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Contact:
Virginia Gold
ACM
212-626-0505
vgold@acm.org

**ACM GROUPS HONOR INNOVATORS WHO TRANSFORMED
PARALLEL COMPUTING**

**Herlihy, Moss, Shavit, and Touitou to Receive Dijkstra Prize for
Introducing Transactional Memory**

NEW YORK, July 18, 2012 – ACM’s Special Interest Groups on Algorithms and Computation Theory (SIGACT) and Operating Systems (SIGOPS) have recognized two research papers that fundamentally changed parallel computing in both theory and practice. In 1993, Maurice Herlihy and J. Eliot B. Moss introduced transactional memory, a new abstraction for multiprocessor architecture that greatly simplifies programming of concurrent computer systems. Two years later, Nir Shavit and Dan Touitou built on the hardware-based transactional synchronization methods of Herlihy and Moss, offering a novel software method for supporting the transactional memory abstraction used on parallel computing operations. Today, they will receive the 2012 Edsger W. Dijkstra Prize, sponsored jointly by SIGACT, SIGOPS, and the European Association for Theoretical Computer Science (EATCS), for their outstanding papers in distributed computing at the ACM Symposium on Principles of Distributed Computing (PODC, <http://www.podc.org/podc2012/>) July 16-18, in Madeira, Portugal.

In terms of fostering research, transactional memory has become a truly transformative idea for parallel computing in shared memory systems, where all processors share a memory that can be used to exchange information between processors. Nearly 1,400 citations were recorded for the Herlihy and Moss paper since it was published, and almost 1,000 citations were reported for the Shavit and Touitou paper. In addition, software architects have developed dozens of runtime implementations of remarkable algorithmic variety. At least four major compilers now support transactional memory in C++. Hardware implementations have been developed by Azul, Sun (Oracle), AMD (on paper), IBM, and Intel. The IBM and Intel implementations, in particular, ensure that hardware support is likely to continue.

At first, Herlihy and Moss’s proposal, introduced in their paper titled “Transactional Memory: Architectural Support for Lock-Free Data Structures,” proved too ambitious for the hardware of the day, and their work was largely ignored within the architecture community for most of the 1990s. Within the

theory community, however, it inspired multiple explorations of the limits of software emulation, most notably the “Software Transactional Memory” paper of Shavit and Touitou.

A professor of computer science at Brown University, Maurice Herlihy was awarded the 2003 Dijkstra Prize for “Wait-free synchronization.” He is a co-recipient with Nir Shavit of the 2004 Gödel Prize for their paper titled “The Topological Structure of Asynchronous Computation.” An ACM Fellow and co-author with Shavit of the textbook *The Art of Multiprocessor Programming*, Herlihy graduated with an A.B. degree in Mathematics from Harvard University. He received M.S. and Ph.D. degrees in Computer Science from the Massachusetts Institute of Technology (MIT).

J. Eliot B. Moss is a professor of Computer Science at the University of Massachusetts Amherst. A Fellow of ACM and of IEEE, he authored *Nested Transactions: An Approach to Reliable Distributed Computing*. He was educated at MIT, where he earned a B.S. degree in Electrical Engineering and Computer Science as well as M.S., E.E., and Ph.D. degrees in Computer Science.

Nir Shavit is a professor of Electrical Engineering and Computer Science at MIT, and a professor of Computer Science at Tel Aviv University. A co-recipient with Maurice Herlihy of the 2004 Gödel Prize for their paper titled “The Topological Structure of Asynchronous Computation,” he co-authored the textbook *The Art of Multiprocessor Programming* with Herlihy. Shavit received B.Sc. and M.Sc. degrees in Computer Science from The Technion – Israel Institute of Technology, and a Ph.D. degree in Computer Science from the Hebrew University in Jerusalem.

Dan Touitou has spent the last 15 years working for the data storage and networking industries. He is currently Chief Technology Officer at Toga Networks, a company providing consulting services to network equipment vendors. Before that he was a Distinguished Engineer at Cisco Systems. He received a B.Sc. degree in Computer Science from the Technion – Israel Institute of Technology and M.Sc. and Ph.D. degrees from Tel Aviv University.

The Dijkstra Prize includes an award of \$2,000, and is named in honor of Edsger W. Dijkstra, a pioneer in distributed computing. He received the 1972 ACM A.M. Turing Award for fundamental contributions to developing programming languages. The Dijkstra Prize is given for outstanding papers on the principles of distributed computing, whose significance and impact on the theory and/or practice of distributed computing have been evident for at least a decade.

About ACM

ACM, the Association for Computing Machinery www.acm.org, is the world’s largest educational and scientific computing society, uniting computing educators, researchers and professionals to inspire dialogue, share resources and address the field’s challenges. ACM strengthens the computing profession’s collective voice through strong

leadership, promotion of the highest standards, and recognition of technical excellence. ACM supports the professional growth of its members by providing opportunities for life-long learning, career development, and professional networking.

About SIGACT

The ACM Special Interest Group on Algorithms and Computation Theory <http://sigact.acm.org> fosters and promotes the discovery and dissemination of high quality research in the domain of theoretical computer science. The field includes algorithms, data structures, complexity theory, distributed computation, parallel computation, VLSI, machine learning, computational biology, computational geometry, information theory, cryptography, quantum computation, computational number theory and algebra, program semantics and verification, automata theory, and the study of randomness. Work in this field is often distinguished by its emphasis on mathematical technique and rigor.

About SIGOPS

The ACM Special Interest Group on Operating Systems <http://sigops.org> addresses a broad spectrum of issues associated with operating systems research and development. Members are drawn from a broad community spanning industry, academia, and government. SIGOPS supports many conferences and workshops. Areas of special interest include: interactions with computer architecture, multiprocessing, distributed, mobile computing, networking, resource management, security, and interprocess communication.

About EATCS

The European Association for Theoretical Computer Science <http://eatcs.org> is an international organization aimed at promoting research in the wide field of the foundations of computer science (ranging from formal languages, abstract computation models, algorithm design and complexity analysis, to applications of logic and semantics in programming). It facilitates the exchange of ideas and results among computer scientists, in particular through the organization of the annual International Conference on Automata, Languages and Programming (ICALP).

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