

# David H. Liu

Princeton University  
Dept. of Computer Science  
35 Olden Street  
Princeton, NJ 08540-5233

[www.cs.princeton.edu/~hl7](http://www.cs.princeton.edu/~hl7)  
[hao.liu@princeton.edu](mailto:hao.liu@princeton.edu)

---

## Education

**Princeton University**, Princeton, NJ

*Ph.D.* in Computer Science

2018-2023 (expected)

Advisor: Amit Levy

Thesis: A Serverless Architecture for Application-level Orchestration

**Duke University**, Durham, NC

*B.S.E.* in Electrical and Computer Engineering

Minor in Math

May 2015

## Interests

I am broadly interested in systems and security, with research and work experience in serverless computing, virtualization, information flow control and Linux device drivers.

## Research Papers

**Doing More with Less: Orchestrating Serverless Applications without an Orchestrator**

David H. Liu, Amit Levy, Shadi Noghabi, Sebastian Burckhardt

*Proc. 20th Symposium on Networked Systems Design and Implementation (NSDI '23), Boston, MA, April 2023*

**How Low Can You Go? Practical cold-start performance limits in FaaS**

Yue Tan, David H. Liu, Nanqinqin Li, Amit Levy

*ArXiv Technical Report:2109.13319, Sept. 2021*

**Pyronia: Intra-Process Access Control for IoT Applications**

Marcela S. Melara, David H. Liu, Michael J. Freedman

*ArXiv Technical Report:1903.01950, March 2019*

**SandTrap: Tracking Information Flows On Demand with Parallel Permissions**

Ali Razeen, Alvin R. Lebeck, David H. Liu, Alexander Meijer, Valentin Pistol, Landon P. Cox

*The 16th ACM International Conference on Mobile Systems, Applications, and Services (MobiSys '18), June 2018*

## Projects

**Unum**

A serverless orchestration system for large-scale applications that supports exactly-once execution guarantees, fault-tolerance, portability across platforms and customization. Unum can run on AWS with AWS Lambda and DynamoDB, or Google Cloud with Google Cloud Functions and Firestore and significantly reduces latency and costs compared with existing orchestrators.

**SnapFaaS**

A light-weight virtual machine based on Firecracker that leverages VM snapshots to reduce cold-start latency.

**Larp**

A CPU scheduler that avoids side-channels from provisioning decisions.

**SandTrap**

A dynamic information-flow tracking system on Android that performs native code taint tracking while imposing improved overheads

<b>Work Experience</b>	<b>PhD Student</b> Princeton Dept. of Comp. Sci.	2018 - 2023
	<b>Research Engineer</b> Princeton Dept. of Comp. Sci.	2017 - 2018
	<b>Software Engineer</b> Nimble Storage, Inc. Linux device driver development for Fibre Channel protocols	2015 - 2017
<b>Teaching Experience</b>	<b>Teaching Assistant</b> Princeton University COS 461 Computer Networks COS 316 Principles of Computer System Design	2019-2020
	<b>Teaching Assistant</b> Duke University Recitation and lab teaching assistant	2012-2015
<b>Honors</b>	<b>Gordon Y.S. Wu Fellowships in Engineering</b> (Princeton)	2018
	<b>Mathematical Contest in Modeling (MCM) Meritorious</b>	2014
	<b>Eta Kappa Nu</b>	2014
	<b>PRUV Fellowship in Mathematics</b>	2013