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Tanvir Ahmed Khan

Assistant Professor, Columbia University in the City of New York

Research Interests

I build systems techniques to enable efficient data center processing. Efficient data center processing is challenging due to rapid growth in data and software complexity along with the ongoing slowdown in hardware performance scaling. As a consequence, micro-architectural structures (*e.g.*, instruction and data cache, branch predictors) can no longer meet the demand of data center applications. Combining insights from computer architecture, compilers, and operating systems, I design techniques to enable near-ideal micro-architectural structures via profile-guided optimizations. Consequently, Intel and ARM have adopted a couple of my techniques. Bridging hardware and software, my work appears in venues like ISCA, MICRO, OSDI, PLDI, FAST, and EuroSys. My research has also received MICRO 2022 Best Paper Award, DATE 2023 Best Paper Award Nomination, IEEE Micro Top Picks 2023 distinction, and multiple prestigious Fellowships.

Education

2017-2023 **Ph.D.**, *University of Michigan*, Ann Arbor, Michigan, USA
- Computer Science and Engineering
- Thesis: Rescuing Data Center Processors

2017 **M.Sc.**, *Bangladesh University of Engineering and Technology*, Dhaka, Bangladesh
- Computer Science and Engineering

2014 **B.Sc.**, *Bangladesh University of Engineering and Technology*, Dhaka, Bangladesh
- Computer Science and Engineering
- Class Rank: 1/153

Awards and Honors

2023 Richard F. and Eleanor A. Towner Prize for Outstanding Ph.D. Research ($2,500), University of Michigan

2023 IEEE Micro Top Pick (awarded to the top 12 computer architecture papers of 2022)

2023 DATE Best Paper Award Nomination

2022-2023 Rackham Predoctoral Fellowship ($100,000 towards tuition, stipend, and insurance), University of Michigan

2022 MICRO Best Paper Award (top two of 83 papers, top 1% of 348 submissions)

2022 Qualcomm Innovation Fellowship Finalist (one of 46 finalists)

2021 Graduate Student Honors (Best PhD Research Award in the Michigan Systems Lab), University of Michigan

2020 Facebook Fellowship Finalist (top 4% of 1800 applicants)

2017-2018 Rollin M. Gerstacker Foundation Fellowship ($100,000 towards tuition, stipend, and insurance)

2014 Crest of Honor, Highest CGPA in the department, presented by BUET alumni association

2009-2014 University Merit Scholarship, Bangladesh University of Engineering and Technology

2009-2014 Dean's List Scholarship, Bangladesh University of Engineering and Technology

Mentee Awards and Honors

2022 First place in ACM undergraduate student research competition (MICRO'22), Kan Zhu

2021 CRA outstanding undergraduate researcher award honorable mention, Shixin Song

2021 First place in ACM undergraduate student research competition (MICRO'21), Shixin Song

2020 First place in ACM undergraduate student research competition (CGO'20), Nathan Brown

Peer-Reviewed Conference Publications

Underlined authors are undergraduate[U] and graduate[G] students mentored by me.

DATE'23 <u>Yuhan Chen</u>[G], Alireza Khadem, Xin He, Nishil Talati, **Tanvir Ahmed Khan**, and Trevor Mudge
PEDAL: A Power Efficient GCN Accelerator with Multiple DAtafLows.
In proceedings of the 26th Design, Automation, and Test in Europe (**DATE**) conference, 2023.
Best Paper Award Nomination 🏅
An accelerator for graph convolutional neural networks that automatically selects optimized dataflow and phase ordering

MICRO'22 **Tanvir Ahmed Khan**, <u>Muhammed Ugur</u>[U], Krishnendra Nathella, Dam Sunwoo, Heiner Litz, Daniel A. Jiménez, and Baris Kasikci
Whisper: Profile-Guided Branch Misprediction Elimination for Data Center Applications.
In proceedings of the 55th IEEE/ACM International Symposium on Microarchitecture (**MICRO**), IEEE, 2022.
Best Paper Award 🏅
First branch prediction technique that identifies precise program contexts leading to branch mispredictions and encodes corresponding hard-to-predict correlations in branch history efficiently using Boolean formulas

