

# Pei Zhang

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CONTACT INFORMATION	Department of Electrical Engineering Princeton University Princeton, NJ 08544 USA	<i>Phone:</i> +1 (609) 356-2525 <i>E-mail:</i> peizhang@princeton.edu <i>WWW:</i> <a href="http://www.peizhang.com/">http://www.peizhang.com/</a>
RESEARCH INTEREST	<ul style="list-style-type: none"><li>• Embedded Systems</li><li>• Mobile systems (sensor networks, ubiquitous computing)</li><li>• Software/Hardware techniques for robustness, power-efficiency and reliability.</li></ul>	
EDUCATION	<p><b>Ph.D. Princeton University</b>, Princeton NJ Sep 2004 - Present Computer Engineering, Dept. of Electrical Engineering Advisor: Margaret Martonosi Thesis Title: <i>"Collaboration and Adaptation for the Longevity of Mobile Delay-Tolerant Systems"</i> Expected graduation date: May 2008</p> <p><b>M.A. Princeton University</b>, Princeton NJ Sep 2002 - May 2004 Electrical Engineering Advisor: Margaret Martonosi</p> <p><b>B.S. California Institute of Technology</b>, Pasadena CA Sep 1998 - May 2002 Electrical Engineering (Graduated with Honors)</p>	
HONORS AND AWARDS	<p>Wu Prize for Excellence, Awarded by the School of Engineering and Applied Science (SEAS) of Princeton University for upper-year graduate students who have performed at the highest level of courses, research and teaching, 2007</p> <p>Outstanding Teaching Assistant Award, by the Department of Electrical Engineering Princeton University, 2005</p> <p>Co-winner of the Global Photonics Energy Corporation's (GPEC) Edith and Martin B. Stein Solar Energy Innovation Award, 2005</p> <p>Winner 3<sup>rd</sup> International Low Power Design Contest ACM/IEEE International Symposium on Low-Power Electronics and Design (ISLPED) 2003</p> <p>Graduate Fellowship, Princeton University, Department of Electrical Engineering 2002 - 2003</p> <p>Named Caltech Summer Undergraduate Research Fellowship (SURF) 2000</p> <p>Caltech Summer Undergraduate Research Fellowship (SURF) 1999</p>	
BOOK CHAPTERS	<p><u>Pei Zhang</u>, Chris Sadler, Ting Liu, Ilya Fischhoff, Margaret Martonosi, Stephen A. Lyon, Daniel I. Rubenstein. Habitat Monitoring with ZebraNet: Design and Experiences. <u>Chapter in Wireless Sensor Networks: A Systems Perspective</u>, N. Bulusu and S. Jha (editors), Artech House, 2005.</p>	

## PUBLICATIONS

Pei Zhang and Margaret Martonosi. "LOCALE: Collaborative Localization Estimation for Sparse Mobile Sensor Networks", The International Conference on Information Processing in Sensor Networks (IPSN 2008), Apr 2008. *To appear*.

Vincent Lenders, Emmanouil Koukoumidis, Pei Zhang and Margaret Martonosi. "Location-based Trust for Mobile User-Generated Contents: Applications, Challenges and Implementations", The 9<sup>th</sup> IEEE Workshop on Mobile Computing Systems and Applications (HotMobile 2008), Feb 2008. *To appear*.

Yong Wang and Pei Zhang and Ting Liu and Chris Sadler and Margaret Martonosi. "Movement Data Traces from Princeton ZebraNet Deployments". CRAWDDAD Database. <http://crawdad.cs.dartmouth.edu/>. 2007.

Trevor Pering, Pei Zhang, Rohit Chaudhri, Yaw Anokwa and Roy Want. "The PSI Board: Realizing a Phone-Centric Body Sensor Network", 4th International Workshop on Wearable and Implantable Body Sensor Networks (BSN2007). Mar, 2007.

Pei Zhang, Chris Sadler and Margaret Martonosi. "Middleware for Long-term Deployment of Delay-tolerant Sensor Networks", The First International Workshop on Middleware for Sensor Networks (MidSens'06). Nov, 2006.

