

John R. Gilbert
Professor of Computer Science
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Research interests:

Combinatorial scientific computing, numerical linear algebra, sparse matrix methods, computation with large graphs, mathematical software, high-performance computing, computational science and engineering.

Experience:

- University of California, Santa Barbara. Professor of Computer Science, since 2002.
- Lawrence Berkeley National Laboratory. Faculty Scientist, since 2004.
- Massachusetts Institute of Technology. Visiting Scientist, Laboratory for Computer Science and Mathematics Department, 2002-2003 and 2008.
- Xerox Palo Alto Research Center. Principal Scientist and Manager, Computation and Matter Area, 1997-2002. Manager, Computational Methods Area, 1994-1997. Member of Research Staff, 1988-1994.
- University of Bergen (Norway). Adjunct Professor of Computer Science, 1987-1989.
- University of Iceland. Visiting Professor of Mathematics, 1985.
- Cornell University. Associate Professor of Computer Science, 1986-1988. Assistant Professor of Computer Science, 1981-1986.

Education:

- Stanford University. Ph.D., Computer Science, 1981.
- University of New Mexico. B.U.S. (summa cum laude in Mathematics), 1973.

Honors and Awards:

- Fellow of the Society for Industrial and Applied Mathematics, 2010.
- MIT 50K Entrepreneur Competition: Software Category Award (as member of Star-P team), 2003.
- Several Xerox Corporation awards for research and for management, 1990-2001.
- Hanes-Willis Visiting Professorship of Computer Science, U. of North Carolina, 1997.
- Distinguished Centennial Alumnus, University of New Mexico, 1989.
- National Science Foundation Presidential Young Investigator, 1985.
- George Forsythe Memorial Award for Teaching, Stanford University, 1978.
- John and Fannie Hertz Foundation Fellow, 1978.

Selected Consulting and Advisory Boards:

- External Advisory Board, Sandia National Laboratories Grand Challenge, since 2008.
- No-fee consultant, MIT Lincoln Laboratory, since 2008.
- Consultant, Silicon Graphics Inc., 2004-2006.
- Advisory Board, Interactive Supercomputing Inc., 2004-2009.
- Defense Science Board Task Force on Critical Technologies, 2005.

- Consultant, Institute for Defense Analyses, since 2001.
- NRC Assessment Board on the NIST Information Technology Laboratory, 1998-2003. Mathematics Panel Chair, 2002-2003.
- Invited participant at various NSF, DOE, DOD, NASA reviews and workshops.

Selected Professional Activities:

- Conference Co-chair, SIAM Symposium on Parallel Processing, 2008.
- Chair, SIAM Activity Group on Supercomputing, 2006-2007.
- Editorial Board, SIAM Review, 2004-2006.
- Editorial Board, SIAM Fundamentals of Algorithms book series, 2004-2006.
- Co-organizer, SIAM Workshop on Combinatorial Scientific Computing, 2004 & 2005.
- Member, SIAM Council, 1997-2003.
- Editorial Board, ACM Transactions on Mathematical Software, 1994-1998.
- Program Director, SIAM Activity Group on Linear Algebra, 1992-1997.
- Chair, ACM Special Interest Group for Numerical Mathematics, 1993-1997. Board Member, 1989-1993.
- Editorial Board, SIAM Journal on Matrix Analysis and Applications, 1988-1992.
- Editorial Board, SIAM Journal on Algebraic and Discrete Methods, 1984-1987.
- Conference committee member, minisymposium organizer for various SIAM meetings.
- Reviewer for various DOE, NSF, and NSERC proposals.

Ph.D. Theses Supervised:

- Anders Edenbrandt. *Combinatorial Problems in Matrix Computation*. Ph.D. 1985, Cornell.
- Raimund Seidel. *Output-Size Sensitive Algorithms for Constructive Problems in Computational Geometry*. Ph.D. 1987, Cornell. Now at Universität des Saarlandes, Saarbrücken, Germany.
- Earl Zmijewski. *Sparse Cholesky Factorization on a Multiprocessor*. Ph.D. 1987, Cornell. Now at Renesys Corp., Boston.
- Hjalmltyr Hafsteinsson. *Highly Parallel Algorithms for Sparse Matrix Computation*. Ph.D. 1988, Cornell. Now at University of Iceland, Reykjavik.
- Viral Shah. *An Interactive System for Combinatorial Scientific Computing with an Emphasis on Programmer Productivity*. Ph.D. 2007, UCSB. Now at Unique Identification Authority, India.
- Imran Patel. *Empirical Evaluation of Software Development Productivity in High-Performance Computing*. Ph.D. 2008, UCSB. Now at amazon.com.
- Vikram Aggarwal. *A Parallel Preconditioner for Octree Meshes*. Ph.D. 2008, UCSB. Now at Google.
- Aydin Buluc. *Linear Algebraic Primitives for Parallel Computing on Large Graphs*. Ph.D. 2010, UCSB. Now at Lawrence Berkeley National Laboratory.

