

# David H. Liu

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<b>Education</b>	<b>Princeton University</b> , Princeton, NJ <i>Ph.D.</i> in Computer Science Advisor: Amit Levy Thesis: A Serverless Architecture for Application-Level Orchestration  <b>Duke University</b> , Durham, NC <i>B.S.E.</i> in Electrical and Computer Engineering Minor in Math	2017-2023      May 2015
<b>Interests</b>	I am broadly interested in systems and security, with research and work experience in cloud computing, serverless systems, virtualization, information flow control and Linux device drivers.	
<b>Work Experience</b>	<b>PhD Candidate in Computer Science</b> Princeton University  <b>Software Engineer</b> Nimble Storage, Inc. <ul style="list-style-type: none"><li>Responsible for developing and maintaining the Linux device driver for Fibre Channel hosts</li><li>Designed and implemented device driver for new Gen 6 Fibre Channel chipset</li><li>Served as liaison with our Fibre Channel HBA vendor Broadcom by leading weekly meetings and tracking joint projects between the two sides</li></ul>	2017 - 2023   2015 - 2017
<b>Research Papers</b>	<b>Doing More with Less: Orchestrating Serverless Applications without an Orchestrator</b> <u>David H. Liu</u> , Amit Levy, Shadi Noghbi, Sebastian Burckhardt <i>Proc. 20th Symposium on Networked Systems Design and Implementation (NSDI '23), Boston, MA, April 2023</i>  <b>How Low Can You Go? Practical cold-start performance limits in FaaS</b> Yue Tan, <u>David H. Liu</u> , Nanqinqin Li, Amit Levy <i>ArXiv Technical Report:2109.13319, Sept. 2021</i>  <b>Pyronia: Intra-Process Access Control for IoT Applications</b> Marcela S. Melara, <u>David H. Liu</u> , Michael J. Freedman <i>ArXiv Technical Report:1903.01950, March 2019</i>  <b>SandTrap: Tracking Information Flows On Demand with Parallel Permissions</b> Ali Razeen, <u>David H. Liu</u> , Alvin R. Lebeck, Alexander Meijer, Valentin Pistol, Landon P. Cox <i>The 16th ACM International Conference on Mobile Systems, Applications, and Services (MobiSys '18), June 2018</i>	
<b>Skills</b>	C, Rust, Python, JavaScript, PyTorch, Linux device driver	
<b>Projects</b>	<b>Unum</b> 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 significant 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>Teaching Experience</b>	<b>Teaching Assistant</b> 2019-2020 Princeton University COS 461 Computer Networks COS 316 Principles of Computer System Design
	<b>Teaching Assistant</b> 2012-2015 Duke University Recitation and lab teaching assistant
<b>Honors</b>	<b>Gordon Y.S. Wu Fellowships in Engineering</b> 2018
	<b>Mathematical Contest in Modeling (MCM) Meritorious</b> 2014
	<b>Eta Kappa Nu</b> 2014
	<b>PRUV Fellowship in Mathematics</b> 2013