

# Siddhartha

FPGA Engineer

## CONTACT INFORMATION



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sidmontu

## INTERESTS

FPGAs, Machine Learning, Computer Architectures, Communication Systems

## PROFESSIONAL SUMMARY

Seasoned researcher interested in FPGAs and efficient architectures for deep learning applications. My recent projects involve developing high-speed machine learning solutions for RF communication systems on the Xilinx RFSoc board, building token dataflow overlay architectures for accelerating highly sparse and irregular workloads, and more. I am a strong programmer and lifelong learner who has a keen interest in doing cutting-edge research.

## EXPERIENCE

### Postdoctoral Research Associate

October 2017 to Present

Computing Engineering Lab,  
School of Electrical and Information Engineering  
University of Sydney  
Supervisors: Philip Leong, David Boland

### Research Assistant

July 2012 to September 2012

Circuits and Systems Research Group,  
Electrical and Electronics Engineering Department  
Imperial College London  
Supervisor: Nachiket Kapre

## EDUCATION

### Nanyang Technological University (NTU), Singapore

PhD, Computer Science & Engineering, February 2019

- Dissertation Title: *Dataflow Optimized Overlays for FPGAs*
- Advisor: Nachiket Kapre

### Imperial College London, London, United Kingdom

BEng, Electrical & Electronics Engineering, June 2012

## TEACHING

### Project Supervisor, University of Sydney

Semesters 2018–Present

Responsibilities: Guidance and supervision to undergraduate students on their final year projects.

### Teaching Assistant, NTU

Semesters 2014–2016

CE4054 - Programmable System on Chip,  
CE4052 - Embedded Software Development

## EXTRA- CURRICULAR

### Data Science Specialization

March 2015 – April 2016

*John Hopkins University*

- Offered via the Coursera platform, the Data Science Specialization teaches how to use the tools of the trade, think analytically about complex problems, manage large data sets, employ statistical methodologies, create visualizations, build and evaluate machine learning algorithms, publish reproducible analyses, and develop data products.

1. **Siddhartha**, and Nachiket Kapre “DaCO: A High-Performance Token Dataflow Coprocessor Overlay for FPGAs” *International Conference on Field-Programmable Technology*, December 2018  
[DOI: [10.1109/FPT.2018.00032](https://doi.org/10.1109/FPT.2018.00032)]
2. **Siddhartha**, Yee Hui Lee, Duncan Moss, Julian Faraone, Perry Blackmore, Daniel Salmond, David Boland, and Philip Leong “Long Short-Term Memory for Radio Frequency Spectral Prediction and its Real-Time FPGA Implementation” *IEEE Military Communications Conference (MILCOM)*, October 2018  
[DOI: [10.1109/MILCOM.2018.8599833](https://doi.org/10.1109/MILCOM.2018.8599833)]
3. **Siddhartha**, Nachiket Kapre “Hoplite-Q: Priority-Aware Routing in FPGA Overlay NoCs” *IEEE 26th Annual International Symposium on Field-Programmable Custom Computing Machines*, May 2018  
[DOI: [10.1109/FCCM.2018.00012](https://doi.org/10.1109/FCCM.2018.00012)]
4. Gopalakrishna Hegde, **Siddhartha**, Nachiket Kapre “CaffePresso: Accelerating Convolutional Networks on Embedded SoCs” *ACM Transactions on Embedded Computing Systems (TECS)*, January 2018  
[DOI: [10.1145/3105925](https://doi.org/10.1145/3105925)]
5. **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](https://doi.org/10.23919/DATE.2017.7926961)]
6. 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 (Best Paper Award)  
[DOI: [10.1145/2968455.2968511](https://doi.org/10.1145/2968455.2968511)]
7. 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](https://doi.org/10.14529/jsfi150307)]

### Short Papers / Posters / Workshops

1. Stephen Tridgell, David Boland, Philip Leong, and **Siddhartha** “Real-time Automatic Modulation Classification” *International Conference on Field-Programmable Technology*, December 2019 (Poster)  
[DOI: TBA]
2. **Siddhartha**, David Boland, Steve Wilton, Barry Flower, Perry Blackmore, and Philip Leong “Simultaneous Inference and Training using On-FPGA Weight Perturbation Techniques” *International Conference on Field-Programmable Technology*, December 2018 (Poster)  
[DOI: [10.1109/FPT.2018.00060](https://doi.org/10.1109/FPT.2018.00060)]
3. **Siddhartha**, Nachiket Kapre “Out-of-Order Dataflow Scheduling for FPGA Overlays.” *Overlay Architectures for FPGAs Workshop (co-located with FPGA 2017)*, February 2017 (Position Paper)  
[DOI: [arXiv:1705.02734](https://arxiv.org/abs/1705.02734)]

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 (Poster)  
[DOI: [10.1109/FPL.2016.7577361](https://doi.org/10.1109/FPL.2016.7577361)]
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 (Short Paper)  
[DOI: [10.1109/FCCM.2016.15](https://doi.org/10.1109/FCCM.2016.15)]
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 (Short Paper)  
[DOI: [10.1109/FCCM.2016.14](https://doi.org/10.1109/FCCM.2016.14)]
7. Nachiket Kapre, Han Jianglei, Andrew Bean, Pradeep Moorthy, and **Siddhartha** “GraphMMU: Memory Management Unit for Sparse Graph Accelerators.” *22nd Reconfigurable Architectures Workshop (co-located with IPDPS)*, May 2015  
[DOI: [10.1109/IPDPSW.2015.101](https://doi.org/10.1109/IPDPSW.2015.101)]
8. **Siddhartha**, Nachiket Kapre “FPGA Acceleration of Irregular Iterative Computations using Criticality-Aware Dataflow Optimizations.” *International Symposium on Field-Programmable Gate Arrays*, February 2015 (Short Paper)  
[DOI: [10.1145/2684746.2689110](https://doi.org/10.1145/2684746.2689110)]
9. **Siddhartha**, Nachiket Kapre “Fanout Decomposition Dataflow Optimizations for FPGA-based Sparse LU Factorization.” *International Conference on Field-Programmable Technology*, December 2014 (Short Paper)  
[DOI: [10.1109/FPT.2014.7082787](https://doi.org/10.1109/FPT.2014.7082787)]
10. **Siddhartha**, Nachiket Kapre “Heterogeneous Dataflow Architectures for FPGA-based Sparse LU Factorization.” *The International Conference on Field Programmable Logic and Applications*, September 2014 (Short Paper)  
[DOI: [10.1109/FPL.2014.6927401](https://doi.org/10.1109/FPL.2014.6927401)]
11. 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](https://doi.org/10.1109/DFM.2014.21)]
12. **Siddhartha**, Nachiket Kapre “Breaking Sequential Dependencies in FPGA-based Sparse LU Factorization.” *International Symposium on Field Programmable Custom Computing Machines*, May 2014 (Short Paper)  
[DOI: [10.1109/FCCM.2014.26](https://doi.org/10.1109/FCCM.2014.26)]