

Xiangyao Yu

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RESEARCH INTERESTS	Transaction processing: Concurrency control, logging, high availability, STM Software-hardware codesign: NVM-DB, RDMA network, GPU-DB, cache coherence, prefetching In-cloud databases: Data warehousing, compute-storage disaggregation	
EDUCATION	Massachusetts Institute of Technology (MIT) Ph.D. in Computer Science - Thesis: Logical Leases: Scalable Hardware and Software Systems through Time Traveling - Advisor: Prof. Srinivas Devadas S.M. in Computer Science - Thesis: An Evaluation of Concurrency Control with One Thousand Cores - Advisor: Prof. Srinivas Devadas Tsinghua University B.E. in Microelectronics Science and Engineering - Advisor: Prof. Leibo Liu	Cambridge, MA Feb. 2015 – Sep. 2017 Sep. 2012 – Feb. 2015 Beijing, China Sep. 2008 – Aug. 2012
PROFESSIONAL EXPERIENCE	Computer Sciences Department, University of Wisconsin-Madison Assistant Professor. Google Visiting Researcher. Supervisor: Dr. Jeff Naughton Database Group, MIT Postdoctoral Associate. Supervisor: Prof. Michael Stonebraker Computer Structure Group, MIT Graduate Research Assistant. Supervisor: Prof. Srinivas Devadas Parallel Computing Lab, Intel Research Intern. Supervisor: Dr. Pradeep Dubey Microsoft Research Asia (MSRA) Research Intern. Supervisor: Dr. Thomas Moscibroda Safari Group, CMU Research Intern. Supervisor: Prof. Onur Mutlu Hulu Full-Time Intern. Supervisor: Dr. Zhibing Wang	Madison, WI Jan. 2020 – Present Madison, WI Aug. 2019 – Jan. 2020 Cambridge, MA Oct. 2017 – Aug. 2019 Cambridge, MA Sep. 2012 – Sep. 2017 Santa Clara, CA Jun. – Aug. 2016 Beijing, China Oct. 2011 – Jun. 2012 Pittsburgh, PA Jun. – Sep. 2011 Beijing, China Aug. 2009 – Feb. 2010
HONORS AND AWARDS	George M. Sprowls Award for Outstanding Ph.D. Thesis Department of Electrical Engineering and Computer Science, MIT Best Paper Nomination Parallel Architectures and Compilation Techniques (PACT) Best Student Paper Award Computer and Communication Security Conference (CCS)	Nov. 2017 Oct. 2015 Nov. 2013

Energy Initiative Fellowship 2012 – 2013
MIT

Graduation with Honors Jun. 2012
Tsinghua University

Best Paper Nomination May 2012
International Symposium on Networks on Chip (NOCS)

First Prize Winner Apr. 2010
Challenge Cup, Tsinghua University

Comprehensive Scholarship 2009 – 2012
Tsinghua University

Third Prize Winner Jun. 2008
21st International Young Physicists' Tournament (IYPT)

TEACHING AND
MENTORING

6.004 Computation Structures, MIT Sep. – Dec. 2016
Teaching Assistant

6.046/18.410 Design and Analysis of Algorithms, MIT Feb. – Jun. 2015
Teaching Assistant

MIT PRIMES Program 2014 – 2016
Research Mentor

INVITED TALKS

Transaction Processing at Scale

- Parallel Computing Lab, Intel, May 2019
- University of Washington, April 2019
- University of Toronto, April 2019
- University of Maryland, March 2019
- Duke University, March 2019
- University of California Irvine, March 2019
- University of Texas at Austin, March 2019
- University of Wisconsin–Madison, March 2019
- Cornell University, March 2019
- University of Illinois Urbana-Champaign, February 2019
- Northwestern University, February 2019
- Purdue University, February 2019

Toward a Cloud DBMS Assistant

- Qatar Computing Research Institute (QCRI) annual meeting, MIT, October 2018

Logical Leases: Scalable Hardware and Software Systems through Time Traveling

- QCRI, Qatar, January 2018
- Shanghai Jiao Tong University (SJTU), January 2018
- Georgia Institute of Technology, March 2017
- University at Buffalo, February 2017
- Carnegie Mellon University, February 2017
- MongoDB, New York, NY, January 2017

TicToc: Time Traveling Optimistic Concurrency Control

- Intel Science and Technology Center for Big Data (ISTC-BD), Hillsboro, OR, August 2016
- North East Database Day (NEDB), MIT, January 2016

