Alek Westover
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Education

Massachusetts Institute of Technology, Cambridge, MA 2022-2026
Candidate for Bachelor's Degree in Mathematics with Computer Science
Relevant coursework:
Advanced Algorithms (Karger), Geometric Algorithms (Indyk), Algorithmic Lower Bounds (Demaine)
Graph theory and Additive Combinatorics (Zhao), Cryptography (Vinod), Analysis of Boolean Functions (Minzer)
Algebraic Combinatorics (Postnikov), Ramsey Theory (Saumerman), Stochastic Processes (Gamarnik)
Linear Algebra + Abstract Algebra (Neguț) + Multivariable Calculus + Real Analysis + Differential Equations

Research Projects

William Kuszmaul and Alek Westover. "A Nearly Quadratic Improvement for Memory Reallocation". Proceedings of the 36th ACM Symposium on Parallelism in Algorithms and Architectures. (SPAA'24)
Maintain memory under item inserts and deletes, minimizing the overhead of moving other items.

William Kuszmaul and Alek Westover. "Scheduling Jobs with Work-Inefficient Parallel Solutions". Proceedings of the 36th ACM Symposium on Parallelism in Algorithms and Architectures. (SPAA'24)
On-line scheduling problem: receive tasks with serial and parallel implementations, have to choose what to run.

Alek Westover "On the Relationship Between Several Variants of the Linear Hashing Conjecture"
Studied the expected *maxload* (number of items in the fullest bin) of several variants of linear hashing. Involved some neat elementary number theory and combinatorics. arxiv.org/abs/2307.13016

William Kuszmaul and Alek Westover. "The Variable-Processor Cup Game". In 12th Innovations in *Theoretical Computer Science Conference*. (ITCS'21)
Proved upper and lower bounds for a two player game involving filling and emptying cups. 10.4230/LIPIcs.ITCS.2021.16

William Kuszmaul and Alek Westover. "Cache-Efficient Parallel-Partition Algorithms using Exclusive-Read-and-Write Memory." Proceedings of the 32nd ACM Symposium on Parallelism in Algorithms and Architectures. (SPAA'20).
Designed and implemented a cache optimal algorithm for the parallel partition problem. arxiv.org/abs/2004.12532

Skills

Data science (Python, Julia); Full-stack web development (javascript, Flask / Node.js); C++; systems engineering (Rust); English (native); Mandarin (fluent)

Experiences

Software Engineer Intern at Neon Databases (Serverless PostgreSQL startup) 2023 summer
Systems engineering in Rust: added support for custom Postgres extensions.
Private Tutor (self-employed) 2017-present
Teach math (e.g. calculus), programming (e.g. python) to high schoolers and adults.
Canada/USA Mathcamp 2019
MIT PRIMES + UROP (mentored computer science research**,** Mentor: William Kuszmaul) 2019-2020, 2022-2023
Regeneron Science Talent Search 2020
National science fair for high school students, 7th place in USA, $70,000.
Project: "Cache-Efficient Parallel-Partition Algorithms using Exclusive-Read-and-Write Memory".
Massachusetts Science Engineering Fair: Second Place Award 2020