

I-Ting Angelina Lee

CONTACT INFORMATION

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RESEARCH INTERESTS

I aim to make parallel programming accessible for everyone, so that every programmer, particularly the non-experts, can rapidly develop high performance software that takes advantage of commodity multicore hardware. To that end, I am interested in developing practical parallel systems based on solid theoretical foundations.

EDUCATION

Sep 2003 - Jun 2012	Massachusetts Institute of Technology Ph.D. in Computer Science, June 2012 S.M. in Computer Science, August 2005 Advisor: Charles E. Leiserson	Cambridge, MA
Sep 2000 - Jun 2003	University of California, San Diego B.S. in Computer Science, June 2003	La Jolla, CA

PUBLICATIONS

- On-the-Fly Pipeline Parallelism.
I-Ting Angelina Lee, Charles E. Leiserson, Tao B. Schardl, Jim Sukha, and Zhunping Zhang.
In *SPAA '13: Proceedings of the 25th ACM Symposium on Parallelism in Algorithms and Architectures*, pages 140–151. ACM, 2013.
- Memory-Mapping Support for Reducer Hyperobjects.
I-Ting Angelina Lee, Aamir Shafi, and Charles E. Leiserson.
In *SPAA '12: Proceedings of the 24th ACM Symposium on Parallelism in Algorithms and Architectures*, pages 287–297. ACM, 2012.
Selected for Best Paper Award
- Location-Based Memory Fences.
Edya Ladan-Mozes, I-Ting Angelina Lee, and Dmitriy Vyukov.
In *SPAA '11: Proceedings of the 23rd ACM Symposium on Parallelism in Algorithms and Architectures*, pages 75–84. ACM, 2011.
- Using Memory Mapping to Support Cactus Stacks in Work-Stealing Runtime Systems.
I-Ting Angelina Lee, Silas Boyd-Wickizer, Zhiyi Huang, and Charles E. Leiserson.
In *PACT '10: The 19th International Conference on Parallel Architectures and Compilation Techniques*, pages 411–420. ACM, 2010.
- Safe Open-Nested Transactions Through Ownership.
Kunal Agrawal, I-Ting Angelina Lee, and Jim Sukha.
In *PPoPP '09: Proceedings of the 14th ACM SIGPLAN Symposium on Principles and practice of parallel programming*, pages 151–162. ACM, 2009.
- Programming with Exceptions in JCilk.
John S. Danaher, I-Ting Angelina Lee, and Charles E. Leiserson.
Science of Computer Programming (SCP), 63(2):147–171, December 2006.
- Exception Handling in JCilk. John S. Danaher, I-Ting Angelina Lee, and Charles E. Leiserson.
In *Proceedings of the Workshop on Synchronization and Concurrency in Object-Oriented Languages*, October 2005.
- Time Division Hashing: A New Scheduling Scheme for Wireless Ad-Hoc Networks.
Winnie Cheng, I-Ting Angelina Lee, and Neha Singh.
In *Proceedings of the International Symposium on Advanced Radio Technologies (ISART)*, March 2005.

- o Memory Abstractions for Parallel Programming.
I-Ting Angelina Lee
Ph.D. Thesis, Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology, March 2012.
- o The JCilk Multithreaded Language.
I-Ting Angelina Lee
Master's Thesis, Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology, August 2005.

TEACHING EXPERIENCE

Fall 2012	6.172 Performance Engineering of Software Systems (U) Instructor Course page: http://stellar.mit.edu/S/course/6/fa12/6.172/index.html	MIT EECS
Fall 2009	6.046J/18.410J Design and Analysis of Algorithms (U) Teaching Assistant	MIT EECS
Fall 2006	6.042J/18.062J Mathematics for Computer Science (U) Teaching Assistant	MIT EECS
Fall 2005	6.001 Structure and Interpretation of Computer Programs (U) Teaching Assistant	MIT EECS
Jan 2001 - Jun 2003	Intro to CS and Object-Oriented Programming (U) Computer Organization & Systems Programming (U) Tutor and Lab assistant	UCSD CSE

RESEARCH EXPERIENCE

Aug 2012 - Present	MIT CSAIL Postdoctoral associate in SuperTech Research Group Advisor: Charles E. Leiserson	Cambridge, MA
Apr 2012 - Jul 2012	Intel Corporation Research scientist in Programming Systems Lab Manager: James M. Stichnoth	Hillsboro, OR
Sep 2003 - Mar 2012	MIT CSAIL Research assistant in SuperTech Research Group Advisor: Charles E. Leiserson	Cambridge, MA
May 2008 - Dec 2008	Sun Microsystems Laboratories Summer and fall (part-time) intern in Programming Language Research Group Mentors: Jan-Willem Maessen and Sukyoung Ryu	Burlington, MA
Jun 2006 - Aug 2006	Intel Corporation Summer intern in Programming Systems Lab Mentors: Richard Hudson and Vijay Menon	Santa Clara, CA