Time Traveling Cache Coherence and Concurrency Control

- Intel, Santa Clara, CA, June 2016
- Brown University, February 2016
- Harvard University, February 2016
- University of Massachusetts, Amherst, February 2016

IMP: Indirect Memory Prefetcher

- Intel, Santa Clara, CA, August 2014 Hillsboro, OR, August 2014

Staring into the Abyss: An Evaluation of Concurrency Control with One Thousand Cores

- Alibaba, Hangzhou, January 2018
- MIT cloud workshop, MIT, September 2014
- CSAIL Alliance Program (CAP) annual meeting, MIT, May 2014

Design Space Exploration and Optimization of Path Oblivious RAM in Secure Processors

- IBM China Research Lab, Beijing, China, August 2013

PROFESSIONAL SERVICE

Program Committee:

- VLDB 2020, 2021
- SIGMOD 2020
- SIGMOD Student Research Competition 2020
- VLDB Demo 2019
- SoCC 2019
- DASFAA 2019

Reviewer for:

- SIGMOD Record 2019
- TKDE 2019
- Transactions on Storage 2019
- SIGMETRICS 2019
- SPAA 2018
- Journal of Supercomputing 2017
- IEEE Transactions on Computers 2017
- SBAC-PAD 2016
- HPCA 2016
- MICRO 2015
- IAAA 2014

PATENTS

- P2. **Xiangyao Yu**, Christopher J. Hughes, Nadathur Rajagopalan Satish, *Hardware Prefetcher for Indirect Access Patterns*, US9582422B2, June 2016
- P1. Thomas Moscibroda, Zhengping Qian, Mark Eugene Russinovich, **Xiangyao Yu**, Jiaxing Zhang, Feng Zhao, *Service Allocation in a Distributed Computing Platform*, US9419859B2, August 2016

CONFERENCE PUBLICATIONS

- C21. Junjay Tan, Thanaa Ghanem, Matthew Perron, **Xiangyao Yu**, Michael Stonebraker, David DeWitt, Ashraf Aboulnaga, Marco Serafini, Tim Kraska, *Choosing A Cloud DBMS: Architectures and Tradeoffs*, Proceedings of the **VLDB** Endowment, August 2019.
- C20. Erfan Zamanian, **Xiangyao Yu**, Michael Stonebraker, Tim Kraska, *Rethinking Database High Availability with RDMA Networks*, Proceedings of the **VLDB** Endowment, Vol. 12, Iss. 11, July 2019.

