colorado Boulder — Boulder, CO
Ph.D. Mechanical Engineering, July 2022 — **GPA 3.6/4.0**
M.S. Mechanical Engineering, August 2018

Missouri University of Science and Technology — Rolla, MO
B.S. Electrical Engineering, May 2016 — **GPA 3.8/4.0**
B.S. Computer Engineering, May 2016

Industry Experience

Pattern Labs — Erie, CO
Seed-stage startup developing a medium-sized fleet of autonomous mobile robots for major airport operations (ANSI/RIA R15.08-1, ISO 6966-1&2, ISO 26262)
Senior Robotics Engineer — Jan 2022 - Present

- **Led motion planning stack** development, testing, and deployment for safe operation of 3+ ton vehicle at up to 25 mph in high stakes, highly dynamic environments
- **Led multi-sensor fusion and state estimation stack implementation**, development, testing, and deployment for perceptually-degraded, GPS-denied environments
- **Performed trade studies and integration tests** for lidar, radar, camera, GNSS, and inertial sensors
- **Interacted** with **investors and customers** to demonstrate system reliability and technical competency
- Led **root cause analysis**, and documented and developed solutions to system defects
- Contributed to engineering staff hiring and training
- Developed tools and processes for sensor reliability testing and calibration
- Developed tools and processes for improving developer productivity and system reliability

RF Localization Software Consultant — June 2021 - Mar 2022

- Subject to NDA; no details available

Academic Experience

Team MARBLE | University of Colorado Boulder — Boulder, CO
*Research team developing a small fleet of semi-autonomous robots for subterranean exploration; took **3rd place in DARPA Subterranean Challenge***
Principal Investigator: Dr. Sean Humbert
Founder / Senior Perception & Navigation Engineer — Sept 2018 - Sept 2021

- Developed, tested, and deployed **terrain-aware navigation software** in large, unstructured, dynamic environments resulting in **~4x autonomy failure reduction** and **0 instances** of physical obstruction
- **Led** development and testing on **multi-modal object detection / fusion stack** in perceptually-degraded environments
- **Led root cause analysis**, and documented and developed solutions to system defects
- Led manufacturing, testing, and deployment of wheeled, tracked, and quadrupedal platforms

Autonomous Robotics & Perception Group | University of Colorado Boulder — Boulder, CO
Principal Investigator: Dr. Christoffer Heckman
Graduate Research Assistant — Aug 2018 - July 2022

- **Led** construction and development of a **high speed, off road, autonomous RC-sized car** utilizing simulation-in-the-loop for **real time, model based motion planning**
- **Led** paid and volunteer **student recruitment, hiring, and training**
- **Managed** a **10-person team** of B.S./M.S. students on various robotics projects

Computer Skills

Programming languages
(C/C++, Python, Matlab, CUDA, Java, C#)

Simulation frameworks
(BulletPhysics, LGSVL, Gazebo, Ignition, Simulink)

Robot runtime frameworks
(ROS/ROS2, CyberRT)

Math / optimization frameworks
(Eigen, GTSAM, SciPy, Ceres)

Sensor libraries (PCL, OpenCV)

Microsoft Office, Google Docs, Latex

Publications

Miles, M. & Heckman, C., 2023. Terrain-Aware Semantic Mapping for Cooperative Subterranean Exploration. *Frontiers in AI and Robotics.* (Under preparation)

Biggie, H., **Miles, M.**, et al., 2022. Flexible Supervised Autonomy for Exploration in Subterranean Environments. *J. Field Robotics*.

Ohradzansky, M., **Miles, M.**, et al., 2020. Multi-Agent Autonomy: Advancements and Challenges in Subterranean Exploration. *J. Field Robotics*.

Miles, M., et al., 2019. Flattening of Diluted Species Profile via Passive Geometry in a Microfluidic Device. *Micromachines*.

Miles, M., Jetter, J., 2016. A Lidar-based navigation system for the visually impaired. International Foundation for Telemetering. *Conference paper and presentation.*