Canturk Isci

CONTACT INFORMATION

Department of Electrical Engineering
Princeton University
Princeton, NJ 08544 USA

Phone: +1 609 468 7744
E-mail: canturk@princeton.edu
Web: http://www.princeton.edu/~canturk

RESEARCH INTERESTS

- Microprocessor power and thermal modeling and measurement
- Application power/performance phase behavior characterization, detection and prediction
- Microarchitectural and system level techniques for dynamic power and thermal management

EDUCATION

Ph.D. **Princeton University**, Princeton, NJ — Sep 2001 – Present
Electrical Engineering
Advisor: Margaret Martonosi
Expected graduation date: June 2007

M.A. **Princeton University**, Princeton, NJ — Sep 2001 – May 2003
Electrical Engineering
Advisor: Margaret Martonosi

M.Sc. **University of Westminster**, London, UK — Sep 2000 – Sep 2001
VLSI System Design
Advisors: Izzet Kale and R.C.S. Morling

B.Sc. **Bilkent University**, Ankara, Turkey — Sep 1996 – Jun 2000
Electrical and Electronics Engineering

HONORS AND AWARDS

Graduate Fellowship, Princeton University, Department of Electrical Engineering — 2001 – 2002

M.Sc. with Distinction, University of Westminster, Department of Electronic Systems, London, UK — 2001

Millennium Scholarship, British Council, UK — 2000 – 2001

Ranked 33rd in National Selection Examination for Graduate Studies (LES) among approximately hundred thousand candidates, Turkey — 2000

Undergraduate Fellowship, Bilkent University, Ankara, Turkey — 1996 – 2000

Ranked 45th in National University Entrance Exam among approximately 1.5 million candidates, Turkey — 1996

Ranked 11th in National Physics Olympiads, Turkey — 1995

PROFESSIONAL EXPERIENCE

Princeton University, Department of Electrical Engineering, Princeton, NJ

Research Assistant in Parapet Research Group — Sep 2001 – Present

Conducted research on runtime characterization of processor power and thermal behavior on real systems via performance monitoring hardware. Developed a runtime power estimation framework with real measurement feedback, and a dynamic processor thermal model on different experimental platforms. Investigated power phase behavior of applications and developed novel methods for detecting recurrent phase behavior under real-system variability. Applied phase analysis methods to duration prediction for dynamic power management via voltage and frequency scaling. Investigated phase tracking methods based on runtime performance monitoring and program counter signatures via dynamic instrumentation. Currently, researching online phase prediction methods on real systems for dynamic power management, and investigating global power management policies for chip multiprocessors.

IBM T.J. Watson Research Center, Yorktown Heights, NY

Intern in Reliability and Power Aware Microarchitectures Group — Jun 2005 – Sep 2005

Worked on Global power management techniques for chip multiprocessors. Developed a trace based multiprocessor analysis tool for early evaluation of global power management policies. Explored different methods for dynamically tuning individual cores to meet chip power/

performance goals. Designed and evaluated per-core dynamic voltage and frequency scaling policies to meet chip-wide power budget targets.
Manager: Pradip Bose, *Mentor:* Alper Buyuktosunoglu

IBM T.J. Watson Research Center, Yorktown Heights, NY

Co-op in Reliability and Power Aware Microarchitectures Group Jul 2004 – Dec 2004

Worked on runtime performance monitoring and phase analysis of IBM POWER4 systems. Designed long-term value and duration prediction methodologies for workload performance phase behavior with applications to dynamic voltage and frequency scaling. Contributed in automated thermal microbenchmark generation for online temperature analysis of real systems.
Manager: Pradip Bose, *Mentor:* Alper Buyuktosunoglu

ASELSAN Electronics Inc., Ankara, Turkey

Intern in Electronic Design Department Jul 1999 – Aug 1999

Worked on the design and testing of voltage controlled oscillator systems.