Pei Zhang and Margaret Martonosi. "Energy Adaptation Techniques to Optimize Data Delivery in Store-and-Forward Sensor Networks", The Fourth ACM Conference on Embedded Networked Sensor Systems (SenSys'06). Nov, 2006.

Pei Zhang, Christopher M. Sadler, Steve A. Lyon, and Margaret Martonosi. "Hardware Design Experiences in ZebraNet", The Second ACM Conference on Embedded Networked Sensor Systems (SenSys'04). Nov, 2004.

T. Liu, C. Sadler, P. Zhang, and M. Martonosi. "Implementing Software on Resource-Constrained Mobile Sensors: Experiences with Impala and ZebraNet". The Second International Conference on Mobile Systems, Applications, and Services (Mobisys'04), June, 2004.

Pardip Hari, Kevin Ko, Emmanouil Koukoumidis, Ulrich Kremer, Margaret Martonosi, Desiree Ottoni, Li Shiuian Peh, Pei Zhang. Sarana: Language, Compiler, and Runtime System Support for Spatially-Aware and Resource-Aware Mobile Computing, under submission.

## PROFESSIONAL EXPERIENCE

Princeton University, Department of Electrical Engineering,  
*Research Assistant*, The ZebraNet and SARANA projects,  
Prof. Margaret Martonosi

2002 - Present

### *ZebraNet*

- Designed the ZebraNet hardware, a lightweight, infrastructure-less, mobile node customized for wildlife tracking.
- Developed a variety of novel hardware/software energy reduction/scavenging techniques.
- Designed the second generation middleware, with software/protocol for minimizing power consumption in sparse mobile networks.
- First real-world deployment of sparse mobile sensor network. Two deployments in central Kenya in Jan 2004 and June 2005.
- Developed a delayed-collaboration that utilizes both hardware and software for system-wide localization, energy management.

## SARANA

- Developed a history based energy policy that actively predicts energy usage of applications.
- Developed a usage based methodology for device to throttle their energy usage.
- Investigating the portability issues related with mobile phone implementation of the SARANA system, to allow for cross platform collaborations.

Microsoft Research India, Bangalore, India

Summer 2007

*Summer Intern* (with Dr. Venkat Padmanabhan)

- Design and implementation of distributed operating system (DOS) for mobile phones, which enable dynamic distributed application deployment.
- Designed a centralized server to distribute sensor applications, and decentralized techniques for a central sever to contact the devices while maintaining user privacy.
- Explored novel collaborative, disruption-tolerant localization techniques from imperfect mobile phone information.

Intel Inc. Santa Clara, CA

Summer 2006

*Summer Intern* (with Dr. Roy Want)

- Participate in designing of a phone interface board which added a number of sensors, enabling novel human-computer interactions.
- Work on the development of driving applications for ubiquitous computing using our mobile phone attachments.
- Explore and designed peripherals to support near field communication (NFC) in mobile phones.

Flarion Technologies, Inc.,

Summer 2005

*Summer Intern* (with Frank Lane)

- Power analysis of the Flarion magnemite ASIC
- Develop power model for baseband and RF chipset
- Formulation of micro-architecture design guidelines for low power operation

California Institute of Technology, Pasadena, CA

Summer 2002

*Research Staff* in the Department of Eng. and Applied Science  
(Professor Theodore Wu)

- Design of experiments for validation of mathematical results of non-linear soliton wave induced long-shore currents.
- Analysis of wave interactions, and induced currents, near inclined beaches

California Institute of Technology, Pasadena, CA

Jan 2001 - Jun 2002

*Research Assistant* in the Department of Electrical Engineering  
(Professor Pietro Perona)

- Investigated techniques for inexpensive arsenic detection.
- Design of an inexpensive arsenic-meter for rural water well testing in Bangladesh.
- Involving inexpensive chemical testing along with high accuracy, environmental insensitive, optical measurements to produce a simple to understand indicator.

