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CHARLES LEISERSON



Position: Professor

 Office: [32-G768](#)

Phone: +1 (617) 253-5833

 Email: cel@csail.mit.edu

Areas of Study:

Algorithms, Architecture, Multicore, Parallel Computation

[Personal Website](#)

Last Update: October 29, 2014

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PUBLICATIONS

Thomas H. Cormen, Charles E. Leiserson, and Ronald L. Rivest, *Introduction to Algorithms*, MIT Press and McGraw-Hill, 1990. Translated into eight languages.

Matteo Frigo, Charles E. Leiserson, and Keith Randall, "The implementation of the Cilk-5 multithreaded language," *1998 ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)*, Montreal, Canada, June 1998, pp. 212-223.

C. Scott Ananian, Krste Asanovic, Bradley C. Kuszmaul, Charles E. Leiserson, Sean Lie, "Unbounded transactional memory," *IEEE Micro*, 2006, to appear. An early version appeared in the *11th International Symposium on High-Performance Computer Architecture*, San Francisco, CA, February 2005, pp. 316-327.

AWARDS

ACM/IEEE: Ken Kennedy Award (2014)

IEEE Computer Society: Taylor L Booth Education Award (2014)

American Association for the Advancement of Science: Fellow (2013)

Association for Computing Machinery: Paris Kanellakis Theory and Practice Award (2013)

ACM Symposium on Parallelism in Algorithms and Architectures: Best Paper (2012)

ACM Symposium on Parallelism in Algorithms and Architectures: Best Paper (2009)

ACM Special Interest Group on Programming Languages: Most Influential PLDI Paper Award (2008)

Association for Computing Machinery: Fellow (2006)

IEEE Micro: Top Picks for "Unbounded Transactional Memory" (2006)

International Computer Chess Association: 2st Place in Dutch Open Computer Chess Championship for Cilkchess (1998)

ACM Special Interest Group on Programming Languages: 1st Prize in the ICFP Programming Contest (1998)

Association for Computing Machinery: Recognition of Service Award (1997)

International Computer Chess Association: 2st Place in Dutch Open Computer Chess Championship for Cilkchess (1997)

IEEE International Conference on Parallel

BIOGRAPHY

Prof. Leiserson's research centers on the theory of parallel computing, especially as it relates to engineering reality. He wrote the first paper on systolic architectures with H.T. Kung and invented the retiming method of digital circuit optimization. He designed and led the implementation of the network architecture for the Connection Machine Model CM-5 Supercomputer produced by Thinking Machines Corporation, which incorporated the fat-tree interconnection network he developed at MIT. Fat-trees are now the preferred interconnect strategy for Infiniband technology. His textbook, *Introduction to Algorithms*, coauthored with Ronald L. Rivest and Thomas H. Cormen was named "Best 1990 Professional and Scholarly Book in Computer Science and Data Processing" by the Association of American Publishers. Currently in its third edition with an additional coauthor Clifford Stein, it is the leading textbook on computer algorithms and, according to [CiteseerX](#), the most cited reference in computer science. As Director of System Architecture at Akamai Technologies, he led the engineering team that developed a world-wide content-distribution network numbering over 20,000 servers. He introduced the notion of cache-oblivious algorithms, which exploit the memory hierarchy near optimally while containing no tuning parameters for cache size or cache-line length. He developed the Cilk multithreaded programming technology, which featured the first provably efficient work-stealing scheduler. He led the development of several Cilk-based parallel chess-playing programs which have won numerous prizes in international competition. With Matteo Frigo, he founded Cilk Arts, Inc., which developed the Cilk++ multicore concurrency platform and was acquired by Intel Corporation in 2009. He was for many years the head of the computer-science program for the Singapore-MIT Alliance distance-education collaboration. His annual workshop on *Leadership Skills for Engineering and Science Faculty*, cotaught with Chuck McVinney, has educated hundreds of faculty at MIT and around the world in the nontechnical issues involved in leading technical teams in academia. He is a Margaret MacVicar Faculty Fellow at MIT, the highest recognition at MIT for undergraduate teaching. He is an ACM Fellow and a senior member of IEEE and SIAM.

Processing: Most Original Paper (1996)

International Computer Chess Association:
1st Place in Dutch Open Computer Chess
Championship for Cilkchess (1996)

Association for Computing Machinery:
Recognition of Service Award (1996)

International Computer Chess Association:
2nd Prize in the World Computer Chess
Championship (1995)

Association for Computing Machinery:
Recognition of Service Award (1995)

International Computer Chess Association:
3rd Place in the International Computer
Chess Championship (1994)

International Computer Chess Association:
3rd Place in the International Computer
Chess Championship (1993)

MIT EECS: Adler Scholar (1991)

Association of American Publishers: Best
1990 Professional and Scholarly Book in
Computer Science and Data Processing
(1990)

IEEE International Conference on Parallel
Processing: Best Presentation Award (1986)

IEEE International Conference on Parallel
Processing: Best Presentation Award (1985)

National Science Foundation: Presidential
Young Investigator Award (1985)

Association for Computing Machinery:
Doctoral Dissertation Award (1982)

John and Fannie Hertz Foundation: Doctoral
Thesis Award (1982)

John and Fannie Hertz Foundation: Hertz
Fellowship (1977)

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