MICRO'22 <u>Yuxuan Zhang</u>[G], **Tanvir Ahmed Khan**, Gilles Pokam, Baris Kasikci, Heiner Litz, and Joseph Devietti
OCOLOS: Online COde Layout OptimizationS.
In proceedings of the 55th IEEE/ACM International Symposium on Microarchitecture (**MICRO**), IEEE, 2022.
IEEE Micro Top Pick 🏅
First online system that enables profile-guided optimizations of unmanaged applications on a running process

ISCA'22 <u>Shixin Song</u>[U], **Tanvir Ahmed Khan**, <u>Sara Mahdizadeh Shahri</u>[G], Akshitha Sriraman, Niranjan K Soundararajan, Sreenivas Subramoney, Daniel A. Jiménez, Heiner Litz, and Baris Kasikci
Thermometer: Profile-Guided BTB Replacement for Data Center Applications.
In proceedings of the 49th International Symposium on Computer Architecture (**ISCA**), ACM, 2022.
First replacement technique that realizes applications' holistic behavior to avoid branch target mispredictions

EuroSys'22 <u>Saba Jamilan</u>[G], **Tanvir Ahmed Khan**, Grant Ayers, Baris Kasikci, and Heiner Litz
APT-GET: Profile-Guided Timely Software Prefetching.
In proceedings of the 17th European Conference on Computer Systems (**EuroSys**), ACM, 2022.
First data prefetching technique that ensures prefetch timeliness using Intel LBR's cycle information

MICRO'21 **Tanvir Ahmed Khan**, <u>Nathan Brown</u>[U], Akshitha Sriraman, Niranjan Soundararajan, Rakesh Kumar, Joseph Devietti, Sreenivas Subramoney, Gilles Pokam, Heiner Litz, and Baris Kasikci
Twig: Profile-Guided BTB Prefetching for Data Center Applications.
In proceedings of the 54th IEEE/ACM International Symposium on Microarchitecture (**MICRO**), IEEE, 2021.
Semiconductor Research Corporation (SRC) Best Paper, Q3'2021
First prefetching technique that enables near-ideal branch predecoding to avoid branch target mispredictions

MICRO'21 Niranjan Soundararajan, <u>Peter Braun</u>[G], **Tanvir Ahmed Khan**, Baris Kasikci, Heiner Litz, and Sreenivas Subramoney
PDede: Partitioned, Deduplicated, Delta Branch Target Buffer.
In proceedings of the 54th IEEE/ACM International Symposium on Microarchitecture (**MICRO**), IEEE, 2021.
First architectural design that stores branch targets efficiently by removing redundancies among branches

OSDI'21 **Tanvir Ahmed Khan**, Ian Neal, Gilles Pokam, Barzan Mozafari, and Baris Kasikci
DMon: Efficient Detection and Correction of Data Locality Problems using Selective Profiling.
In proceedings of the 15th USENIX Symposium on Operating Systems Design and Implementation (**OSDI**), USENIX Association, 2021.
Received the "Artifact Available" USENIX badge
First profiling technique that enables in-production profiling without any overhead, guides optimizations to make real-world workloads twice as faster, and has been adopted in the Arm Neoverse N1 Core

ISCA'21 **Tanvir Ahmed Khan**, Dexin Zhang[U], Akshitha Sriraman, Joseph Devietti, Gilles Pokam, Heiner Litz, and Baris Kasikci
Ripple: Profile-Guided Instruction Cache Replacement for Data Center Applications.
In proceedings of the 48th International Symposium on Computer Architecture (**ISCA**), IEEE, 2021.
First cache replacement technique that uses program context to make efficient code replacement decisions

FAST'21 Ian Neal, Gefei Zuo, Eric Shiple, **Tanvir Ahmed Khan**, Youngjin Kwon, Simon Peter, and Baris Kasikci
Rethinking File Mapping for Persistent Memory.
In proceedings of the 19th USENIX Conference on File and Storage Technologies (**FAST**), USENIX, 2021.
Optimizes the file offsets to persistent memory mapping operation, providing up to 45% performance gains