GRANTS

Parallelism without Concurrency NSF grant proposal co-authored with Charles E. Leiserson for a collaborative program with Carnegie Mellon University (Guy Blelloch) and Georgetown University (Jeremy T. Fineman) <i>Grant number CCF-1314547, funded for \$1,300,000 over 4 years</i>	2013
Using Thread-Local Memory Mapping to Support Memory Abstractions for Dynamic Multithreading NSF grant proposal co-authored with Charles E. Leiserson <i>Grant number CNS-1017058, funded for \$500,000 over 2 years</i>	2010
Sun Microsystems Fellowship	Fall 2004 - Spring 2005

PROFESSIONAL SERVICES

Program Committee Member

- Supercomputing (Programming Systems) 2014
- TRANSACT 2014
- X10 Workshop 2013
- CSAIL Student Workshop 2007, 2008

Reviewer

- International Conference on Distributed Computing and Networks (ICDCN) 2014
- Symposium on Parallelism in Algorithms and Architectures (SPAA) 2009, 2010, 2011, 2013
- Conference on Parallel Architectures and Compilation Techniques (PACT) 2012
- European Conference on Object-Oriented Programming (ECOOP) 2012
- ACM Transactions on Programming Languages and Systems (TOPLAS) 2012

Undergraduate Women's Mentoring Program at MIT

Organizing Committee Fall 2013 - Spring 2014

INVITED TALKS

- On-the-Fly Pipeline Parallelism
 - Rice University, Houston, TX October 2013
 - Washington University in St. Louis, St. Louis, MO October 2013
- Memory Abstractions for Parallel Programming
 - Lehigh University, Bethlehem, PA December 2013
 - Princeton University, Princeton, NJ November 2013
 - Rice University, Houston, TX November 2013
 - Columbia University, New York, NY June 2013
 - Stony Brook University, Stony Brook, NY June 2013
 - Rutgers, Piscataway, NJ June 2013
 - Brown University, Providence, RI May 2013
 - University of Pennsylvania, Philadelphia, PA April 2013
 - University of California, Los Angeles, Los Angeles, CA March 2013
 - University of Washington, Seattle, WA July 2012
 - Microsoft Research, Seattle, WA July 2012
- Memory-Mapping Support for Reducer Hyperobjects
 - University of California, Irvine, Irvine, CA March 2013
 - University of California, San Diego, La Jolla, CA March 2013
 - Intel Corporation, Merrimack, NH June 2012
- Using Memory Mapping to Support Cactus Stacks in Work-Stealing Runtime Systems
 - University of Massachusetts Amherst, Amherst, MA March 2011
 - University of California, Irvine, Irvine, CA January 2011
 - University of California, San Diego, La Jolla, CA January 2011
 - Oracle Labs, Burlington, MA September 2010
 - Tel-Aviv University, Tel-Aviv, Israel June 2010
 - Intel Labs, Hudson, MA February 2010
- The JCilk Language for Multithreaded Computing
 - University of California, San Diego, La Jolla, CA June 2007
 - University of Texas at Austin, Austin, TX May 2007
 - Intel Labs, Santa Clara, CA June 2006
 - Sun Labs, Burlington, MA October 2005

SOFTWARE

- TLMM: a patch for the Linux kernel to support a new memory mechanism called *thread-local memory mapping (TLMM)*, which designates a region of the process's virtual-address space as "local" to each thread that can be mapped independently.
This is joint work with Silas Boyd-Wickizer.
<https://github.com/angelee/linux> (the *tlmm* branch)

- Cilk-M: a Cilk-based work-stealing runtime system that employs TLMM to provide a “cactus-stack memory abstraction” to allow seamless transitions between parallel and serial code while maintaining provably good time and space bounds.
The Cilk-M runtime system works with Intel’s C++ compiler 12.0 which supports Cilk Plus linguistics. The Cilk-M runtime system also supports *reducers*, a useful linguistic mechanism for avoiding determinacy races, but with a more efficient mechanism compared to the one in Cilk Plus.
- Reducer array library: library support for a new type of reducer that offers the same functionality as an array of reducers but with significantly less overhead, in terms of execution time and space consumption.
- The JCilk system: a prototype implementation of JCilk, a Java-based multithreaded language that incorporates Cilk’s fork-join primitives for parallel control, and extends Java’s existing exception handling semantics to work with dynamic multithreading provided by the fork-join primitives.
This is joint work with John Danaher.
<http://people.csail.mit.edu/angelee/jcilk.tar.gz> (32-bit systems only)

CITIZENSHIP

U.S. Citizen

REFERENCES

Prof. Charles E. Leiserson

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Phone: 617-253-5833
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Prof. Michael A. Bender

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State University of New York at Stony Brook
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Prof. Guy E. Blelloch

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Prof. Vivek Sarkar

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