





RUSSELL SCHWARTZ

Robotics and Autonomous Systems Developer

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EDUCATION

- Carnegie Mellon University** Aug 2022 – Dec 2023
Master of Science in Computer Science Pittsburgh, PA
- University of Maryland** (*summa cum laude*) Aug 2018 – May 2022
Bachelor of Science in Computer Science College Park, MD
Bachelor of Science in Mathematics

PROFESSIONAL EXPERIENCE

- Astrobotic Technology** May 2023 – Aug 2023
Robotic Perception Intern Pittsburgh, PA
- Contributed to the terrain-relative navigation autonomy stack for the Griffin lunar lander by developing flight-ready image-processing and localization software in C++
 - Developed and tested a prototype of spacecraft visual-odometry for enhanced localization during descent and landing, including modern scale-recovery and bundle-adjustment methods
- Johns Hopkins Applied Physics Lab** May 2021 – Aug 2021
Intelligent Systems Intern Laurel, MD
- Developed tooling in python, C++, and fortran to optimize the flight-plan of aircraft under a complex objective function involving the communication between an onboard device and an orbital satellite
 - Utilized modern non-linear solvers in conjunction with legacy high-fidelity physics simulations
- NASA Jet Propulsion Lab** Jan 2021 – April 2021
Robotics & Artificial Intelligence Intern Pasadena, CA
- Investigated methods for ground-level terrain-relative navigation for camera-equipped GPS-denied robots and planetary rovers
 - Developed robust methods for extracting salient features from a horizon image via deep-learning-based semantic segmentation
 - Studied the effectiveness of using observed features in conjunction with an accurate map to estimate robot pose; developed QGIS plugins to automate analysis of Jezero Crater
- Ncyber LLC** May 2019 – Aug 2019
Mobile Software Development Intern Columbia, MD
- Developed a network analysis app for Android mobile devices that tests network speed and stability, aggregates user data across multiple devices, and generates real-time data visualizations

PUBLICATIONS

- “Topographical landmarks for ground-level terrain relative navigation on mars,” *IEEE Aerospace AeroConf*, 2022.
- “Semantic mapping in unstructured environments: Toward autonomous localization of planetary robotic explorers,” *IEEE Aerospace AeroConf*, 2022.
- “Robust Multi-Agent Task Assignment in Failure-Prone and Adversarial Environments,” *Robotics: Science and Systems*, 2020
- “Deriving Common Analytical Constants from Combinatorial Structures,” *HCC Journal of Research in Progress - First Ed.*, 2017

SKILLS

Languages

Python C++17 C# Java JavaScript
TypeScript Matlab

Frameworks

Numpy Pandas TensorFlow PyTorch
Scikit-learn OpenCV Ceres

Technical

Git Gitlab CI/CD Docker Unix Jira
CMake \LaTeX

Non-Technical

Mathematical reasoning Research formulation
Data visualization Self-management

RESEARCH EXPERIENCE

- CMU Robotics: AART Lab** Sep 2022 – Present
Considered the deployment of a team of robots for simultaneous exploration and monitoring of a spatio-temporally dynamic environment, modeled via a mixture of gaussian processes. Advisor: Katia Sycara
- UMD Robotics: RAAS Lab** Aug 2019 – May 2022
Investigated task-allocation algorithms for multi-agent robotic systems operating in highly failure-prone (and adversarial) environments, where cooperation leads to higher chance of success. Presented findings at RSS 2020. Advisor: Pratap Tokekar
- Gemstone Team LEMMA** Aug 2018 – May 2022
Developed novel methods to automatically detect and model the spread of extremism in niche online communities. Implemented sophisticated NLP tools (including BERT) to automatically identify extreme content in a >5TB dataset. Advisor: Pierre-Emmanuel Jabin