

William Andrews

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PROFESSIONAL SUMMARY

William & Mary student passionate about mathematics and computer science, with strong experience in C++ and high-performance computing (HPC). Skilled in designing efficient algorithms, parallel programming, and applying mathematical concepts to practical problem-solving. Solid understanding of machine-level programming and low-level performance optimization.

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

WORK HISTORY

IT Intern

@ Nova.org Internet Service Provider

Spring 2024 - Current

- Supporting deployment of open-source alternatives to mainstream cloud platforms.
- Gaining experience in Linux-based system administration and networking services.

Software Engineer Intern @ DisinfoLab W&M

Fall 2024 - Current

- Developing software tools to analyze political and technological trends.
- Contributed to research on judicial public opinion, culminating in a [published article](#).

PROJECTS

Directed Research in High-Performance Computing (C/C++) – In Progress Fall 2025

- Collaborating with a faculty advisor to study parallel matrix algorithms and other numerical algorithms on CPU and GPU architectures.
- Exploring performance optimization techniques including multi-threading and memory/cache-efficient designs. Planning and implementing benchmarks to evaluate scalability and efficiency of parallel algorithms.

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

- Designed and implemented a high-performance transit routing engine using a bidirectional, multithreaded A* algorithm.
- Leveraged parallelism with `std::thread` to efficiently search from both start and end nodes simultaneously, reducing route computation times while improving accuracy.
- Applied heuristic reweighting and optimized edge exploration to handle large-scale graphs visualized with GraphViz.
- Containerized the entire application with Docker for consistent deployment across environments, with a server using Flask API.

Matroid Algorithm Optimization (C++)

- [Designed a modular C++ framework](#) to represent and manipulate matroids: algebraic structures in combinatorial optimization.
- Implemented matroid greedy algorithms to solve problems in graph theory, linear algebra, and set systems.
- Structured code for extensibility, enabling experimentation with multiple complex matroid types and algorithm variations.

High Performance Linear Algebra Prototype (C++)

- Developed a custom matrix class framework and implemented core operations with emphasis on performance.
- Parallelized dot product computations using TBB, OpenMP, and `std::thread`, optimizing memory access and cache efficiency.
- Benchmarked parallel implementations against serial baselines to evaluate scalability and performance gains.

Nova Website (Linux) @ [Nova.org](https://nova.org)

- Contributed to the development of an [internal website](#) to host services and documentation for [Nova.org](https://nova.org).
- Aimed to provide secure, open-source alternatives to centralized ISP solutions.

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.