Faruk **Volkan Mutlu**

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Education

Northeastern University | PhD in Computer Engineering *Sep 2018 – Present | Boston, MA*

- **Courses:** Data Networks, Mobile and Wireless Networks, Probabilistic System Modeling and Analysis, Graph Theory, Numerical Optimization, Computer Architecture, High Performance Computing, Machine Learning.

Middle East Technical University | BSc in Electrical and Electronics Engineering *Sep 2014 – Jun 2018 | Ankara, Turkey*

- **Courses:** Data Structures, Computer Architecture, Operating Systems, Microprocessors, Computer Networks.

Experience

Google | PhD Software Engineering Intern *Sep 2023 – Dec 2023 | Sunnyvale, CA*

- Improved multipathing capabilities of proprietary user-space network transport implemented in C++.
- Identified congestion signals indicating network conditions unsuitable for multipathing, such as incast or lack of alternate paths for bottlenecks, and implemented a detector for these conditions.
- Developed a mechanism to dynamically disable multipathing to eliminate redundant flows when unsuitable conditions are detected.
- Demonstrated through various experiments that the improved multipathing component significantly reduces overhead compared to baseline while maintaining all performance benefits under nominal conditions.

Northeastern University | Teaching Assistant (Digital Logic Design Laboratory) *May 2023 – Aug 2023 | Boston, MA*

- Taught students fundamentals of digital logic design and using SystemVerilog for hardware description and testing. Helped students during lab sessions and office hours with assignments that takes them through the process of building a simplified RISC-V based processor. Graded students' lab reports weekly.

Hewlett Packard Enterprise | Wireless Lab Network Simulation Intern *May 2022 – Aug 2022 | Boston, MA*

- Developed novel method to generate realistic traffic models of multimedia applications (e.g. Zoom, Skype) from real packet traces. Analyzed performance benefits of new Wi-Fi 6 features with the ns-3 simulator using application traffic generated by this method. Automated process that collects test data from real traces, runs simulations, then compares simulation output to validation data.

Northeastern University | Graduate Research Assistant *Sep 2018 – Present | Boston, MA*

- Proposed novel algorithm that optimally utilizes multiple tiers of cache devices for in-network caching by accounting for network statistics and device parameters. Implemented a data-centric network simulator using Python with the SimPy library to evaluate algorithm performance.
- Integrated joint forwarding and caching algorithm with state-of-the-art Named Data Networking forwarder using C++ to enable high-throughput distribution of large data. Deployed integrated forwarder over a wide-area network testbed using Docker containers to study its performance in real settings.
- Developed algorithm that jointly optimizes caching and power resources to minimize delay in wireless HetNets. Evaluated algorithm performance by modeling network snapshots using Julia.

ASELSAN | Hardware Design Engineer Co-op *Dec 2017 - Mar 2018 | Ankara, Turkey*

- Built reusable functional verification environment for proprietary RISC-V chip using SystemVerilog and the UVM standard. Prototyped DRAM controller and AHB & APB peripherals for proprietary RISC-V chip by programming an FPGA using Verilog.

Middle East Technical University | Undergraduate Researcher *Mar 2017 - Mar 2018 | Ankara, Turkey*

- Developed a battery-aware status update policy for energy-harvesting devices with finite batteries. Assessed policy performance in terms of data freshness by simulating devices using MATLAB.

Technical Skills

Research Expertise: Information-centric Network Architectures, Network Resource Optimization
Languages: C++, Python, Julia, MATLAB, Bash, Assembly (x86, ARM, RISC-V), Verilog/SystemVerilog
Other: Docker, OpenMP, MPI, Slurm, ns-3, SimPy, MongoDB