





# Aiden Slabiak

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## EDUCATION

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### University of Alabama

*B.S. Computer Science*

December 2026

*GPA: 3.7/4.0*

### Forsyth Central High School (Dual Enrollment at University of North Georgia)

June 2023

*GPA: 4.1/4.0*

## COURSEWORK

**Courses:** Complex Algorithms & Data Structures, Operating Systems & Concurrency, High-Performance Computing, Programming Languages (Compiler Design)

**Awards:** Dean's List (3x)

## TECHNICAL SKILLS

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**Languages:** C/C++, Python

**Tools:** Git/GitHub, VS Code, GDB Debugger, WSL

**Libraries:** OpenMP, Boost.Asio, MPI, pandas, NumPy, Matplotlib

## PROJECTS

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### Pathfinding with Fibonacci & Pairing Heaps | *C++, Algorithms, Data Structures*

Feb. 2026

- Engineered Fibonacci and Pairing Heap priority queues to optimize Dijkstra's and Prim's algorithms.
- Achieved  $\sim 2\times$  speedup on specific graphs using Pairing Heaps, evaluating operation count vs. runtime trade-offs.
- Analyzed performance bottlenecks in the data structures related to cache locality and memory overhead.

### SIMD Accelerated Matrix Library | *C++, AVX2/AVX-512, Intrinsics*

Jan. 2026

- Vectorized 4x4 and 8x8 matrix operations using AVX2 compiler intrinsics.
- Achieved  $\sim 3.5\times$  speedup over scalar loops via loop unrolling and 32-byte alignment.
- Tested extensively with random matrices to ensure numerical correctness.

### Immediate-Mode GUI & Rendering | *C++, Direct-3D11, Win32 API, Graphics*

Oct. 2025

- Architected an Immediate-Mode GUI library from scratch using Direct3D11.
- Designed a custom windowing system with Z-order layering and event/input handling.
- Built a batch rendering pipeline aggregating geometry and text into minimal draw calls.

## EXPERIENCE

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### Undergraduate Research Assistant | *University of Alabama*

2026 – Present

- Contributed to the development of an AI-driven platform for students.
- Researched and evaluated modern AI techniques to inform platform design decisions.
- Collaborated with faculty and graduate researchers to validate findings and ensure accuracy of insights.

### Customer Fitness Advisor | *University of Alabama*

2023 – 2024

Collaborated with team members to manage daily gym operations and member support.

### Fitness Operations Associate | *Onelife Fitness*

2022 – 2023

Coordinated with staff to maintain efficient facility operations and client support.

## ADDITIONAL ACHIEVEMENTS

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### Study Abroad – Tokyo, Vietnam, Taiwan

Summer 2025

Explored global business practices through the STEM-MBA program by analyzing developing markets in Vietnam versus developed markets in Taiwan, engaging with local businesses and universities, and gaining hands-on cross-cultural and international STEM insights.