

DEEPANJALI MISHRA

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BRIEF BIOGRAPHY

We design computer systems around assumptions about the applications they will run. These assumptions shape the capabilities we build into our servers; e.g., the processors we use, the memory systems we provision, and the operating systems that manage them. My research broadly focuses on understanding the **growing gap between the capabilities of existing servers and the demands of emerging applications (e.g., agentic AI)**, and redesigning servers to better support these applications.

Emerging applications are changing not only what servers compute, but also how they use the underlying system. My research therefore first characterizes how these applications execute; in particular, I map the semantic behavior of agents to understand how their reasoning, tool use, and computation translate into system-level demands. I then study how these demands interact with existing server designs across multiple layers of the systems stack, particularly computer architecture and operating systems, and across heterogeneous devices, including CPUs, GPUs, and memory systems. This approach allows me to identify where existing servers fall short and where they can be redesigned around the needs of emerging applications.

Ultimately, my goal is to build servers that efficiently support the next generation of applications; improving their performance and energy efficiency while rethinking the hardware-software boundary around their needs.

My research has been recognized with the 2026 WICArch Early-Career Researcher Fellowship, the 2024 Carnegie Institute of Technology Dean's Fellowship, and the 2022 ACM-W Scholarship.

EDUCATION

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| ❖ Ph.D. in Electrical and Computer Engineering
Advisor: Akshitha Sriraman | Carnegie Mellon University
Aug 2024 - Present |
| ❖ B.E. in Electronics and Communication
University Rank: 7 (Across ~22,000 students) | Visvesvaraya Technological University
Aug 2018 - May 2022 |

RESEARCH EXPERIENCE

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| ❖ Graduate Research Assistant , Carnegie Mellon University
Advisor: Prof. Akshitha Sriraman
Redesigning data center systems through hardware-software co-design to enable efficient hyperscale operation | Aug 2024 – Present |
| ❖ Research Associate , Carnegie Mellon University
Mentor: Prof. Akshitha Sriraman
Explored how to design a minimal set of accelerators for hyperscale data center services | Jan 2024 – Apr 2024 |
| ❖ Visiting Scholar , Microsoft Research India
Mentors: Dr. Vivek Seshadri, Dr. Ashish Panwar, and Prof. Akshitha Sriraman
Designed microarchitectural techniques to enable efficient metadata management in run-time monitoring tools | Jul 2023 – Dec 2023 |
| ❖ Research Intern , ETH Zurich
Mentor: Prof. Onur Mutlu
Introduced a new address space in Virtuoso, a tool for virtual memory research | May 2023 – Jul 2023 |
| ❖ Research Fellow , Microsoft Research India
Mentors: Dr. Vivek Seshadri, Dr. Ashish Panwar, and Prof. Akshitha Sriraman
Developed virtual memory optimizations for taint-tracking applications | Jul 2022 – Jul 2023 |
| ❖ Research Intern , Microsoft Research India
Mentors: Dr. Vivek Seshadri and Prof. Akshitha Sriraman
Developed techniques for efficient metadata management in dynamic program monitoring tools | Apr 2022 – Jun 2022 |

❖ **Research Intern**, Microsoft Research India
Mentors: Dr. Vivek Seshadri and Prof. Akshitha Sriraman
Prototyped an FPGA-based accelerator for posit number representation

Sep 2021 – Feb 2022

AWARDS AND HONORS

- ❖ **ACM WICArch Early-Career Researcher Fellowship** 2026
Awarded \$1,000 toward conference travel
- ❖ **Carnegie Institute of Technology Dean's Fellowship**, Carnegie Mellon University 2024
Awarded \$83,000 toward tuition, stipend, and travel
- ❖ **Institute Gold Medal and Valedictorian**, Cambridge Institute of Technology, Bangalore 2023
Recognized for outstanding academic performance (Class of 2022)
- ❖ **ACM-W Scholarship** 2022
Recognized for academic excellence
- ❖ **Three Minute Thesis Championship Finalist**, Carnegie Mellon University 2025, 2026
Awarded \$250 for outstanding short thesis presentations (2025 🟢🔊, 2026 🟢🔊)
- ❖ **Travel Grants**
 - **ISCA Travel Grant**, 53rd International Symposium on Computer Architecture (ISCA) 2026
Awarded \$1,000 toward conference travel
 - **ASPLOS Travel Grant**, ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS) 2026
Awarded up to \$600 toward conference travel
 - **MICRO Travel Grant**, 58th IEEE/ACM International Symposium on Microarchitecture (MICRO) 2025
Awarded \$580 toward conference travel
 - **ISCA Travel Grant**, 49th International Symposium on Computer Architecture (ISCA) 2022
Awarded \$1,200 toward conference travel
 - **uArch Workshop Travel Grant**, Undergraduate Architecture Mentoring Workshop (uArch) 2022
Awarded \$1,200 to attend a workshop on pursuing doctoral programs

