

# Shuguang Feng

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## CONTACT INFORMATION

Advanced Computer Architecture Lab (ACAL)  
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## RESEARCH INTERESTS

My research interests include reliable, reconfigurable computer architecture, embedded systems, and compilers. I am particularly interested in exploiting the interaction between software (compilers, schedulers, hypervisors) and hardware (microarchitecture, system architecture, sensors) to develop systems with enhanced performance and reliability.

## EDUCATION

**University of Michigan** **May 2007 - Present**  
*Ann Arbor, MI*

Ph.D. candidate in Computer Science and Engineering

- Advisor: Scott Mahlke

**University of Michigan** **September 2005 - December 2006**  
*Ann Arbor, MI*

M.S.E., Computer Science and Engineering (7.518/9.0 GPA, 1520 GRE)

**University of Florida** **August 2001 - May 2005**  
*Gainesville, FL*

B.S., Computer Engineering (3.98/4.0 GPA, 1600 SAT)

- Graduated first in class

## HONORS AND AWARDS

- EECS Graduate Fellowship, *University of Michigan*
- National Merit Scholar, *National Merit Scholarship Corporation*
- Robert C. Byrd Honors Scholar, *U.S. Department of Education (State of Florida)*
- Anderson Scholar (w/ highest distinction), *University of Florida*
- College of Engineering Dean's Scholar, *University of Florida*
- ECE Department Electric E Award (highest ECE award), *University of Florida*

## ACADEMIC EXPERIENCE

**University of Michigan** **January 2006 - Present**  
*Research Assistant* *Ann Arbor, MI*

Investigating robust, fault-tolerant, computer architectures. Focused on modeling long-term effects of wearout mechanisms on processor reliability and leveraging this information to design self-healing, reconfigurable systems.

**University of Michigan** **September 2006 - December 2006**  
*Graduate Teaching Instructor* *Ann Arbor, MI*

Teaching assistant for undergraduate computer architecture course. Responsibilities included teaching recitation sections, holding office hours, and developing homeworks/exams.

**University of Florida Machine Intelligence Lab** **May 2003 - August 2003**  
*Research Experience for Undergraduates* *Gainesville, FL*

Participated in National Science Foundation funded research program focused on machine learning, computer vision, and robotic platform design.

- Integrated COTS and custom designed sensors (sonar, pressure, voice recognition) with commercial microprocessor.

- Extensive use of CAD tools to design and manufacture custom printed circuit boards and an autonomous boat platform.

PROFESSIONAL  
EXPERIENCE

**IBM T.J. Watson Research Center** **September 2008 - January 2009**  
*Graduate Intern, Power and Reliability Aware Architecture Group* *Yorktown Heights, NY*  
 Worked on soft-error reliability qualification.

- Performed exploratory statistical fault injection experiments on a communications processor.
- Proposed a new methodology for characterizing the reliability of large-scale systems.

**Intel Corporation** **June 2007 - August 2007**  
*Graduate Intern, Visual Computing Group* *Hillsboro, OR*  
 Worked on developing a virtualization layer capable of automatically exploiting the parallelism and redundancy available in heterogeneous, multi-core systems to improve performance and reliability.

- Designed and implemented a preliminary simulator.

**University of Florida (IPPD)** **August 2004 - May 2005**  
*Electrical Design Engineer* *Gainesville, FL*  
 Worked on an interdisciplinary team to develop a wireless medical monitoring system for the United States Special Operations Command.

- Integrated COTS sensors with a military issued PDA using custom designed hardware.
- Delivered a working prototype complete with monitoring hardware and software.

**Honeywell Space and Electronic Systems** **May 2005 - August 2005**  
*Electrical Design Intern* *Clearwater, FL*  
 Worked with multiple electrical design teams assisting with project reviews and performing preliminary design space exploration.

- Conducted feasibility studies involving redesign of legacy equipment.

**Honeywell Space and Electronic Systems** **May 2004 - August 2004**  
*Electrical Design Intern* *Clearwater, FL*  
 Provided engineering support for the Space Shuttle Main Engine Controller Single Board Computer group.

- Assisted lead electrical engineer in detailed design reviews of upgrades to the the Space Shuttle's health monitoring computer.

PUBLICATIONS

**Maestro: Orchestrating Lifetime Reliability in Chip Multiprocessors.**  
 Shuguang Feng, Shantanu Gupta, Amin Ansari, and Scott Mahlke.  
*To appear in the Proceedings of the 2010 International Conference on High Performance Embedded Architectures and Compilers (HiPEAC)*, January 2010.

**ZerehCache: Armoring Cache Architectures in High Defect Density Technologies.**  
 Amin Ansari, Shantanu Gupta, Shuguang Feng, and Scott Mahlke.  
*To appear in the Proceedings of the 42nd International Symposium on Microarchitecture (MICRO-42)*, December 2009.

**Adaptive Online Testing for Efficient Hard Fault Detection.**  
 Shantanu Gupta, Amin Ansari, Shuguang Feng, and Scott Mahlke.  
*To appear in the Proceedings of the 27th International Conference on Computer Design (ICCD-27)*, October 2009.

**Enabling Ultra Low Voltage System Operation by Tolerating On-Chip Cache Failures.**  
 Amin Ansari, Shuguang Feng, Shantanu Gupta, and Scott Mahlke.

*Proceedings of the 2009 International Symposium on Low Power Electronics and Design (ISLPED)*, August 2009.

**The StageNet Fabric for Constructing Resilient Multicore Systems.**

Shantanu Gupta, Shuguang Feng, Amin Ansari, Jason Blome, and Scott Mahlke.

*Proceedings of the 41st International Symposium on Microarchitecture (MICRO-41)*, November 2008.

**A Reconfigurable Microarchitecture Building Block for Resilient CMP Systems.**

Shantanu Gupta, Shuguang Feng, Amin Ansari, Jason Blome, and Scott Mahlke.

*Proceedings of the International Conference on Compilers, Architecture, and Synthesis for Embedded Systems (CASES)*, October 2008.

**Olay: Combat the Signs of Aging with Introspective Reliability Management.**

Shuguang Feng, Shantanu Gupta, and Scott Mahlke.

*The Workshop on Quality-Aware Design (W-QUAD) held in conjunction with ISCA-35*, June 2008.

**Self-calibrating Online Wearout Detection.**

Jason A. Blome, Shuguang Feng, Shantanu Gupta, and Scott Mahlke.

*Proceedings of the 40th International Symposium on Microarchitecture (MICRO-40)*, December 2007.

**StageNet: A Reconfigurable CMP Fabric for Resilient Systems.**

Shantanu Gupta, Shuguang Feng, Jason A. Blome, and Scott Mahlke.

*The Second Annual Reconfigurable and Adaptive Architecture Workshop (RAAW-2) held in conjunction with MICRO-40*, December 2007.

**Online Timing Analysis for Wearout Detection.**

Jason A. Blome, Shuguang Feng, Shantanu Gupta, and Scott Mahlke.

*The Second Workshop on Architectural Reliability (WAR-2) held in conjunction with MICRO-39*, December 2006.

**Cost-Efficient Soft Error Protection for Embedded Microprocessors.**

Jason A. Blome, Shantanu Gupta, Shuguang Feng, Scott Mahlke and Daryl Bradley.

*Proceedings of the 2006 International Conference on Compilers, Architectures, and Synthesis for Embedded Systems (CASES)*, October 2006.

RELEVANT  
GRADUATE  
COURSES

- EECS573: Microarchitecture
- EECS570: Parallel Computer Architecture
- EECS583: Advanced Compilers
- EECS427: VLSI
- EECS492: Artificial Intelligence