MICRO'20 **Tanvir Ahmed Khan**, Akshitha Sriraman, Joseph Devietti, Gilles Pokam, Heiner Litz, and Baris Kasikci
I-SPY: Context-Driven Conditional Instruction Prefetching with Coalescing.
In proceedings of the 53rd IEEE/ACM International Symposium on Microarchitecture (**MICRO**), IEEE, 2020.
Semiconductor Research Corporation (SRC) Best Paper, Q3'2020
First instruction prefetching technique that enables conditional prefetching only when program context leads to instruction cache misses; I-SPY achieves near-ideal cache performance and has been adopted by Intel

IISWC'20 Yuhan Chen[U], Jingyuan Zhu[U], **Tanvir Ahmed Khan**, and Baris Kasikci
CPU Microarchitectural Performance Characterization of Cloud Video Transcoding.
In proceedings of the IEEE International Symposium on Workload Characterization (**IISWC**), IEEE, 2020.
Finds key bottlenecks in instruction cache, data cache, and branch predictor for video transcoding workloads

PLDI'19 **Tanvir Ahmed Khan**, Yifan Zhao[U], Gilles Pokam, Barzan Mozafari, and Baris Kasikci
Huron: Hybrid False Detection and Repair.
In proceedings of the 40th ACM SIGPLAN Conference on Programming Language Design and Implementation (**PLDI**), ACM, 2019.
Received the "Artifacts Available" and "Artifacts Functional" ACM badges
Semiconductor Research Corporation (SRC) Best Paper, Q2'2019
A system that makes parallel programs up to $8\times$ faster by automatically detecting and repairing false sharing

Peer-Reviewed Journal/Workshop Publications and Posters

Underlined authors are undergraduate[U] and graduate[G] students mentored by me.

IEEE Micro'23 Yuxuan Zhang[G], **Tanvir Ahmed Khan**, Gilles Pokam, Baris Kasikci, Heiner Litz, and Joseph Devietti
Online COde Layout OptimizationS via OCOLOS.
IEEE Micro, IEEE, 2023.

OSR'22 Muhammed Ugur[U], Cheng Jiang[U], Alex Erf[U], **Tanvir Ahmed Khan**, and Baris Kasikci
One Profile Fits All: Profile-Guided Linux Kernel Optimizations for Data Center Applications.
ACM Special Interest Group on Operating Systems (SIGOPS) Operating Systems Review, ACM, 2022.

WoSC'22 Truls Asheim[G], **Tanvir Ahmed Khan**, Baris Kasikci, and Rakesh Kumar
Impact of Microarchitectural State Reuse on Serverless Functions.
In proceedings of the 8th International Workshop on Serverless Computing (**WoSC**), ACM, 2022.

Wireless Networks'19	**Tanvir Ahmed Khan** and A. B. M. Alim Al Islam *Enhancing Throughput in Multi-Radio Cognitive Radio Networks.* Wireless Networks, Springer, 2019.
MobiSys'16	**Tanvir Ahmed Khan** and A. B. M. Alim Al Islam *Poster: Overcoming Throughput Degradation in Multi-Radio Cognitive Radio Networks.* In proceedings of the 14th Annual International Conference on Mobile Systems, Applications, and Services (MobiSys) Companion, ACM, 2016.
WiMob'15	**Tanvir Ahmed Khan**, Chowdhury Sayeed Hyder, and A. B. M. Alim Al Islam *Towards Exploiting a Synergy between Cognitive and Multi-Radio Networking.* In proceedings of the 11th IEEE International Conference on Wireless and Mobile Computing, Networking and Communications (WiMob), IEEE, 2015.

Employment

2017-2023	**University of Michigan**, Ann Arbor, Michigan, USA ○ Research Assistant, Electrical Engineering and Computer Science ○ Advisor: Baris Kasikci
Summer 2021	**ARM**, Austin, Texas, USA ○ Research Intern, Microarchitecture Research Group ○ Mentor: Krishnendra Nathella and Dam Sunwoo
Summer 2020	**Facebook**, Menlo Park, California, USA ○ Software Engineer Intern, Binary Optimization and Layout Tool (BOLT) Team ○ Mentor: Maksim Panchenko
Summer 2019	**Microsoft**, Redmond, Washington, USA ○ Research Intern, Azure Hardware Research Group ○ Mentor: Gagan Gupta and Rathijit Sen
2014-2017	**Bangladesh University of Engineering and Technology**, Dhaka, Bangladesh ○ Lecturer, Department of Computer Science and Engineering

