

# Preston Robinette

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## SUMMARY

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**Research Interests**      Generative AI, Computer Vision, Reinforcement Learning,  
Evolutionary Algorithms, Information Hiding, Cybersecurity

## RELEVANT SKILLS

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

## EDUCATION

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**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

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**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**

*Undergraduate Research*

Clinton, SC

*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**

*Undergraduate Summer Research*

Oak Ridge, TN

*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**

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### **Institute for Software Integrated Systems (ISIS) Student Council**

*Co-Leader*

Nashville, TN

*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**

*Computer Science Department Representative*

Nashville, TN

*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**

*Mentor*

Nashville, TN

*Jan 2021 - Present*

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

### **VandyHacks (email for samples)**

*AI Workshop Leader*

Nashville, TN

*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**

*Project Manager*

Dayton, OH

*May 2021 - Aug 2021*

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

## **SELECTED PUBLICATIONS**

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- Monsters in the dark: Sanitizing hidden threats with diffusion models. In *International Conference on Learning Representations*, 2024 (submitted)
- SUDS: Sanitizing universal and dependent steganography. In *European Conference on Artificial 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
- Reinforcement learning heuristics for aerospace control systems. In *2022 IEEE Aerospace Conference (AERO)*, pages 1–12. IEEE, 2022

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