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# Jay Lang

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## Education

### Massachusetts Institute of Technology (MIT)

- **Master of Engineering (M.Eng) in Electrical Engineering and Computer Science**
- Relevant coursework: Computer System Architecture (6.590), Formal Reasoning About Programs (6.512)
- Thesis: *Lab-bc*: A Serverless Computing Platform for MIT Educators

*Class of 2023*  
Cambridge, MA

### Massachusetts Institute of Technology (MIT)

- **Bachelor of Science (S.B.) in Computer Science and Engineering**
- Relevant coursework: OS Research Seminar (6.581), Distributed Systems (6.584), Performance Engineering (6.106)

*Class of 2022*  
Cambridge, MA

## Recent Research and Work Experience

### Massachusetts Institute of Technology (MIT)

*Teaching Assistant, 6.205 [Digital Systems Laboratory]*

- Designed a fault-tolerant serverless computing platform allowing students to invoke industry-standard EDA tools remotely
- Deployed this system to 78 students on excess in-house compute with 100% uptime despite frequent machine failures
- Redesigned student lab exercises, including an implementation of the IEEE 802.3u Fast Ethernet standard on FPGA fabric

Cambridge, MA  
*Sep 22 - June 23*

### Massachusetts Institute of Technology (MIT)

*Teaching Assistant, 6.180 [Introduction to Computer Systems]*

- Designed material for and taught 23 recitations to reinforce course material, ranging from OS design to systems security
- Co-authored a semester-long design project, exams, and readings; deployed new hands-on exercises to >300 students

Cambridge, MA  
*Jan 22 - June 22; Jan 23 - June 23*

### Apple Inc.

*Streaming Media, Software Engineering Intern*

- Designed a high-granularity, low-runtime power consumption analysis methodology applicable across Apple platforms
- Automated the identification of power regressions in streaming media down to the granularity of individual call stacks
- Enabled developers to profile regressions and test resolutions orders of magnitude faster than previous approaches

Cupertino, CA  
*May 22 - Aug 22*

### Computer Science and Artificial Intelligence Laboratory (CSAIL @ MIT)

*Undergraduate Researcher*

- Co-developed PACMAN, a novel attack which leaks ARM Pointer Authentication (PA) codes via speculative execution
- Reverse-engineered the Apple M1 TLB hierarchy via a dedicated, custom-built, bare-metal execution environment
- Performed the first-ever micro-architectural side channel attack against M1, irreparably breaking PA on these platforms

Cambridge, MA  
*Sept 21 - May 22*

### Apple Inc.

*Streaming Media, Software Engineering Intern*

- Developed and applied novel memory performance analysis against AVFoundation's HTTP Live Streaming framework
- Presented project to senior executives, including Craig Federighi; worked with four teams to integrate into future builds

Cupertino, CA  
*June 21 - Aug 21*

## Personal Projects

### advantaged:

- Implemented a mesh network which restores internet connectivity in densely populated areas after severe power outages
- Won HackMIT sustainability first prize and IBM Call for Code Climate Change Challenge after scaling to 1,000+ devices

**Linux Kernel:** Wrote an x86/64-specific patchset highlighting vulnerable memory leaks in fork(2). Accepted upstream.

**PFS:** Specification for distributed, content-addressed filesystem for low-bandwidth environments. Presented to NASA staff.

## Athletics

### MIT NCAA Swimming and Diving Team

*National-Level Diver on 1m and 3m; National and Intercollegiate Record Holder*

- NCAA Division III 3 meter national champion, 5 time national champion for Legacy Diving junior national team

Cambridge, MA  
*Sept 18 - November 21*

## Skills Summary

**Computer Systems** – Proficient in freestanding C, Linux/OpenBSD/Plan 9 kernel work, Python, Verilog, Perl, Go

**Music** – 18-year background in piano, pursuing independent study to master jazz and improvisation

**Scholarships** - National Merit Scholar and TD Ameritrade scholarship recipient