Postdoctoral Scholars Supervised:

- David Eppstein, Xerox PARC, 1989-1990. Now at University of California, Irvine.
- Shang-Hua Teng, Xerox PARC, 1991-1992. Now at University of Southern California.
- Nabil Kahale, Xerox PARC, 1992-1993. Now at ESCP Europe, Paris.
- Annamaria Amenta, Xerox PARC, 1993-1995. Now at University of California, Davis.
- Sivan Toledo, Xerox PARC, 1996-1998. Now at Tel-Aviv University, Israel.

Selected Invited Lectures and Seminars:

- “Combinatorial preconditioning for sparse linear systems.” Keynote, 5th Intl. Symp. on Solving Irregular Problems in Parallel (IRREGULAR’98), Berkeley, August 1998.
- “Smart matter: Frontiers in computation.” Keynote, Computational Science and Engineering Symposium, University of Illinois at Urbana-Champaign, April 2001.
- “Graph algorithms in scientific computing: Past, present, and future.” Keynote, 16th Pacific Northwest Numerical Analysis Seminar, Victoria, Canada, September 2002.
- “Support graph preconditioning.” Applied Mathematics Colloquium, MIT, November 2002.
- “An interactive environment for numerical and combinatorial supercomputing.” Keynote, 46th Scandinavian Simulation Society Conference, Trondheim, Norway, October 2005.
- “Combinatorial scientific computing: Experiences, directions, and challenges.” Keynote, DOE CSCAPES workshop, Santa Fe, June 2008.
- “Challenges in combinatorial scientific computing.” Applied Mathematics Colloquium, MIT, December 2008.
- “Combinatorial scientific computing: Experiences and challenges.” Tutorial, Third Workshop on Algorithms for Modern Massive Data Sets (MMDS’10), Palo Alto, June 2010.

Patents, Software Packages, and Licensing of Intellectual Property:

- Sparse matrices for Matlab: Sparse matrix representations, operations, solvers, and permutations for the Matlab programming environment. J. R. Gilbert, C. Moler, and R. Schreiber. Software licensed to The MathWorks, 1991.
- Generating local addresses and communication sets for data-parallel programs. J. R. Gilbert, S. Teng, S. Chatterjee, F. J. E. Long, and R. S. Schreiber. U.S. Patent 5,450,313, issued 1995.
- Method of compilation optimization ... for data-parallel programs. J. R. Gilbert, S. Chatterjee, and R. Schreiber. U.S. Patent 5,474,842, issued 1995.
- SuperLU: Direct solution of general nonsymmetric sparse systems of linear equations on hierarchical-memory sequential computers. J. Demmel, S. Eisenstat, J. R. Gilbert, S. Li, and J. Liu. Software library licensed for public use, 1995.
- Tools for efficient sparse matrix computation. J. R. Gilbert, J. Lamping, A. Mendhekar, and T. Shpeisman. U.S. Patent 5,781,779, issued 1998.
- SuperLU-MT: Direct solution of general nonsymmetric sparse systems of linear equations on multithreaded parallel computers. J. Demmel, J. R. Gilbert, and S. Li. Software library licensed for public use, 1998.
- Ordered sparse accumulator and its use in efficient sparse matrix computation. J. R. Gilbert, W. W. Pugh Jr., and T. Shpeisman. U.S. Patent 5,983,230, issued 1999.
- Matlab Mesh Partitioning and Graph Separator Toolbox. J. R. Gilbert and S. Teng. Software licensed for public use, 2002.
- Star-P: Sparse matrix representations, operations, and solvers for the Matlab*P / Star-P interactive parallel programming environment. J. R. Gilbert and V. Shah. Software licensed to MIT and Interactive Supercomputing, Inc., 2005.

Publications: See attached list.