Xi Yang

hiyangxi@gmail.com xi.yang@sydney.edu.au
Postdoc at University of Sydney

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yangxi.github.io

Goal

Craft platforms with which humane people can control the fire of computing.

Research Interests

My research focuses on creating new tools for understanding and controlling the run-time behavior of complex computer systems.

Working Experience

- **University of Sydney** Sydney, Australia
  Postdoc *2019 - 2020*
  - Extended the high-frequency sampling profiling approach.
- **Confluent** Sydney, Australia
  Software Engineer *2018 - 2019*
  - Helped to build the distributed performance evaluation framework and to improve the performance of Confluent cloud development infrastructure.
- **Terrain Data** Sydney, Australia
  Software Engineer *2017 - 2018*
  - Helped to create the first interactive algorithm management system with which non-tech users can manage, annotate, and search their structural data.

Education

- **Australian National University** Canberra, Australia
  Ph.D. Computer Science *Oct. 2011 - May. 2019*
  - Thesis: SHIM and Its Applications
  - 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: Prof. Kevin Elphinstone

Honors and Awards

- Paper recognized as Honorable Mention in **IEEE Micro Top Picks from the 2015 Computer Architecture Conferences**. *"Computer Performance Microscopy with SHIM"*
- **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, **"Elfen Scheduling: Fine-Grain Principled Borrowing from Latency-Critical Workloads using Simultaneous Multithreading"**, in Proceedings of the 2016 USENIX Annual Technical Conference **(USENIX ATC)** , Denver, CO, June 22-24, 2016.
- **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 - May. 2019*
  - Designed and implemented Tailor, a real-time latency controller that uses a SHIM-based high-frequency profiler and an application-level network proxy to continuously monitor and act on hazardous system behaviors.
  - Designed and implemented Elfen, a scheduler that co-runs latency-critical workloads and batch workloads on the same SMT CPUs. Elfen significantly improves the datacenter CPU utilization without affecting latency-critical workloads. **USENIX ATC 2016**
  - 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. **ISCA 2015**
  - Evaluated the overhead of managed language runtime barriers. **ISMM 2012**
- **Australian National University** Canberra, Australia
  Mphil Computer Science *May 2009 - March 2011*
  - Analyzed the overhead of zero initialization, discovered that the cost is high for Java workloads, and proposed three better designs to reduce the direct and indirect zeroing costs simultaneously. The three new zeroing approaches are in JikesRVM now. **OOPSLA 2011**
  - Analyzed directly measured power and performance of five generations of Intel CPUs 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. Contributed parts of the project, PXA255 and Gumstix BSP, to the open source RTEMS operating system.

Community Services

- **Program Committee Member**
  - OOPSLA'13 AEC, 20' ERC
  - PLDI'16 ERC
  - OOPSLA'16 AEC
  - ASPLOS'20 AEC
  - ISMM'20 PC