Aneesh Durg

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EDUCATION

University of Texas at Austin

Aug 2025 - Present

Incoming **PhD student** in **Computer Science**

University of Illinois at Urbana-Champaign

Aug 2015 - May 2019

Recieved BS in **Computer Science & Mathematics** with **High Distinction**

- GPA: 3.57/4.00
- Dean's List: Fall '15, Fall '16

RESEARCH EXPERIENCE

Research Assistant

Apr 2024 - Present

University of Washington (Prof. Simon Peter)

- Investigating the role runtime reconfigurable networking will play in large scale distributed graph applications
- Benchmarking the effect of changing network topology on real world distributed graph databases
- Built a framework to enable running existing applications (such as distributed graph databases) in customizable network topologies
    - The project is availible at: https://github.com/aneeshdurg/toposim

AWARDS

NSF GRFP Honorable Mention 2025

WORK EXPERIENCE

AI Software Engineer

Feb 2025 - Present

Corvic AI — remote, part-time

- Improving ingest pipelines and data management.

Senior Software Engineer

Jul 2023 - Nov 2024

Bodo.ai — remote

- Developing the core engine - an optimizing compiler and scalable distributed runtime (using **MPI**) for **SQL** and python/pandas workflows.
- Designed and implemented a distributed streaming external sort operator capable of sorting larger than memory streams of rows and applying a limit during the sort operation, while being **2x** faster than the original in-memory implementation in some benchmarks.
- Built profiling/tracing infrastructure to analyze and optimize query performance
- Expanded **Iceberg** support by implementing **DDL** operations and adding integrations with the **AWS Glue** catalog
- Expanded compiler and runtime support for data types and operations for snowflake **SQL** compatability.
- Helped redesign and implement orchestrator/worker compilation model to hide distributed semantics from users.

Senior Software Engineer/Team Lead

Feb 2021 - Jun 2023

KatanaGraph — Austin, TX

- Worked on building a distributed graph compute engine that provides AI, analytics, and a graph database.
- Lead a team of **5** to implement and support graph database querying and ingest.
    - Guided design discussions, identified organizational blockers, and coordinated with product to set priorities and generate new technical requirements.
- Implemented compiler and runtime support for the **Cypher** query language.
- Designed and implemented novel high performance algorithms for distributed subgraph pattern matching (tested on ~**20B** nodes, **44B** edges)
    - Improved performance by **100x** in queries against the **LDBC-SNB** datasets and reduced memory usage by over **95%** on benchmarks simulating specific client workloads.
- Proposed and implemented AST transformations to optimize query performance
- Designed syntax extensions to **Cypher** to allow users to tune query performance
- Designed and implemented hotswap mechanism to enable testing new code on existing **kubernetes** deployments - reduced iteration time by **30x**
- Built infrastructure for benchmarking the query engine in isolation from the rest of the product using **slurm**

Member of Technical Staff

Aug 2019 - Feb 2021

Qumulo — Seattle, WA

- Worked on building a distributed scale-out filesystem, supporting both on-prem and cloud.
- Designed and implemented a solution for reducing server downtime during upgrades by **10x** in a team of four
- Implemented **SMB3.1** support and features, and extended platform support for two new hardware configurations
- Lead migration of **python2** code to **python3**, and introduced enforced type checking via **mypy**
- Proposed and implemented a python dependency verification tool for customer and cloud deployments

Software Engineering Intern

May 2018 - Aug 2018

Qumulo — Seattle, WA

- Worked on migrating an on-prem filesystem to work in **AWS**
- Helped implement a new hardware abstraction layer to interact with **AWS** resources
- Designed and developed an IP failover solution in **AWS**.
- Used **Linux namespaces** to speed up testing time by up to 5x.

Machine Learning Tools Intern

May 2017 - Aug 2017

Intel — Austin, TX

- Evaluated performance of **Intel Movidius Neural Compute stick (NCS)** .

