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, system security, 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

Mycelium: Large-Scale Distributed Graph Queries with Differential Privacy.
E. Roth, **K. Newatia**, Y. Ma, K. Zhong, S. Angel, and A. Haeberlen.
Proceedings of the 28th ACM Symposium on Operating Systems Principles (**SOSP '21**), Virtual, October 2021.

RESEARCH EXPERIENCE

Massive-Scale Differentially Private Analytics Oct 2020 - Apr 2022
Supervised by Profs. Andreas Haeberlen and Sebastian Angel *University of Pennsylvania*

· Developed Mycelium, the first system to process large-scale differentially private graph queries, using a combination of cryptographic techniques (Fully Homomorphic Encryption, Zero Knowledge Proofs, Multi-Party Computation, and Verifiable Secret Re-sharing). Worked on optimizing query processing, handling special queries, ensuring the security of our novel mix-net communication protocol, and led the implementation and evaluation of the system.

Blockchain Jun 2019 - Dec 2019
Supervised by Profs. Robbert van Renesse and Hakim Weatherspoon *Cornell University*

· Developed Vegvisir, a partition-tolerant blockchain for use in power-constrained IoT environments with limited network connectivity. Built Android apps for emergency response and healthcare using the blockchain system.

Distributed systems + PL Aug 2018 - May 2019
Supervised by Prof. Andrew Myers *Cornell University*

· Implemented a distributed version of Scrabble with strong security guarantees using Fabric, a high-level programming language for building secure distributed applications.

INDUSTRY EXPERIENCE

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

· Incoming research intern at Microsoft Research (MSR).

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

PROGRAMMING SKILLS

• Python • C • C++ • Java • OCaml

SELECTED PROJECTS

GeoWave-FoundationDB Sep 2019 - Dec 2019
Project for CS 5152 (Open Source SWE) *Cornell University*

· Worked on creating a data store extension within GeoWave for FoundationDB (a fault-tolerant distributed database) to retrieve and analyze massive geospatial datasets. Implemented reader, writer and deleter for FoundationDB using transactions.

Destination Matcher Apr 2019 - May 2019
Project for CS 4300 (Language & Information) *Cornell University*

· 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 nicheness metric calculated using network structure of Wikivoyage to emphasize the "hidden gems" of world travel.

AguaClara, Software sub-team Jan 2017 - May 2018
Supervised by Prof. Monroe Weber-Shirk *Cornell University*

· Used Python to model the environmental engineering equations behind the design of water treatment plants of AguaClara, a project team at Cornell which aims to provide clean drinking water to tens of thousands of people in Honduras and India.

TEACHING EXPERIENCE

CIS 502: Analysis of Algorithms Jan 2022 - May 2022
Teaching Assistant *University of Pennsylvania*

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

CIS 505: Software Systems Aug 2021 - Dec 2021
Teaching Assistant *University of Pennsylvania*

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

SERVICE

EuroSys '22 AEC March 2022

· Evaluated artifacts (code and experimental results) of accepted papers at EuroSys '22 as part of the AEC (Artifact Evaluation Committee).

Code Afrique Jan 2019

· 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.