

MUHAMMAD LAGHARI

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EDUCATION

Ph.D. in Computer Science.

Virginia Polytechnic Institute and State University (Virginia Tech), Blacksburg, VA.
Research Area: Computer Architecture and Operating Systems.

August 2018 - *present*

M.S. with thesis in Computer Science and Engineering.

Koç University, Istanbul, Turkey.
Research Area: Parallel and Multicore Computing.

July 2018

B.S. in Computer Science.

Lahore University of Management Sciences (LUMS), Lahore, Pakistan.

May 2016

TECHNICAL SKILLS AND TOOLS

C, C++, Linux kernel development, Python, Verilog, OpenMP, MPI, CUDA, Shell scripting

RESEARCH EXPERIENCE

Graduate Research Assistant at HEAP Lab (Virginia Tech)

Supervisor: Dr. Steve Jian (PhD. University of Illinois at Urbana-Champaign)

Fall 2018 - *present*

- Designing and implementing main memory compression in hardware to enable applications utilize 4X more DRAM as present in the system at less than 1% performance overhead.

SoC Architect at Samsung Semiconductor Inc.

Supervisor: Dr. Nhon Quach and Dr. Lide Duan

Spring 2024

- Laid the groundwork for a universal SoC-level memory compression scheme for Samsung's flagship mobile SoC.

Hardware Test Engineer II at Microsoft Azure

Supervisor: Dr. Srilatha Manne and Dr. Pulkit Misra

Spring 2021 - Fall 2021

- Power and performance characterization of machines used in Microsoft Azure to reduce the carbon cost of applications without any performance loss. Analyzed system and architectural characteristics, such as uncore and core frequencies, and IPC, to determine the impact of each component on total power consumption of a machine.

Summer Research Intern at Microsoft Research

Supervisor: Dr. Srilatha Manne and Dr. Esha Choukse

Summer 2020

- Studied jitter when multiple VMs with different characteristics are colocated on the same host.
- Analyzed the benefits of cache partitioning using Intel Cache Allocation Technology (CAT) in multi-VM scenarios and argued how Intel CAT does not scale well with processors with high core count running a large number of VMs.

PUBLICATIONS

"DyLeCT: Achieving Huge-page-like Translation Performance For Hardware-compressed Memory", Gagandeep Panwar, **Muhammad Laghari**, Esha Choukse, Xun Jian. *51st ACM/IEEE International Symposium on Computer Architecture (ISCA 2024)*

"Translation-optimized Memory Compression For Capacity", Gagandeep Panwar, **Muhammad Laghari**, David Bears, Yuqing Liu, Chandler Jearls, Esha Choukse, Kirk W. Cameron, Ali R. Butt, Xun Jian. *55th ACM/IEEE International Symposium on Microarchitecture (MICRO 2022)*

"Object Placement for High Bandwidth Memory Augmented with High Capacity Memory", **Mohammad Laghari** and Didem Unat. *29th International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD)*

"Phase-Based Data Placement Scheme for Heterogeneous Memory Systems", **Mohammad Laghari**, Najeeb Ahmad and Didem Unat. *30th International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD)*

ADDITIONAL EXPERIENCES

- **Graduate Teaching Assistant at Virginia Tech** for *CS2506: Computer Organization II* (Fall 2018, Spring 2019, Fall 2019, Fall 2022, Spring 2023, and Fall 2023), *CS5505/ECE5505: Computer Architecture* (Spring 2023).

- **Teaching Assistant at Koç University** for *COMP303: Computer Architecture* (Fall 2016), *COMP304: Operating Systems* (Spring 2017), *COMP106: Discrete Mathematics* (Fall 2017).