Kirshanthan Sundararajah

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EDUCATION

Purdue University, West Lafayette, IN. — Aug 2015 - Dec 2022
Ph.D. in Electrical and Computer Engineering
M.S. in Electrical and Computer Engineering

University of Moratuwa, Katubedda, Sri Lanka. — Jul 2009 - Mar 2014
B.Sc.(Hons) in Electronics and Telecommunication Engineering

PROFESSIONAL EXPERIENCE

- **Graduate Research Assistant** @*Purdue University* — Aug 2015 - Present
  PLCL Group
  - **(Poly/Uni)Rec**: Framework for composing transformations for nested recursion and loops.
  - **SparseLNR**: Accelerating sparse tensor computation.
  - **DARM**: Framework for melding similar control-flow graphs.
  - **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

- A Dias, **K Sundararajah**, C Saumya, and M Kulkarni "SparseLNR: Accelerating Sparse Tensor Computations Using Loop Nest Restructuring" in *International Conference on Supercomputing*, ICS 2022. 🏆 **Best Paper Award** [ACM DL]
- C Saumya, **K Sundararajah**, and M Kulkarni "DARM: Control-Flow Melding for SIMT Thread Divergence Reduction" in *International Conference on Code Generation and Optimization*, CGO 2022. [IEEE Xplore]
- 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

- ECE 368 Data Structures [Instructor] @*Purdue University* Summer 2021 and Summer 2022
- 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

- Registration Chair for PPoPP 2023.
- 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

- **Awards**
  - *Best Paper Award* at International Conference on Supercomputing (ICS) 2022.
  - *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^{th}, 34^{th}, 29^{th}, and 45^{th} in *IEEExtreme 7.0, 6.0, 5.0 and 4.0*, respectively.
  - Placed 4^{th} 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