

# Résumé

**Susmit Biswas**

<http://www.cs.ucsb.edu/~susmit>

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## CONTACT INFORMATION

Lawrence Livermore National Laboratory  
7000 East Avenue, L-560  
Livermore, CA - 94550

office: +1 925 422 2595  
mobile: +1 805 450 6440  
e-mail: biswas3@llnl.gov

## RESEARCH INTERESTS

Computer architecture, reliability, security, memory system design and optimizations, energy-efficient computing.

## EDUCATION

**Doctor of Philosophy** *September 2005 – September 2010*  
Department of Computer Science, University of California at Santa Barbara

**Bachelor of Technology, B. Tech. (Hons.)** *August 2001 – June 2005*  
Department of Computer Science and Engineering, Indian Institute of Technology, Kharagpur, India

## PROFESSIONAL EXPERIENCE

**Postdoctoral Researcher,** *Lawrence Livermore National Laboratory, August 2010 – Present*  
Today's HPC systems are restricted by the amount of physical memory present in the system for solving large scale problems with high memory requirements. We designed and implemented a user-level content-aware memory allocation library for automatically reducing the memory footprints of MPI applications (~ 30% on average), enabling a user to solve larger memory bound problems without any changes in the source code, operating system or hardware.

**Teaching Assistant,** *UCSB, September 2005 - June 2007*  
Teaching assistant for undergraduate courses in the Department of Computer Science including computer architecture and programming courses.

## HONOURS AND AWARDS

Dissertation Year Fellowship 2010, Department of Computer Science, UC Santa Barbara  
IEE Frenkel Fellowship, two awards university-wide in 2009  
1st Prize in the Design Contest in VLSI Design 2006, Hyderabad  
1st Prize in the Design Contest in VLSI Design 2004, Mumbai  
Jagadis Bose National Science Talent Scholarship 2002  
NTS Scholarship 1999

## RESEARCH EXPERIENCE

**Optimizing Power Usage in Datacenter Servers** *UCSB, March 2009 - Present*  
Datacenters run thousands of servers at low utilization even at low load as the working set size of web-applications (such as web-search) does not become smaller. We explore hardware and software design choices and their interactions to harness this phenomenon, and thereby reduce power usage in datacenters at low loads.

**Reducing Off-Chip Accesses in Multiprocessor,** *UCSB, September 2007 - Present*  
The increasing gap between processor and memory performance has been challenged more by the augmentation of multicore processors. The goal of this work is to mitigate memory bandwidth limitation in multiprocessor environment using cache management techniques.

**Fault Tolerant Memory System Design,** *UCSB, December 2006 - October 2007*  
Nanotechnology based systems are prone to manufacturing defect as high as 10%. The goal of this

project is to develop memory system which can be used with this future technology.

#### **Characterization of Error-Tolerant Applications,**

*UCSB, March - June, 2006*

This work presents static analysis based protection for most control operations, which are crucial to produce error tolerance for without this protection. Overall, our results indicate that with simple control protection, the error tolerance of many applications can provide designers with considerable added flexibility considering future challenges posed by soft errors.

#### **Object Tracking in Compressed Domain,**

*IIT Kharagpur, May 2003 - May 2005*

Developed a object tracking system from MPEG video using motion vector feature combined with color histogram. The system has a simple web based interface in which user can mark the object initially and then the tracked object is displayed.

### **PUBLICATIONS**

Susmit Biswas, Mohit Tiwari, Luke Theogarajan, Timothy P. Sherwood, Frederic T. Chong, "From Microns-to-Megawatts: Modeling the Data Center Scale Effects of Targeted Superlattice Thermal Management", to appear in the 38th International Symposium on Computer Architectures (ISCA'11)

Susmit Biswas, Bronis R. de Supinski, Martin Schulz, Diana Franklin, Tim Sherwood, Frederic T. Chong, "Exploiting Data Similarity to Reduce Memory Footprints", to appear in the proceedings of 25th IEEE International Parallel & Distributed Processing Symposium (IPDPS'11)

Guoping Long, Diana Franklin, Susmit Biswas, Pablo Ortiz, Jason Oberg, Dongrui Fan, Frederic T. Chong, "Minimal Multi-Threading: Finding and Removing Redundant Instructions in Multi-Threaded Processors", in the proceedings of 43rd International Symposium on Microarchitecture (Micro 43), 2010

Susmit Biswas, Diana Franklin, Timothy Sherwood, Frederic T. Chong, "Conflict-Avoidance in Multicore Caching for Data-Similar Executions", in the proceedings of the *International Symposium on Pervasive Systems, Algorithms, and Networks (I-SPAN 2009)*, Kaoshiung, Taiwan, December 2009

Susmit Biswas, Diana Franklin, Alan Savage, Ryan Dixon, Timothy Sherwood, Frederic T. Chong, "Multi-Execution: Multicore Caching for Data-Similar Executions", in the proceedings of the *International Symposium on Computer Architectures (ISCA'09)*, June 2009

Susmit Biswas, Tzvetan Metodiev, Gang Wang, Fredric T. Chong and Ryan Kastner, "Combining Static and Dynamic Defect-Tolerance Techniques for Nanoscale Memory Systems", *International Conference on Computer-Aided Design (ICCAD)*, November 2007

Susmit Biswas, Tzvetan S. Metodiev, Fredric T. Chong and Ryan Kastner, "A Pageable, Defect-Tolerant Nanoscale Memory System", *2007 IEEE/ACM Symposium on Nanoscale Architectures (NANOARCH'07)*

D. Thaker, D. Franklin, J. Oliver, S. Biswas, D. Lockhart, T. Metodi, F. Chong, "Characterization of Error-Tolerant Applications when Protecting Control Data", *IIWSC 2006*

Ashwani, S. Biswas, S. Singh, S. Sural, A. K. Majumdar, "Object Tracking Using Background Subtraction And Motion Estimation In MPEG Video", *ACCV 2006*

G. S. Brar, S. Kundu, P. Worah, S. Biswas, A. Mukhopadhyay, A. Basu: "OaSis: An Application Specific Operating System for an Embedded Environment", *VLSI Design 2004*

### **ACTIVITIES**

Program committee member, Architecture and Systems Track, ISPAN 2011

Program committee member, LPSoC'11 Workshop, held in conjunction with IGCC 2011

Co-chair of the 2<sup>nd</sup> annual Graduate Student Workshop on Computing (GSWC'07)

Reviewer of ACM TACO, ANCS, ACM JETC, Micro, PACT, ICCD, CGO, IPDPS, ISCA

### **References**

Available upon request.