Adhitha Dias

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Summary

I am a Ph.D. student at Purdue ECE with more than 6 years of experience as a research assistant and a software engineer. My interests lie in compilers, programming languages (PL), systems, and high-performance computing. I currently work on compiler optimizations for sparse tensor computations.

Education

PhD, Purdue University, West Lafayette, IN. Jan 2021 - Dec 2025 (expected)
Major: Electrical and Computer Engineering
Advised by: Prof. `Milind Kulkarni`
Thesis Topic: Sparse Tensor Algebra Compiler Optimizations
GPA - 4.00/4.00
Coursework: Programmable Accelerator Architectures (GPU), Deeplearning, Database Systems, AI Hardware, Numerical Analysis.

`MS`**, Purdue University**, West Lafayette, IN. Jan 2021 - May 2023
Major: Electrical and Computer Engineering
GPA - 4.00/4.00
Coursework: Data Structures & Algorithms, Compilers, Computer Architecture, Programming Languages, Operating Systems, Parallel Programming, Distributed Systems, Linear Algebra, Random Variables, Graph Theory.

B.Sc. Engineering (Hons), University of Moratuwa, Sri Lanka. Sep 2014 - Dec 2018
Major: Electronic and Telecommunication Engineering
GPA - 4.05/4.20 [First Class Honours] | Within top 2% of the Engineering Batch

Richmond College, Galle, Sri Lanka. Jan 2002 - Dec 2013
Completed University Entrance in Physical Science/Mathematics Stream.
Z-score of 2.9495 | Ranked 1^{st} in the country in G.C.E.(A/L) examination | Ranked 15^{th} in G.C.E.(O/L) examination

Publications

- **Adhitha Dias**, Logan Anderson, Kirshanthan Sundararajah, Artem Pelenitsyn, and Milind Kulkarni "SparseAuto: An Auto-scheduler for Sparse Tensor Computations using Recursive Loop Nest Restructuring" in *The Object-Oriented Programming, Systems, Languages, and Applications*, OOPSLA 2024 `[ACM DL]`.
- **Adhitha Dias**, Kirshanthan Sundararajah, Charitha Saumya and Milind Kulkarni "SparseLNR: Accelerating Sparse Tensor Computations Using Loop Nest Restructuring" in *International Conference on Supercomputing*, ICS 2022.
  Best Paper Award `[ACM DL]`
- **Adhitha Dias**, Hasitha Prashan, Yasod Rasanka, Menusha Munasinghe and Ranga Rodrigo and Peshala Jayasekara "Deep Learning of Augmented Reality Based Human Interactions for Automating a Robot Team" in *International Conference on Control, Automation, and Robotics*, ICCAR 2020. `[IEEE Xplore]`

Experience

Graduate Research Assistant, Purdue University Jan 2021 - Present

- **SparseAuto**: Compile time optimizations for complex sparse tensor algebra multiplications using tensor kernel dis-association/distribution and fusion. This is an extension to our *SparseLNR* work. Intended to exploit the scheduling space more broadly and introduce an auto-scheduler.
- **SparseLNR**: Optimized sparse tensor algebra operations at compile-time using a novel loop nest restructuring algorithm. Filled the gap, partly, in fusing kernels with non-affine loop bounds in tensor computations. Achieved speedups of 0.86-1997x compared to the baseline. The paper written won the best-paper award at the International Conference on Supercomputing (ICS) '22. (C/C++, DSL, Tensor Algebra Compiler).

Software Engineer Intern, Meta, Menlo Park, CA May 2025 - Aug 2025

- Worked on design space exploration for a cache architecture in AI Systems Hardware/Software Co-Design for Meta's next-generation AI hardware.

- Implemented a cache simulator for the design space exploration.

Software Engineer Intern, Meta, Menlo Park, CA May 2024 - Aug 2024

- Added float8 compiler support for graph-mode covering end-to-end flow from Pytorch to Glow/MTIA (Meta Training and Inference Accelerator) compiler.
- Implemented reference linear kernel (float8), quantization, and dequantization kernels (float8 to/from bfloat16).
- Integrated CI tests for graph-mode workflow.

Research Scientist/Engineer Intern, Adobe Research, San Jose, CA May 2023 - Aug 2023

- Achieved 2-4x speedups for Adobe FireFly training by introducing activation checkpointing.
- Performed research on introducing model parallelism to Adobe FireFly training.

