

Hashim Sharif

Computer Science Department
University of Illinois at Urbana-Champaign
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Education

- 2014–2021 **University of Illinois at Urbana-Champaign, Urbana, IL**
PhD in Computer Science
Advisor: Vikram Adve
- 2009–2013 **National University of Computer and Emerging Sciences, Lahore, Pakistan**
Bachelor of Science in Computer Science

Experience

- April 2021– **Postdoctoral Researcher, University of Illinois at Urbana-Champaign,**
Advisors: Vikram Adve and Sasa Misailovic
- 2016–2021 **Graduate Research Assistant, University of Illinois at Urbana-Champaign, Urbana, IL,**
- 2017 Summer **Summer Research Associate, Argonne National Lab, Lemont, IL**
- 2015 Summer **Summer Research Associate, SRI International, Menlo Park, CA**
- 2013–2014 **Research Assistant, Lahore University of Management Sciences, Lahore, Pakistan**

Research Areas

- Compilers
- Systems for Machine Learning
- Accuracy-aware Program Optimization
- Program Analysis
- Programming Languages

Impact

- Collaborating with a robotics startup, Earthsense, I optimized the software stack of an in-production autonomous agriculture robot using *ApproxCaliper* - an **application-aware neural network optimization framework**. Our optimizations reduced the cost of deployed compute hardware by 3x.

- The ApproxHPVM deep learning compiler is being actively used at IBM Research for compiling neural network programs to a custom heterogeneous SoC developed for self-driving vehicles.
- I led two major open-source releases of the HPVM project; release v0.5 was presented at the open-source conference, FOSDEM 2020, and v1.0 is actively used by IBM Research and academic research groups.
- In terms of teaching and collaborating on various projects, I have mentored over 10 PhD and undergraduate students.

Publications

Selected Conference Papers

- [In Review] **Hashim Sharif***, Yifan Zhao*, Peter Pao-Huang, Vatsin Ninad Shah, Arun Narenthiran, Mateus Valverde Gasparino, Nathan Zhao, Abdulrahman Mahmoud, Sarita Adve, Girish Chowdhary, Sasa Misailovic, Vikram Adve. *ApproxCaliper: Exploiting Application-level Error Resiliency for Optimizing Neural Networks*. (* equal contribution.)
- [PPoPP'21] **Hashim Sharif**, Yifan Zhao, Maria Kotsifakou, Akash Kothari, Ben Schreiber, Elizabeth Wang, Yasmin Sarita, Nathan Zhao, Keyur Joshi, Vikram Adve, Sasa Misailovic, and Sarita Adve. *ApproxTuner: a Compiler and Runtime System for Adaptive Approximations*. In *Proceedings of the 26th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP'21)*, 2021, February, Virtual.
- [OOPSLA'19] **Hashim Sharif**, Prakalp Srivastava, Muhammad Huzaifa, Maria Kotsifakou, Keyur Joshi, Yasmin Sarita, Nathan Zhao, Vikram Adve, Sasa Misailovic, and Sarita Adve. *ApproxHPVM: a Portable Compiler IR for Accuracy-aware Optimizations*. In *Proceedings of the ACM on Programming Languages (OOPSLA'19)*, 25 October 2019, Athens, Greece.
- [ASE'18] **Hashim Sharif**, Muhammad Abubakar, Ashish Gehani, and Fareed Zaffar. *TRIMMER: Application Specialization for Code Debloating*. In *Proceedings of the 33rd ACM/IEEE International Conference on Automated Software Engineering (ASE'18)*, September 7, 2018, Montpellier, France.

Journal Publication

- [TSE'22] Aatira Anum Ahmad, Abdul Rafae Noor, **Hashim Sharif**, Usama Hameed, Shoaib Asif, Mubashir Anwar, Ashish Gehani, Fareed Zaffar, and Junaid Haroon Siddiqui. *TRIMMER: An Automated System for Configuration-based Software Debloating*. *IEEE Transactions on Software Engineering (TSE'22)*.

Workshop Papers and Presentations

- [LLVMDev'20] **Hashim Sharif**, Maria Kotsifakou, Yifan Zhao, Akash Kothari, Ben Schreiber, Elizabeth Wang, Yasmin Sarita, Nathan Zhao, Keyur Joshi, Vikram Adve, Sasa Misailovic, and Sarita Adve. ApproxTuner: a Compiler and Runtime System for Adaptive Approximations. *2020 LLVM Virtual Developers Meeting*, October 8, 2020 (**Oral**).
- [LLVM-HPC 2017] **Hashim Sharif**, Vikram Adve, and Hal Finkel. Developing an OpenMP Offloading Runtime for UVM-Capable GPUs. *The Fourth Workshop on the LLVM Compiler Infrastructure in HPC*, November 13, 2017, Denver, CO (**Oral**).
- [OpenMPCon 2017] **Hashim Sharif**, Vikram Adve, Hal Finkel, and Lingda Li. Developing an OpenMP Offloading Runtime for UVM-Capable GPUs. *2017 OpenMP Developers Meeting*, September 19, 2017, Stony Brook University, NY (**Oral**).
- [IPAW'16] Manolis Stamatogiannakis, Hasanat Kazmi, **Hashim Sharif**, Remco Vermeulen, Ashish Gehani, Herbert Bos, Paul Groth. Trade-Offs in Automatic Provenance Capture. *6th International Provenance and Annotation Workshop*, Maclean, VA, June 8, 2016.

