

**Sivan A. TOLEDO, Ph.D.**

## **CURRICULUM VITAE**

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Phone :	03-6405285
Date and place of birth:	17.5.66, Tel Aviv
ZAHAL (Israeli) Military Service:	1984-1989
Marital status:	Married
No. of children:	2

## **EDUCATION**

1988-1991	B.Sc., Mathematics and Computer Science (summa cum laude) Tel Aviv University Date of award: 1991
1990-1991	M.Sc., Computer Science (summa cum laude) Tel Aviv University Date of award: 1991 Title of Masters Thesis: Extremal polygon containment problems and other issues in parametric searching Name of Supervisor: Professor M. Sharir
1991-1995	Ph.D., Computer Science (minor in Management of technology and innovation) Massachusetts Institute of Technology Date of award: 1995 Title of Doctoral Dissertation: Quantitative performance modeling of scientific computations and creating locality in numerical algorithms Name of Supervisor: Professor C.E. Leiserson

## **ACADEMIC AND PROFESSIONAL EXPERIENCE**

1991-1995	Research assistant, Massachusetts Institute of Technology
Summer 1993	Researcher, IBM Almaden Research Center, San jose, California
1993-1994	Teaching assistant, Massachusetts Institute of Technology
Jun 1995-Aug 1996	Postdoctoral Associate, Laboratory for Computer Science, Massachusetts Institute of Technology

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Aug 1995-Oct 1996	Postdoctoral Fellow, IBM T.J. Watson Research Center, Yorktown Heights, NY
Oct 1996-Jun 1998	Postdoctoral Associate, Xerox Palo Alto Research Center, Palo Alto, CA
Jun 1998-Sep 1998	Visitor, Xerox Palo Alto Research Center, Palo Alto, CA
Oct 1997-Sep 2002	Senior Lecturer, Dept. of Computer Science, Tel-Aviv University (on leave at Xerox Palo Alto Research Center Oct 1997–September 1998).
Oct 2003-present	Associate Professor, Dept. of Computer Science, Tel-Aviv University. Courses taught: Operating Systems (Spring '99, Spring '00, Spring '01, Spring '02, Spring '03), Parallel Computing (Fall '99, Summer '00, Fall '00, Fall '01), Advanced Parallel Computing (Spring '00, Spring '01), Seminar in High-Performance Computing (Fall '98), Combinatorial Algorithms in Scientific Computing (Spring '02). Scientific Computing (Fall '02), Programming Workshop (Fall '02, Spring '03).

## PROGRAM COMMITTEES AND EDITORIAL DUTIES

### Editorships

2002–2003	Editor for a special issue on combinatorial scientific computing, <i>Linear Algebra and its Applications</i> , with Gilbert, Hendrickson, and Pothén.
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### Program Committees

1996-1997	Program committee member, 5th Annual Workshop on I/O in Parallel and Distributed Systems (IOPADS '97).
1999-2000	Program committee member, 2nd Conference on Numerical Analysis and Applications (NAA '2000)
2000-2001	Program committee member, 4th International Conference on Parallel Processing and Applied Mathematics (PPAM '2001)
2001-2002	Program committee member, International Parallel and Distributed Processing Symposium (IPDPS '2002)
2002-2003	Program committee member, International Parallel and Distributed Processing Symposium (IPDPS '2003)
2000-2003	Program committee member, 5th International Conference on Parallel Processing and Applied Mathematics (PPAM '2003)
2003	Chairman, 3th Jerusalem Parallel and Distributed Processing Symposium.
2004	Program committee member, SIAM Workshop on Combinatorial Scientific Computing (CSC 2004).

### Referee

Referee for: SIAM J. on Scientific Computing, SIAM J. on Matrix Analysis and Applications, SIAM J. on Computing, J. of the ACM, ACM Trans. on Mathematical Software, J. of Algorithms, IEEE

Trans. on Computers, Algorithmica, Information Processing Letters, Mathematical Programming, J. of Complexity, Discrete Applied Mathematics, Journal of Parallel and Distributed Computing.

Reviewer for: ACM Symposium on the Theory of Computing – 1993, ACM Symmposiums on Parallel Algorithms and Architectures – 1993 and 1994, International Symposium on Computer Architecture – 1993, International Parallel Processing Symposium – 1995, International Conference of the Austrian Center for Parallel Computation–1996, International Conference on Parallel Processing – 1996. ACM Symposium on Discrete Algorithms – 1999. ACM Symposium on Principles of Programming Languages — 2001. International Conference in Computational Science — 2001.

