

David A. Ledbetter

dledbetter456@gmail.com | www.davidamosledbetter.com (portfolio) | https://github.com/dledbetter123

EDUCATION

University of Maryland, Baltimore County, Baltimore, MD

Computer Science BS (Grad. Accel. Program) - AI/ML Focus (Statistics Minor) | December 2023 | GPA 3.75

- **Meyerhoff Scholar, UMBC Cyber Scholar, GEM Fellow**
 - **Relevant Courses:** Data Structures, Algorithm Design and Analysis, Machine Learning, Software Engineering
- Computer Science MS - AI/ML and Intelligent Distributed Systems | December 2024

- ML/Intelligent Distributed Systems Researcher
- **Relevant Courses:** Natural Language Processing, Computer Vision, Data Science, Distributed Systems (**Golang**)

EXPERIENCES

ML/Full Stack SWE (Full Time) - Apple, San Diego, CA

May 2024 – Present

- Built **self-healing coding agent** on a **custom in-house harness** (built on **LangGraph**) orchestrating agentic nodes: **Anthropic Claude** auto-repairs code while local **Qwen** performs **tool calling** to cut **token costs**.
- Modeled code exploration after **partially observable Markov decision processes**, guaranteeing **Claude** detects true divergences while ignoring false error reports.
- Designed **RAG** pipeline where **Qwen** summarizes metrics from sources such as Apple Vision results, parsing of execution flow of code, etc. and then marshaled for **Claude** context.
- Manage **backend** administering and collecting results from **100,000+ devices** and many more tests per month.
- Built **async Python** probe manager that runs outside of self-heal agent, which delivers consistent raw metrics into the agent flow to avoid latency.
- Replaced **Celery** on stdout: in-house **distributed task queue + IPC + state management + episode tracking**.
- Reduced resource usage of two **cloud-native** services in **Kubernetes** cluster by over **50%** and **75%**, respectively.

Skills Used: *LangGraph, RAG, vector DBs, FastAPI/Pydantic, async Python, ML, Kubernetes, Swift*

ML/Systems Researcher - Ebiquity Lab UMBC

September 2021 – Present

- Built application-transparent **eBPF kernel probe** monitoring data transfers, connections, and function signatures across **distributed systems, MySQL (MariaDB), and Docker**.
- Built **Graph Attention Pooling Framework** to increase dependency length for **language models**.
- Performed **exploratory data analysis** on **benign vs. malware** execution dataset.
- Built graph structure for video stream similarity with **memoized** operations, cutting runtime by **75%**.
- Created **statistical tests** approximating image contours, improving accuracy **58%** over standard similarity metrics.
- Distilled **GPT4V** model for **96.7%** reduction in latency communicating with autonomous agents like aerial drones.
- Authored paper detailing my method for detecting anomalies with **visual transformers**.

Skills Used: *Python, C/C++, Computer Vision, Distributed Systems, MySQL, Docker, Machine Learning, Bash*

Full Stack SWE Intern - Cisco Meraki, San Francisco, CA

May – August 2023

- Built Meraki dashboard policy management features using **React/ReduxJS** and **Ruby on Rails**.
- Rewrote model codebase to use **Typescript** to allow more accurate data representations and satisfy build constraints.
- Upgraded **policy management** API for complete **CRUD** support, giving users control over a consistent model.
- Authored **Jest** unit tests and optimized snapshot files for successful **Jenkins** integration.

Skills Used: *React/ReduxJS, Typescript, Gerrit, Git, SVN, Atlassian tools, Ruby, Agile, API development*

Software Engineering Intern - Northrop Grumman Space, Linthicum Heights, MD

June – August 2022

- Developed **satellite operating system** software collaboratively with a 12-member **agile** scrum team.
- Reorganized **memory management** on navigation computers and streamlined data object representations.
- Created and applied **regular expressions** for managing large output files efficiently.

Skills Used: *C++, Regular Expressions, Jira, Bitbucket, Confluence, Agile*

PROJECTS

Character-Aware Neural Language Model

September – December 2023

- Built **character-aware NLM** in **PyTorch**, encoding character tokens tested on the **UD EWT corpus**.
- Achieved **3% reduction in perplexity** versus same-size SOTA models on new words.
- **Tuned** Highway and Convolution Block parameters, refining the character-to-word prediction process.

PUBLICATIONS & PRESENTATIONS

- Chukkapalli, S. S. L., **Ledbetter, D.**, Joshi, A., Finin, T., & Freeman, J. (2025). *Impostors Among Us: An Agentic Approach to Identifying and Resolving Conflicts in Collaborative Network Environments*.
- Chukkapalli, S. S. L., **Ledbetter, D.**, Jayarajah, K., Joshi, A., & Finin, T. (Submitted 2023). Resilient Self-Organizing Collaborative Sensor Networks. (*Submitted for The Web Conference 2024*)
- **Ledbetter, D.** (2022). *Energy-Efficient Onboard Autonomous Drone Navigation: Wall Following and Obstacle Detection*. (URCAD 2022 poster)