Boeing Satellite Systems, El Segundo, CA

Summer 2001

*Summer Intern* in the Power Electronics group

- Design and implemented power supply testing equipments.
- Analysis of tapped inductor switching power supply.
- Analysis of various electronic failure modes specific to zero-G and high-G environments.

California Institute of Technology, Pasadena, CA Summer 2000  
*Summer Researcher* in the Department of Electrical Engineering  
 (Professor Glen George)

- Designed and implemented digitally controlled buck-boost (fly-back) power converters.
- Experienced with high speed digital feedback systems.

California Institute of Technology, Pasadena, CA Summer 1999  
*Summer Researcher* in the Department of Eng. and Applied Science  
 (Professor Theodore Wu)

- Designed and ran wave experiments on long-shore current induced by obliquely incident waves.
- Used digital particle image velocimetry system, with algorithm developing for image analysis.
- Written programs for image analysis in C to calculate vector fields.

TESLAcO, Irvine, CA Summer 1998  
*Summer Intern*, (Professor Slobodan Ćuk)

- Constructed customized, high-power power supplies.
- Experience with various switching power supplies including, bang-bang, buck, boost, fly-back, and Ćuk converters.
- Power supply performance and specification testing.

TEACHING  
EXPERIENCE

Head Teaching Assistant, Princeton University Spring 2005  
 ELE 302 System Design and Analysis (Car Lab)

Teaching Assistant, Princeton University Spring 2004  
 ELE 302 System Design and Analysis (Car Lab)

Head Teaching Assistant, California Institute of Technology Spring 2002  
 EE 90 Analog Electronics Laboratory

Head Teaching Assistant, California Institute of Technology Spring 2002  
 EE 105 Application-Specific Computers

Dean's Tutor, California Institute of Technology Spring 2002  
 EE/CS 52 Microprocessor Systems Laboratory.

Head Teaching Assistant, California Institute of Technology Winter 2001  
 EE 91b Experimental Projects in Electronic Circuits.

Dean's Tutor, California Institute of Technology Winter 2001  
 EE/CS 51 Principles of Microprocessor Systems.

Head Teaching Assistant, California Institute of Technology Fall 2001  
 EE 91a Experimental Projects in Electronic Circuits.

Dean's Tutor, California Institute of Technology Fall 2001  
 EE 50 Advanced Digital Design.

Teaching Assistant, California Institute of Technology Fall 2001  
 EE 4 Fundamentals of Digital Systems

Teaching Assistant, California Institute of Technology  
EE 90 Analog Electronics Laboratory Spring 2001

Teaching Assistant, California Institute of Technology  
EE 91b Experimental Projects in Electronic Circuits. Winter 2000

Teaching Assistant, California Institute of Technology  
EE 91a Experimental Projects in Electronic Circuits. Fall 2000

ACTIVITIES ACM Student Member 2007 - Present

ACSSPU Executive Committee, and News Letter Editor 2005 - Present

ACSSPU Vice President (2003-2005) 2003 - 2005

ACSSPU Social Chair (2002-2003) 2002 - 2003

Reviewer for: IEEE Pervasive Computing magazine, Pervasive and  
Mobile Computing, NSDI'06, SenSys'07, MobiSys'07, MidSens2006,

COMPUTER SKILLS Experienced programming in C, C++, Java, TinyOS, VHDL, Perl, assembly(x86, PIC and  
Motorola HC11, 5800x, msp430, PAL, Mach, FPGA, TI dspC55)

PERSONAL INFORMATION **Languages:** English and Chinese(Fluent)

**Citizenship:** USA

REFERENCES **Prof. Margaret Martonosi**  
Department of Electrical Engineering  
Princeton University  
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**Prof. Li-Shiuan Peh**  
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**Prof. Stephen A. Lyon**  
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**Prof. Bradley W. Dickinson**  
Department of Electrical Engineering  
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Princeton, NJ 08544  
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E-mail: bradley@Princeton.EDU

**Prof. Venkat Padmanabhan**  
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Bangalore 560 080, India  
Phone: +91 (80) 2361 - 4657  
E-mail: padmanab@microsoft.com