

KSHITIJ SUDAN

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RESEARCH INTERESTS

Large cache designs for CMPs, Performance analysis of multi-core systems, Formal methods of verification, Architectural simulation frameworks, High performance computing.

SUMMARY OF EXPERIENCE

- (a) *Graduate Research Assistant, Univ. of Utah*: Spring 2008 - Present.
- (b) *Graduate Teaching Assistant, Univ. of Utah*: Fall 2007 - Spring 2008.
- (c) *Engineering Intern, ST Microelectronics, India*: Spring 2007.
- (d) *Intern, Space Technology Cell, IIT-Kharagpur*: Summer 2006.
- (e) *Undergraduate Research Assistant, Microwave CAD Lab, Univ. of Delhi*: Summer 2004 - Summer 2007.

EDUCATION

- SCHOOL OF COMPUTING, UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH
M.S./Ph.D. program, Computer Science (*August 2007 - present*)
- DELHI COLLEGE OF ENGINEERING, UNIVERSITY OF DELHI, NEW DELHI, INDIA
B.E., Computer Engineering (*August 2003 - May 2007*)

REFEREED PUBLICATIONS

- **Dynamic Hardware-Assisted Software-Controlled Page Placement to Manage Capacity Allocation and Sharing within Large Caches**, Manu Awasthi, Kshitij Sudan, Rajeev Balasubramonian, John Carter, 15th International Symposium on High-Performance Computer Architecture (**HPCA-15**), Raleigh, February 2009.
- **A Parallel Algorithm for Discrete Gabor Transforms.**, Kshitij Sudan, Nipun Saggar, Asok De, International Conference on Parallel Distributed Processing Techniques and Applications, **PDPTA 2007**.

EXPERIENCE

- (a) **Graduate Research Assistant, Prof. Rajeev Balasubramonian, and Prof. John Carter, University of Utah** (*Spring 2008-Present*)
 - **Research Focus: CMP Memory Hierarchy Design**
To mitigate the adverse impacts of process technology, especially wire delays on cache performance, we are working on determining optimal cache designs. We recently proposed decoupling the placement of data in a shared, last-level cache (LLC) from its location in main memory. The proposed mechanisms allow flexibility in capacity allocation, data migration and replication for a shared LLC of a CMP. The work appears in HPCA-2009 proceedings.
- (b) **Graduate Teaching Assistant, University of Utah** (*Fall 2007-Spring 2008*)
 - **Course: Software Practices**
This course introduced students to large system design in C++. It taught skills required to design, implement, and maintain large software systems.
- (c) **Engineering Intern, ST Microelectronics, New Delhi, India** (*Spring 2007*)
 - Internship with Processor Verification Group at ST Microelectronics involved functional verification of ST's embedded VLIW processor, and used hardware emulation on FPGAs. Effort was centered around building a closed loop test-bench by integrating test pattern generators with cycle accurate reference models, hardware emulation and functional qualification tools.

(d) **Summer Intern, Space Technology Cell, IIT-Kharagpur, India** (*Summer 2006*)

- The goal of this internship was to understand numerical modeling of microwave antennas and using it to develop parallel algorithms for antenna simulations.

(e) **Undergraduate Research Assistant, Microwave CAD Lab, Univ. of Delhi, India**

(*Summer 2004-Summer 2007*)

- We worked towards developing a parallel simulation tool for microwave antennas. We built the software and hardware infrastructure for the project and involved set up of a compute cluster to aid simulation of computationally intensive, microwave antenna models. It also entailed development of parallel algorithms, understanding of underlying hardware capabilities to optimize performance and programming to model antennas. Administration and configuration of cluster infrastructure were also integral parts of this project. As a culmination of this work, I wrote my undergraduate thesis titled “*A Parallel, Gabor Frame-Based Method-of-Moments Solver for Printed Antenna Analysis*”

RELEVANT COURSEWORK

- **University of Utah**

Advanced Computer Architecture, Operating Systems, Special Topics in Computer Architecture, Parallel Computer Architecture, Practical Functional Programming, Writing Research Proposals

- **University of Delhi**

Computer Architecture, Digital Logic Design, Microprocessor and Microcontroller applications, Data Structures and Algorithms, Software Engineering

SKILLS

- TOOLS AND LANGUAGES : gdb, svn, MATLAB, C, C++, Perl, VHDL.
- PLATFORMS : Unix, Windows.
- SIMULATORS : SimpleScalar, Simics.

REFERENCES

Prof. Rajeev Balasubramonian

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Prof. John Carter

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University of Utah, and IBM
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