Muhammed Ugur

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Education

Yale University — New Haven, CT
Ph.D. in Computer Science — *Aug. 2022 – Present*
Advisor: *Prof. Abhishek Bhattacharjee*

University of Michigan — Ann Arbor, MI
M.S. in Computer Science and Engineering — *Sep. 2020 – May 2021*

University of Michigan — Ann Arbor, MI
B.S. in Computer Science with Honors, Minor in Mathematics — *Sep. 2016 – May 2020*

Research

Areas: Computer Architecture, Computer Systems, Compilers, Neural Engineering, Signal Processing
Topics: Hardware/Software Co-Design, Brain-Computer Interfaces, Accelerators, Datacenter Optimizations

I am building low-power, flexible, and high performance computer architectures for invasive brain-computer interfaces in order to advance the treatment of neurological disorders such as epilepsy and paralysis. My research focuses on building scalable processors to decode large streams of neural activity in real-time for closed-loop feedback and stimulation. My goal is to design a surgically-aware and ethical computing platform for future neurotechnologies that is up-to-date with advances in semiconductor manufacturing and neurophysiology.

Conference Publications

[1] *SCALO: An Accelerator-Rich Distributed System for Scalable Brain-Computer Interfacing*, Karthik Sriram, Raghavendra Pradyumna Pothukuchi, Michal Gerasimiuk, **Muhammed Ugur**, Oliver Ye, Rajit Manohar, Anurag Khandelwal, and Abhishek Bhattacharjee **[ISCA 2023]**
Best Paper Award Winner

[2] *Whisper: Profile-Guided Branch Misprediction Elimination for Data Center Applications*, Tanvir Ahmed Khan, **Muhammed Ugur**, Krishnendra Nathella, Dam Sunwoo, Heiner Litz, Daniel A Jiménez, and Baris Kasikci **[MICRO 2022]**
Best Paper Award Winner

Journal/Workshop Publications

[1] *One Profile Fits All: Profile-Guided Linux Kernel Optimizations for Data Center Applications*, **Muhammed Ugur**, Cheng Jiang, Alex Erf, Tanvir Ahmed Khan, and Baris Kasikci **[OSR 2022]**

[2] [Workshop + Poster] *Understanding Branch Prediction in Data Center Applications*, **Muhammed Ugur**, Tanvir Ahmed Khan, Dam Sunwoo, Krishnendra Nathella, Daniel A. Jiménez, and Baris Kasikci, The Fourth Young Architect Workshop **[ASPLOS 2022]**

[3] [Workshop + Poster] *Multi-Application Linux Kernel Profile*, **Muhammed Ugur**, Tanvir Ahmed Khan, and Baris Kasikci, Student Research Competition at 42nd ACM SIGPLAN Conference on Programming Language Design and Implementation **[PLDI 2021]**

Experience

Department of Computer Science, PhD — New Haven, CT
Graduate Student, Yale University; Advisor: *Prof. Abhishek Bhattacharjee* — *Aug. 2022 – Present*

- **Systems & Architecture**: Building low-power, multi-accelerator systems for invasive brain-computer interfaces
- **Neural Engineering**: Designing chips for on-device processing and storage of large-scale neural recordings. Working with clinicians and researchers at Yale School of Medicine to ensure safety, accuracy, and validity of design.

Computer Science and Engineering Ann Arbor, MI
Research Assistant, University of Michigan; Advisor: *Prof. Baris Kasikci* *March 2021 – July 2022*

- **Systems & Architecture**: Optimized the Linux kernel and branch prediction for data center applications
- **Machine Learning Systems**: Profiled popular DL libraries and ML models to determine key bottlenecks

Clinc Inc. Ann Arbor, MI
Software Engineer *June 2019 – Feb. 2021*

- **Full-Stack**: Developed new crowdsourcing infrastructure and services for NLP platform

Center for Healthcare Engineering and Patient Safety Ann Arbor, MI
Research Assistant, University of Michigan; Advisor: *Prof. Amy Cohn* *May 2018 – May 2019*

- **Full-Stack**: Built web platform to manage surgical instruments for Michigan Medicine

Department of Biostatistics Ann Arbor, MI
Research Assistant, University of Michigan; Advisor: *Prof. Hui Jiang* *Oct. 2017 – Apr. 2018*

- **Genomics**: Analyzed costly algorithms for differential gene expression

Awards

- **ISCA 2023 Best Paper Award**
- **MICRO 2022 Best Paper Award**
- **Yale Conference Travel Fellowship**
- **Yale University Fellowship**
- **ISCA Student Travel Grant, '23**
- **MICRO Student Travel Grant, '22**
- **ASPLOS Student Travel Grant, '22, '23**

Teaching

- **CPSC 420/520 Computer Architecture** Spring 2024

Programming Skills

Languages: C/C++, Python, Rust, Verilog, High-Level Synthesis, Shell Scripting
Miscellaneous: Docker, Git, Linux perf, Intel TopLev, LLVM