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Dear Cerebras Systems recruiting team,

I am a Computer Science student at the University of Waterloo applying for the AI Software Engineering Intern (Stack, Runtime, MLE) role. I am deeply passionate about **performance-critical runtime systems** and **machine learning infrastructure**, especially software that translates high-level abstractions into efficient and correct execution on specialized hardware.

I am currently an undergraduate research assistant in the Multicore Lab at Waterloo, where I contribute to extending Verlib (PPoPP'24) with **lock-free data structures on GPU** for efficient range queries. My work emphasizes **correctness and performance under concurrency**, including reasoning about memory consistency, implementing a **CPU baseline for controlled benchmarking**, and debugging subtle correctness issues in low-level GPU systems code. I also migrated the project to the **CUDA toolchain (nvcc)** and designed abstractions supporting both **versioned and non-versioned** data structures.

In parallel, I conducted research at Wolfram Research on a cellular automata **runtime and parallel execution engine**. I designed tiled update schemes and halo exchange mechanisms to ensure correctness, implemented sparse frontier updates combined with dense scans achieving a **127% speedup** on low-activity states, and built a **benchmark harness** to measure throughput, active ratios, and scheduling overhead. This work required profiling system behavior and iterating on execution strategies across multiple kernels.

Additionally, my competitive programming background, including placing **top 10 nationally in the Canadian Computing Olympiad twice** and achieving **USACO Platinum**, reflects a **solid understanding of data structures, algorithms, and systems fundamentals**, which I consistently apply to systems and performance engineering problems.

I am excited about the opportunity to contribute to Cerebras' compiler, runtime, and ML framework stack, and to help build reliable, high-performance software for large-scale AI training systems.

Sincerely,
Austin Jiang