PEER-REVIEWED CONFERENCE AND JOURNAL PUBLICATIONS

- ❖ **Deepanjali Mishra**, Konstantinos Kanellopoulos, Ashish Panwar, Akshish Panwar, Akshitha Sriraman, Vivek Seshadri, Onur Mutlu, and Todd C. Mowry. *Address-Scaling: Architectural Support for Fine-grained Thread-safe Metadata Management*. **IEEE Computer Architecture Letters (CAL)**, March 2024. 🟢

PEER-REVIEWED WORKSHOP PUBLICATIONS & POSTERS

- ❖ **Deepanjali Mishra**, Tanvir Ahmed Khan, Gilles Pokam, Heiner Litz, and Akshitha Sriraman. *Towards Energy Efficient Memory Accesses via Speculative Load Micro-Op Fusion*. 10th Workshop on Cognitive Architectures (**CogArch @ISCA**). June 2026.
- ❖ **Deepanjali Mishra**, Tanvir Ahmed Khan, Gilles Pokam, Heiner Litz, and Akshitha Sriraman. *Speculative Load Micro-Op Fusion*. Architecture 2.0 Workshop (**A2.0 @ISCA**). June 2026.
- ❖ **Deepanjali Mishra**, Tanvir Ahmed Khan, Gilles Pokam, Heiner Litz, and Akshitha Sriraman. *Speculative Load Micro-Op Fusion*. 3rd Workshop on Hot Topics in System Infrastructure (**HotInfra @ISCA**). June 2026.
- ❖ **Deepanjali Mishra**, Tanvir Ahmed Khan, Gilles Pokam, Heiner Litz, and Akshitha Sriraman. *Speculative Load Micro-Op Fusion*. Energy Efficient Machine Learning and Cognitive Computing (**EMC2 @ASPLOS**). March 2026.
- ❖ **Deepanjali Mishra**, Tanvir Ahmed Khan, Gilles Pokam, Heiner Litz, and Akshitha Sriraman. *Speculative Load Fusion for Cloud Efficiency*. 7th International Workshop on Cloud Intelligence/AIOps (**AIOps @ASPLOS**). March 2026.

- ❖ **Deepanjali Mishra**, Tanvir Ahmed Khan, Gilles Pokam, Heiner Litz, and Akshitha Sriraman. *Speculative Load Micro-Op Fusion for Memory-Centric Systems*. 5th Workshop on Memory-Centric Computing Systems (**MCCSys @ASPLOS**). March 2026.
- ❖ **Deepanjali Mishra**, Tanvir Ahmed Khan, Gilles Pokam, Heiner Litz, and Akshitha Sriraman. *Speculative Load Micro-Op Fusion*. Virtuoso: Ideas and Infrastructures for Novel HW/OS Interfaces (**Virtuoso @ASPLOS**). March 2026.
- ❖ **Deepanjali Mishra**, Tanvir Ahmed Khan, Gilles Pokam, Heiner Litz, and Akshitha Sriraman. *Access-Fusion: Memory Access Composition in Disaggregated Systems*. 5th Workshop on Heterogeneous Composable and Disaggregated Systems (**HCDS @ASPLOS**). March 2026.
- ❖ Ramya Prabhu, Aditya K. Kamath, and **Deepanjali Mishra**. *System Optimizations for Human Well-Being*. Wild and Crazy Ideas (**WACI @ASPLOS**). March 2026.
- ❖ **Deepanjali Mishra**, Akshitha Sriraman, and Vivek Seshadri. *Address-Scaling: Architectural Support for Fine-Grained Thread-Safe Metadata Management*. 4th Young Architect Workshop (**YArch @ASPLOS**). March 2022. 

PROFESSIONAL SERVICE

❖ Workshop Co-Organizer

- 2nd Writing Workshop for Women in Computer Architecture (**WICArch**) Aug 2026 
held online
- Workshop on Ethical Systems and Architecture Design (**HotEthics**) Mar 2026 
co-located with ASPLOS 2026
- 1st Scarab Microarchitectural Simulator Workshop Oct 2025 
co-located with MICRO 2025
- 1st Writing Workshop for Women in Computer Architecture (**WICArch**) Oct 2025 
held online

❖ Mentor

- Undergraduate Architecture Mentoring Workshop (**uArch**) Jun 2026
co-located with ISCA 2026

❖ Panelist

- Undergraduate Architecture Mentoring Workshop (**uArch**) Jun 2026
co-located with ISCA 2026

❖ Reviewer

- Machine Learning for Architecture and Systems Workshop (**MLArchSys**) May 2026
co-located with ISCA 2026

❖ Artifact Evaluation Committee Member

- ACM Special Interest Group on Data Communication (**SIGCOMM 2026**) Aug 2026
- International Conference on Parallel Architectures and Compilation Techniques (**PACT 2026**) Aug 2026
- IEEE/ACM International Symposium on Microarchitecture (**MICRO 2025**) Aug 2025
- USENIX Conference on File and Storage Technologies (**FAST 2026**) Jul 2025
- USENIX Annual Technical Conference (**ATC 2025**) May 2025 
- USENIX Symposium on Operating Systems Design and Implementation (**OSDI 2025**) May 2025 
- ACM International Conference on Architectural Support for Programming Languages and Operating Systems (**ASPLOS Fall 2025**) Feb 2025 
- ACM International Conference on Architectural Support for Programming Languages and Operating Systems (**ASPLOS Spring 2025**) Dec 2024 

