

# Adhitha Dias

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## Summary

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I am a 3<sup>rd</sup> year PhD student at Purdue ECE with 2 years of work experience as a software engineer and more than 2 and a half years of experience as a research assistant. I am broadly interested in software engineering, compilers, programming languages and high performance computing. My current research focuses on developing compile-time optimizations for sparse tensor algebra computations. I am looking for full-time internship positions for summer 2023.

## Education

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- 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
- MS, Purdue University**, West Lafayette, IN. Jan 2021 - May 2023 (expected)  
Major: Electrical and Computer Engineering  
GPA - 4.00/4.00  
Relevant Courses: Data Structures & Algorithms, Compilers, Computer Architecture, Programming Languages, Operating Systems, Parallel Programming, Distributed Systems, Programmable Accelerator Architectures (GPU).
- 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

## Publications

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- **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

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- Graduate Research Assistant, Purdue University** Jan 2021 - Present
- **SparseTDA**: 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 (on-going).
  - **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, 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 improvements 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 2016 - Dec 2016

- **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

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- Programming Languages: Java, C/C++, Python, 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

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### • 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<sup>st</sup> (out of 32k students) in Sri Lanka in Math Stream at the University Entrance Examination 2013.
- Ranked 15<sup>th</sup> (out of 400k students) in Sri Lanka at the G.C.E.(O/L) examination 2010.

### • 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<sup>th</sup> 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

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

## Other Qualifications

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