

Linda Torczon

Senior Research Scientist
Faculty Director, CS Professional Masters Program
Adjunct Lecturer in Computer Science

Department of Computer Science
Rice University
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Houston, Texas, USA 77005

EDUCATION AND EMPLOYMENT

Education

B.S., Chemical Engineering Rice University, 1980 (*magna cum laude*)
M.S., Computer Science Rice University, 1984
Ph.D., Computer Science Rice University, 1985

Positions

Faculty Director, CS Professional Masters Program	Rice University	2016 to present
Adjunct Lecturer in Computer Science	Rice University	2013 to present
Senior Research Scientist	Rice University	2007 to present
Assistant Chair	Rice University	2013 to 2016
Research Scientist	Rice University	1998 to 2006
Faculty Fellow	Rice University	1992 to 1998
Research Associate	Rice University	1985 to 1992
Executive Director	Center for High Performance Software Research	2000 to 2006
Executive Director	NSF-sponsored GrADS and VGrADS Projects	1999 to 2009
Executive Director	Los Alamos Computer Science Institute	1998 to 2006
Executive Director	Center for Research on Parallel Computation	1990 to 2001
Executive Director	Geophysical Parallel Computation Project	1990 to 1994

INTELLECTUAL WORKS

Books and Book Chapter

1. K.D. Cooper, K. Kennedy, and L. Torczon, "Compilers," in *Encyclopedia of Physical Science and Technology, Third Edition*, R.A. Myers (editor), Academic Press, 2001, pages 433–442.
2. J. Dongarra, I. Foster, G. Fox, W. Gropp, K. Kennedy, L. Torczon, and A. White, *Sourcebook of Parallel Computing*, Elsevier Morgan-Kaufmann, San Francisco, CA, 2003, 842 pages.
3. K.D. Cooper and L. Torczon, *Engineering a Compiler*, Elsevier Morgan-Kaufmann, Burlington, MA, *First Edition*, 2004, 801 pages; *Second Edition*, 2011, 800 pages.

Patent

Digital Computer Register Allocation and Code Spilling Using Interference Graph Coloring, U.S. Patent Number 5,249,295, September, 1995 (with P. Briggs, K. Cooper, and K. Kennedy).

Journal Articles

1. K. Cooper, K. Kennedy, and L. Torczon, “The Impact of Interprocedural Analysis and Optimization in the \mathcal{R}^n Programming Environment,” *ACM Transactions on Programming Languages and Systems (TOPLAS)*, 8(4), October, 1986, pages 491–523.
2. A. Carle, K. Cooper, R. Hood, K. Kennedy, L. Torczon, and S. Warren, “A Practical Environment for Scientific Programming,” *IEEE Computer*, 20(11), November, 1987, pages 75–89.
3. D. Callahan, K. Cooper, R. Hood, K. Kennedy, and L. Torczon, “ParaScope: A Parallel Programming Environment,” *The International Journal of Supercomputer Applications*, 2(4), December, 1988, pages 84–99.
4. K. Cooper, M. Hall, and L. Torczon, “An Experiment with Inline Substitution,” *Software–Practice and Experience*, 21(6), June, 1991, pages 581–601.
5. P. Briggs, K. Cooper, and L. Torczon, “Coloring Register Pairs,” *ACM Letters on Programming Languages and Systems (LOPLAS)*, 1(1), March, 1992, pages 3–13.
6. K. Cooper, M. Hall, and L. Torczon, “Unexpected Side Effects of Inline Substitution: A Case Study,” *ACM Letters on Programming Languages and Systems (LOPLAS)*, 1(1), March, 1992, pages 22–32.
7. K. Cooper, M. Hall, R. Hood, K. Kennedy, K. McKinley, J. Mellor-Crummey, L. Torczon, and S. Warren, “The ParaScope Parallel Programming Environment,” *Proceedings of the IEEE*, 81(2), February, 1993, pages 244–263.
8. P. Briggs and L. Torczon, “An Efficient Representation for Sparse Sets,” *ACM Letters on Programming Languages and Systems (LOPLAS)*, 2(1–4), March–December, 1993, pages 59–69.
9. M. Burke and L. Torczon, “Interprocedural Optimization: Eliminating Unnecessary Recompile,” *ACM Transactions on Programming Languages and Systems (TOPLAS)*, 15(3), July, 1993, pages 367–399.
10. P. Briggs, K. Cooper, and L. Torczon, “Improvements to Graph Coloring Register Allocation,” *ACM Transactions on Programming Languages and Systems (TOPLAS)*, 16(3), May, 1994, pages 428–456.
11. K. Cooper, M. Hall, K. Kennedy, and L. Torczon, “Interprocedural Analysis and Optimization,” *Communications on Pure and Applied Mathematics*, 48, 1995, pages 947–1003.
12. K. Cooper, T. Harvey, and L. Torczon, “How to Build an Interference Graph,” *Software–Practice and Experience*, 28(4), April, 1998, pages 425–444.
13. F. Berman, A. Chien, K. Cooper, J. Dongarra, I. Foster, D. Gannon, L. Johnsson, K. Kennedy, C. Kesselman, J. Mellor-Crummey, D. Reed, L. Torczon, and R. Wolski, “The GrADS Project: Software Support for High-level Grid Programming,” *International Journal of High Performance Computing Applications*, 15(4), November, 2001, pages 327–344.

