Jialin Cai

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PROFESSIONAL EXPERIENCE

Software Engineer Cherry Hill, NJ
Lockheed Martin (Advanced Research Laboratories) July 2023 - Present

- Software lead on a research team developing and optimizing a low probability of detection waveform to transmit/receive encrypted messages below the noise floor. Established a flexible, well-documented C++ API and testing framework, increasing throughput by nearly 500% via concurrency and GPU optimizations.
- Designed a lightweight, scalable distributed overlay protocol in Python for dynamically updating device routes in ad hoc mobile networks. The software was adopted as part of Lockheed's 5G.MIL initiative.
- Replicated and validated research utilizing convolutional neural networks for multi-target tracking applications.

Graduate Teaching Assistant Philadelphia, PA
University of Pennsylvania (Systems Programming) January 2022 - May 2023

- Lead recitation and graded coursework for 50+ students on key systems programming concepts, debugging tools, and exam preparation.
- Held weekly office hours to provide mentorship, code review, and collaboratively resolve bugs.

EDUCATION

University of Pennsylvania, School of Engineering and Applied Science Philadelphia, PA
Masters of Computer Science, 3.7 GPA May 2023

- Relevant Courses: Software Design/Testing, Distributed Web Systems, Computer Graphics, Data Structures, Algorithms, Operating Systems

New York University, Tisch School of the Arts New York, NY
Bachelor of Fine Arts, 3.7 GPA January 2020

- Relevant Courses: Linear Algebra, Calculus, Economics

SKILLS

- **Programming Languages**: Python, C/C++, HTML, CSS/SCSS, JavaScript
- **Frameworks/Libraries:** Node.js, React, AGILE framework, Numpy, Pandas
- **Technology:** Linux, Docker, Git,AWS RDS/EC2, Bash,, Cmake, Catch2

PROJECTS & LEADERSHIP

University of Pennsylvania, ByteBuilders
A search engine on Amazon EC2, specifically optimized for managing extensive datasets.

- Developed web crawlers to scrape data from millions of US sites and populate distributed storage servers.
- Implemented a scaled-down version of Apache Spark to process and index web pages efficiently.
- Designed a PageRank algorithm that achieved sub-1-second average response times for phrase-based search queries.

University of Pennsylvania, PennCloud
A distributed system for document storage and email transfer.

- Designed database and backup protocols to ensure data consistency during up to 66% storage node failure.
- Implemented thread-safe SMTP and POP3 mail servers.

Mini-Minecraft
A game generating randomized virtual worlds.

- Utilized concurrency and GPU programming to generate and render terrain and biomes efficiently.
- Developed a physics engine to control player motion, detect collisions, and manipulate blocks in real time.

Mini-Maya
An application to import, render, and manipulate 3D meshes.

- Supported skinning and joint manipulation features.