Snehasish Kumar

snehasish.net
github.com/snehasish

Professional Experience

09/17 – Software Engineer, Google, Sunnyvale, CA, USA

01/17 – 08/17 Postdoctoral Researcher: Simon Fraser University, Burnaby, BC, Canada

06/13 – 12/13 Research Intern, IBM, T.J. Watson Research Centre, Yorktown Heights, NY, USA

Academic

05/13 – 11/16 **PhD in Computing Science**, *Simon Fraser University*, British Columbia, Canada, *4.0/4.0*.
Supervisor: Dr. Arrvindh Shriraman
– Adapted program analysis techniques to understand what to specialize in a workload.
– Designed an abstraction for partial specialization of workloads.
– Implemented automated, scalable characterization and program transformation tools in LLVM.
– Designed and evaluated a hybrid coherence protocol for accelerator rich architectures.
– Designed and evaluated a hardware accelerator for software data structures.
Publications: **HPCA'17, IISWC'16, MICRO'16, ICS'16, ISCA'15, ICS'15**

01/11 – 04/13 **MSc in Computing Science**, *Simon Fraser University*, British Columbia, Canada, *3.8/4.0*.
Supervisor: Dr. Arrvindh Shriraman
– Designed and evaluated a variable granularity cache memory system.
– Evaluated a variable granularity coherence protocol for multiprocessor systems.
Publications: **ISCA'13, MICRO'12**

08/06 – 04/10 **B. Tech in Computer Engineering**, *Biju Patnaik University of Technology*, Orissa, India, *8.3/10.0*.
Supervisor: Dr. Satyananda Champati Rai

Publications

2018 **– NACHOS: Software-Driven Hardware-Assisted Memory Disambiguation for Accelerators,**
Naveen Vedula, Arrvindh Shriraman, Snehasish Kumar, and Nick Sumner,
24th ACM International Conference on High Performance Computer Architecture, HPCA '18.
Acceptance Rate ≈ 20%.

2017 **– Needle: Leveraging program analysis to extract accelerators from whole programs,**
Snehasish Kumar, Nick Sumner, Vijayalakshmi Srinivasan, Steve Margerm, and Arrvindh Shriraman,
23rd ACM International Conference on High Performance Computer Architecture, HPCA '17.
Acceptance Rate ≈ 22%.

2016 **– ChainSaw: Creating Von-Neumann Accelerators with Fused Instruction Chains,**
Amirali Sharifian, Snehasish Kumar, Apala Guha, and Arrvindh Shriraman,
49th Annual IEEE/ACM International Symposium on Microarchitecture, MICRO '16.
Acceptance Rate ≈ 22%.

– SPEC-AX: Extracting Accelerator Benchmarks from Microprocessor Benchmarks,
Snehasish Kumar, Nick Sumner, and Arrvindh Shriraman,
2016 IEEE International Symposium on Workload Characterization, IISWC '16.
Acceptance Rate ≈ 30%.

– Peruse and Profit: Estimating the Accelerability of Loops,
Snehasish Kumar, Vijayalakshmi Srinivasan, Amirali Sharifian, Nick Sumner, and Arrvindh Shriraman,
30th ACM International Conference on Supercomputing, ICS '16.
Acceptance Rate ≈ 24%.

2015 – **Fusion: Design Tradeoffs in Coherent Cache Hierarchies for Accelerators,**
Snehasish Kumar, Arrvindh Shriraman, and Naveen Vedula,
42nd Annual International Symposium on Computer Architecture, ISCA '15.
Acceptance Rate ≈ 19%.

– **DASX: Hardware Accelerator for Software Data Structures,**
Snehasish Kumar, Naveen Vedula, Arrvindh Shriraman, and Vijayalakshmi Srinivasan,
29th ACM International Conference on Supercomputing, ICS '15.
Acceptance Rate ≈ 25%.

2013 – **Protozoa: Adaptive Granularity Cache Coherence,**
Hongzhou Zhao, Arrvindh Shriraman, Snehasish Kumar, and Sandhya Dwarkadas,
40th Annual International Symposium on Computer Architecture, ISCA '13.
Acceptance Rate ≈ 19%.

2012 – **Amoeba-Cache: Adaptive Blocks for Eliminating Waste in the Memory Hierarchy,**
Snehasish Kumar, Hongzhou Zhao, Arrvindh Shriraman, E. Matthews, S. Dwarkadas, and L. Shannon,
45th Annual IEEE/ACM International Symposium on Microarchitecture, MICRO '12.
Acceptance Rate ≈ 18%.

Workshops

03/16 GCASR'16 – Statistical program analysis assisted cost-effective sampling in large scale scientific simulations
06/15 SFU-ZU workshop on Big Data – Data Structure Accelerators
12/13, 08/14 WoNDP'13, PACT'14 – SQRL: Hardware Accelerator for Collecting Software Data Structures

Invited Talks

06/16 IBM Research – Needle [HPCA '17]
01/16 SRC India Design Review – Caches [MICRO '12, ISCA '15]
01/16 Intel Bangalore – Fusion [ISCA '15]

Awards

08/16 President's PhD Scholarship, Simon Fraser University
'16, '14, '12 Graduate Fellowship, Simon Fraser University
01/14 Special Graduate Entrance Scholarship, Simon Fraser University

Projects

01/15 Networks: Parallel implementation of Kou, Markowsky and Berman (1981) algorithm
04/14 Natural Language Processing: Optimizing the Bitpar CKY parser
12/11 Computational Geometry: Interactive demo for the Linear Cell Complex (CGAL)
04/11 Machine Learning: Non-Negative Matrix Factorisation for large datasets

References

Dr. Arrvindh Shriraman, Simon Fraser University – (`ashriram@cs.sfu.ca`)
Dr. William N. Sumner, Simon Fraser University – (`wsumner@cs.sfu.ca`)
Dr. Viji Srinivasan, IBM Research – (`viji@us.ibm.com`)