14. K. Kennedy, B. Broom, K. Cooper, J. Dongarra, R. Fowler, D. Gannon, L. Johnsson, J. Mellor-Crummey, and L. Torczon, “Telescoping Languages: A Strategy for Automatic Generation of Scientific Problem-Solving Systems from Annotated Libraries,” *Journal of Parallel and Distributed Computing*, 61(12), December, 2001, pages 1802–1826.
15. K. Cooper, D. Subramanian, and L. Torczon, “Adaptive Optimizing Compilers for the 21st Century,” *Journal of Supercomputing*, 23(1), August, 2002, pages 7–22.
Originally appeared in *Proceedings of the 2001 LACSI Symposium*, Los Alamos Computer Science Institute, Santa Fe, NM, USA, October 2001.
16. K. Cooper, A. Grosul, T. Harvey, S. Reeves, D. Subramanian, L. Torczon, and T. Waterman, “Exploring the Structure of the Space of Compilation Sequences Using Randomized Search Algorithms,” *Journal of Supercomputing*, 36(2), May, 2006, pages 135–151.
Originally appeared in *Proceedings of the 2004 LACSI Symposium*, Los Alamos Computer Science Institute, Santa Fe, NM, USA, October, 2004.

Refereed Conferences and Workshops

1. K. Cooper, K. Kennedy, and L. Torczon, “The Impact of Interprocedural Analysis and Optimization on the Design of a Software Development Environment,” *Proceedings of the ACM SIGPLAN 85 Symposium on Language Issues in Programming Environments*, June, 1985, pages 107–116.
Proceedings also published as SIGPLAN Notices, 20(7).
2. K. Cooper, K. Kennedy, and L. Torczon, “Optimization of Compiled Code in the \mathcal{R}^n Programming Environment,” *Proceedings of the 19th Annual Hawaii International Conference on Systems Sciences*, January, 1986, pages 492–502.
3. D. Callahan, K. Cooper, K. Kennedy, and L. Torczon, “Interprocedural Constant Propagation,” *Proceedings of the SIGPLAN 86 Symposium on Compiler Construction*, July, 1986, pages 152–161.
Proceedings also published as SIGPLAN Notices, 21(7).
4. K. Cooper, K. Kennedy, and L. Torczon, “Interprocedural Optimization: Eliminating Unnecessary Recompile,” *Proceedings of the SIGPLAN 86 Symposium on Compiler Construction*, July, 1986, pages 58–67.
Proceedings also published as SIGPLAN Notices, 21(7).
5. K. Cooper, K. Kennedy, L. Torczon, A. Weingarten, and M. Wolcott, “Editing and Compiling Whole Programs,” *Proceedings of the ACM SIGPLAN/SIGSOFT Symposium on Practical Software Environments (PSDE)*, December, 1986, pages 92–101.
Proceedings also published as SIGPLAN Notices, 22(1).

