Andrew Balch

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EDUCATION

University of Virginia, Charlottesville, VA   Spring 2025
Bachelor of Science, Computer Science, 3.92 GPA
Relevant course work: Human-Computer Interaction, Machine Learning, Artificial Intelligence, Systems of Inequality, Politics of Modernity, Mathematical Statistics, Data to Knowledge

Universitat Politécnica de Valéncia, Valéncia, Spain   Fall 2022
Engineering study abroad program

Governor's School for Science and Technology | York High School, Yorktown, VA   Spring 2021
Advanced Diploma, Dual-enrolled, 4.75 GPA

RESEARCH EXPERIENCE

Undergraduate Researcher, *UVA Human-AI Technology Lab*   May 2022 - Present
- Worked alongside PhD students as an active lab member
- Lead a multi-year-long, interdisciplinary project leveraging ubiquitous devices to gain insights into micronutrient status
- Spearheaded inter-lab, inter-departmental collaboration for micronutrient spectroscopy
- Designed and built a smartphone attachment to quantify Vitamin B12 in a solution
- Collaborated with a PhD student to implement state-of-the-art Constrained Reinforcement Learning approaches for real-world safety
- Helped run human-subjects study for communicating wellness through music

Capstone Research, *advised by Professor Afsaneh Doryab*   Dec. 2023 – Apr. 2024
- Continued previous cancer treatment modeling project as my B.S.C.S capstone
- Developed a novel, data-driven visualization approach that integrates feature selection
- Demonstrated the system to the Chief of Colorectal Surgery at Emory Cancer Center

Research Mentorship, *The MITRE Corporation*   Sep. 2020 – Apr. 2021
- Mentored under a software engineer and cybersecurity expert at The MITRE Corporation
- Analyzed behavior of 17,000 Android malware samples scraped from database
- Presented a novel, deep learning-based behavior forecasting solution in TensorFlow to industry professionals

Cancer Treatment Modeling, *Emory Cancer Center*   Apr. 2020 – Sep. 2020
- Cleaned and analyzed treatment data set with Excel, Pandas, Sci-Kit Learn, MatPlotLib
- Aimed to understand prognoses and infer optimal treatment plans for over 1,800 patients

International Science and Engineering Fair Project   Aug. 2019 – Feb. 2020
- Designed, developed, and tested an autonomous robotics system powered by induction
- Proved wireless power would cut cycle time by > 50%, built system infrastructure on AWS

WORK EXPERIENCE

Supervisor, *Clearwater Pool Management*   Aug. 2019 – Sep. 2020
- Supervised workforce and locations, collaborated with others to ensure smooth operation

Lifeguard, *Clearwater Pool Management*   May 2019 – Aug. 2019

PUBLICATIONS

Balch, Andrew, Cardei, Maria A., Kranz, Sibylle, Doryab, Afsaneh. (2024). "Towards an Accessible, Noninvasive Micronutrient Status Assessment Method: A Comprehensive Review of Existing Techniques." *arXiv preprint arXiv:2408.11877*.

Submitted to ACM Transactions on Computing for Healthcare

Balch, Andrew. (2024). "Why Algorithms Remain Unjust: Power Structures Surrounding Algorithmic Inequality." *arXiv preprint arXiv:2405.18461*.

Pending submission to ACM Conference on Human Factors in Computing Systems (CHI)

PRESENTATIONS

Balch, Andrew, Doryab, Afsaneh. (Oct. 2024). "Data-Driven Event Sequence Visualization of Rectal Cancer Outcomes" *Poster session upcoming at UVA Engineering Research Expo, Charlottesville, VA*.

Balch, Andrew, Doryab, Afsaneh. (Apr. 2024). "Using Smartphones to Hack Human Micronutrition." *Poster session at Commonwealth Cyber Initiative Symposium, Richmond, VA*.

Balch, Andrew, Doryab, Afsaneh. (Oct. 2023). "Smartphone-Based Spectrophotometer for Vitamin B12 Quantification" *Poster session at UVA Engineering Research Expo, Charlottesville, VA*.

HONORS & AWARDS

Dean's Undergraduate Research Fellowship	Summer 2024
Outstanding Undergraduate Research - Honorable Mention	April 2024
Computer Science Department	
Dean's List	Spring 2024
Dean's Undergraduate Research Fellowship	Summer 2023
Outstanding Undergraduate Research	April 2023
UVA Computer Science Department	
Dean's List	Fall 2023
Dean's List	Spring 2023
Dean's List	Spring 2022
Dean's List	Fall 2021
Highest Honors in Research Methodology and Ethics	Spring 2021
Governor's School for Science and Technology	
First Place at Tidewater Science and Engineering Fair	March 2020

SKILLS

Research: Experienced taking an interdisciplinary, critical approach to addressing social problems

Programming: Adept in Python, R, Java, and C/C++ as well as Git, AWS, and Kubernetes

Analysis Tools: **Developed projects with TensorFlow and PyTorch, proficient in MatLab, SAS, Excel, and SQL**

Data Science: **Applied exploratory data analysis, regression analysis, data embedding, etc. in professional contexts**

Prototyping: **Hands-on experience building devices with 3D printing, microcontrollers, sensors, IoT**

Languages: **Spanish at an intermediate level**