

**Xiang Pan**  
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## Overview

I enjoy building efficient, secure, reliable, and scalable systems.

## Education

- **The Ohio State University** Columbus, OH  
*Ph.D. in Computer Science* 09/2010 - 05/2017
  - Dissertation: “*Designing Future Low-Power and Secure Processors with Non-Volatile Memory*”
  - Committee: Radu Teodorescu (**Advisor**), Feng Qin, Christopher Stewart, Yinqian Zhang
- **Beijing University of Posts and Telecommunications** Beijing, China  
*B.E. in Computer Science [Top 5%]* 09/2006 - 07/2010

## Industry Experience

- **Uber Technologies, Inc.** San Francisco, CA  
*Software Engineer* 06/2018 - Present
  - Build distributed realtime rider pricing serving systems. [**Skills:** Python, Java, HDFS, Spark, Cassandra, Hive, Kafka, ELK]
- **Qualcomm Technologies, Inc.** Austin, TX  
*Senior Engineer* 04/2017 - 06/2018
  - Build software simulator to model architectural features and performance of Hexagon DSP Processor. [**Skills:** C/C++, Shell, System Modeling/Analysis]
- **Samsung Austin R&D Center** Austin, TX  
*Software Engineering Intern* 05/2015 - 08/2015
  - Build CPU power measurement software framework and conduct leakage power characterization and validation on Galaxy-S7 CPU. The developed framework has been used for future power measurements in Samsung. [**Skills:** C++, Assembly, Android]
- **Hewlett-Packard Laboratories** Palo Alto, CA  
*Research Intern* 05/2014 - 08/2014
  - Exploit architecture/OS support to design temperature variation aware Memristor memory scheduling policies to improve performance and energy efficiency. Proposed solution achieved 10% performance improvement and 27% energy reduction. [**Skills:** C++, QEMU, gem5, System Modeling/Analysis]
- **Hewlett-Packard Enterprise** Boise, ID  
*Software Engineering Intern* 05/2013 - 08/2013
  - Build performance profiling software framework for HP-3PAR storage disk array. The developed framework has been used for identifying future embedded software performance bottlenecks in HP. [**Skills:** C++, Python, Shell, Performance Profiling]
- **Tsinghua University Microprocessor and SoC Technology R&D Center** Beijing, China  
*Research Intern* 06/2009 - 06/2010
  - Optimize MESI protocol to be aware of data usage in all cache hierarchies to better design cacheline replacement policy in the shared last level cache. Proposed solution achieved 14% performance improvement. [**Skills:** C++, System Modeling/Analysis]
  - Build ELF and PE loaders for a software-based CPU simulator. [**Skills:** C++]

## Research Experience

- *When Non-Volatile Caches Meet Cold Boot Attacks (04/2016 - 02/2017)*: Conduct proof-of-concept cold boot attacks on systems with non-volatile caches running AES disk encryption algorithm and design corresponding countermeasures. Proposed attacks have been successfully performed on real systems and the developed countermeasure solution is 100% effective in defending those attacks with small performance overhead. [**Skills:** C/C++, gem5, AES, Kernel Programming]
- *Rethinking Near-Threshold Multiprocessor Design with Non-Volatile Memory (06/2013 - 09/2014)*: Implement a new NT-CMP architecture that uses STT-RAM to build all on-chip caches to save power; exploit greedy algorithm on the proposed architecture for better hardware resource management to further improve energy efficiency. Proposed design achieved 11% performance improvement and 32% energy reduction. [**Skills:** C++, Shell, Assembly, System Modeling/Analysis]
- *Using Non-Volatile Memory to Enable Fast Sleep/Wakeup of Idle Cores (03/2012 - 03/2013)*: Implement a low-power microprocessor framework that leverages STT-RAM to build a fast and low overhead checkpointing mechanism which enables fast shutdown and wake-up of cores without loss of their execution states to save power in various core idle scenarios. Proposed design achieved 34% energy reduction with less than 3% performance/area overhead. [**Skills:** C++, Shell, Assembly, System Modeling/Analysis]
- *Characterizing and Eliminating Synchronization Induced Voltage Emergencies in Many-Core Processors (09/2011 - 11/2011)*: Build a kernel module based software tool using Intel's Running Average Power Limit (RAPL) interface to obtain CPU power trace when running barrier synchronized multithreaded benchmarks on Intel Sandy Bridge i7 processor. [**Skills:** C/C++, Kernel Programming, Multithreading]
- *Reactive Core Acceleration for Power-Constrained Chip Multiprocessors (11/2010 - 08/2011)*: Compile PARSEC benchmarks for SESC simulator by rewriting benchmark pthread code using Linux Threads Library; design core acceleration algorithms to accelerate program execution and mitigate effects of process variation and application imbalance. Proposed design achieved 19% performance improvement and 23% energy-delay reduction. [**Skills:** C++, Compiler, Multithreading]

## Publications

- X. Pan**, A. Bacha, S. Rudolph, L. Zhou, Y. Zhang, R. Teodorescu “*NVCool: When Non-Volatile Caches Meet Cold Boot Attacks*”, ICCD-2018
- X. Pan**, A. Bacha, R. Teodorescu “*Respin: Rethinking Near-Threshold Multiprocessor Design with Non-Volatile Memory*”, IPDPS-2017
- X. Pan** and R. Teodorescu “*NVSleep: Using Non-Volatile Memory to Enable Fast Sleep/Wakeup of Idle Cores*”, ICCD-2014
- X. Pan** and R. Teodorescu “*Using STT-RAM to Enable Energy-Efficient Near-Threshold Chip Multiprocessors*”, PACT-2014 (Short Paper)
- T. Miller, R. Thomas, **X. Pan**, R. Teodorescu “*VRSync: Characterizing and Eliminating Synchronization Induced Voltage Emergencies in Many-Core Processors*”, ISCA-2012
- T. Miller, **X. Pan**, R. Thomas, N. Sedaghati, R. Teodorescu “*Booster: Reactive Core Acceleration for Mitigating the Effects of Process Variation and Application Imbalance in Low-Voltage Chips*”, HPCA-2012

## Skills

**Languages:** C/C++, Python, Java, Shell, Assembly

**Systems:** Linux (Kernel Programming), Android, MapReduce, HDFS, Spark, Cassandra, Hive, Kafka, ELK

**Tools:** GNU Toolchain, JetBrains Toolbox, QEMU, Docker, Git, SVN, L<sup>A</sup>T<sub>E</sub>X, gem5