Teaching

Winter 2022	**University of Michigan**, EECS 582 ○ **Primary Instructor** for the graduate course, Advanced Operating Systems
Spring 2022	**Carnegie Mellon University**, 18-847C ○ Invited guest lecture on profile-guided compiler optimizations for Data Center Computing
Winter 2019	**University of Michigan**, EECS 570 ○ Teaching Assistant with Prof. Thomas Wenisch for the graduate course, Parallel Computer Architecture
2014-2017	**Bangladesh University of Engineering and Technology**, CSE 305, CSE 313, CSE 309 ○ **Primary Instructor** for the undergraduate course, Computer Architecture ○ **Primary Instructor** for the undergraduate course, Operating Systems ○ **Primary Instructor** for the undergraduate course, Compilers

Research Mentoring

2022-present	Yiwei Yang (UCSC PhD) Emulating memory disaggregation for data center applications

2022-present Pooneh Safayenikoo (UCSC PhD)
Data-driven far memory allocation, prefetching, and replacement

2022-2023 Woojin Jung (Cranbrook High School)
Performance characterization and optimization of distributed gradient boosting workloads

2022-2023 Kan Zhu (UM BSc → University of Washington PhD)
Architectural implications of Google's data center applications
First place in ACM undergraduate student research competition (MICRO'22)

2022-2023 Diane Chiang (UM BSc → University of Washington MSc)
Visualization of thread interleavings among Google's data center applications

2022-2023 Fangjia Shen (Purdue PhD)
Performance characterization and acceleration of Apache Spark workloads

2021-2023 Saba Jamilan (UCSC PhD)
Profile-guided timely software prefetching and replacement
First author of APT-GET [EuroSys'22]

2021-2023 Surim Oh (UCSC PhD)
Precise and timely wrong-path prefetching

2021-2023 Ali Ansari (EPFL PhD)
Architectural and systems-level implications of CloudSuite-4.0 applications

2021-2023 Shanqing Lin (EPFL PhD)
Systems-level architectural simulation of CloudSuite-4.0 applications

2021-2023 Truls Asheim (NTNU PhD)
Analyzing microarchitectural behaviour of serverless functions
First author of the WoSC'22 paper

2020-2023 Peter Braun (UCSC PhD)
Performance characterization and optimization of modern processor's frontend for data center applications
Co-author of PDede [MICRO'21]

2020-2023 Yuxuan Zhang (UPenn PhD)
Online profile-guided optimizations for C/C++ applications
First author of OCOLOS [MICRO'22]

2020-2023 Yuhan Chen (UM BSc → UM PhD)
Performance characterization and acceleration of irregular workloads
First author of the IISWC'20 paper
First author of the DATE'23 paper

2020-2022 Sara Mahdizadeh Shahri (UM PhD → CMU PhD)
Proxy-web: a proxy app suite for production web services
Co-author of Thermometer [ISCA'22]

2021-2022 Shixin Song (UM BSc → MIT PhD)
Profile-guided BTB replacement for data center applications
First author of Thermometer [ISCA'22]
First place in ACM undergraduate student research competition (MICRO'21)
CRA outstanding undergraduate researcher award honorable mention, 2022

2020-2022 Muhammed Ugur (UM BSc, MSc → Yale PhD)
Profile-guided Linux Kernel optimizations for data center applications
Co-author of Whisper [MICRO'22]
First author of One Profile Fits All [OSR'22]

2022 Zhenhang He (UM BSc → Pinterest)
Enabling microarchitectural simulations of data center applications

2021 Scott Hadley (UM BSc → ARM)
Enabling microarchitectural simulations of managed workloads

2019-2021 Nathan Brown (UM BSc, MSc → ARM)
Profile-guided instruction cache and BTB prefetching for data center applications
Co-author of Twig [MICRO'21]
First place in ACM undergraduate student research competition (CGO'20)

2020 Dexin Zhang (USTC BSc → USTC PhD)
Profile-guided instruction cache replacement for data center applications
Co-author of Ripple [ISCA'21]