Bilkent University, Ankara, Turkey

Summer Research in Electronics Engineering Department Jun 1999 – Jul 1999

Contributed in the programming of Texas Instruments, C54x Series DSP Chip and hardware platform development for communications project.

TEACHING EXPERIENCE

Teaching Assistant, **Princeton University,** Princeton, NJ Spring 2004

ELE101 Computing for a Mobile World, by Prof Margaret Martonosi

An introductory class, covering the fundamentals of programming and computer systems with a specific focus on aspects of computing for mobile and handheld computers. Designed and supervised bi-weekly precept sessions. Helped prepare and grade homework assignments, graded exams and conducted office hours. Prepared, supervised and graded individual term projects.

Teaching Assistant, **Princeton University,** Princeton, NJ Fall 2002

ELE375 Computing Structures, by Prof Margaret Martonosi

A course on how computers work and effective principles for computer systems design, where the final term project culminates in building a working computer on an FPGA. Helped prepare and grade homework assignments, graded exams and conducted office hours and precept sessions. Supervised and graded individual term projects.

ACTIVITIES

Student Member, IEEE 1999 – Present

Chair of Academic Affairs, Princeton University Graduate Student Government 2005 – Present

Organizer of Computer Engineering Graduate Workshop (CEW) 2002 – 2003
Princeton University, Department of Electrical Engineering

Reviewer for PACT'03, HPCA'04, ISCA'04, ISLPED'04, ASPLOS'04, MICRO'04, ISLPED'05, PAC2'05, Computer Architecture Letters'05, ISPASS'06

PUBLICATIONS

Canturk Isci and Margaret Martonosi, ***Phase Characterization for Power: Evaluating Control-Flow-Based and Event-Counter-Based Techniques***. In International Symposium on High-Performance Computer Architecture (*HPCA-12)*, Feb 2006.

Canturk Isci and Margaret Martonosi, ***Detecting Recurrent Phase Behavior under Real-System Variability***. In IEEE International Symposium on Workload Characterization (IISWC'05), Oct 2005.

Canturk Isci, Margaret Martonosi and Alper Buyuktosunoglu, ***Long-term Workload Phases: Duration Predictions and Applications to DVFS***. In IEEE MICRO, Special Issue on Energy Efficient Design, Sep/Oct 2005.

Canturk Isci, Zhigang Hu, Margaret Martonosi and Pradip Bose , ***Building Microarchitectural Stressmarks for Thermal Testing***. In Austin Conference on Energy-Efficient Design (ACEED-

2005) [*Internal Track*], Mar 2005.

Canturk Isci, Margaret Martonosi and Alper Buyuktosunoglu, ***Workload Phase Duration Prediction and its Application to DVFS***. In Austin Conference on Energy-Efficient Design (ACEED-2005) [*Internal Track*], Mar 2005.

Canturk Isci, Gilberto Contreras and Margaret Martonosi, ***Hardware Performance Counters for Detailed Runtime Power and Thermal Estimations: Experiences and Proposals***. In Hardware Performance Monitor Design and Functionality Workshop in conjunction with 11th International Symposium on High-Performance Computer Architecture (HPCA-11), Feb 2005.

Canturk Isci and Margaret Martonosi, ***Runtime Power Monitoring in High-End Processors: Methodology and Empirical Data***. In 36th ACM/IEEE International Symposium on Microarchitecture (MICRO-36), Dec 2003.

Canturk Isci and Margaret Martonosi, ***Identifying Program Power Phase Behavior Using Power Vectors***. In 6th IEEE International Workshop on Workload Characterization (WWC-6), Nov 2003.

Canturk Isci, ***Pseudo-Random Testing of Arithmetic Circuits***. M.Sc. Thesis, University of Westminster, London, UK, Oct 2001.

COMPUTER SKILLS C, Perl, Matlab, Pascal, VHDL, Verilog, Spice, Renoir, QuickFault

LANGUAGES Turkish (Native), English (Fluent), German (Basic)