Siddhartha

CONTACT
INFORMATION

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RESEARCH
INTERESTS

Dataflow Computing, Machine Learning, Circuit Design, System Verification, FPGAs, Embedded Systems, High-Performance Computing

EDUCATION

Nanyang Technological University, Singapore

Doctoral Student, Computer Science & Engineering, *Expected:* Summer 2017
- Thesis Topic: *Dataflow Computing Model for Heterogeneous Embedded Coprocessors*
- Thesis Advisor: Nachiket Kapre, Ph.D

Imperial College London, London, United Kingdom

BEng, Electrical & Electronics Engineering, June 2012

RESEARCH
EXPERIENCE

Research Assistant   July 2012 to September 2012
Circuits and Systems Research Group,
Electrical and Electronics Engineering Department
Imperial College London
Supervisor: Nachiket Kapre, Ph.D

CONFERENCE
PUBLICATIONS

1. **Siddhartha**, Nachiket Kapre "eBSP: Managing NoC traffic for BSP workloads on the 16-core Adapteva Epiphany-III Processor." *Design, Automation, and Test in Europe*, March 2017 [DOI: `10.23919/DATE.2017.7926961`]

2. **Siddhartha**, Nachiket Kapre "Out-of-Order Dataflow Scheduling for FPGA Overlays.", *Overlay Architectures for FPGAs Workshop (co-located with FPGA 2017)*, February 2017 [DOI: `arXiv:1705.02734`] (Position Paper)

3. Gopalakrishna Hegde, **Siddhartha**, Nachiappan Ramasamy, Nachiket Kapre "CaffePresso: An Optimized Library for Deep Learning on Embedded Accelerator-based platforms." *International Conference on Compilers, Architecture, and Synthesis for Embedded Systems*, October 2016 [DOI: `10.1145/2968455.2968511`] (Best Paper Award)

4. Sidharth Maheshwari, Gourav Modi, **Siddhartha**, Nachiket Kapre "Vector FPGA Acceleration of 1-D DWT Computations using Sparse Matrix Skeletons." *26th IEEE International Conference on Field-Programmable Logic and Applications*, August 2016 [DOI: `10.1109/FPL.2016.7577361`] (Poster)

5. **Siddhartha**, Nachiket Kapre "Communication Optimization for the 16-core Epiphany Floating-Point Processor Array." *24th IEEE International Symposium on Field-Programmable Custom Computing Machines*, May 2016 [DOI: `10.1109/FCCM.2016.15`] (Short Paper)

6. Gopalakrishna Hegde, **Siddhartha**, Nachiappan Ramasamy, Vamsi Buddha, Nachiket Kapre "Evaluating Embedded FPGA Accelerators for Deep Learning Applications." *24th IEEE International Symposium on Field-Programmable Custom Computing Machines*, May 2016 [DOI: `10.1109/FCCM.2016.14`] (Short Paper)

7. Nachiket Kapre, Han Jianglei, Andrew Bean, Pradeep Moorthy, and **Siddhartha** "GraphMMU: Memory Management Unit for Sparse Graph Accelerators." *22nd Reconfigurable Architectures Workshop 2015 (co-located with IPDPS 2015)*, May 2015 [DOI: 10.1109/IPDPSW.2015.101]

8. Pradeep Moorthy, **Siddhartha**, and Nachiket Kapre "A Case for Embedded FPGA-based SoCs for Energy-Efficient Acceleration of Graph Problems." *Supercomputing Frontiers 2015*, March 2015 [DOI: 10.14529/jsfi150307]

9. **Siddhartha**, Nachiket Kapre "FPGA Acceleration of Irregular Iterative Computations using Criticality-Aware Dataflow Optimizations." *International Symposium on Field-Programmable Gate Arrays*, February 2015 [DOI: 10.1145/2684746.2689110] (Short Paper)

10. **Siddhartha**, Nachiket Kapre "Fanout Decomposition Dataflow Optimizations for FPGA-based Sparse LU Factorization." *International Conference on Field-Programmable Technology*, December 2014 [DOI: 10.1109/FPT.2014.7082787] (Short Paper)