Undergraduate Research

- [PACIS'15] **Hashim Sharif**, Saad Ismail, Shehroze Farooqi, Mohammad Taha Khan, Mohammad Ali Gulzar, Hasnain Lakhani, Fareed Zaffar, and Ahmed Abbasi. A Classification Based Framework to Predict Viral Threads *Pacific Asia Conference on Information Systems (PACIS'15)*.
- [SocialCom'14] **Hashim Sharif**, Fareed Zaffar, Ahmed Abbasi, and David Zimbra. Detecting Adverse Drug Reactions Using a Sentiment Classification Framework. *Proceedings of the 2014 International Conference on Social Computing (SocialCom'14)*.

Talks

- **ApproxCaliper: Exploiting Application-level Error Resiliency for Optimizing Neural Networks**
 - Talk at Harvard University, 02/18/2022, Virtual
 - Talk at SRI International, 02/14/2022, Virtual
 - UIUC Compiler Seminar, 02/07/2022, University of Illinois
 - Illinois Autonomous Farm Workshop, 7/7/2021, University of Illinois

- **ApproxTuner: a Compiler and Runtime System for Adaptive Approximations**
 - PPOPP'21, 3/2/2021, Virtual
 - Google Compiler Seminar, 3/12/2021, Virtual
 - Talk at DePaul University, Chicago, 2/19/2021, Virtual
 - Talk to Qualcomm Compiler Team, 12/13/2020, Virtual
 - LLVM Developers conference, 10/8/2020, Virtual
 - Talk to Amazon Compiler Team, 6/2/2020, Virtual
- **ApproxHPVM: a Portable Compiler IR for Accuracy-aware Optimizations**
 - UIUC Compiler Seminar, 10/16/2019, University of Illinois
 - Talk to IBM Research Computer Architecture Team, 9/6/2019, Yorktown Heights, NY
- **TRIMMER: Application Specialization for Code Debloating**
 - LUMS ISPL Seminar Series, 11/5/2020, Virtual
 - UIUC Compiler Seminar, 08/28/2018, University of Illinois
- **Developing an OpenMP Offloading Runtime for UVM-Capable GPUs**
 - OpenMP Developers Meeting, September 19, 2017, Stony Brook University, NY
 - LLVM-HPC Workshop at Supercomputing 2017, November 13, 2017, Denver, CO

Services

- Fall 2021 Empirical Software Engineering Journal 2021 - *Reviewer*
- Fall 2021 Principles and Practice of Parallel Programming 2022 (PPOPP'22) - *External Reviewer*
- Spring 2021 Transactions on Design Automation of Electronic Systems 2021 - *Reviewer*
- Spring 2018 UIUC Compiler Seminar - *Student Organizer*

Teaching and Mentoring

Teaching Assistant

- Fall 2015 UIUC CS 498 Digital Forensics (with Roy Campbell)

Guest Lectures

- Spring 2021 UIUC CS 526 Advanced Compiler Construction
- Fall 2020 UIUC CS 598 Approximate and Probabilistic Computing
- Spring 2020 UIUC CS 526 Advanced Compiler Construction
- Fall 2013 LUMS CS Topics in Network Security
- Spring 2014 LUMS CS Network Security

Research Mentoring

- 2019-present UIUC PhD student, Yifan Zhao
Worked jointly on the ApproxCaliper and ApproxTuner projects.
- 2019-present UIUC PhD student, Akash Kothari
Worked together on the ApproxTuner project and the HPVM release.
- 2019-present UIUC PhD student, Abdul Rafae Noor
Worked together on TRIMMER and HPVM release.
- 2020-present UIUC PhD student, Mubashir Anwar
Collaborated on TRIMMER Journal version and TRIMMER release.
- 2019-present UIUC undergraduate student, Nathan Zhao
Worked together on ApproxHPVM, ApproxTuner, and ApproxCaliper.
- 2020-present UIUC undergraduate student, Peter Pao-Huang
Worked together on ApproxTuner and ApproxCaliper.
- 2021-present UIUC undergraduate student, Vatsin Ninad Shah
Collaborated on the ApproxCaliper project.
- 2019-2020 UIUC undergraduate student, Elizabeth Wang
Collaborated on the ApproxTuner project.
- 2019-2020 Cornell undergraduate student, Yasmin Sarita
Worked on ApproxHPVM, while Yasmin was a summer intern at UIUC.
- 2018-2019 LUMS undergraduate student, Usama Hameed
Worked together on TRIMMER. Usama is pursuing his PhD at UCLA.
- 2019-2020 LUMS undergraduate student, Shoaib Asif
Collaborated on TRIMMER. Shoaib is pursuing his PhD at UT Austin.

References

Vikram Adve

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