INVITED TALKS

❖ Speculative Load Micro-Op Fusion for Data Center Efficiency

	Workshop on Hot Topics in System Infrastructure (HotInfra)	Jun 2026
	Workshop on Cognitive Architectures (COGARCH)	Jun 2026
	Workshop on Agentic AI for Computing Systems Design (Architecture 2.0)	Jun 2026
	Parallel Data Lab, Host: Prof. David G. Anderson	Apr 2026
	Energy Efficient Machine Learning and Cognitive Computing Workshop (EMC2)	Mar 2026
	Cloud Intelligence Workshop (AIOps)	Mar 2026
	Memory-Centric Computing Systems Workshop (MCCSys)	Mar 2026
	Heterogeneous Composable and Disaggregated Systems Workshop (HCDS)	Mar 2026
	Virtuoso: Ideas and Infrastructures for Novel HW/OS Interfaces Workshop	Mar 2026
	Systems & Networking Seminar Group, Host: Prof. Srinivasan Seshan	Oct 2025
	Systems & Networking Seminar Group, Host: Prof. Justine Sherry	Apr 2025
	Intel Labs, Host: Sreenivas Subramoney	Jan 2025
	Parallel Data Lab Annual Workshop & Retreat, Host: Prof. Greg Ganger	Oct 2024

❖ Mindfulness: Mechanisms for Intentionally Delaying Systems for Human Well-Being

	Wild and Crazy Ideas (WACI)	Mar 2026
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❖ Address Scaling: Architectural Support for Fine-Grained Thread-Safe Metadata Management

	Computer Architecture Seminar Group, Host: Prof. Brandon Lucia	Feb 2024
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TECHNICAL SKILLS

- ❖ **Programming Languages:** C/C++, Python, x86 Assembly, Bash/Shell, Verilog HDL
- ❖ **Tools and Frameworks:** Linux Perf, Intel PMU Tools, Intel VTune, Intel PT, LLVM, DynamoRIO, Pin
- ❖ **Hardware Simulators:** gem5, Scarab, Sniper, Virtuoso
- ❖ **Hardware Platforms:** Spartan-3E and SnōMākr FPGAs, 8051 MCU, Raspberry Pi, Arduino Uno

MENTORING EXPERIENCE

❖ Undergraduate Research Mentoring

– Ronald Ho, University of Wisconsin–Madison	2026
– Ved Lakshminarayanan, Carnegie Mellon University Selected for the Summer Undergraduate Research Apprenticeship (SURA)	2026
– Sumanth D, BMS College of Engineering, Bengaluru, India	2026
– Vishv Vekariya, L.D. College of Engineering, Ahmedabad, India	2026

❖ Graduate Research Mentoring

– Alex Li, Carnegie Mellon University	2026
– Cristian Embleton, Carnegie Mellon University	2026
– Chris Bhagwat, Carnegie Mellon University	2026
– Harry Zheng, Carnegie Mellon University	2026
– Naren Vilva, Carnegie Mellon University	2026

TEACHING EXPERIENCE

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- ❖ **Graduate Teaching Assistant**, Carnegie Mellon University Spring 2026
Computer Architecture and Systems (18-742), Prof. Phillip Gibbons
 - ❖ **Invited Guest Lectures**, Carnegie Mellon University
 - **Green Computing** Feb 2026
Computer Architecture and Systems (18-742), Prof. Phillip Gibbons
 - **Enabling Efficient and Sustainable Data Center Systems** Dec 2025
Introduction to Computer Systems (15-213), Prof. Phillip Gibbons

OUTREACH ACTIVITIES

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- ❖ **WICArch Gathering at ASPLOS 2026** Mar 2026
 Organized an in-person networking and mentoring event for members of the ACM Women in Computer Architecture (WICArch) community at ASPLOS 2026
 - ❖ **Member, Diversity, Inclusion, and Belonging Committee**, [Microsoft Research India](#) 2021 – 2023
 - ❖ **Skills Development Minister, Student Council**, [Deens Academy](#) 2016 – 2017

REFERENCES

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- ❖ **Academia**
 - [Prof. Akshitha Sriraman](#) (akshitha@cmu.edu)
 Assistant Professor, Department of Electrical and Computer Engineering, Carnegie Mellon University
 - [Prof. Heiner Litz](#) (hlitz@ucsc.edu)
 Associate Professor, Department of Computer Science, University of California, Santa Cruz
 - [Prof. Tanvir Ahmed Khan](#) (tk3070@columbia.edu)
 Assistant Professor, Department of Electrical Engineering, Columbia University
 - ❖ **Industry**
 - [Dr. Gilles Pokam](#) (gilles.pokam@amd.com)
 Fellow, Advanced Micro Devices
 - [Dr. Vivek Seshadri](#) (vivek@karya.in)
 Co-Founder, Karya Inc
 - [Dr. Ashish Panwar](#) (ashishpanwar@microsoft.com)
 Principal Researcher, Systems Group, Microsoft Research India