6. D. Callahan, K. Cooper, R. Hood, K. Kennedy, L. Torczon, and S. Warren, “Parallel Programming Support in ParaScope,” *Parallel Computing in Science and Engineering: Proceedings of the Fourth International DFVLR Seminar on Foundations of Engineering Sciences*, Bonn, Germany, June, 1987, pages 89–106.
 Proceedings published as Lecture Notes in Computer Science 295/1988.
7. P. Briggs, K. Cooper, K. Kennedy, and L. Torczon, “Coloring Heuristics for Register Allocation,” *Proceedings of the SIGPLAN 89 Conference on Programming Language Design and Implementation (PLDI)*, July, 1989, pages 275–284.
 Proceedings also published as SIGPLAN Notices, 24(7).
8. P. Briggs, K. Cooper, and L. Torczon, “Rematerialization,” *Proceedings of the SIGPLAN 92 Conference on Programming Language Design and Implementation (PLDI)*, July, 1992, pages 311–321.
 Proceedings also published as SIGPLAN Notices, 27(7).
9. D. Grove and L. Torczon, “Interprocedural Constant Propagation: A Study of Jump Function Implementations,” *Proceedings of the ACM SIGPLAN 93 Conference on Programming Language Design and Implementation (PLDI)*, June, 1993, pages 90–99.
 Proceedings published as SIGPLAN Notices, 28(6).
10. K. Kennedy, M. Mazina, J. Mellor-Crummey, K. Cooper, L. Torczon, F. Berman, A. Chien, H. Dail, O. Sievert, D. Angulo, I. Foster, R. Aydt, D. Reed, D. Gannon, L. Johnsson, C. Kesselman, J. Dongarra, S. Vadhiyar, and R. Wolski, “Toward a Framework for Preparing and Executing Adaptive Grid Programs,” *Proceedings of the International Parallel and Distributed Processing Symposium (IPDPS '02)*, 2002.
11. D. Callahan, K. Cooper, K. Kennedy, and L. Torczon, “Interprocedural Constant Propagation,” in *Best of PLDI 1979-1999 (Special Issue)*, ACM SIGPLAN Notices, 39(4), April, 2004, pages 155–166.
 Paper and a retrospective on the work by the authors appear in this special issue. Original paper appeared in *PLDI '86*.
12. P. Briggs, K. Cooper, K. Kennedy, and L. Torczon, “Coloring Heuristics for Register Allocation,” in *Best of PLDI 1979-1999 (Special Issue)*, ACM SIGPLAN Notices, 39(4), April, 2004, pages 283–294.
 Paper and a retrospective on the work by the authors appear in this special issue. Original paper appeared in *PLDI '89*.
13. L. Almagor, A. Grosul, K. Cooper, T. Harvey, S. Reeves, D. Subramanian, L. Torczon, and T. Waterman, “Finding Effective Compilation Sequences,” *Proceedings of the 2004 ACM SIGPLAN/SIGBED Conference on Languages, Compilers, and Tools for Embedded Systems (LCTES)*, June, 2004, pages 231–239.
 Proceedings also published as ACM SIGPLAN Notices, 39(7).

14. A. Grosul, K. Cooper, T. Harvey, S. Reeves, D. Subramanian, L. Torczon, and T. Waterman, “ACME: Adaptive Compilation Made Efficient/Easy,” *Proceedings of the 2005 ACM SIGPLAN/SIGBED Conference on Languages, Compilers, and Tools for Embedded Systems (LCTES)*, June, 2005, pages 69–77.

Proceedings also published as ACM SIGPLAN Notices, 40(7).

Unrefereed Workshop Papers

1. P. Briggs, K. Cooper, and L. Torczon, “Aggressive Live Range Splitting,” *Proceedings of Code 91—Workshop on Code Generation Concepts, Tools, and Techniques*, Schloss Dagstuhl, Germany, May, 1991.

Also available as Technical Report 90–146, Department of Computer Science, Rice University, November, 1990, and as Technical Report 90101, Center for Research on Parallel Computation, Rice University, 1990.

Technical Reports

1. K. Cooper, K. Kennedy, and L. Torczon, “Recompilation Algorithms for an Optimizing Compiler Based in the \mathcal{R}^n Programming Environment,” Technical Report 84–7, Department of Computer Science, Rice University, November, 1984.
2. K. Cooper, R. Hood, K. Kennedy, and L. Torczon, “The \mathcal{R}^n Environment: A Capsule Description,” Technical Report 87–46, Department of Computer Science, Rice University, June, 1987.
3. D. Callahan, K. Cooper, K. Kennedy, and L. Torczon, “Advanced Techniques in Interprocedural Analysis,” Technical Report 87–48, Department of Computer Science, Rice University, June, 1987.
4. K. Cooper, M. Hall, and L. Torczon, “The Perils of Interprocedural Knowledge”, Technical Report 90065, Center for Research on Parallel Computation, Rice University, 1990.
5. M. Burke, K. Cooper, K. Kennedy, and L. Torczon, “Interprocedural Optimization: Eliminating Unnecessary Recompilation,” Technical Report RC 15968 (70983), IBM Research Division, July, 1990.
Also available as Technical Report 90058, Center for Research on Parallel Computation, Rice University, July, 1990.
6. P. Briggs, K. Cooper, M. Hall, and L. Torczon, “Goal-Directed Interprocedural Optimization,” Technical Report 90102, Center for Research on Parallel Computation, Rice University, 1990.
7. P. Briggs, K. Cooper, and L. Torczon, “Using Conditional Branches to Improve Constant Propagation,” Technical Report 95533, Center for Research on Parallel Computation, Rice University, 1995.
8. L. Almagor, K. Cooper, A. Grosul, T. Harvey, S. Reeves, D. Subramanian, L. Torczon, and T. Waterman, “Building Adaptive Compilers,” Technical Report R05-448, Department of Computer Science, Rice University, 2005.