2020 Ashfaqur Rahaman (BUET BSc → Utah PhD)
Load-time code layout optimizations

2020 Yineng Yan (UM BSc → UT Austin PhD)
Record and replay debugging for arbitrary GPU programs

2019 Shariq Hafeez (UM BSc → Citadel)
Optimizing data locality for stash databases

2019 Zhiqi Chen (UM BSc → CMU MSc)
Optimizing data locality for MySQL

2019 Xiaohe Cheng (HKUST BSc → Google)
Optimizing data locality for Memcached, Redis, SQLite, Graph500, and XStream

2018-2019 Yifan Zhao (UM BSc → UIUC PhD)
Hybrid false sharing detection and repair
Co-author of Huron [PLDI'19]

Grants and Gifts

2023 **Google gift, 300K USD**
Rethinking Micro-Architectural and Operating Systems Abstractions for Data Center Applications
Principal Investigators: Tanvir Ahmed Khan and Baris Kasikci

2022 **Intel TSA grant, 600K USD**
Data-Driven Processor Design for Datacenter Applications
Principal Investigators: Baris Kasikci, Daniel A. Jiménez, Heiner Litz, and Akshitha Sriraman

2021 **Semiconductor Research Corporation (SRC) realignment grant, 406K USD**
Proxy-Web: A Proxy App Suite for Production Web Services
Principal Investigators: Baris Kasikci, Timothy Rogers, and David Brooks

2020 **NSF/Intel Partnership on Foundational Microarchitecture Research (FoMR), 360K USD**
Taming the Instruction Bottleneck in Modern Datacenter Applications
Principal Investigators: Baris Kasikci and Joseph Devietti

2020 **Semiconductor Research Corporation (SRC) seed grant 150K USD**
Proxy-Web: A Proxy App Suite for Production Web Services
Principal Investigators: Baris Kasikci, Timothy Rogers, and David Brooks

Open-Source Software and Tools

September 2022 **OCOLOS**
The artifact implements the first online code layout optimization system (MICRO 2022) for applications written in C/C++ languages and allows profile-guided optimization to be performed on a running process.
https://github.com/upenn-acg/Ocolos-MySQL

July 2022 **One Profile Fits All**
The artifact consists of software and source code of Linux Kernel's profile-guided optimizations (OSR 2022 and Linux Plumbers Conference 2021) and evaluation scripts for eight open-source data center applications (Apache, Nginx, Redis, Memcached, Leveldb, Rocksdb, MySQL, and PostgreSQL).
https://github.com/efeslab/lk-profile and https://github.com/facebookincubator/BOLT

June 2022 **Thermometer**
The artifact consists of Thermometer's (ISCA 2022) software and source code, evaluation, and instructions.
https://github.com/efeslab/thermometer-artifact

July 2021 **DMon**
The artifact contains the prototype of DMon (OSDI 2021) implementing selective profiling, a technique that locates data locality problems with low-enough overhead that is suitable for production use.
https://github.com/efeslab/dmon-ae

June 2021 **I-SPY** and **Ripple**
The artifact consists of software and source code of I-SPY (MICRO 2020) and Ripple (ISCA 2021), a VirtualBox image with pre-installed data center applications, and these applications' traces.
https://github.com/efeslab/ispy-ripple

February 2021 **NVM File Indexing**
The open-source file system is optimized for file mapping on persistent/non-volatile memory (FAST 2021).
https://github.com/efeslab/nvm-file-indexing

May 2019 **Huron**
The artifact consists of a VirtualBox image containing the Huron (PLDI 2019) software and source code, evaluation data, instructions, and all open source evaluation applications and input files.
https://github.com/efeslab/huron and https://doi.org/10.1145/3325966

Selected Press

March 2022 **Tanvir Ahmed Khan awarded Rackham Predoctoral Fellowship**
The Michigan Engineer News Center
https://cse.engin.umich.edu/stories/tanvir-ahmed-khan-awarded-rackham-predoctoral-fellowship

November 2021 **Outstanding research recognized at Graduate Honors Competition**
The Michigan Engineer News Center
https://cse.engin.umich.edu/stories/outstanding-research-recognized-at-graduate-honors-competition

October 2021 **Arm Neoverse N1 – Performance Analysis Methodology to Tune Production Systems and Application Code**
Arm Community Blogs
https://community.arm.com/arm-community-blogs/b/tools-software-ides-blog/posts/arm-neoverse-n1-performance-analysis-methodology

