

RUSSELL SCHWARTZ

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EDUCATION

Carnegie Mellon University

Master of Science in Robotics

Research Lab/Advisor: TBD

Pittsburgh, PA

Aug 2022 – Aug 2024

University of Maryland

Bachelor of Science in Computer Science

Bachelor of Science in Mathematics

College Park, MD

Aug 2018 – May 2022

Honors: *Summa Cum Laude* - 4.00 GPA

PROFESSIONAL EXPERIENCE

APL Intelligent Systems Intern

Johns Hopkins Applied Physics Laboratory

May 2021 – Aug 2021

Laurel, MD

- Developed tooling to optimize the flight-plan of fixed-wing aircraft under a complex objective function involving the communication between an onboard device and an orbital satellite. Utilized SNOPT and OTIS to search the space of physically feasible solutions with the help of custom tooling written in both Fortran and Python. Helped with integration of the new tool into an existing desktop architecture for use in the field.
- Created a system for testing automated network security analysis tools (such as APL's AVRA) on simulated networks repeatably. The user specifies network topology, OS types, and software distributions, and the resulting network is automatically virtualized via Docker and GNS3, and the testing procedure is run autonomously.

NASA Robotics & Artificial Intelligence Intern

NASA Jet Propulsion Laboratory

Jan 2021 – April 2021

Pasadena, CA

- Researched various methods for terrain-relative navigation using monocular cameras for robots operating in GPS-denied areas on Earth and for planetary rovers on Mars, resulting in a number of publications
- Developed robust methods for extracting salient terrain features (e.g. the peak of a distant mountain) from an image via semantic segmentation with DeepLab as well as traditional computer vision techniques
- Studied the effectiveness of using observed features (in conjunction with an accurate map of the area) to estimate pose. Developed plugins for QGIS that automatically detect potential landmarks from a DEM, analyze their visibility, and compute localization accuracy for every point in the scene. Applied these techniques/tooling to imagery from Perseverance's Navcams and DEMs of Jezero Crater, resulting in a predicted localization accuracy in the 10s of meters

Software Development Intern

Ncyber LLC

May 2019 – Aug 2019

Columbia, MD

- Developed a network analysis app for Android mobile devices that tests network speed and stability, aggregating user data across multiple devices and carriers
- Implemented various real-time data-visualizations including a geographic heatmap of aggregate internet coverage

Software Development & Data Analysis Intern

Treble Network

April 2018 – March 2019

Baltimore, MD

- Developed and tested applications for iOS, Android, and Web, contributing to the core design of a new online business networking platform
- Analyzed customer analytics using Firebase, Excel, and Python

Audio-Visual Technologies Intern

Vision Technologies

June 2016 – Aug 2016

Glen Burnie, MD

- Aggregated technical specifications for enterprise-grade AV hardware
- Worked with hardware experts to determine requirements for a given application, and aided in installation

OTHER RESEARCH

UMD Robotics: RAAS Lab

Aug 2019 – May 2022

Investigated task-allocation algorithms for multi-agent robotic systems. Worked to answer the question of how to assign agents to tasks in highly failure-prone environments where cooperation leads to higher chance of success. Presented findings on stochastic and adversarial failure models at RSS 2020, including efficient algorithms that yield optimal or near-optimal results.

Gemstone Team LEMMA

Aug 2018 – May 2022

Worked with a team of other undergraduates at UMD to develop novel methods to automatically detect and then model the spread of extremism in niche online communities. Framed the problem as an economic trade model on a graph of social connections. Implemented sophisticated NLP tools to automatically identify extreme content in a >5TB dataset. Culminated in a thesis presentation.

PUBLICATIONS

- J. Vander Hook, R. Schwartz, K. Ebadi, K. Coble, and C. Padgett, "Topographical landmarks for ground-level terrain relative navigation on mars," in *IEEE Aerospace AeroConf*, 2022.
- K. Ebadi, K. Coble, D. Kogan, D. Atha, R. Schwartz, C. Padgett, and J. Vander Hook, "Semantic mapping in unstructured environments: Toward autonomous localization of planetary robotic explorers," in *IEEE Aerospace AeroConf*, 2022.
- Schwartz, R., & Tokekar, P. "Robust Multi-Agent Task Assignment in Failure-Prone and Adversarial Environments" in *Robotics: Science and Systems*, 2020
- Schwartz, R., Long, M. "Deriving unexpected mathematical constants from Pascal's Triangle". *HCC Journal of Research in Progress - First Edition*, 2017

LEADERSHIP & VOLUNTEER WORK

- **Boy Scouts of America** – Served as Patrol Leader, Quartermaster, and Senior Patrol Leader for Boy Scout troop. Oversaw 80 younger scouts while organizing weekly meetings, camping trips, and service projects. (2012 - 2018)
- **Math Team Captain** – Participated for 4 years in Howard High School mathematics team. Led the team to win first place in the division senior year. (2013 - 2017)
- **Math Honor Society Vice President** – Organized meetings and wrote challenge problems for 100 students. (2014 - 2017)
- **MS Chesapeake Challenge** – Participated in a charity event for the National Multiple Sclerosis Society by raising over \$1,000 for MS research. Participated in the metric century bike ride and volunteered at rest stops. (June 2016, 2017, and 2018)

HONORS

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| • UMD Banneker/Key Scholarship | • National Merit Scholar | • BSA: Order of The Arrow |
| • UMD Computer Science Dept. Honors | • Math, Tech, Science Honor Societies | • First place at <i>HoCo Hacks</i> '16 & '17 |
| • ICPC 2018 Regional Finalist | • Winston Family Writing Award | • John Lockwood Mathematics Award |