## OTHER PROFESSIONAL ACTIVITIES

- 1999–present      Chairman of the computer committee, School of Mathematical Sciences (Fall '99–Summer '00) and School of Computer Science (Fall '00–present), Tel-Aviv University
- 2001–2002      Committee member, Computer-science Grants Committee, Israeli Academy of Sciences
- 2003              Organized and obtained funding for four not-for-credit programming-skills courses for advanced computer-science students in Tel-Aviv University, two funded by IBM and two by Microsoft.
- 2001–present      Distribution of TAUCS, a library of linear solvers. *The sparse direct solver for symmetric/hermitian positive definite systems is now being integrated into Matlab as part of its built-in linear solve operator, the backslash.*

## ACTIVE PARTICIPATION IN SCIENTIFIC MEETINGS

- 1991              Extremal polygon containment problems. *7th ACM Symposium on Computational Geometry*, New Hampshire
- 1992              Competitive fault tolerance in area-universal networks. *4th ACM Symposium on Parallel Algorithms and Architectures*, San Diego, California
- 1992              Maximizing non-linear concave functions in fixed dimensions. *33th Symposium on Foundations of Computer Science*, Pittsburgh
- 1994              Efficient out-of-core algorithms for linear relaxation using blocking covers. *34th Symposium on Foundations of Computer Science*, Palo Alto, California
- 1994              PerfSim: An automatic performance analysis tool for data-parallel Fortran programs. *4th Annual MIT Student Workshop on Scalable Computing*, Cape Cod, Massachusetts

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- 1995 PerfSim: An automatic performance analysis tool for data-parallel Fortran programs. *5th Symposium on the Frontiers of Massively Parallel Computation*, McLean, Virginia
- 1995 Preconditioning with a decoupled rowwise ordering on the CM-5. *7th SIAM Conference on Parallel Processing for Scientific Computing*, San Francisco
- 1995 Out-of-core Krylov-subspace methods. *5th Annual MIT Student Workshop on Scalable Computing*, Cape Cod, Massachusetts
- 1996 Predicting performance with Benchmaps. *10th International Parallel Processing Symposium*, Hawaii
- 1996 The design and implementation of SOLAR, a portable library for scalable out-of-core linear algebra computations. *ACM Workshop on I/O in Parallel and Distributed Systems*, Philadelphia
- 1997 Improving Instruction-Level Parallelism in Sparse Matrix-Vector Multiplication using Reordering, Blocking, and Prefetching. *8th SIAM Conference on Parallel Processing for Scientific Computing*, Minneapolis
- 1998 Support-graph preconditioners. *Copper Mountain Conference On Iterative Methods*, Copper Mountain, Colorado.
- 1998 A survey of out-of-core algorithms in numerical linear algebra. *DI-MACS Workshop on External-Memory Algorithms and Visualization*, Piscataway, New Jersey.
- 1999 High-Performance Out-of-Core Sparse LU Factorization. *9th SIAM Conference on Parallel Processing for Scientific Computing*, San-Antonio, Texas
- 1999 Strategies for designing cache-friendly sparse-matrix codes. *4th International Congress on Industrial and Applied Mathematics*, Edinburgh, Scotland
- 1999 Theoretical Analyses of Cache Misses in Dense-Linear Algebra Algorithms. *Workshop on Linear Algebra with Recursive Algorithms*, Lingby, Denmark
- 2001 Three talks: Out-of-Core SVD and QR decompositions, Nested-dissection orderings for sparse LU with partial pivoting, Communication-efficient parallel dense LU using a 3-dimensional approach (this talk given by my student Dror Irony). *10th SIAM Conference on Parallel Processing for Scientific Computing*, Portsmouth, Virginia
- 2001 Implementation and evaluation of Vaidya's preconditioners (talk given by my student Doron Chen), *Preconditioning 2001*, Tahoe, California
- 2001 Font subsetting and downloading in the PostScript printer driver of Qt/X11, *XFree86 Technical Conference*, Oakland, California

