# Preston Robinette

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## SUMMARY

**Research Interests** Adversarial Learning, Reinforcement Learning, Evolutionary Algorithms, Interactive Technologies, Cybersecurity, Generative Models

## 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

**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

**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

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

- 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 - Present*

- 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

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

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

**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*

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

**Superposition Amplify** Nashville, TN
*Mentor* *Jan 2021 - May 2021*

- Mentored a high school student interested in computer science
- Met biweekly to discuss computer science topics, undergraduate degrees, and exciting CS opportunities

**Vanderbilt University** Nashville, TN
*Teaching Assistant* *Aug 2020 - May 2021*

- Assisted in teaching Vanderbilt undergraduate course, Introduction to Engineering
- Guided students in final projects, graded exams and homework sets

## SELECTED PUBLICATIONS

- 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
- Automated detection of corrosion in used nuclear fuel dry storage canisters using residual neural networks. *Nuclear Engineering and Technology*, 53(2):657–665, 2021
- Myoelectric control of prosthetics and robotics. *Bulletin of the American Physical Society*, 63, 2018
- On using real-time reachability for the safety assurance of machine learning controllers. In *2022 IEEE International Conference on Assured Autonomy (ICAA)*, pages 1–10. IEEE, 2022
- Reinforcement learning heuristics for aerospace control systems. In *2022 IEEE Aerospace Conference (AERO)*, pages 1–12. IEEE, 2022