

# Susmit Biswas

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CONTACT INFORMATION	Computer Architecture Lab Department of Computer Science University of California, Santa Barbara	office: +1 805 893 5385 mobile: +1 805 450 9128 e-mail: susmit@cs.ucsb.edu
RESEARCH INTERESTS	Computer architecture, reliability, security, memory system design, energy-efficient computing.	
EDUCATION	<i>Doctor of Philosophy</i> Department of Computer Science, University of California at Santa Barbara	<b>September 2005 – present</b>
	<ul style="list-style-type: none"><li>• Expected graduation date: June 2010</li><li>• Advisors: Professor Fred Chong and Professor Tim Sherwood</li></ul>	
	<i>Bachelor of Technology, BTech (Hons)</i> Computer Science and Engineering, Indian Institute of Technology, Kharagpur, India	<b>August 2001 – June 2005</b>
HONOURS AND AWARDS	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	
PROFESSIONAL EXPERIENCE	<b>Automatically Reducing Memory Footprint of MPI Applications,</b> <i>Lawrence Livermore National Laboratory, July - Sept 2008, June - Sept 2009</i> Designed and implemented a content-aware memory allocation library for automatically reducing the memory footprints of MPI applications, enabling a user to solve larger memory bound problems.	
	<b>Quality Testing of RTLC and Modelsim,</b> <i>Mentor Graphics, Noida, India, May - July 2004</i> Developed a test suite to be used for testing of System Verilog compiler as intern.	
RESEARCH EXPERIENCE	<b>Optimizing Power Usage in Datacenter Servers</b> <i>UCSB, March 2009 - Present</i> 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.	
	<b>Reducing Off-Chip Accesses in Multiprocessor,</b> <i>UCSB, September 2007 - Present</i> 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.	
	<b>Fault Tolerant Memory System Design,</b> <i>UCSB, December 2006 - October 2007</i> 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.	
	<b>Low-Cost Value Prediction for Error-Tolerant Applications,</b> <i>UCSB, July - November, 2006</i> Value Prediction results in performance degradation in modern architecture with deeper pipeline because of high recovery cost. We proposed a static analysis based method to identify error tolerant operations in application and predict them without recovering from misprediction which resulted in significant performance improvement without noticeable loss of fidelity.	
	<b>Characterization of Error-Tolerant Applications,</b> <i>UCSB, March - June, 2006</i> 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, Diana Franklin, Timothy Sherwood, Frederic T. Chong, "Conflict-Avoidance in Multicore Caching for Data-Similar Executions", to appear in the *International Symposium on Pervasive Systems, Algorithms, and Networks (I-SPAN 2009)*, Kaoshiung, Taiwan, December 2009

Susmit Biswas, Diana Franklin, Timothy Sherwood, Frederic T. Chong, Bronis R. de Supinski, Martin Schulz, "PSMalloc: Content Based Memory Management for MPI Applications", MEDEA 2009 Workshop, September, 2009, in conjunction with PACT'09

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

Vlasia Anagnostopoulou, Susmit Biswas, Alan Savage, Ricardo Bianchini, Tao Yang, Frederic T. Chong, "Energy Conservation in Datacenters through Cluster Memory Management and Barely-Alive Memory Servers", in the *2009 Workshop on Energy-Efficient Design (WEED'09)*, June 20, 2009, in conjunction with ISCA'09

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", *IEEE/ACM Symposium on Nanoscale Architectures (NANOARCH'07)*, October 2007

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

S. Dey, S. Biswas, A. Mukhopadhyay, A. Basu: "An Approach to Architectural Enhancement for Embedded Speech Applications", *VLSI Design 2006*

A. Mukhopadhyay, S. Dey, P. Saraswat, S. Biswas, V. S. Nori, S. Bhattacharya, A. Basu, "Sanyog: An Iconic Communication Aid for Children Suffering from Cerebral Palsy and Motor Neuron Disorders", *VLSI Design 2006*

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

A. Mukhopadhyay, P. Worah, S. Biswas, S. Biswas, R. Das, A. Basu, "Katha-Mala: A Voice Output Communication Aid for the Children with Severe Speech and Multiple Disorders (SSMI)", *VLSI Design 2004*

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

Reviewer of PACT-2006, Micro-2006, IISWC-2006, ICCD-2007, ANCS-2007, Nanoarch-2007, CF-2008, PACT-2008, ISPAAS-2009, IPDPS-2009, PACT-2009, CGO-2010, ACM JETC, ACM TACO

Co-chaired the second annual Graduate Student Workshop on Computing (GSWC'07)

## REFERENCES

Available upon request.