Software Engineer, Sysco LABS, Sri Lanka (Branch of Sysco Corporation, Houston, TX) Feb 2019 - Dec 2020

- **Enterprise Menu**: Developed features for two of the most complex sections in a graph-based menu management system for multi-location restaurants. (JanusGraph, Neo4J, NodeJS, React/Redux, Java Spring MVC, SonarQube, GrayLog, AWS SNS, AWS S3)
- **Merchandising User Management**: Implemented the first cur version of the application allowing administrators to manage user access to the merchant portal. (JavaScript, NodeJS, React/Redux, Java, Spring Boot, PostgreSQL)
- **Merchandising Authorization and Authentication**: Implemented API for handling secure access to the merchant portal. Achieved user authentication within milliseconds by using caching. (Microsoft Active Directory, Amazon Cognito, JWT authentication, Single sign-on (SSO), Introspection, Redis)
- **Cloud Reports**: Developed features in cloud reports for restaurant point-of-sale devices. (React/Redux, Jenkins, Docker, AWS ECS, AWS S3, Java Spring Web Flux)
- **Communicator API**: Introduced a lock mechanism to distribute load among a cluster of docker instances for sending emails, SMS, and voice messages, and improvments like dockerizing the component and deploying to AWS ECS. Achieved 2-3x improvement in the message sending rate. (MySQL, Twilio integration, SendGrid integration, Redis, Graylog, Symfony, PHP)

Research Intern, School of Information Systems, Singapore Management University, Singapore June 2017 - Dec 2017

- **Follow My Lead**: Introduced an algorithm to automate the checkpoint acquisition in a video-based indoor-navigation system. (Android, AR, Sensor Fusion, OpenCV).
- **Wi-Fi based Indoor Localization using Distributed Antennas**: Worked on finding a localization solution using different Wi-Fi access-points using the angle of arrival of the Wi-Fi packets. (FPGA, GNU Radio, IEEE 802.11 PHY, OFDM, WARP devices, MATLAB, Music and SAGE algorithms)

Skills

- Programming Languages: C/C++, Python, CUDA, Java, JavaScript, Scala, Coq, MATLAB and Bash.
- Operating Systems: Unix/Linux, Windows.
- Systems and Libraries: OpenMP, MPI, NumPy, PyTorch, TensorFlow, CUDA
- Databases: MySQL, CouchDB, Neo4J, Janus Graph
- Tools/Frameworks and IDEs: Git, Docker, AWS, gem5, Vim, NetBeans, Visual Studio Code.

Achievements

- **Awards, Honors and Grants**
  - **The Best Paper Award** At the International Conference on Supercomputing 2022.
  - ACM Grants to Attend *PLDI 2021 and 2022.*
  - *Dean's List Award* Included in the Dean's List in all 8 semesters for obtaining a high GPA during Undergrad.
  - *Sri Lanka Telecom Scholarship 2016* For Best Academic Performance.
  - *Mahapola Merit Scholarship* And `Dialog` *Merit Scholarship 2014-2018* For Undergraduate Studies.
  - *People's bank scholarship 2014* For G.C.E.(A/L) performance.
  - Ranked 1^{st} (out of $32k$ students) in Sri Lanka in Math Stream at the University Entrance Examination 2013. `[Ada Derana News]`, `[Daily Mirror News]`, `[Hiru News]`.

- Ranked 15^{th} (out of $400k$ students) in Sri Lanka at the G.C.E.(O/L) examination 2010.
- `Dialog` *Merit Scholarship 2010* For G.C.E.(O/L) performance.

- **Competitions**
  - Finalists in *International Robotics Challenge (IRC) 2016-2017* at TECHFEST, IIT Bombay, India.
  - Winners in *Sri Lankan Robotics Challenge (SLRC) 2016.*
  - Runners-up in *MoraXtreme Coding Competition 2016* organized by University of Moratuwa, Sri Lanka.
  - Placed 4^{th} in *Sri Lanka Mathematics Olympiad Competition 2013.*
  - Runners-up in *The Australian National Chemistry Quiz 2012* organized by the Royal Australian Chemical Institute.

Professional Activities

- **Member of the Artifact Evaluation Committee** `[AEC]`, ICFP '25. Jun 2025 - Jul 2025
- **Member of the Artifact Evaluation Committee** `[AEC]`, ECOOP '25. May 2025 - Jun 2025
- **Seminar Coordinator**, Purdue Programming Languages and Systems Research Group `(PurPL)`. Aug 2022 - Jul 2024
- **President**, Sri Lankan Student Association at Purdue `(SLAP)`. Aug 2022 - Jul 2024
- **Member of the Artifact Evaluation Committee** `[AEC]`, PPoPP '24. Nov 2023 - Dec 2023
- **Member of the Artifact Evaluation Committee** `[AEC]`, PPoPP '23. Nov 2022 - Dec 2022
- **Attendee**, Programming Languages Mentoring Workshop (PLMW) at PLDI and OOPSLA. June, Nov 2021, June 2022

Other Qualifications

- **Master Java Developer**, Institute of Java and Software Engineering (IJSE), Sri Lanka. Aug 2013 - May 2014
- **Diploma in Management Accounting**, Charted Institute of Management Accountants, UK. Jan 2014 - Dec 2015