

Snehasish Kumar

Summary of Qualifications

- 3+ years of experience implementing analyses and transformation on LLVM IR.
- Design of LLVM IR abstractions for hardware accelerators. (published MICRO'16)
- Implementation of low overhead, dynamic profiling for characterization. (published IISWC'16)
- Interfacing LLVM IR to FPGA (Verilog) code generators for irregular programs. (published HPCA'17)
- Design and evaluation of coherence protocols for hardware accelerators. (published ISCA'15)
- Design and evaluation of variable granularity caching mechanisms. (published MICRO'12, ISCA'13)

Academic

- 05/13 – 11/16 **PhD in Computing Science**, *Simon Fraser University*, British Columbia, Canada, 4.0/4.0.
01/11 – 04/13 **MSc in Computing Science**, *Simon Fraser University*, British Columbia, Canada, 3.8/4.0.
08/06 – 04/10 **B. Tech in Computer Engineering**, *BPUT*, Orissa, India, 8.3/10.0.

Technical Skills

Compiling for accelerators, workload analysis and microarchitecture modeling

Languages C++11, C, Python

Frameworks LLVM compiler infrastructure, Intel Pin

Professional Experience

- 06/13 – 12/13 **Research Intern : Systems Technology and Architecture**
IBM, T.J. Watson Research Centre
- Built a static analysis tool to find code regions hardware accelerators can target.
 - Incorporated state of the art compiler techniques such as loop memory dependence analysis.
 - In use at IBM Research till end of 2015 (2.5 years).
- '11 – '16 **Research Assistant : Computer Architecture Research Group**, *Simon Fraser University*
- 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.

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