- C19. Yi Lu, **Xiangyao Yu**, Samuel Madden, *STAR: Scaling Transactions through Asymmetric Replication*, Proceedings of the **VLDB** Endowment, Vol. 12, Iss. 11, July 2019.
- C18. Yu Xia, **Xiangyao Yu**, William Moses, Julian Shun, Srinivas Devadas, *LiTM: A Lightweight Deterministic Software Transactional Memory System*, International Workshop on Programming Models and Applications for Multicores and Manycores (**PMAM@PPoPP**), February 2019.
- C17. **Xiangyao Yu**, Vijay Gadepally, Stan Zdonik, Tim Kraska, and Michael Stonebraker, *FastDAWG: Improving Data Migration in the BigDAWG Polystore System*, VLDB workshop on Polystores and other Systems for Heterogeneous Data (**POLY@VLDB**), August 2018.
- C16. **Xiangyao Yu**, Yu Xia, Andrew Pavlo, Daniel Sanchez, Larry Rudolph, Srinivas Devadas, *Sundial: Harmonizing Concurrency Control and Caching in a Distributed OLTP Database Management System*, Proceedings of the **VLDB** Endowment, Vol. 11, Iss. 10, June 2018.
- C15. **Xiangyao Yu**, Chris Hughes, Nadathur Satish, Onur Mutlu, Srinivas Devadas, *Banshee: Bandwidth-Efficient DRAM Caching via Software/Hardware Cooperation*, Proceedings of the 50th International Symposium on Microarchitecture (**MICRO**), October 2017.
- C14. **Xiangyao Yu**, Hongzhe Liu, Ethan Zou, Srinivas Devadas, *Tardis 2.0: Optimized Time Traveling Coherence for Relaxed Consistency Models*, Proceedings of the 25th International Conference on Parallel Architectures and Compilation Techniques (**PACT**), September 2016.
- C13. **Xiangyao Yu**, Andrew Pavlo, Daniel Sanchez, Srinivas Devadas, *TicToc: Time Traveling Optimistic Concurrency Control*, Proceedings of **SIGMOD**, June 2016.
- C12. **Xiangyao Yu**, Christopher Hughes, Nadathur Satish, Srinivas Devadas, *IMP: Indirect Memory Prefetcher*, Proceedings of the 48th International Symposium on Microarchitecture (**MICRO**), December 2015.
- C11. **Xiangyao Yu**, Srinivas Devadas, *Tardis: Time Traveling Coherence Algorithm for Distributed Shared Memory*, Proceedings of the 24th International Conference on Parallel Architectures and Compilation Techniques (**PACT**), October 2015. **Best Paper Session.**
- C10. **Xiangyao Yu**, Syed Kamran Haider, Ling Ren, Christopher Fletcher, Albert Kwon, Marten van Dijk, Srinivas Devadas, *PrORAM: Dynamic Prefetcher for Oblivious RAM*, International Symposium on Computer Architecture (**ISCA**), June 2015.
- C9. **Xiangyao Yu**, George Bezerra, Andrew Pavlo, Srinivas Devadas, and Michael Stonebraker, *Staring into the Abyss: An Evaluation of Concurrency Control with One Thousand Cores*, Proceedings of the **VLDB** Endowment, vol. 8, iss. 3, November 2014.
- C8. Rachata Ausavarungnirun, Chris Fallin, **Xiangyao Yu**, Kevin Chang, Greg Nazario, Reetuparna Das, Gabriel Loh, and Onur Mutlu, *Design and Evaluation of Hierarchical Rings with Deflection Routing*, Proceedings of the 26th International Symposium on Computer Architecture and High Performance Computing (**SBAC-PAD**), October 2014.
- C7. Christopher Fletcher, Ling Ren, **Xiangyao Yu**, Marten van Dijk, Omer Khan, and Srinivas Devadas, *Suppressing the Oblivious RAM Timing Channel While Making Information Leakage and Program Efficiency Trade-offs*, Proceedings of the International Symposium on High Performance Computer Architecture (**HPCA**), February 2014.
- C6. **Xiangyao Yu**, Christopher Fletcher, Ling Ren, Marten Van Dijk, and Srinivas Devadas, *Generalized External Interaction with Tamper-Resistant Hardware with Bounded Information Leakage*, Proceedings of the Cloud Computing Security Workshop (**CCSW**), November 2013.
- C5. Emil Stefanov, Marten van Dijk, Elaine Shi, Christopher Fletcher, Ling Ren, **Xiangyao Yu**, and Srinivas Devadas, *Path ORAM: An Extremely Simple Oblivious RAM Protocol*, Proceedings of the 20th Computer and Communication Security Conference (**CCS**), 2013. **Best Student Paper Award.**
- C4. Ling Ren, Christopher W. Fletcher, **Xiangyao Yu**, Marten van Dijk, and Srinivas Devadas, *Integrity Verification for Path Oblivious-RAM*, Proceedings of the 17th IEEE High Performance Extreme Computing Conference (**HPEC**), 2013.

- C3. Ling Ren, **Xiangyao Yu**, Christopher W. Fletcher, Marten van Dijk, Srinivas Devadas, *Design Space Exploration and Optimization of Path Oblivious RAM in Secure Processors*, 40th International Symposium on Computer Architecture (**ISCA**), 2013.
- C2. Yuan Lin Yeoh, Bo Wang, **Xiangyao Yu**, Tony Tae Hyoung Kim, *A 0.4V 7T SRAM with Write Through Virtual Ground and Ultra-fine Grain Power Gating Switches*, IEEE International Symposium on Circuits and Systems (**ISCAS**), 2013.
- C1. Chris Fallin, Greg Nazario, **Xiangyao Yu**, Kevin Chang, Rachata Ausavarungnirun, Onur Mutlu. *MinBD: Minimally-Buffered Deflection Routing for Energy-Efficient Interconnect*, In 6th ACM/IEEE International Symposium on Networks-on-Chip (**NOCS**), 2012. **One of the five papers nominated for the Best Paper Award.**

JOURNAL
PUBLICATIONS

- J2. Emil Stefanov, Marten van Dijk, Elaine Shi, Christopher Fletcher, Ling Ren, **Xiangyao Yu**, Srinivas Devadas, *A Retrospective on Path ORAM*, IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (**TCAD**), 2019.
- J1. Rachata Ausavarungnirun, Chris Fallin, **Xiangyao Yu**, Kevin Chang, Greg Nazario, Reetuparna Das, Gabriel Loh, Onur Mutlu, *A Case for Hierarchical Rings with Deflection Routing: An Energy-Efficient On-Chip Communication Substrate*, Parallel Computing (**PARCO**), 2016.