KARAN NEWATIA

(607) · 697 · 3749 ⋄ knewatia@seas.upenn.edu
Website: https://karannewatia.github.io/
Github: https://github.com/karannewatia

EDUCATION

University of Pennsylvania *Jul 2020 - May 2025 (Expected)*
PhD in Computer and Information Science
Advised by Profs. Andreas Haeberlen and Linh Thi Xuan Phan
Research interests: distributed systems, privacy, applied cryptography

Cornell University
Master of Engineering in Computer Science *Jan 2020 - May 2020*
Bachelor of Arts in Computer Science *Aug 2016 - Dec 2019*

PUBLICATIONS

Solver-In-The-Loop Cluster Resource Management for Database-as-a-Service.
Arnd König, Yi Shan, **Karan Newatia**, Luke Marshall, and Vivek Narasayya.
50th International Conference on Very Large Databases (**VLDB '24**), August 2024.

Arboretum: A Planner for Large-Scale Federated Analytics with Differential Privacy.
Elizabeth Margolin*, **Karan Newatia***, Edo Roth, Tao Luo, and Andreas Haeberlen.
29th ACM Symposium on Operating Systems Principles (**SOSP '23**), October 2023.

Mycelium: Large-Scale Distributed Graph Queries with Differential Privacy.
Edo Roth, **Karan Newatia**, Yiping Ma, Ke Zhong, Sebastian Angel, and Andreas Haeberlen.
28th ACM Symposium on Operating Systems Principles (**SOSP '21**), October 2021.

∗ = co-first authors

RESEARCH EXPERIENCE

Large-Scale Federated Analytics with Differential Privacy Oct 2020 - current
Supervised by Prof. Andreas Haeberlen *University of Pennsylvania*

· Developed Mycelium, the first system to process large-scale differentially private graph queries, using a combination of cryptographic techniques such as Fully Homomorphic Encryption, Zero Knowledge Proofs, Multi-Party Computation, and MixNets.
· Developed Arboretum, a novel query planner that allows federated analytics systems to automatically optimize query plans for a broad range of differentially private queries, including support for the exponential mechanism and secrecy of the sample, at scale.

Synchronous Data Centers July 2020 - current
Supervised by Profs. Andreas Haeberlen and Linh Phan *University of Pennsylvania*

· Developing a new system design for data center networks which aims to capture many of the benefits of the synchronous model such as higher efficiency, better predictability, and support for new kinds of services, while eliminating problems such as congestion and long latency tails.

PROGRAMMING SKILLS

• Python • C • C++ • C# • Java • OCaml

INDUSTRY EXPERIENCE

Research Intern, Microsoft Research May 2023 - Aug 2023
Supervised by Josh Benaloh (Senior Principal Cryptographer) *Redmond, WA*

· Performed research on end-to-end verifiable elections (ElectionGuard) in the Security and Cryptography group at Microsoft Research (MSR).

Research Intern, Microsoft Research May 2022 - Aug 2022
Supervised by Arnd Christian König (Principal Researcher) *Redmond, WA*

· Performed research on cluster management in the Data Systems group at Microsoft Research (MSR).

TEACHING EXPERIENCE

CIS 5550: Internet and Web Systems Jan 2023 - Feb 2023
Guest Lecturer *University of Pennsylvania*

· Gave guest lectures on networking and fault tolerance.

CIS 5020: Analysis of Algorithms Jan 2022 - May 2022
Teaching Assistant *University of Pennsylvania*

· Responsibilities included teaching recitation sections, holding weekly office hours, and grading assignments and exams.

CIS 5050: Software Systems Aug 2021 - Dec 2021
Teaching Assistant *University of Pennsylvania*

· Responsibilities included teaching special lab sessions, advising open-ended final projects, holding weekly office hours, and grading programming assignments and exams.

Code Afrique Jan 2019
Instructor *Ghana*

· Taught the basics of Computer Science using Python to over 450 high school students in Ghana at Code Afrique, a program designed to encourage African high school students to pursue Computer Science.

SELECTED PROJECTS

GeoWave-FoundationDB 2019

· Created a data store extension within GeoWave for FoundationDB (a fault-tolerant distributed database) to retrieve and analyze massive geospatial datasets.

Destination Matcher 2019

· Implemented a travel destination recommendation system which returns destinations based on user's interests and preferences (such as activities, climate, local language, drinking age).
· Created a custom metric calculated using the network structure of Wikivoyage to emphasize the "hidden gems" of world travel.

SELECTED COURSEWORK

- Operating Systems, Distributed Computing, System Security, Databases, Cryptography
- ML, Computational Linguistics, Language & Information, Large-Scale ML
- Algorithms, Functional Programming, Open-Source Software Engineering, Game Theory