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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 evaulated a hybrid coherence protocol for accelerator rich architectures.
– Designed and evaulated 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