Emma **Andrews**

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Education

University of Florida	*Gainesville, Florida*
Ph.D. in Computer Science	*May 2023 - May 2027*
University of Florida	*Gainesville, Florida*
M.S. in Computer Science, GPA: 3.88	*Aug. 2021 - May 2023*
University of Florida	*Gainesville, Florida*
B.S. in Computer Science with Mathematics minor, GPA: 3.92	*Aug. 2017 - May 2021*

Skills

Programming	Python, C/C++, Julia, Rust, Java, Verilog
Technologies	Windows, Linux, Git, VxWorks

Professional Experience

University of Florida CISE Department — *Gainesville, Florida*

Graduate Research Assistant, Embedded Systems Lab — *Aug. 2022 - Present*

- Investigating how to reduce dataset bias for better machine learning models
- Created a diffusion model that produces images based on spatial layouts and depth values
- Utilized machine unlearning to maintain dataset privacy while removing dataset bias
- Collaborated with other researchers on Test Vector Leakage Assessment for symmetric and asymmetric encryption algorithms
- Created hardware implementation of Elliptic Curve Integrated Encryption Scheme and Elliptic Curve Digital Signature Algorithm with the goal of configurability
- Investigated and implemented mitigation techniques for different types of attacks against the elliptic curve modules

L3Harris Technologies — *Palm Bay, Florida*

Software Engineering Intern, Space and Airborne Systems Segment — *May 2022 - July 2022*

- Implemented C++ classes for message handling and telemetry
- Created unit tests using googletest for implemented classes
- Updated documentation with updated design decisions and implementation details

L3Harris Technologies — *Palm Bay, Florida*

Software Engineering Intern, Space and Airborne Systems Segment — *May 2021 - July 2021*

- Designed software module structure for battery trays on a satellite
- Utilized design patterns in structuring the design
- Established virtual machine environment that comes pre-loaded with all tools required for doing development on the project to cut down on time needed to request all software and tools

L3Harris Technologies — *Palm Bay, Florida*

Software Engineering Intern, Space and Airborne Systems Segment — *July 2020 - Aug. 2020*

- Provided support to final efforts of system worked on previously (May 2019 - August 2019)
- Tested final end system before delivery of product to formal qualification testing
- Ensured testing documents were valid in exact testing procedures and grammar

L3Harris Technologies *Palm Bay, Florida*

SOFTWARE ENGINEERING INTERN, SPACE AND AIRBORNE SYSTEMS SEGMENT *May 2019 - Aug. 2019*

- Worked on a team responsible for the creation of software using VxWorks and C++ to monitor a space satellite and its hardware
- Built unit tests to test components of the baseline and to prove that requirements were met
- Implemented several requirements into the baseline that were missing or had changed

Teaching Experience

University of Florida Engineering Education Department *Gainesville, Florida*

GRADUATE TEACHING ASSISTANT *Aug. 2021 - May 2022*

- Assisted students in Computer Engineering Design 1 and 2, a two semester sequence for undergraduate computer engineers to complete their senior capstone
- Graded students' assignments
- Acted as the client for groups to direct them forward to meet course requirements of the project
- Answered students' questions regarding assigned labs, project milestones and deliverables, and their projects.

University of Florida CISE Department *Gainesville, Florida*

UNDERGRADUATE TEACHING ASSISTANT *Aug. 2018 - May 2019*

- Helped students in Programming Fundamentals 1 (Aug. - Dec. 2018) and Programming Fundamentals 2 (Jan. - May 2019) with questions they had relating to the programming languages and concepts taught
- Answered any questions related to strong programming skills and Java or C++-specific concepts
- Graded students' code for labs, projects, and free responses on exams
- Assisted first time programmers in Programming Fundamentals 1 adjust to the course and they type of work required to succeed in the class

Research

Security IP *Gainesville, Florida*

UF EMBEDDED SYSTEMS LAB *Jan. 2022 - August 2023*

- Investigating how to reduce dataset bias for better machine learning models
- Created hardware implementation of Elliptic Curve Integrated Encryption Scheme and Elliptic Curve Digital Signature Algorithm with the goal of configurability
- Investigated and implemented mitigation techniques for different types of attacks against the modules

Publications

Journal Articles

- A. Jayasena, E. Andrews, and P. Mishra, "TVLA*: Test Vector Leakage Assessment on Hardware Implementations of Asymmetric Cryptography Algorithms," IEEE Transactions on Very Large Scale Integration (VLSI) Systems, vol. 31, no. 9, pp. 1269–1279, Sep. 2023, doi: 10.1109/TVLSI.2023.3297027.

Conference Proceedings

- E. Andrews, D. Bau, and J. Blanchard, "From Droplet to Lilypad: Present and Future of Dual-Modality Environments," in 2021 IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC), Oct. 2021, pp. 1–2. doi: 10.1109/VL/HCC51201.2021.9576355.

Book Chapters

- E. Andrews, Z. Pan, and P. Mishra, "Explainable Artificial Intelligence," in Explainable AI for Cybersecurity, Springer, 2023, pp. 29–51.

Preprints and Other Publications

- E. Andrews and P. Mishra, "Explainable Metric Learning for Deflating Data Bias." SRC TECHCON, Sep. 2024.
- Z. Pan, E. Andrews, L. Chang, and P. Mishra, "Privacy-Preserving Debiasing using Data Augmentation and Machine Unlearning." arXiv, Apr. 19, 2024. doi: 10.48550/arXiv.2404.13194.
- E. Andrews, Z. Pan, and P. Mishra, "Towards Accurate Measurement of Pretraining Bias." SRC TECHCON, Sep. 2023.
- K. Rani, E. Andrews, A. Jayasena and P. Mishra, "Defending Elliptic Curve Cryptography against Laser Fault injection Attacks", GOMACTech Conference, San Diego, California, Mar. 20-23, 2023.