

# Kirshanthan Sundararajah

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## EDUCATION

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Ph.D., Purdue University, West Lafayette, IN.  
Major: Electrical and Computer Engineering

Aug 2015 - May 2022

B.Sc.Eng.(Hons), University of Moratuwa, Katubedda, Sri Lanka.  
Major: Electronics and Telecommunication Engineering

Jul 2009 - Mar 2014

## PROFESSIONAL EXPERIENCE

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- **Graduate Research Assistant @Purdue University** Aug 2015 - Present  
*PLCL Group*
  - **PolyRec**: Framework for composing and verifying transformations for nested recursion and loops.
  - **DARM**: Framework for melding similar control-flow graphs.
  - **SparseLNR**: Accelerating sparse tensor computation.
  - **Grafter**: Framework for fusing general recursive traversals over heterogeneous trees.
  - **Treelogy**: Benchmark suite for tree traversals.
  - **HACCLE**: An ecosystem for *Secure Multi-Party Computations*.
- **Software Engineering Intern @Nvidia** Sep 2020 - Dec 2020  
*GPU Compiler Group*
  - **Diesel Compiler**: Warp specialization and pipelining for GPU kernels.
- **Software Engineering Intern @Reservoir Labs** June 2020 - Aug 2020  
*R-Stream Compiler Group*
  - **ParSEC Backend**: A task-based runtime backend for *R-Stream* polyhedral compiler.
- **Research Intern @Microsoft Research** June 2018 - Sep 2018  
*RiSE Group*
  - **Parallelizing Word2Vec**: Parallelizing and scaling *Word2Vec* training to execute on many cores.
- **Associate Electronic Engineer @Zone24x7 Inc.** May 2012 - Oct 2012  
*Signs24x7 Group*
  - **Image Compression Algorithm**: Implementation of memory efficient image compression algorithm, supposed to perform decompression on an *STM32 microcontroller* based system.
  - **Clock Synchronization Algorithm**: Implementation of real-time clock synchronization algorithm, deployed on an *ARM microprocessor* runs *embedded Linux*.
  - **Hardware Abstraction Layer**: Implementation of *Hardware Abstraction Layer (HAL)* for radio communication protocol stack of *Electronic Paper Display (EPD)*, driven by an *STM32 microcontroller*.

## PUBLICATIONS

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- C Saumya, **K Sundararajah**, and M Kulkarni "DARM: Control-Flow Melding for SIMT Thread Divergence Reduction" in *Code Generation and Optimization*, CGO 2022. [Arxiv]
- Y Bao, **K Sundararajah**, R Malik, Q Ye, C Wagner, N Jaber, F Wang, M H Ameri, D Lu, A Seto, B Delaware, R Samanta, A Kate, C Garman, J Blocki, P Letourneau, B Meister, J Springer, T Rompf, and M Kulkarni "HACCLE: Metaprogramming for Secure Multi-Party Computation" in *International Conference on Generative Programming: Concepts and Experiences*, GPCE 2021. [ACM DL]
- **K Sundararajah** and M Kulkarni "Composable, Sound Transformations of Nested Recursion and Loops" in *Programming Languages, Design and Implementation*, PLDI 2019. [ACM DL]
- L Sakka, **K Sundararajah**, R R Newton, and M Kulkarni "Sound, Fine-Grained Traversal Fusion for Heterogeneous Trees" in *Programming Languages, Design and Implementation*, PLDI 2019. [ACM DL]
- L Sakka, **K Sundararajah** and M Kulkarni "TreeFuser: A Framework for Analyzing and Fusing General Recursive Tree Traversals" in *Object-Oriented Programming, Systems, Languages, and Applications*, OOPSLA 2017. [ACM DL]
- N Hegde, J Liu, **K Sundararajah**, and M Kulkarni "Treelogy: A Benchmark Suite for Tree Traversals" in *IEEE International Symposium on Performance Analysis of Systems and Software*, ISPASS 2017. [IEEE Xplore]
- **K Sundararajah**, L Sakka, and M Kulkarni "Locality Transformations for Nested Recursive Iteration Spaces" in *Architectural Support for Programming Languages and Operating Systems*, ASPLOS 2017. [ACM DL]
- **K Sundararajah** and S Jayasena, "Model-based Input-adaptive Vectorization" in *Moratuwa Engineering Research Conference*, MERCon 2016. [IEEE Xplore]
- **K Sundararajah**, L Logeswaran, P N D Panagoda, L P Wijesinghe, D V S X De Silva, and A A Pasqual, "Layered Depth Image Based HEVC Multi-view Codec" in *Advances in Visual Computing: Proceedings of the International Symposium on Visual Computing*, ISVC 2014. [Springer]

## TEACHING EXPERIENCE

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- ECE 368 Data Structures [Instructor] @Purdue University Summer 2021
- ECE 295 Introduction to Data Science [TA] @Purdue University Summer 2019 and Fall 2020
- CS 1032 Programming Fundamentals [TA] @University of Moratuwa Mar 2014 - Jun 2015

## SERVICE

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- Member of Project for Inclusion in ECE (PIECE) Committee 2022.
- Member of External Review Committee (ERC) for OOPSLA 2022.
- Member of Artifact Evaluation Committee (AEC) for OOPSLA 2022.
- Member of Artifact Evaluation Committee (AEC) for PLDI 2020.
- Member of Program Committee (PC) for Doctoral Symposium at ECOOP 2019.
- External collaborative reviewer for POPL 2019.
- Student volunteer for PLDI 2016, SPLASH 2018, PLDI 2019, and SPLASH 2021.
- Co-organizer of PurPL weekly seminar (Fall 2017 - Spring 2021) and volunteer for PurPL Fest 2019.

## ACHIEVEMENTS

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- **Awards**

- *Bilsland Dissertation Fellowship 2021-2022, Purdue University.*
- *Electrical and Computer Engineering Fellowship 2015-2016, Purdue University.*
- *V. K. Samaranayake Research Assistantship 2014-2015, University of Moratuwa.*
- *Mahapola Merit Scholarship 2009-2014, University of Moratuwa.*

- **Grants**

- *ACM Travel Grant to Attend PLDI 2019.*
- *ACM Travel Grant to Attend SPLASH 2018.*
- *ACM Travel Grant to Attend ASPLOS 2017.*
- *ACM Travel Grant to Attend PLDI 2016.*
- *ACM Travel Grant to Attend CGO 2015.*

- **Competitions**

- *Silver Medal in ACM Student Research Competition at SPLASH 2018.*
- *Placed 25<sup>th</sup>, 34<sup>th</sup>, 29<sup>th</sup> and 45<sup>th</sup> correspondingly in IEEEExtreme 7.0, 6.0, 5.0 and 4.0.*
- *Placed 4<sup>th</sup> in Sri Lanka Robot Competition (SLRC) 2012.*
- *Champions of Inter-University Statistics Quiz Competition 2010, University of Colombo, Sri Lanka.*
- *Participated at International Mathematics Olympiad Competition(IMO) 2009, Bremen, Germany*