

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 advanced 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++, Fortran)

- Collaborating with a faculty advisor to explore advanced HPC topics, including parallel matrix algorithms, GPU acceleration, and performance optimization.
- Focused on implementing and benchmarking linear algebra and numerical algorithms on CPU and GPU architectures.
- Optimizing for memory efficiency, cache-aware design, SIMD/vectorization, and multi-threaded performance in large-scale scientific computations.

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

- 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 average route computation times and improving accuracy.
- Applied heuristic reweighting and optimized edge exploration to handle large-scale graphs visualized with GraphViz.

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 Library (C++)

- Built a high-performance linear algebra library supporting custom matrix types, standard matrix operations, and parallelized computation.
- Implemented parallelized dot products using `TBB`, `OpenMP`, and `std::thread`, with a focus on optimizing cache efficiency and memory access patterns. Benchmarked parallel algorithms against serial versions to measure performance gains.

Nova Website (Linux) @ [Nova.org](#)

- Contributed to the development of an [internal website](#) to host services and documentation for [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.