Preston Robinette

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SUMMARY

Research Interests Generative AI, Deep Learning, Computer Vision, Information Hiding Reinforcement Learning, Cybersecurity

RELEVANT SKILLS

Computer Languages Python, C++, Bash, MATLAB
Operating Systems MacOS, Linux, Windows

EDUCATION

Vanderbilt University, Nashville, TN — Expected Spring 2025
Ph.D. in Computer Science — GPA: 4.0/4.0

- Awards: National Defense Science and Engineering Graduate Fellow, ABS Scholarship Award

Presbyterian College, Clinton, SC — 2017 - 2020
B.S. in Physics, Computer Science — GPA: 4.0/4.0

- Awards: Valedictorian, Presidential Fellow, Summa Cum Laude, Outstanding Senior in Computer Science, NASA Undergraduate Research Award

RESEARCH EXPERIENCE

Google — Mountain View, CA
Software Engineer Intern — *May 2024 - Aug 2024*

Apple — Cupertino, CA
Machine Learning Engineer Intern — *May 2023 - Aug 2023*

- Explored methods to improve data efficiency in Apple's manufacturing machine learning pipeline used to identify defects in high-resolution manufacturing images
- Contributed **self-supervised learning (SSL)** and **foundation model knowledge distillation** capabilities to a collaborative Git repository, ensuring the usability and repeatability of these contributions across users
- Conducted experiments utilizing these methods to evaluate detection performance compared to current methodology and established baselines for future work

National Security Agency — Oahu, HI
Cybersecurity Engineer Intern — *May 2022 - Aug 2022*

- Designed and developed Python scripts to parse and analyze midpoint and endpoint network traffic (PCAPs) using Pandas and regular expressions
- Created and implemented intrusion detection rules to detect malicious traffic for various common vulnerability exploits (CVEs)
- Created and evaluated firewall rules to prevent malware attacks on a network
- Completed various mini-projects related to computer network exploitation, vulnerability research, scanning and exploit development, incident response and data analytics, network forensics, and basic landline and wireless telecommunications networks

Air Force Research Laboratory — Dayton, OH
Reinforcement Learning Intern — *May 2021 - Aug 2021*

- Investigated the impact of reinforcement learning heuristics on aerospace control systems, an issue arising from the variance of reinforcement learning algorithms
- Implemented architecture and hyperparameter optimization methods for two aerospace reinforcement learning environments and tasks
- Improved agent performance (minimum episode length, mean reward, and interaction efficiency) by 200%

NASA Langley Research Center — Hampton, VA
Software Engineering Intern — *Jun 2020 - Aug 2020*

- Updated preexisting SAGE III payload software in Python
- Designed and developed Python scripts to calibrate pre-flight and in-flight telemetry by manipulating and analyzing complex, high-dimensionality data taken from pre-flight laboratory testing and in-flight telemetry
- Collaborated with data scientists, software engineers, and project managers

NASA South Carolina Space Grant Consortium Clinton, SC
Undergraduate Research *Aug 2019 - May 2020*

- Developed a 3D printed, open source, prosthetic hand controlled via myoelectric sensing and interpretation
- Designed and implemented control for the hand in C++ by measuring voltages from specific muscles and calculating targeted responses
- Conducted signal processing in Python to study the relationship between myoelectric signals and individual finger movements
- Implemented and tested machine learning algorithms to differentiate finger movements with 80% accuracy

Oak Ridge National Laboratory Oak Ridge, TN
Undergraduate Summer Research *Jun 2019 - Aug 2019*

- Developed a CNN to detect corrosion in spent nuclear fuel canisters with 96% accuracy using PyTorch
- Analyzed and labeled a large scale dataset of images to be used in training, validation, and testing
- Created a graphical user interface that highlights corroded sections of uploaded images in a heat map

LEADERSHIP EXPERIENCE

Vanderbilt Undergraduate Review Journal Nashville, TN
Mentor *Jan 2021 - Present*

- Lead seminars for engineering undergraduate students on how to review academic writing

Institute for Software Integrated Systems (ISIS) Student Council Nashville, TN
Co-Leader *Sept 2022 - Dec 2023*

- Co-lead an initiative to reinstate the Vanderbilt ISIS Student Council, which creates learning opportunities, plans social events, and organizes academic talks for students in ISIS

Vanderbilt Graduate Student Council Nashville, TN
Computer Science Department Representative *Jan 2022 - Dec 2023*

- Represent the Computer Science (CS) Department on Vanderbilt's Graduate Student Council
- Advocate for CS students needs and concerns at monthly council meetings, vote on initiatives that have been brought to the floor, and facilitate relevant information to CS students

VandyHacks (email for samples) Nashville, TN
AI Workshop Leader *Jan 2021 - Jan 2022*

- Created and taught content to undergraduate students in AI topics, including supervised learning, reinforcement learning, genetic algorithms, and deepfakes

Air Force Research Laboratory Dayton, OH
Project Manager *May 2021 - Aug 2021*

- Supported high school students in research projects involving reinforcement learning on aerospace control problems

SELECTED PUBLICATIONS

- Shadows and secrets: Sanitizing image steganography with diffusion models. In *International Conference on Machine Learning (ICML)*, 2024 (submitted)
- Case study: Neural network malware detection verification for feature and image datasets. In *International Conference on Formal Methods in Software Engineering (FormaliSE'24)*, 2024
- SUDS: Sanitizing universal and dependent steganography. In *European Conference on Artifical Intelligence*, 2023
- Self-preserving genetic algorithms for safe learning in discrete action spaces. In *Proceedings of the ACM/IEEE 14th International Conference on Cyber-Physical Systems (with CPS-IoT Week 2023)*, pages 110–119, 2023
- Training agents to satisfy timed and untimed signal temporal logic specifications with reinforcement learning. In *International Conference on Software Engineering and Formal Methods*, pages 190–206. Springer, 2022

For more information, please visit: *https://pkrobinette.github.io* or *https://www.linkedin.com/in/prestonrobinette/*