9. K. Cooper, J. Mellor-Crummey, E. Merényi, V. Sarkar, L. Torczon, M. Burke, and P. Sadayappan, “The Platform-Aware Compilation Environment: Preliminary Design Document,” Technical Report TR10-13, Department of Computer Science, Rice University, 2010.
10. K. Cooper, J. Mellor-Crummey, E. Merényi, V. Sarkar, L. Torczon, M. Burke, and P. Sadayappan, “The Platform-Aware Compilation Environment: Status and Future Directions,” Technical Report TR12-04, Department of Computer Science, Rice University, 2012.

UNIVERSITY ACTIVITIES

1. Associate, Brown College, 1983 to present.
 - Outstanding Associate*, 1984 to 2002, 2011 to present
 - Award for Excellence in the Sciences*, 1994
 - President’s Award*, 1986
2. Resident Associate, Brown College, 1984 to 1989.
3. Member, Rice University Self Study, Committee on Computing, 1984.
4. Member, Graduate Committee, Department of Computer Science, 1985 to 1998, 2016 to present.
5. Member, Research Council, 1993 to 1995.
6. Faculty Sponsor, Tau Beta Pi, 1993.
7. Member, Ad Hoc Security Review Committee, Subcommittee on Policies and Principles, 1994.
8. Faculty Liaison, Rice Women in Computing, 1994 to 1995.
9. Member, Ad Hoc Committee on the Role of the Resident Associate, 1995.

PROFESSIONAL ACTIVITIES

1. Referee, *Transactions on Programming Languages and Systems*, *Software—Practice & Experience*, *IEEE Transactions on Software Engineering*, *EUROMICRO Journal*, and *Letters on Programming Languages and Systems*.
2. Member, *ex officio*, Executive Committee, Center for Research on Parallel Computation, 1990 to 2001.
3. Member, *ex officio*, Facilities Committee, Center for Research on Parallel Computation, 1990 to 2001.
4. Member, National Science Foundation Research Initiation Awards Panel, 1991.
5. Member, Program Committee for ACM SIGPLAN Conference on Programming Language Design and Implementation, 1994, 2000, and 2009.

6. Member, National Science Foundation Post Doc Panel for the New Technologies Program of the Division of Advanced Scientific Computing, 1994.
7. Member, National Science Foundation Postdoctoral Research Associates Program Panel for the Division of Advanced Scientific Computing, 1995.
8. Member, Steering Committee, GirlTECH '95, 1995.
9. Treasurer, ACM SIGPLAN Conference on Programming Language Design and Implementation, May, 1996.
10. Tutorials Chair, ACM SIGPLAN Conference on Programming Language Design and Implementation, 1997.
11. Member, Tutorial Committee, Supercomputing '97, November, 1997.
12. Member, Executive Committee, Los Alamos Computer Science Institute, 1998 to 2006.
13. Member, Executive Committee, NSF-Sponsored GrADS and VGrADS Projects, 1999 to 2009.
14. Fundraiser, Annunciation Orthodox School Capital Campaign (\$6 million campaign), 2000 to 2001.
15. Member, Advanced Scientific Computing Research Committee of Visitors for the Department of Energy Office of Science, 2004.
16. Member, Panels, Workshops, and Presentations Committee, Grace Hopper Women in Computing Conference, 2012.

