Snehasish Kumar

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Education

05/2013 – Present **PhD in Computing Science**, *Simon Fraser University*, British Columbia, Canada, *4.0/4.0*.
Senior Supervisor : Dr. Arrvindh Shriraman
The objective of my research is to facilitate energy efficient computation using hardware accelerators via a two pronged approach. The first, hardware-centric approach explores novel microarchitecture closely coupled with the cache memory hierarchy to offload computation. The second, software-centric approach uses static program analyses to deduce which parts of a given program are amenable to hardware acceleration. Together these approaches indicate the potential sources and benefits of using hardware accelerated computation.

01/2011 – 04/2013 **MSc in Computing Science**, *Simon Fraser University*, British Columbia, Canada, *3.8/4.0*.
Senior Supervisor : Dr. Arrvindh Shriraman
A novel microarchitecture was proposed which incorporated adaptive granularity cache lines for memory hierarchies to eliminate bandwidth and energy waste. The system varies the cache line size dynamically based on the nature of the application to only bring in useful data. This increases cache utilisation and improves miss rate by increasing the effective cache size. This work has been peer reviewed and presented at the IEEE International Symposium of Microarchitecutre (2012). A continuation of this research led to the design of a coherence protocol which adaptively changes the storage and coherence granularity in order to increase efficiency and reduce energy consumption. This work was presented at the ACM/IEEE International Symposium on Computer Architecture (2013).

08/2006 – 04/2010 **B. Tech in Computer Engineering** , *Biju Patnaik University of Technology*, Orissa, India, *8.3/10.0*.
Supervisor : Dr. Satyananda Champati Rai
I was responsible for the design and implementation of a constrained vector genetic algorithm to solve the problem of selecting an optimal borrowing scheme for the channel allocation problem in wireless mobile networks.

Publications

2015 **Fusion : Design Tradeoffs in Coherence Hierarchies for Accelerators,**
Snehasish Kumar, Arrvindh Shriraman, and Naveen Vedula, In *Proceedings of the 42nd Annual International Symposium on Computer Architecture*, ISCA 2015.

DASX : Hardware Accelerator for Software Data Structures,
Snehasish Kumar, Naveen Vedula, Arrvindh Shriraman, and Vijayalakshmi Srinivasan, In *Proceedings of the 29th ACM International Conference on Supercomputing*, ICS 2015.

2013 **Protozoa: Adaptive Granularity Cache Coherence,**
Hongzhou Zhao, Arrvindh Shriraman, Snehasish Kumar, and Sandhya Dwarkadas, In *Proceedings of the 40th Annual International Symposium on Computer Architecture*, ISCA 2013, pages 547–558.

Architectural Support for a Variable Granularity Cache Memory System,
Snehasish Kumar, *MSc Thesis*.

2012 **Amoeba-Cache: Adaptive Blocks for Eliminating Waste in the Memory Hierarchy,**
Snehasish Kumar, Hongzhou Zhao, Arrvindh Shriraman, Eric Matthews, Sandhya Dwarkadas, and Lesley Shannon, In *Proceedings of the 2012 45th Annual IEEE/ACM International Symposium on Microarchitecture*, IEEE MICRO 2012, pages 376–388.

2011 **MiCi: A Novel Micro-Level Temporal Channel Imploration for Mobile Hosts,**
Snehasish Kumar, Satyananda Champati Rai, Rajib Mall, and Sateesh Kumar Pradhan, *CoRR*, abs/1104.4204.

Presentations and Posters

05/2015   ZU 2015
05/2015   ISCA 2015
05/2015   ICS 2015
08/2014   PACT 2014
12/2012   MICRO 2012

Awards

01/2014	Special Graduate Entrance Scholarship, Simon Fraser University
01/2016	Graduate Fellowship, Simon Fraser University
08/2014	
01/2012	

Projects

04/2015	Parallel implementation and analysis of the KMB algorithm Mentor: Dr. Jiangchuan Liu, Network Modelling Lab, SFU
12/2014	Implementation of Apriori on Hadoop Mentor: Dr. Ke Wang, Database and Data Mining Lab, SFU
04/2014	Optimizing the Bitpar CKY parser Mentor: Dr. Anoop Sarkar, Natural Language Lab, SFU
12/2011	Interactive demo for the Linear Cell Complex (Computational Geometry Algorithms Library) Mentor: Dr. Guillaume Damiand , CNRS at LIRIS, Universitè Claude Bernard
04/2011	Non-Negative Matrix Factorisation for very large datasets Mentor: Dr. Oliver Schulte, Computational Logic Group, SFU

Work Experience

06/2013 – 12/2013	Research Intern : Systems Technology and Architecture IBM, T.J. Watson Research Centre Mentor: Dr. Vijayalakshmi Srinivasan
2011 – 2015	Research Assistant : SYNAR Group, Simon Fraser University
2011, 2013	Teaching Assistant : CMPT 880, 120, 165, 300

Technical Skills

Languages	C++11, C, Python, Java, Matlab, R
Simulators	Multifacet GEMS(Ruby), MacSim

Leadership

05/2012 – 03/2013	Councillor, Graduate Student Society, Simon Fraser University
11/2008 – 07/2010	Microsoft Student Partner
09/2009 – 07/2010	Treasurer, IEEE Student Chapter