September 2021 **Facebook Has Been Working On BOLT'ing The Linux Kernel For Greater Performance**
Phoronix
https://www.phoronix.com/news/Facebook-BOLTing-The-Kernel

April 2020	**Undergraduate research on speeding up data centers earns ACM first prize**
	The Michigan Engineer News Center
	https://cse.engin.umich.edu/stories/undergraduate-research-on-speeding-up-data-centers-earns-acm-first-prize
August 2019	**Automated tool optimizes complex programs better than humans**
	The Michigan Engineer News Center
	https://cse.engin.umich.edu/stories/automated-tool-optimizes-complex-programs-better-than-humans
February 2019	**Speeding up code with clever data manipulation**
	The Michigan Engineer News Center
	https://cse.engin.umich.edu/stories/speeding-up-code-with-clever-data-manipulation

Invited Talks

How Can We Help Students Learn to Review Papers?

June 2023	Revisiting the Review Processes Workshop (Co-located with ISCA 2023)
	Orlando, FL, USA

Rescuing Data Center Processors

April 2023	Cornell University (Department of Computer Science)
	Host: Giulia Guidi
April 2023	Stony Brook University (Department of Computer Science)
	Host: Dongyoon Lee
April 2023	Texas A&M University (Department of Computer Science and Engineering)
	Host: Daniel A. Jiménez
March 2023	University of Waterloo (Department of Electrical and Computer Engineering)
	Host: Hiren Patel
March 2023	University of Waterloo (David R. Cheriton School of Computer Science)
	Host: Martin Karsten
March 2023	Rutgers University (Department of Computer Science)
	Host: Richard P. Martin
March 2023	École Polytechnique Fédérale de Lausanne (School of Computer and Communication Sciences)
	Host: Sanidhya Kashyap
March 2023	University of Minnesota Twin Cities (Department of Electrical and Computer Engineering)
	Host: Ulya Karpuzcu
March 2023	University of North Carolina at Chapel Hill (Department of Computer Science)
	Host: Shahriar Nirjon
March 2023	University of Toronto (Department of Computer Science)
	Host: Gennady Pekhimenko
March 2023	Columbia University (Electrical Engineering Department)
	Host: Asaf Cidon
February 2023	University of Illinois Urbana-Champaign (Electrical and Computer Engineering Department and Department of Computer Science)
	Hosts: Nam Sung Kim and Tianyin Xu
February 2023	Northeastern University (College of Engineering-Electrical and Computer Engineering)
	Host: Yanzhi Wang
February 2023	Purdue University (Department of Computer Science)
	Host: Xuehai Qian

February 2023	New York University (NYU) Courant Institute of Mathematical Sciences (Computer Science Department) Host: Lakshminarayanan Subramanian
February 2023	Boston University (Department of Computer Science) Host: Jonathan Appavoo
February 2023	Boston University (Department of Electrical and Computer Engineering) Host: Manuel Egele
December 2022	Columbia University Host: Baishakhi Ray
October 2022	Intel Labs ArchFest Host: Zeshan Chishti
January 2022	University of California, Riverside Host: Zhiyun Qian
January 2022	University of California, Irvine Host: Sangeetha Abdu Jyothi
November 2021	Applications Driving Architectures (ADA) Fall Symposium Session chair: Ada Gavrilovska
November 2021	University of Michigan Graduate Honors Competition Host: Emily Mower Provost
November 2021	University of California, Los Angeles Host: Jens Palsberg
November 2021	University of California, San Diego Host: Dean Tullsen
October 2021	University of Michigan Systems Lab Host: Max S. New
October 2021	University of California, Santa Cruz Hosts: Lindsey Kuper and Tyler Sorensen
October 2021	Texas A&M University Host: Daniel A. Jiménez
September 2021	University of Rochester Host: Sreepathi Pai

Whisper: Profile-Guided Branch Misprediction Elimination for Data Center Applications

December 2022	Apple Computer Architecture Reading Group Host: Muawya Al-Otoom and Tyler Huberty
November 2022	AMD Tech Talk Host: Jagadish Kotra
November 2022	ARM Austin CPU Group Host: Dam Sunwoo
October 2022	IEEE/ACM International Symposium on Microarchitecture (MICRO) Session chairs: Ulya Karpuzcu and Boris Grot