RESEARCH FUNDING

1. K.D. Cooper, J. Mellor-Crummey, K. Palem, V. Sarkar, and L. Torczon, *The Platform-Aware Compilation Environment*, \$9,997,465 from the Defense Advanced Projects Research Agency through the Air Force Research Lab, 3/09–7/12.
2. K. Kennedy, F. Berman, H. Casanova, A. Chien, K.D. Cooper, J. Dongarra, S.L. Johnson, C. Kesselman, C. Koelbel, D. Reed, R.A. Tapia, L. Torczon, and R. Wolski, *ITR: Virtual Grid Application Development Software System (VGrADS)*, \$8,250,000 from the National Science Foundation, 9/03–9/09.
3. K.D. Cooper, D. Subramanian, and L. Torczon, *ITR: Building Practical Compilers Based on Adaptive Search*, \$1,612,000 from the National Science Foundation, 9/02–8/07.
4. K. Kennedy, F. Berman, A. Chien, K.D. Cooper, J. Dongarra, I. Foster, D. Gannon, L. Johnson, K. Kennedy, C. Kesselman, J. Mellor-Crummey, D. Reed, L. Torczon, and R. Wolski, *Grid Application Development Software Project*, \$5,632,450 from the National Science Foundation, 10/99–9/05.
5. K.D. Cooper, D. Subramanian, and L. Torczon, *Code Optimization for Embedded Systems*, \$1,107,398 from the Defense Advanced Research Projects Agency, 7/97–7/01.

6. K.D. Cooper, J.K. Bennett, and L. Torczon, *Optimizing VHDL Intermediate Forms*, \$751,246 from the Defense Advanced Research Projects Agency, 7/97–10/00.
7. L. Torczon, *Group Travel Grant for Faculty at Minority/Female Institutions to Attend PLDI '97*, \$19,809 from the National Science Foundation, 5/97–4/98.
8. L. Torczon, *Compiler-Based Optimization of Non-Numerical Code*, \$197,128 from the Advanced Technology Program of the State of Texas, 1/96–9/98.
9. K. Kennedy and L. Torczon, *Girl Games Prototype CD-ROM Project: Girls Designing Games for Girls*, \$28,602 from the National Science Foundation, 11/95 – 10/96.
10. K.D. Cooper, K. Kennedy, and L. Torczon, *Compilation Problems for Scalable Node Machines*, \$1,100,594 from the Advanced Research Projects Agency, 8/95–10/98.
11. K. Kennedy, K.D. Cooper, and L. Torczon, *Continuation of A Software Platform for Parallel Scientific Programming*, \$1,118,644 from the Advanced Research Projects Agency, 7/95–9/98.
12. K. D. Cooper, K. Kennedy, C. Koelbel, J. Mellor-Crummey, and L. Torczon, *Jointly Defined Effort to Develop Tools and Compiler Technology Supporting Scalable Computation*, \$792,928 from IBM Corporation, 1/93–12/95.
13. K. Kennedy, A. Carle, M.W. Hall, R.T. Hood, K. Kennedy, J. Mellor-Crummey, L. Torczon, and S.K. Warren, *A Software Platform for Parallel Scientific Programming*, \$2,821,028 from the Defense Advanced Research Projects Agency, 7/92–7/95.
14. K. Kennedy et al., *Center for Research on Parallel Computation*, \$37,922,804 from the National Science Foundation, 2/92–9/01.
15. K.D. Cooper, K. Kennedy, and L. Torczon, *Compiling for Advanced Microprocessors*, \$1,949,884 from the Defense Advanced Research Projects Agency, 6/91–12/95.
16. K. Kennedy, K.D. Cooper, R.T. Hood, and L. Torczon, *Parallel Programming Support in ParaScope*, \$675,000 from IBM Corporation, 9/89–8/91.
17. K. Kennedy et al., *Center for Research on Parallel Computation*, \$13,431,320 from the National Science Foundation, 2/89–1/94.
(I was not an investigator on the original proposal. I was added as a principal investigator when I became executive director of the CRPC in 1990.)
18. K. Kennedy, K.D. Cooper, and L. Torczon, *Advanced Techniques in Interprocedural Analysis*, \$203,985 from the National Science Foundation, 2/88–7/91.
19. K. Kennedy, D. Callahan, K.D. Cooper, R.T. Hood, and L. Torczon, *Parallel Programming Support in the \mathcal{R}^n Programming Environment*, \$638,000 from IBM Corporation, 9/87–8/89.
20. K. Kennedy, *An Advanced Programming Environment for Workstations*, \$600,000 from IBM Corporation, 9/85–8/87.
(At the request of IBM Corporation, I was added as a principal investigator after the contract was awarded.)