

William Bradford

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Education

University of Virginia College of Engineering and Applied Science.

Charlottesville, VA.

BS Computer Science & BA Mathematics, 3.7/4.0 GPA

Aug. 2021 - May 2025

- Operating Systems, Computer Architecture, Data Structures, Algorithms, Real Analysis, Abstract Algebra, Abstract Linear Algebra, Physics I & II
 - Undergraduate Research Advisors: Dr. S. S. Ravi, Dr. Felix Lin, Dr. Kevin Skadron
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Experience

Processing in Memory Graduate Researcher. Charlottesville, VA.

Sep. 2024 - present

- Developed several benchmarks for simulated Processing in Memory (PIM) architectures including Bit-Serial, Bank-Level, and Fulcrum under Dr. Kevin Skadron (C++)
- Iterated over five different implementations of SpMV, designed three novel compression methods
- Designed a novel accelerator for performing Sparse Matrix-Vector (SpMV) multiplications called LoBSTA
- Produced an analytical model (Python) and cycle-accurate simulator for LoBSTA (Go)
- Achieved $15.1 - 27.0 \times$ theoretical maximum speedup for LoBSTA analytical models and $3.32 \times$ average un-pipelined simulated speedup for SpMV executions over a 28-core CPU benchmark
- Implemented PIM device simulation for data filtering and batch random updates using DRAMSim3

Intern at Avantus Federal. Washington, DC.

May 2022 - Aug. 2022

- Worked *under NDA* to help secure company sale to QinetiQ, estimated at \$590 million in value
 - Repeatedly contacted many company leaders to perform requirements elicitation to build internal application
 - Learned a new programming language to support automation of industry processes
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Course Projects & Specializations

Colbra: Conditional Branching for MapReduce Collectives. Cloud Computing

Fall 2025

- Used ns-3 network simulation (C++) to profile communication costs and data transfer overheads, showing a 17% reduction in communication time over prior node assignment
- Used offline benchmarking to profile which operations should map to which accelerators, speedup of $6.1 \times$ peak / $2.8 \times$ average speedup over traditional MapReduce load balancing methods (C++)

Relevant Course Projects. Operating Systems/Computer Architecture/Machine Learning

- Wrote virtual memory addressing and access system and kernel-level multitasking system for Raspberry Pi (Assembly and C)
 - Implemented simulation of pipelined 32-bit processor with five execution stages in HCLRS, an in-house hardware design language
 - Produced a 17-page paper regarding comparisons of binary classification models and initial findings for reversing MD5 hashes using a modified multi-layer perceptron
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Passion Projects

ResSpec.

Dec. 2025

- Created ResSpec, an automated resume specializer application written in Ocaml which automatically selects the most relevant portions of a user's work experience and outputs a PDF resume, rendered from Typst code
- Assembled *this resume* using ResSpec, implemented using a modified sorting formulation to match tags of a job to resume experiences

Dark World Shader.

Mar. 2023

- A stylized rendering shader for Minecraft, which creates a horror aesthetic through parabolic terrain geometry deformation and ray length-based staged lighting processing
 - Mimics the visual style of the VisualBoy, a failed Nintendo virtual reality product
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Skills