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- 2002 Multilevel support-graph preconditioners, *Latsis 2002: Iterative Solvers for Large Linear Systems*, Zurich, Switzerland
- 2002 Multilevel support-graph preconditioners, *Latsis 2002: Iterative Solvers for Large Linear Systems*, Zurich, Switzerland
- 2002 Parallel and Fully Recursive Multifrontal Supernodal Sparse Cholesky, International Conference on Computational Science 2002, Amsterdam
- 2002 Support Preconditioners in TAUCS, Sparse Days at CERFACS, Toulouse, France
- 2002 Combinatorial Open Problems in Preconditioning, SIAM Annual Meeting, Philadelphia
- 2002 Parallel Randomized Best-First Search, Man vs. Machine: The Experiment, Haifa, Israel
- 2003 (No talk given), Microsoft Research Crash Course IV: Software and Web Engineering in the Microsoft .NET Environment, Cambridge, England
- 2003 The Design and Implementation of a New Out-of-Core Sparse Cholesky Factorization Method, International Conference on Numerical Analysis and Computational Mathematics (NACoM-2003), Cambridge, England
- 2003 Experience with OpenType font production, EuroTeX 2003, Brest, France

## GRANTS AND AWARDS

- 1988-1991 4-year tuition plus stipend award, special Interdisciplinary Program, Tel Aviv University
- 1991 Dean's list of outstanding graduate students
- 1991 Maus Prize for distinguished Master's thesis in computer science
- 1998 US\$60K Seed funding from Tel-Aviv University.
- 1999-2002 US\$60K equipment grant from ISF: Computing and Communication Equipment for Parallel Computing. Together with Intrator, Fibich, and Matias from Tel-Aviv University. Intrator was the lead PI.
- 2000-2001 US\$12.5K research grant from the University Research Fund, Tel-Aviv University: Cache-efficient Algorithms. Single PI.
- 2000-2004 US\$145K research grant from the ISF: Cache-efficient Algorithms. Single PI.
- 2001-2002 US\$40K IBM Faculty Partnership Award.
- 2001 US\$40K IBM Equinox Equipment Award. I am the coordinator for this award, which was awarded to the School of Computer Science.
- 2002 US\$1K Equipment Award from *MasterFont—Studio Rosenberg*.

2003–2007 US\$80K research grant from the US-Israeli Binational Science Foundation (BSF): Efficient Algorithms for Indecomposable Numeric-Combinatorial Problems. With Alan Edelman (MIT) and John R. Gilbert (UCSB).

### MEMBERSHIP IN PROFESSIONAL SOCIETIES

2001–2003 SIAM

### INTERNS SUPERVISED AT XEROX PARC

Summer 1998 Tzu-Yi Chen. Parallel Multithreaded Minimum-Degree Ordering Code. The results of this research resulted in a conference paper and were included in Chen’s PhD thesis submitted to U.C. Berkeley.

### MASTERS STUDENTS SUPERVISED AT TEL-AVIV UNIVERSITY

Mar 1999–Aug 2000 Dror Irony. *A 3D Parallel Communication-Efficient Dense Linear Solver.*

Mar 1999–Feb 2001 Doron Chen. *Vaidya’s Combinatorial Preconditioners.*

Jun 2000–Mar 2001 Yaron Shoham. *Highly Parallel Game-Tree Search Algorithms.*

Mar 1999–Jul 2001 Igor Breinman. *Nested-Dissection Orderings for Sparse LU with Partial Pivoting.*

Mar 2000–Jan 2001 Eyal Baruch. *Dynamic Parallel Matrix Algorithms.*

Aug 2000–January 2003 Vladimir Rotkin. *An Out-of-Core Sparse Linear Solvers.*

Mar 2001–January 2003 Gil Shklarski. *High-performance computational kernels.*

Oct 2002–present Haim Avron. *Parallel sparse-matrix factorizations.*

Oct 2002–present Ofra Pavlouchich. *Cilk scheduling and cilk-library support.*

Oct 2002–present Elad Rozin. *Analysis of Sparse Cholesky Factorization Algorithms.*

Feb 2003–present Eitan Ben-Amos. *Security in grid computing.*

Nov 2002–present Shachar Rubinstein. *A fault-tolerant cluster scheduler.*

April 2003–present Omer Meshar.

April 2003–present Anat Rapoport.

June 2003–present Eran Bida. *Automatically tuned sorting.*

June 2003–present Assaf Sagi. *Hypergraph column-ordering for sparse LU with partial pivoting.*

### DOCTORAL STUDENTS SUPERVISED AT TEL-AVIV UNIVERSITY

Aug 2000–present Dror Irony.  
*Parallel Matrix Algorithms.*

Mar 2001–present

Doron Chen.

*Preconditioning for Sparse Linear Systems.*

Date: August 2003