- Proposed and built a tool to split large networks across multiple **NCS** devices
- Developed a browser plugin to demonstrate real-time image recognition on Raspberry PIs using **NCS**.
- Developed a benchmarking suite to demonstrate a 1.5x speedup on **CNNs** (**GoogLeNet**, **AlexNet**, **Age-Gender Net**) by using **NCS**. Compared against CPU/GPU using **Caffe**.
- Made a proof of concept demonstrating potential performance gains by parallelizing NCS convolution.
- Improved performance of **libSVM** on intel CPUs by using **OpenMP** for parallelism and **MKL** BLAS libraries to use intel CPU specific BLAS instructions. Achieved a 4x speed on the "Up squared" development board (Apollo Lake SoC).

Lead Developer
May 2016 - Dec 2016

Hacklab Innovations — Bangalore, KA (India)

- Built AAMI - a wearable reading assistant for the blind and visually impaired.
- Developed and optimized a real-time imaging solution to find text in images and synthesize audio using **OpenCV**, **tesseract-ocr**, and **Caffe**.
- Designed and built a tactile feedback mechanism to help visually impaired users navigate lines of text.

TEACHING EXPERIENCE / PROJECTS

What Is a Filesystem?
https://aneeshdurg.me/what_is_a_filesystem

- An online interactive book/visualization for students learning filesystem concepts.
- Implements a interactive **ext2**-esque filesystem simulator with animations to illustrate disk accesses
- Features a terminal simulator demonstrating how standard **GNU/Linux coreutils** might interact with the disk.

Systems Programming Course Lead
Jan 2017 - May 2019

CS241 @ UIUC

- Development lead for assignments, Lab/Office hours assistant, Honors mentor.
- Designed and created assignments (and associated infrastructure) to allow students to implement and explore concepts such as filesystems, containers, and cooperative scheduling.
- Mentored honors students to complete projects exploring areas such as distributed systems, compilers and Linux kernel development.
- Wrote and gave lectures on additional topics such as containerization, and kernel development for the honors section
- Held review sessions for assignments with low average score by creating slides and handouts that demonstrated concepts through hands-on guided exploration of topics

Illinois-CS241 Coursebook
https://github.com/illinois-cs241/coursebook

- Helped write and review portions of the free coursebook, which covers a superset of all content from UIUC's CS241
- Contributed chapters on filesystems, containers, and basic kernel development.

Research Game Developer
May 2016 - May 2017

Project 415x @ UIUC with Prof. Cary Malkiewich & Prof. Jenya Sapir

- https://github.com/project415x/project415x.github.io
- Developed an open source game to kinesthetically teach linear algebra concepts.
- Held experimental trials to evaluate effectiveness of the game, but the results were inconclusive.

Intro to CS Honors Course Staff
Jan 2016 - May 2017

CS196 @ UIUC

- Mentored the honors section of Intro to CS - a student run course.
- Held office hours to help students navigate homework assignments that introduced them to topics in computing
- Introduced students to Software Engineering best practices and Agile methodology
- Successfully guided 3 teams of students to complete projects in various areas, such as Computer Vision, collaborative real-time web applications.

PROJECTS

See https://github.com/aneeshdurg for a complete list

monkeywrench
https://github.com/aneeshdurg/monkeywrench

- Integrates **generative AI** code completion (e.g. Github Copilot) into the browser developer console
- Lowers the barrier to entry for developers and users to modify the behavior of webpages

rainbow
https://github.com/aneeshdurg/rainbow

- Static analysis tool for **C/C++** to reject semantically invalid callgraphs, powered by **clang** and **Cypher**
- Provides an ergonomic way for users to label functions and lambdas and to define relationships between those labels that should be considered invalid. Some example usecases are:
  - Prevent functions that assume locks are held from being called without a lock
  - Prevent functions using collective **MPI** operations from being called during another collective operation
  - Prevent secure functions from being called from insecure contexts

spycy
https://github.com/aneeshdurg/spycy

- An in-process graph database library for python that implements a **openCypher** frontend
- Provides implementable interfaces for data sources to enable querying real world graphs.
  - Wrote a demo that uses **spycy** and **WASM** to filter HTML nodes in a browser using **openCypher**

Video Synthesizer

https://aneeshdurg.me/vith

- A **GPU**/**WebGL** accelerated interface to build complex generative visual effects that achieve real-time manipulation of audio and video input.
- Features modules that can be chained and combined with various operators

hostfile

https://crates.io/crates/hostfile

- A **Rust** library to parse /etc/hosts files
- Over **200K** downloads on crates.io