Maria Cardei

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Education

University of Virginia, *School of Engineering and Applied Science*
Ph.D. in Computer Science August 2023 – Expected May 2028
Master of Computer Science August 2023 – May 2025
NSF GRFP Fellow | Provost Fellow | NSF NRT Fellow
Research Focus: AI for Computational Behavior Modeling (*Advisor: Professor Afsaneh Doryab*)

University of Florida, *Herbert Wertheim College of Engineering*
B.S in Biomedical Engineering, Minor in Computer Science June 2018 – May 2023
GPA: 3.94/4.00 | Honors: cum laude

Research Experience

Graduate Research Assistant August 2023 – Present
University of Virginia, HAI Lab, Advised by Dr. Afsaneh Doryab

- Developing **AI/ML methods for modeling human behavior and health**, including image-based analysis, trajectory matching, and spectrophotometric sensing for accessible, non-invasive biological assessment.
- Designing and evaluating **multi-agent and RL frameworks** for complex decision-making and coordination problems.

ML/AI Engineer Intern May 2025 – September 2025
Dexcom, San Diego, California (Remote)

- Led end-to-end development of an **LLM benchmarking framework** for personalized decision-support in diabetes management, including task and data generation, multi-metric evaluation, and analysis.
- Built and deployed distributed **cloud infrastructure** on Google Cloud Platform (e.g., Vertex AI, Model Garden, BigQuery, GCS) to run 2.8M evaluations across 15K users.

Research Intern (NSF REU in Sensing and Smart Systems) May 2022 – January 2023
Florida Atlantic University Institute for Sensing and Embedded Network Systems Engineering (I-SENSE), Advised by Dr. Behnaz Ghoraani

- Researched and applied **domain adaptation** techniques to generalize human activity recognition models to the Parkinson's population using Python.
- Evaluated **deep learning** model complexity and data augmentation strategies.

Research Intern (REU) May 2021 – August 2021
Wake Forest Center for AI Research, Advised by Dr. Metin Gurcan

- Applied **deep learning and image processing** methods to detect cell nuclei in medical pathology images, implementing and evaluating Faster R-CNN models.
- Pre-processed and analyzed large-scale medical imaging datasets using MATLAB and Python, and **researched advanced object detection algorithms** for improved accuracy.

Peer-Reviewed Publications

Journal Articles

- **M. Cardei**, A. Doryab, "Factorized Deep Q-Network for Cooperative Multi-Agent Reinforcement Learning in Victim Tagging", *IEEE Transactions on Automation Science and Engineering (T-ASE) 2026.* **Accepted.**

- C. Zhao*, **M. Cardei***, M. Clark*, R. Yan, A. Doryab, "Capturing Biobehavioral Rhythms in Everyday Life: Data and Models for Cyclic Behavior in Naturalistic Settings", *ACM Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT) 2026.* **Accepted**.
- M. Clark*, **M. Cardei***, C. Zhao, I. Cardei, R. Yan, A. Doryab, "The Human Rhythms Dataset: Connecting Cyclical Human Behaviors and Wellness", *Nature Scientific Data 2026.* **Accepted.**
- A. Balch, **M. Cardei**, S. Kranz, A. Doryab, "Towards an Accessible, Noninvasive Micronutrient Status Assessment Method: A Comprehensive Review of Existing Techniques", *ACM Transactions on Computing for Healthcare 2025.*
- S. Davidashvilly, **M. Cardei**, M. Hssayeni, C. Chi, B. Ghoraani, "Deep neural networks for wearable sensor-based activity recognition in Parkinson's disease: investigating generalizability and model complexity", *Nature Biomedical Engineering Online 2024.*

Conference Papers

- **M. Cardei**, A. Doryab, "Practical Heuristics for Victim Tagging During a Mass Casualty Incident Emergency Medical Response", *IEEE 20th International Conference on Automation Science and Engineering (CASE), Bari, Italy 2024.*

Conference Posters & Abstracts

- A. Balch, **M. Cardei**, A. Doryab, "Exploring Smartphone-based Spectrophotometry for Nutrient Identification and Quantification", *ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp), Espoo, Finland 2025.*
- **M. Cardei**, A. Doryab, "Multi-Agent System for Optimizing Victim Tagging in Human/Autonomous Responder Team", *15th ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS), Hong Kong, China 2024.*

Preprints / Under Review

- **M. Cardei**, J. Lamp, M. Derdzinski, K. Bhatia, "DM-Bench: Benchmarking LLMs for Personalized Decision Making in Diabetes Management". **Under review.**
- **M. Cardei**, S. Ahmed, G. Chapman, A. Doryab, "Pairwise Spatiotemporal Partial Trajectory Matching for Co-Movement Analysis". **Under review.**.

* Authors contributed equally.