11. **Siddhartha**, Nachiket Kapre "Heterogeneous Dataflow Architectures for FPGA-based Sparse LU Factorization." *The International Conference on Field Programmable Logic and Applications*, September 2014 [DOI: 10.1109/FPL.2014.6927401] (Short Paper)

12. Nachiket Kapre, **Siddhartha** "Limits of Statically-Scheduled Token Dataflow Processing." *International workshop on Data-Flow Models (DFM) for Extreme Scale Computing (co-located with PACT 2014)*, August 2014 [DOI: 10.1109/DFM.2014.21]

13. **Siddhartha**, Nachiket Kapre "Breaking Sequential Dependencies in FPGA-based Sparse LU Factorization." *International Symposium on Field Programmable Custom Computing Machines*, May 2014 [DOI: 10.1109/FCCM.2014.26] (Short Paper)

PROGRAMMING EXPERIENCE	**Hardware**

Hardware

- **Verilog/VHDL** : Studied both standards formally in college, and now using Verilog extensively for design and verification of a manycore custom dataflow processor overlay in doctoral research. Familiar with both Xilinx/Altera developer tools, and also proficient with open-source Verilog simulators like iverilog and Verilator. Currently studying advanced language extensions in SystemVerilog and also verification frameworks like OVM/UVM.
- **VivadoHLS/MaxIDE** : Used for quick prototyping + feasibility study projects. Familiar with the tools and design concepts, would be comfortable with picking up again if needed.
- **SystemC/OpenCL** : Light introductory experience, familiar with fundamental concepts.
- **CUDA** : Knowledgeable with the NVIDIA GPU programming CUDA framework, used for projects ranging from class assignments to scientific computing research.

Software

- **C/C++** : Competent and very comfortable with the programming environment. Developed and managed multiple C/C++-based projects, and familiar with development tools and good design practices.
- **Java** : Managed and wrote extensions to an existing large Java-based project written for software-based hardware simulation for quick design space exploration. Competent with most common features of the programming language.
- **Command Line Tools** : Strong preference for working in Unix-based environments, and strongly in support of automation technologies. Competent with tools like regex, GNU make, git, sed, awk, etc, and use them regularly to script and/or manage

large projects. Also familiar with terminal-based database systems like MySQL and MongoDB.

- **Python** : Familiar with the programming environment; have used for scripting and rapid prototyping, e.g. recurrent neural networks.
- **R** : Primary choice of programming environment for conducting any statistical analysis. Also competent with graphics packages like ggplot2, and machine learning libraries like caret. Completed a 10-module data science specialization course offered by the John Hopkins University on Coursera, which was taught in R.
- **LaTeX** : Primary choice for typesetting any technical reports, or conference/journal publications. This CV was built on an existing open-source LaTeX template.
- **HTML/CSS/Javascript** : Web design + mobile application development as a hobby. Attended a HTML5 web/app design bootcamp and participated in several local hackathons.

AWARDS
- Richard Newton Young Fellow Award, Design Automation Conference, June 2013

TEACHING EXPERIENCE

Teaching Assistant   Summer/Winter Terms 2014–16
CE4054 - Programmable System on Chip,
CE4052 - Embedded Software Development
Instructor: Nachiket Kapre, Ph.D
School of Computer Science and Engineering,
Nanyang Technological University

EXTRA-CURRICULAR

Data Science Specialization   March 2015 – April 2016
John Hopkins University
- Offered via the Massively Open Online Courses (MOOC) Coursera platform, the Data Science Specialization teaches how to use the tools of the trade, think analytically about complex problems, manage large data sets, deploy statistical principles, create visualizations, build and evaluate machine learning algorithms, publish reproducible analyses, and develop data products.

Communication Coach   January 2014 – November 2016
School of Humanities and Social Sciences, NTU
- A university-wide coaching role on written & verbal communication skills for undergraduate and graduate students.

REFERENCES

Nachiket Kapre

Assistant Professor,   ✉ nachiket@uwaterloo.ca
Electrical and Computer Engineering,
University of Waterloo, Canada