William Andrews

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Personal Website | GitHub Project Portfolio

INTERNSHIP OBJECTIVES & FOCUS

Computer Science & Mathematics major seeking to contribute to a high-performance software engineering team. Strong foundation in **C/C++**, **Python**, **Linux**, and **system programming**. Building expertise in parallel and distributed computing, with focus on **multi-threading**, **algorithmic efficiency,** and **low-level performance optimization**. Expanding skills in software development, DevOps practices, and scalable system design.

PROJECTS

Graph Transit Routing Engine Using a Bidirectional Multithreaded A* Algorithm (C++, Docker, Python)

- Implemented a **parallel routing engine** inspired by Waze to explore efficient shortest-path computation for transit networks.
- Traditional single-threaded shortest path algorithms can struggle with performance and scalability in transit applications. To address this, I investigated parallel approaches that balance speed and accuracy.
- Implemented a **bidirectional, multithreaded A* algorithm** in **C++** that reduced long distance computation times by searching from both start and end nodes simultaneously.
- Applied heuristic reweighting and optimized edge exploration to scale on large graphs (visualized in GraphViz).
- Containerized the system with **Docker** with deployment via **Flask** API, enabling consistent functionality across environments.
- Corporate routefinding methods are not open source, so here I explored the development of open source alternatives.

Fact Forecast: Fact-Checked News Platform (Python) @ DisinfoLab W&M

- Contributed to a technical team in backend development, and created automated RSS feed gatherers to aggregate articles from verifiably fact-checked diverse news sources, to provide reliable world news updates regarding different countries.
- Designed and maintained data pipelines to standardize and store scraped content for downstream use.
- Collaborated with the core development team to integrate scraping functionality into the platform's backend infrastructure.
- Project in progress, available at **Fact Forecast**.

Directed Research in High-Performance Computing (C/C++)

- Researching parallel matrix algorithms on CPU and GPU architectures with faculty advisor.
- Exploring performance optimization techniques including **multi-threading** with **memory and cache-efficient designs**.
- Designing and running **scalability benchmarks** for algorithm evaluation.

Matroid Algorithm Optimization (C++)

- **Designed a modular C++ framework** to represent and manipulate matroids in combinatorial optimization.
- Implemented matroid greedy algorithms to solve problems in graph theory, linear algebra, and set systems.
- Enabled experimentation with multiple matroid types and algorithm variations.
- This project explored the important concept of breaking up complex problems into simpler subproblems.

YouTube Judicial Comment Scraper (Python) @ DisinfoLab W&M

- Built Python tools to scrape, clean, and preprocess YouTube comment data for research on Mexican judicial reforms.
- Co-authored a research report analyzing public sentiment trends, **published** in ***The Diplomatic Courier***.
- Implemented efficient data pipelines to handle large volumes of user-generated content.

RECENT INTERNSHIPS

Software Engineer Intern @ DisinfoLab W&M **Fall 2024 - Current**

- Contributing to backend website development and website data management; see project description above.
- Developing software tools to analyze political and technological trends.
- Created data scrapers and sentiment analysis tools for public opinion on judicial reform, culminating in a **published article**.

DevOps Intern @ Nova.org Internet Service Provider **Spring 2025 - Current**

- Supporting deployment of open-source alternatives to mainstream cloud platforms.
- Gaining experience in Linux-based system administration, networking services, and DevOps practices.
- Assisting with integration of cPanel and related tools into existing systems to improve service management.

EDUCATION - CS GPA: 3.90 | Math GPA: 3.79 | Total GPA: 3.80

College of William & Mary | Williamsburg, Virginia **Expected Spring 2027**

Bachelor of Science | *1st Major: Computer Science* | *2nd Major: Mathematics*

Relevant Courses: Operating Systems, System Programming, Computer Organization, Directed Research in HPC, Algorithms, Honors Elementary Analysis, Graph Theory, Intermediate Linear Algebra, Abstract Algebra, Advanced Multivariable Calculus