

Neil Agarwal

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RESEARCH INTERESTS

Machine Learning+Systems, Networked and Distributed Systems, Video Analytics, Digital Privacy

EDUCATION

Princeton University

Ph.D., Computer Science

Advisor: Prof. Ravi Netravali

Aug 2021 – Present

University of California, Los Angeles

Ph.D., Computer Science (transferred)

Sept 2019 – Jun 2021

University of California, Berkeley

B.A., Computer Science

Member of Upsilon Pi Epsilon, Nu Chapter – Computer Science Honor Society

Aug 2015 – May 2019

PUBLICATIONS, PRESENTATIONS & WHITE PAPERS

Neil Agarwal, Ravi Netravali. “Boggart: Accelerating Retrospective Video Analytics via Model-Agnostic Ingest Processing.” *In submission*.

Frank Cangialosi, Neil Agarwal, Venkat Arun, Junchen Jiang, Srinivas Narayana, Anand Sarwate, Ravi Netravali. “Privid: Practical, Privacy-Preserving Queries on Public Video.” *In submission*.

Neil Agarwal, Matteo Varvello, Andrius Aucinas, Fabian Bustamante, Ravi Netravali. "Mind the Delay: The Adverse Effects of Delay-Based TCP on HTTP." *CoNEXT 2020*.

Neil Agarwal, Jack Sullivan. *Differentially Private Queries in a Practical Systems Setting*. CS261 Final Project Report. Dec. 13, 2018.

Neil Agarwal, Hugh Greenberg, Sean Blanchard, and Nathan DeBardleben. “SaNSA – The Supercomputer and Node State Architecture.” *2018 Workshop on Fault-Tolerance for HPC at Extreme Scale (FTXS)*.

Neil Agarwal. *Supercomputer and Node State Architecture (SaNSA)*. Poster presented at the UltraScale Systems Research Center Student Symposium at the Los Alamos National Laboratory. Aug. 6, 2018.

Neil Agarwal. *The Global Data Plane Visualization & Monitoring Application: A White Paper*. Aug. 2017.

Neil Agarwal. *The Global Data Plane Visualization & Monitoring Application*. Demo presented at the TerraSwarm Annual Review at UC Berkeley. Oct. 2016.

PAST EXPERIENCES

Microsoft Research, Azure for Operators

Jun 2021 – Aug 2021

Research Intern, Advisor: Dr. Victor Bahl

UCLA

Aug 2019 – Jun 2021

Graduate Student Researcher, Advisor: Prof. Ravi Netravali

- Developed *Boggart*, a system for accelerating retrospective machine learning-based video analytics queries via generalizable ingest-time processing.
- In *Privid*, explored the tradeoffs between privacy and utility in video analytics on public surveillance cameras, and developed a system for privacy-preserving video analytics based on formal differential privacy techniques.
- Studied the adverse effects of delay-based congestion control on HTTP; observed that delay-based algorithms often underestimate available network capacity in mobile networks which enables HTTP/1.1's multiple connections to achieve higher levels of network throughput than with HTTP/2's single multiplexed connection. (CoNEXT 2020)

NetSys Lab, UC Berkeley

Oct 2017 – Jun 2019

Undergraduate Student Researcher, Advisor: Prof. Scott Shenker

- Demonstrated feasibility of the concept of packet state load balancing using TCP headers.
- Investigated security benefits of applying cryptography to stateless load balancing, comparing our results with state-of-the-art load balancing algorithms and systems.
- Explored new link state routing mechanism to handle failure more gracefully and reduce the number of packets lost while the routing table is being updated. The idea centers around using reliable flooding to handle packet delivery during recalculation of the routing table.

UltraScale Systems Research Center, Los Alamos National Laboratory

May – Aug 2018

Research Intern, Advisor: Dr. Nathan DeBardeleben

- Designed health models of the lab's High Performance Computing (HPC) clusters
- Developed SaNSA, a software infrastructure that consumes data from multiple sources across the lab such as system logs, compute job reservations, and the system workload manager. It then aggregates the data using a multi-pass state extraction algorithm, and performs a panel of analytics such as anomaly detection via machine learning and state transition analysis using Markov Chains.
- Used SaNSA to perform a study of 4 open compute clusters at LANL, ingesting and analyzing over 1.1 billion lines of system logs.

Sony PlayStation, San Francisco

May – Aug 2017

Software Engineering Intern – PlayStation Vue

- Designed a personalized real-time televised sports recommendation system in Java using Spring, Docker, Kafka, Cassandra, and Solr.

Swarm Lab, UC Berkeley

Jan 2016 – Oct 2017

Undergraduate Student Researcher, Advisor: Prof. John Kubiatowicz

- Investigated a new architecture for IoT infrastructure, raising the level of abstraction to a data-centric design focused around the distribution, preservation and protection of information.
- Designed and developed a distributed application to monitor and visualize the Global Data Plane.

UC Berkeley

May – Aug 2016

Undergraduate Student Instructor – The Structure & Interpretation of Computer Programs (CS61A)

- Led discussion/lab sections, produced course content, assisted in writing exams, held office hours.
- Guest lectured to 400+ students on interpreter design, lexical/syntactic analysis, meta-circular evaluation.

OPEN-SOURCE CONTRIBUTIONS

- Python Implementation of the Hasty Pudding Cipher, a tweakable-block cipher.
<https://github.com/neilsagarwal/hpc>