William Andrews

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Projects

Graph Theoretic Transit Routing Engine - C++, Docker, Flask Aug. 2025
Personal Project *Alexandria, VA*
- Implemented a **Waze-inspired** routing engine to explore open source shortest path computation methods.
- Developed a multi-threaded, bidirectional A* algorithm in **C++** reducing long distance computation times.
- Visualized graphs using GraphViz, deployed in a **Docker** containerized server using **Flask**.

Fact Forecast: Fact-Checked News Platform - Python, Kubernetes, FastAPI Jan. 2025 – Present
DisinfoLab W&M *Williamsburg, VA*
- Contributed to **FastAPI** backend development for fact-checked news platform **Fact Forecast**.
- Built automated **Python** RSS feed gatherers with Feedparser to aggregate verified news sources.
- Assisting with deployment of a **Kubernetes** cluster (self-hosted at Nova.org) for containerized applications.
- Supporting deployment of **Elasticsearch** to enable data indexing, search, and analytics.

Directed Study in High Performance Computing - C/C++ Aug. 2025 – Present
The College of William & Mary *Williamsburg, VA*
- Researching serial and parallel matrix multiplication on CPU and GPU architectures.
- Studying parallel and distributed computing with shared-memory (**OpenMP**) and distributed-memory (**MPI**) models.
- Exploring performance optimization techniques including multi-threading with memory and cache-efficient designs in C.
- Implementing vectorized matrix operations in C using **AVX/AVX-512** intrinsics, benchmarking hand-optimized vs compiler auto-vectorized code across different data layouts (AoS vs SoA).

Matroid Algorithm Optimization - C++ May. 2025 – Aug. 2025
Personal Project *Alexandria, VA*
- Designed a **C++ framework** to solve matroids in combinatorial optimization.
- Implemented matroid greedy algorithms to find minimum spanning trees in regular and bipartite graphs, find the minimum basis for matrices, and solve abstract set systems.
- Generalized a small algorithm to solve multiple unrelated and cross-disciplinary abstract algebraic problems.

YouTube Judicial Comment Analysis - Python, Hugging Face Transformers Sept. 2024 – Dec. 2024
DisinfoLab W&M *Williamsburg, VA*
- Built **Python** tools to scrape, clean, and pre-process YouTube comment data for research on Mexican judicial reforms.
- Constructed a sentiment analysis tool using **Hugging Face transformer** model bert-base-cased to analyze **thousands** of positive/negative/neutral comments.
- Co-authored a research report analyzing public sentiment trends, **published** in *The Diplomatic Courier*.

Internship Experience

Software Engineer Intern Sept. 2024 – Present
DisinfoLab W&M *Williamsburg, VA*
- Using tools like **Kubernetes** and **Elasticsearch** self-hosted at Nova.org to support backend development.
- Contributing to backend development of the fact-checked news platform **Fact Forecast**.
- Created RSS feed scrapers using **Python** and Feedparser.
- Developed **Python** software tools using **Hugging Face transformer** models for sentiment analysis.

DevOps Intern Jan. 2025 – Present
Nova.org - Private Internet Service Provider *Remote*
- Supporting deployment of open-source alternatives to mainstream cloud platforms.
- Gaining experience in **Linux** system administration, networking services, and **DevOps** practices.
- Assisting with integration of **cPanel** and related tools into existing virtual machine to improve service management.

Education

The College of William & Mary - CS GPA 3.90 Williamsburg, VA
B.S. in Computer Science and Mathematics *Sept. 2023 – Expected May 2027*

Classes

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

Skills & Interests

Skills: C/C++, Python, Linux, Docker, Kubernetes, FastAPI, Algorithms, Graph Theory, Real Analysis, Abstract Algebra.

Interests: Basketball, Weightlifting, Philosophy, Stock Investing, Quantum Physics.