

## Hongyi Xin

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### Education

#### Carnegie Mellon University

Aug 2011 – present (expected to graduate in 2017)

#### University of Michigan

Aug 2009 – May 2011

#### Shanghai Jiaotong University

Aug 2007 – May 2011

Ph.D. *in progress*, Computer Science

B.S. Computer Engineering

GPA: 3.86

B.S. Electrical Engineering

GPA: 3.7

### Publications

- Hongyi Xin, Sunny Nahar, Richard Zhu, John Emmons, Gennady Pekhimenko, Carl Kingsford, Can Alkan, Onur Mutlu. “Optimal Seed Solver: Optimizing Seed Selection in Read Mapping,” in *Oxford Bioinformatics*, Volume 32, Issue 11, May 2016.
- Hongyi Xin, John Greth, John Emmons, Gennady Pekhimenko, Carl Kingsford, Can Alkan, Onur Mutlu. “Shifted Hamming Distance: A Fast and Accurate SIMD-Friendly Filter for Local Alignment in Read Mapping,” in *Oxford Bioinformatics*, Volume 31 Issue 10, June 2015.
- Donghyuk Lee, Farhad Hormozdiari, Hongyi Xin, Faraz Hach, Can Alkan, Onur Mutlu. “Fast and Accurate Mapping of Complete Genomics Reads,” in *Methods (Elsevier)*, Volume 79-80, June 2015.
- Vivek Seshadri, Samihan Yedkar, Hongyi Xin, Onur Mutlu, Phillip B. Gibbons, Michael A. Kozuch, Todd Mowry. “Mitigating Prefetcher-Caused Pollution using Informed Caching Policies for Prefetched Blocks”, in *ACM Transactions on Architecture and Code Optimization (TACO)*, Volume 11 Issue 4, January 2015.
- Gennady Pekhimenko, Vivek Seshadri, Yoongu Kim, Hongyi Xin, Onur Mutlu, Todd Mowry. “Linearly Compressed Pages: A Low-complexity, low-latency main memory compression framework” in Proceedings of the *46th International Symposium on Microarchitecture (MICRO 2013)*, Davis, CA, USA, December 2013.
- Hongyi Xin, Donghyuk Lee, Farhad Hormozdiari, Samihan Yedkar, Onur Mutlu, Can Alkan. “Accelerating Read Mapping with FastHASH,” in *BMC Genomics*, Volume 14, January 2013.
- Joseph L. Greathouse, Hongyi Xin, Yixin Luo, and Todd Austin. “A Case for Unlimited Watchpoints,” in Proceedings of the *17th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2012)*, London, United Kingdom, March 2012.

### Submissions under Revision

### Conference Talks

- “Accelerating Read Mapping with FastHASH,” in *11th Asia Pacific Bioinformatics Conference (APBC 2013)*, Vancouver, Canada, January 2013.

### Posters

- “Optimal Seed Solver (OSS): Optimizing Seed Selection in Read Mapping” in *High Throughput Sequencing (HiTSeq 2015)*, Dublin, Ireland, July 2015.
- “Shifted Hamming Distance (SHD): A Fast and Accurate SIMD-Friendly Filter for Local Alignment in Read Mapping” in *High Throughput Sequencing (HiTSeq 2014)*, Boston, United States, July 2014.

- “Accelerating Read Mapping with FastHASH,” in *17th Pacific Symposium on Biocomputing (PSB 2012)*, Hawaii, United States, January 2012.

### Contributed Software Projects

- Optimal Seed Solver (OSS). OSS is a dynamic-programming based, linear average-case complexity algorithm that enhances the performance of seed-and-extend based read mappers. OSS finds the least frequent set of  $e+1$  non-overlapping seeds from a read to tolerate a maximum of  $e$  errors.
- Shifted Hamming Distance (SHD). SHD is a SIMD-friendly edit-distance filter that quickly estimates the edit-distances between string pairs and filters out string pairs that have large edit-distances.
- Micro-Read Fast Alignment Search Tool (mrFAST). mrFAST is a DNA read mapper which map short DNA strings generated with the Illumina platform to reference genome assemblies; in a fast and memory-efficient manner.

### Work and Research Experience

#### Summer Internship at Microsoft Research Redmond Summer 2016

*Research mentors:* Dr. Bill Bolosky

*Research topics:* Mapping synthetic long reads with SNAP.

#### Summer Internship at IBM Research Watson Summer 2014

*Research mentors:* Dr. Jayaram Kallapalayam Radhakrishnan, Dr. Shu Tao and Dr. Anshul Ghandhi

*Research topics:* Accelerating distributed iterative analytics applications using GPUs.

#### Computer Architecture Lab at Carnegie Mellon, Ph.D. student, Fall 2011 – Present

*Research advisor:* Dr. Onur Mutlu

*Research topics:* Hardware/software support for DNA sequence mapping.

#### University of Michigan, undergraduate researcher, Summer 2010 – Spring 2011

*Research advisor:* Dr. Todd Austin

*Research Topics:* Computer security, hardware optimizations for security software and software debuggers.

### Skills

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|-------------------------|--------------------------|
| • C/C++ Programming     | • Pthread & OpenMP & MPI |
| • CUDA Programming      | • Hadoop                 |
| • Java                  | • Verilog & Cadence      |
| • Swift                 | • Python & Shell         |
| • C# & .NET Programming | • HTML & PHP             |

### Teaching

#### Carnegie Mellon University, Teaching Assistant, CS Dept.

- TA for Computer Architecture, 15-740, in Fall 2013.
- TA for Parallel Programming and Parallel Architecture, 15-418, in Spring 2013.

### Honors

- 2010-2011 University of Michigan EECS Distinguished Scholar Award
- 2011 Shanghai Distinguished Undergraduate Student Award
- 2009-2011 Dean’s List, University of Michigan EECS Department
- 2008-2009 Excellent Student Leader of Shanghai Jiaotong University