

# RUSSELL SCHWARTZ

Robotics Software Engineer  
Pittsburgh, PA

(US Citizen, Active TS/SCI)

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## EDUCATION

- Carnegie Mellon University** *GPA: 4.0* Aug 2022 – Dec 2023  
*Master of Science in Computer Science* Pittsburgh, PA
- University of Maryland** *GPA: 4.0* Aug 2018 – May 2022  
*Bachelor of Science in Computer Science* College Park, MD  
*Bachelor of Science in Mathematics*

## PROFESSIONAL EXPERIENCE

- Astrobotic Technology** May 2023 – Present  
*Perception Software Engineer III* Pittsburgh, PA
- Developed perception algorithms for autonomous terrain-relative navigation and hazard-detection for the Griffin lunar lander
  - Implemented flight software in C++ responsible for real-time sensor data processing, filtering, and decision making aboard the spacecraft
  - Worked with a variety of sensors: monocular camera, stereo cameras, LiDAR, doppler LiDAR, IMU, sun-tracker, star-tracker
  - Utilized modern robotics methods: feature extraction, visual odometry, fiducials, ICP, global pointcloud registration, Gaussian processes, surface meshes, uncertainty propagation, kalman filtering
  - Developed Python prototypes and simulations for early-stage testing and supported field testing of later-stage integrated systems
- Johns Hopkins Applied Physics Lab** May 2021 – Aug 2021  
*Intelligent Systems Intern* Laurel, MD
- Developed tooling in Python and C++ to optimize motion planning for aircraft under complex objective functions 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 & Autonomy Intern* Pasadena, CA
- Worked with the Mars 2020 team to investigate methods for ground-level terrain-relative navigation using onboard rover cameras
  - Developed robust methods for extracting salient terrain features from imagery via semantic segmentation as well as conventional vision techniques
  - Modeled the effectiveness of using observed features in conjunction with an accurate map to estimate rover pose

## SKILLS

### Languages

Python C++17 Rust C# Java  
JavaScript Matlab

### Frameworks

Numpy OpenCV Open3D Eigen PCL  
GDAL PyTorch Scikit-learn cFS ROS 2

### Technical

Git Jira Docker CMake  $\LaTeX$

### Non-Technical

Mathematical modeling Systems engineering  
Data visualization Technical communication

## RESEARCH EXPERIENCE

- CMU Robotics** 2022 – 2023  
Evaluated methods (both classical and learning-based) for coordinating a team of robots for exploration and monitoring of dynamic environments modeled as a mixture of Gaussians. Developed controllers for a swarm of Khepera mobile robots.
- UMD Robotics** 2019 – 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.
- UMD LEMMA Group** 2018 – 2022  
Worked with early large language-model BERT to develop novel methods for detecting extremist content in niche online communities. Implemented tooling for processing large (>50TB) datasets and for fine-tune training of the model.

## SELECT PUBLICATIONS

- "Hazard Detection LiDAR System for Robotic Lunar Landers: Flight Test Results," *AIAA SciTech*, 2025
- "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