Thermometer: Profile-Guided BTB Replacement for Data Center Applications

June 2022	IEEE/ACM International Symposium on Computer Architecture (ISCA) Session chair: Esha Choukse

Twig: Profile-Guided BTB Prefetching for Data Center Applications

May 2022	Applications Driving Architectures (ADA) Annual Symposium
	Session chair: Zachary Tatlock
October 2021	IEEE/ACM International Symposium on Microarchitecture (MICRO)
	Session chair: Pedro Trancoso

Locality Optimizations for Data Center Applications

September 2021	Semiconductor Research Corporation (SRC) TECHCON
	Session chair: Lisa Green
July 2021	ARM Research
	Host: Alex Rico
May 2021	Applications Driving Architectures (ADA) Annual Symposium
	Session chair: Timothy G. Rogers
April 2021	EuroSys Doctoral Workshop
	Session chair: Irene Zhang
December 2020	Students' Forum Speaker, International Conference on Networking, Systems and Security
	Session chair: Mahmuda Naznin

DMon: Efficient Detection and Correction of Data Locality Problems Using Selective Profiling

July 2021	USENIX Symposium on Operating Systems Design and Implementation (OSDI)
	Session chairs: Deniz Altinbüken and Rashmi Vinayak

Ripple: Profile-Guided Instruction Cache Replacement for Data Center Applications

June 2021	IEEE/ACM International Symposium on Computer Architecture (ISCA)
	Session chair: Esha Choukse

I-SPY: Context-Driven Conditional Instruction Prefetching with Coalescing

October 2020	IEEE/ACM International Symposium on Microarchitecture (MICRO)
	Session chair: Trevor E. Carlson

Huron: Hybrid False Sharing Detection and Repair

August 2019	Microsoft C++ Compiler Team
	Host: Mo Di
June 2019	ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)
	Session chair: Veselin Raychev
May 2019	Azure Hardware Research Group
	Host: Lisa Hsu

Overcoming Throughput Degradation in Multi-Radio Cognitive Radio Networks

May 2018	Intel Labs Wireless Networking Research Group
	Host: Satish C. Jha

Selected Professional Services

2024	Program Committee Member for European Conference on Computer Systems (EuroSys'24)
2024	Program Committee Member for International Symposium on Code Generation and Optimization (CGO'24)
2023	Program Committee Member for International Symposium on Code Generation and Optimization (CGO'23)
2022	External Review Committee Member for International Symposium on Microarchitecture (MICRO'22)
2022	Publicity Chair for Young Architect Workshop (YArch'22)
2022	External Review Committee Member for International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS'22)

2021 Shadow Program Committee Member for European Conference on Computer Systems (EuroSys'21)

2021 External Review Committee Member for International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS'21)

2020 Artifact Evaluation Committee Member for SIGPLAN Conference on Programming Language Design and Implementation (PLDI'20)

2020 Artifact Evaluation Committee Member for Third Conference on Machine Learning and Systems (MLSys'20)

2020 Artifact Evaluation Committee Member for International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS'20)

2019 Artifact Evaluation Committee Member for ACM Symposium on Operating Systems Principles (SOSP'19)

2019 Student Volunteer for SIGPLAN Conference on Programming Language Design and Implementation (PLDI'19)

Outreach Activities

2022-present **High School Student Mentoring**
- Woojin Jung (Cranbrook High School)

2018-present **Mentoring Students from Underserved Groups**
- Diane Chiang (UM BSc)
- Yiwei Yang (UCSC PhD)
- Pooneh Safayenikoo (UCSC PhD)
- Saba Jamilan (UCSC PhD)
- Surim Oh (UCSC PhD)
- Yuxuan Zhang (UPenn PhD)
- Sara Mahdizadeh Shahri (UM PhD)
- Shixin Song (UM BSc)
- Ashfaqur Rahaman (BSc in Naval Engineering)
- Xiaohe Cheng (HKUST BSc)

2022 **Data Analytics for Detroit Digital Inclusion**
- Eliminating digital inequality in the greater Detroit area
- As a volunteer, advising and mentoring undergraduate and master's student research assistants

2021 **"My CS PhD" Information Session Panelist**
- Attending as a panelist in the info session for undergraduates about getting a PhD in computer science