Achievements and Awards

National Science Foundation Graduate Research Fellowship Program (NSF GRFP) - 2025

University of Virginia Computer Science Outstanding Service Award - 2025

Certification in Cyber-Physical Systems - 2025

CASE 2024 IEEE/RAS Travel Support - 2024

University of Virginia Provost Fellowship - 2023

National Science Foundation National Research Traineeship (NSF NRT) (2023 - 2024)

University of Virginia Computer Science Scholar (2023-2024)

University of Florida President's Honor Roll - 2020

Florida Bright Futures Scholarship (2018 - 2023)

Teaching and Mentorship Experience

Research Mentor
University of Virginia Fall 2025 - Present
- Mentor 3 undergraduate and 1 master's student contributing to graduate-level research projects, providing guidance on paper reviewing, ML implementation, and project ideation.

Teaching Assistant
University of Virginia Fall 2024 - Present
- Delivered lectures, led discussions, and provided academic support for graduate and undergraduate courses including *Signal Processing and Machine Learning*, *Foundations of Data Analysis*, and *Computational Behavior Modeling*.
- Managed assignments, exams, and grading for up to 74 students while holding weekly office hours to assist with coursework and projects, ensuring clarity, consistency, and engagement.

Charlottesville High School Engineering Mentor
University of Virginia Link Lab Fall 2024
- Mentored a senior high school team on a semester-long engineering project, providing weekly guidance on technical challenges, user-centered study design, and project management.
- Supported students in developing soft skills such as presenting effectively and time management.

Teaching Assistant
Girls Who Code (GWC) Summer Immersion Program June 2023 - August 2023
- Delivered an engaging game design curriculum (JavaScript, p5.js) to high school girls, fostering an inclusive and supportive STEM learning environment.
- Provided personalized guidance and debugging support on student projects during office hours.

Content Co-Developer and Co-Teacher
Florida Atlantic University I-DeepLearn Summer Outreach Program June 2022
- Co-developed and taught the I-DeepLearn Summer Outreach Program, introducing high school girls to deep learning through hands-on projects.

Service Experience

Computer Science Graduate Student Group Social Co-Chair
University of Virginia January 2024 - Present
- Elected by computer science and computer engineering graduate students for two consecutive terms to plan, coordinate, and host up to 3 social events per month fostering community engagement.

Paper Reviewer
University of Virginia March 2024 - Present
- Provided reviews of 5 potential publications for *ACM Transactions on Computing for Healthcare* and *IMWUT*.

Student Volunteer
UbiComp Conference, Espoo, Finland October 2025
- Supported the organization of a 700+ attendee international conference by providing technical assistance during presentation sessions, managing registration, and leading events.

Computer Science Recruitment Volunteer
University of Virginia January 2024 - January 2025
- Represented the UVA Computer Science graduate program at three recruitment events, engaging with prospective students and faculty, answering questions, and promoting UVA.

Presentations and Panels

Panelist: "Summer Internship as a Computer Science Graduate Student"
University of Virginia Computer Science Internship Panel November 2025

Poster: "Exploring Smartphone-based Spectrophotometry for Nutrient Identification and Quantification"
UbiComp 2025 October 2025

Panelist: "Career Paths in Science and Engineering"
Building Leaders for Advancing Science and Technology (BLAST) STEM Career Panel August 2025

Presentation: "What is Research?"
University of Virginia's Women in Computer Science (WiCS) Hackathon February 2025

Presentation: "Practical Heuristics for Victim Tagging During a Mass Casualty Incident Emergency Medical Response"
IEEE CASE 2024 August 2024

Panelist: "How to Find the Right Career Path"
Wake Forest Biomedical Informatics Internship Alumni Panel June 2023

Poster: "Nuclei Detection in Immunohistochemical Images of Diffuse Large B-Cell Lymphoma using Deep Learning"
Biomedical Engineering Society (BMES) Conference 2021 October 2021

Relevant Courses

University of Virginia (M.C.S, Ph.D.)
Analyzing Online Behavior for Public Health; Machine Learning in Systems Security; Machine Learning for Image Analysis; Natural Language Processing; Machine Learning; Human-Robot Interaction; Cyber-Physical Systems: Formal Methods, Safety and Security; Cyber-Physical Systems: Technology and Ethics; Computational Behavior Modeling; Signal Processing, Machine Learning, and Control.

University of Florida (B.S.)
Introduction to Data Science; Introduction to Multimodal ML in Python; Operating Systems; Introduction to Computer Organization; Data Structures/Algorithms; Programming Fundamentals 1 & 2; Applied Discrete Structures; Clinical Engineering Design; Quantitative Physiology; Computer Applications for Biomedical Engineering; Biosignals & Systems; Biomedical Instrumentation.

Technical Skills & Tools

- **Core Competencies in ML:** RL, LLMs, deep learning, CNNs, Siamese Networks, image and medical image analysis, object detection; data integration, feature extraction, model training, benchmarking, and evaluation.
- **Programming:** Python, MATLAB, C++, Java, SQL.
- **Cloud & Infrastructure:** Google Cloud Platform (Vertex AI, Model Garden, BigQuery, GCS), Microsoft Azure, parallelized workflows.
- **ML, Data Analysis & Visualization:** TensorFlow, PyTorch, Scikit-learn, OpenCV, Pandas, NumPy, SciPy, Matplotlib, Seaborn, Plotly.
- **Tools:** Google Colab, Jupyter Notebooks, Git.