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yangxi.github.io
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Research Interests

My research interests are programing language implementations, computer architecture, and operating systems, especially micro-architecture aware optimization techniques.

Education

- **Australian National University** Canberra, Australia
  Ph.D. Computer Science *Oct. 2011 - Date*
  - Supervisors: Prof. Steve Blackburn, Prof. Kathryn McKinley
- **Australian National University** Canberra, Australia
  Mphil Computer Science *May 2009 - March 2011*
  - Thesis: Locality Aware Zeroing: Exploiting Both Hardware and Software Semantics
  - Supervisors: Prof. Steve Blackburn, Prof. Kathryn McKinley
- **University of Electronic Science and Technology of China** Chengdu, China
  B.S. Computer Science *Sept. 2004 - July 2008*
  - Thesis: RTEMS on L4 Microkernel
  - Supervisor: Dr. Kevin Elphinstone
  - I did the work at NICTA's ERTOS group, University of New South Wales as a visitor student.

Honors and Awards

- **ANU PhD. Scholarship:** Three year full scholarship.
- **2012 Google Australia PhD Fellowship in Energy Aware Computing:** One year fellowship, one of three awarded in Australia and 40 worldwide.
- Paper selected for **Communications of the ACM Research Highlights**. *"Looking Back and Looking Forward: Power, Performance, and Upheaval"*
- Paper selected for **IEEE Micro Top Picks from the 2011 Computer Architecture Conferences**. *"What Is Happening to Power, Performance, and Software?"*

Publications

- **X. Yang**, S. M. Blackburn, and K. S. McKinley, **"Computer Performance Microscopy with SHIM"**, in Proceedings of the 42nd International Symposium on Computer Architecture **(ISCA)** , Portland, OR, June 13-17, 2015.

- R. Shahriyar, S. M. Blackburn, **X. Yang**, and K. M. McKinley, **"Taking Off the Gloves with Reference Counting Immix"**, in Proceedings of the 2013 ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications **(OOPSLA)**, Indianapolis, IN, October 26-31, 2013.
- **X. Yang**, D. Frampton, S. M. Blackburn, and A. L. Hosking, **"Barriers Reconsidered, Friendlier Still!"**, in Proceedings of the 2012 International Symposium on Memory Management **(ISMM)** , Beijing, China, June 15-16, 2012.
- H. Esmaeilzadeh, T. Cao, **X. Yang**, S. M. Blackburn, and K. S. McKinley, **"What is Happening to Power, Performance, and Software?,"**, **IEEE Micro**, vol. 32, pp. 110-121, 2012.
- H. Esmaeilzadeh, T. Cao, **X. Yang**, S. M. Blackburn, and K. S. McKinley, **"Looking Back and Looking Forward: Power, Performance, and Upheaval,"**, **Communications of the ACM**, vol. 55, iss. 7, pp. 105-114, 2012.
- **X. Yang**, S. M. Blackburn, D. Frampton, J. B. Sartor, and K. S. McKinley, **"Why Nothing Matters: The Impact of Zeroing"**, in Proceedings of the 2011 ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications **(OOPSLA)**, Portland, OR, October 22-27, 2011.
- H. Esmaeilzadeh, S. M. Blackburn, T. Cao, **X. Yang**, and K. S. McKinley, **"Looking Back on the Language and Hardware Revolution: Measured Power, Performance, and Scaling"**, in Proceedings of the 16th International Conference on Architectural Support for Programming Languages and Operating Systems **(ASPLOS)**, Newport Beach, CA, USA, March 5-11, 2011.

Research Experience

- **Australian National University** Canberra, Australia
  Ph.D. Computer Science *Oct. 2011 - Date*
  - Improve the CPU utilization of performance-critical workloads with fine-grain feedback information from the SHIM profiler. **In Progress**
  - Designed and implemented SHIM, a continuous profiler that samples at resolutions as fine as 15 cycles; three to five orders of magnitude finer than current continuous profilers. SHIM is an open source project. **ISCA 2015**
  - Evaluated overheads of a range of useful barriers used by managed language runtime systems on a range of modern hardware and workloads. **ISMM 2012**
- **Australian National University** Canberra, Australia
  Mphil Computer Science *May 2009 - March 2011*
  - Analyzed the overhead of zero initialization, discovered the cost is surprisingly high, and proposed three better designs to reduce the direct and indirect zeroing costs simultaneously. The three new zeroing approaches are in Jikes RVM now. **OOPSLA 2011**
  - Helped to analyze measured chip power and performance on five process technology generations executing 61 diverse benchmarks with a rigorous methodology. **ASPLOS 2011**
- **University of Electronic Science and Technology of China** Chengdu, China
  B.S. Computer Science *Sept. 2004 - July 2008*
  - Ported the RTEMS, a single address space RTOS, to the L4 Microkernel, and evaluated the performance. Parts of the project, PXA255 and Gumstix BSP, were contributed to the RTEMS.

Selected Open Source Projects

- **SHIM** github.com/shimProfiler/SHIM
  - SHIM is a open source high frequency continuous profiler. I designed, implemented, and maintain the project.
- **Jikes RVM on OpenJDK** RVM-549-OpenJDK
  - Jikes RVM is not able to run many new and important applications because it is using the GNU Classpath library and the library is not in active development anymore. This project attempts to port the OpenJDK library to Jikes RVM to fix the problem.
- **RTEMS on the Cortex-M3 CPU of OMAP4 SoC** https://github.com/yangxi/omap4m3
  - The OMAP4 SoC has the potential to become a nice research platform for researchers who are interested in the heterogeneous system, since it has two big Cortex-A9 cores and two small Cortex-M3 cores. However, because there is no open source RTOS running on the small cores, it is hard to try ideas on the platform. This project ported the RTEMS to the small M3 cores. The RTEMS is loaded by and communicates with the Linux kernel running on the big A9 cores.

Community Services

- **Program Committee Member**
  - OOPSLA'13 AEC