

## CURRICULUM VITAE

### THOMAS REPS

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Computer Sciences Department  
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### EDUCATION

1982	Ph.D., Cornell University	Computer Science
1982	M.S., Cornell University	Computer Science
1977	B.A., <i>cum laude</i> , Harvard University	Applied Mathematics

### POSITIONS

2007–08 Guest Professor, University of Paris 7, Paris, France  
2000–01 Visiting Researcher, Consiglio Nazionale delle Ricerche (CNR), Pisa, Italy  
1993–94 Guest Professor, Datalogisk Institut, University of Copenhagen, Copenhagen, Denmark  
1990–93 Associate Chairman, Computer Sciences Department, University of Wisconsin  
1988– President and Co-founder, GrammaTech, Inc.  
1985– Professor, Comp. Sci. Dept., Univ. of Wisconsin, (Asst.: 85–88; Assoc.: 88–94; Full: 94–)  
1984–85 Research Associate, Department of Computer Science, Cornell University  
1982–83 Visiting Researcher, Institut National de Recherche en Informatique et en Automatique (INRIA), Rocquencourt, France  
1982–84 Post-Doctoral Associate, Department of Computer Science, Cornell University

### AWARDS AND HONORS

2014 #4 (field rating) and #7 (citations) on Microsoft Academic Search's list of most-highly-cited authors in Programming Languages (as of 8/27/2014)  
2014 #13 (field rating) and #19 (citations) on Microsoft Academic Search's list of most-highly-cited authors in Software Engineering (as of 8/27/2014)  
2013 Foreign member, Academia Europaea  
2011 ACM SIGSOFT Retrospective Impact Paper Award (for Reps, T., Horwitz, S., Sagiv, M., and Rosay, G., "Speeding up slicing," 1994)  
2010 ACM SIGSOFT Retrospective Impact Paper Award (for Reps, T. and Teitelbaum, T., "The Synthesizer Generator," 1984)  
1982– 15 conference papers invited for special submission to journals  
2008 EAPLS Best-Paper Award at ETAPS '08 (with J. Lim)  
2005 ACM Fellow  
2004 EAPLS Best-Paper Award at ETAPS '04 (with G. Balakrishnan)  
2003 Recognized as a "Highly Cited Researcher" in the field of Comp. Sci., Inst. for Scientific Inf.  
2002 Horwitz, S., Reps, T., and Binkley, D., "Interprocedural slicing using dependence graphs" selected as one of the 50 most influential papers from the ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI), 1979–99.  
2000 Guggenheim Fellowship, John Simon Guggenheim Memorial Foundation  
2000 Humboldt Research Award, Alexander von Humboldt Foundation  
1997 Vilas Associate Award, University of Wisconsin  
1988 David and Lucile Packard Fellowship for Science and Engineering  
1986 IBM Faculty Development Award  
1986 NSF Presidential Young Investigator Award  
1983 ACM Doctoral Dissertation Award

## RESEARCH INTERESTS

Program analysis (abstract interpretation, interprocedural dataflow analysis, alias analysis, pointer analysis, shape analysis, slicing, analysis of multi-threaded programs, and model checking); computer security (analysis of machine code, authorization problems, and policy weaving); code instrumentation; path problems; incremental computing; program-development environments; and automatic differentiation.

For further information, see <http://pages.cs.wisc.edu/~reps/past-research.html>.

## PUBLICATIONS

### Books

Datta, A., Jha, S., Li, N., Melski, D., and Reps, T., *Analysis Techniques for Information Security*. Synthesis Lectures on Information Security, Privacy, and Trust, Morgan & Claypool Publishers, 2010.

Reps, T. and Teitelbaum, T., *The Synthesizer Generator: A System for Constructing Language-Based Editors*. Springer-Verlag, New York, NY, 1988.

Reps, T. and Teitelbaum, T., *The Synthesizer Generator Reference Manual: Third Edition*. Springer-Verlag, New York, NY, 1988.

Chinese reprint published by the World Publishing Corporation, Beijing, China, 1991.

Reps, T., *Generating Language-Based Environments*. The M.I.T. Press, Cambridge, MA, 1984.

### Edited Books

*Program Analysis and Compilation, Theory and Practice: Essays Dedicated to Reinhard Wilhelm*, Reps, T., Sagiv, M., and Bauer, J. (eds.), Lecture Notes in Computer Science, Vol. 4444, Springer-Verlag, 2007.

*Proceedings of the 27th ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL)* (Boston, Massachusetts, USA, January 19-21, 2000), M.N. Wegman and T.W. Reps (eds.) ACM, 2000.

### Journal Publications

Reps, T., Turetsky, E., and Prabhu, P., Newtonian program analysis via tensor product. In *ACM Trans. on Program. Lang. and Syst.* 39(2): 9:1-9:72 (2017).

Thakur, A., Lal, A., Lim, J., and Reps, T., PostHat and all that: Automating abstract interpretation. In *Electr. Notes Theor. Comput. Sci.* 311, 15–32 (2015).

Elder, M., Lim, J., Sharma, T., Andersen, T., and Reps, T., Abstract domains of affine relations. In *ACM Trans. on Program. Lang. and Syst. (TOPLAS)* 36(4): 11:1–11:73 (2014).

Aung, M., Horwitz, S., Joiner, R., and Reps, T., Specialization slicing. In *ACM Trans. on Program. Lang. and Syst. (TOPLAS)* 36(2): 5:1–5:67, (2014).

Lim, J. and Reps, T., TSL: A system for generating abstract interpreters and its application to machine-code analysis. In *ACM Trans. on Program. Lang. and Syst. (TOPLAS)* 35(1): 4:1–4:59 (2013).

Zhang, W., Sun, C., Lim, J., Lu, S., and Reps, T., ConMem: Detecting crash-triggering concurrency bugs through an effect-oriented approach. In *ACM Trans. on Softw. Eng. and Methodology (TOSEM)* 22(2): 10:1–10:33 (2013).

Kidd, N., Reps, T., Dolby, J., and Vaziri, M., Finding concurrency-related bugs using random isolation. In *Int. Journal on Software Tools for Technology Transfer (STTT)* 13, 6 (2011), 495–518.

Kidd, N., Lammich, P., Touili, T., and Reps, T., A decision procedure for detecting atomicity violations for communicating processes with locks. In *Int. Journal on Software Tools for Technology Transfer (STTT)* 13, 1 (2011), 37–60.

Lim, J., Lal, A., and Reps, T., Symbolic analysis via semantic reinterpretation. In *Int. Journal on Software Tools for Technology Transfer (STTT)* 13, 1 (2011), 61–87.

- Elder, M., Gopan, D., and Reps, T., View-augmented abstractions. In *Electr. Notes Theor. Comput. Sci.* 267, 1 (2010), 43-57.
- Reps, T., Sagiv, M., and Loginov, A., Finite differencing of logical formulas for static analysis. In *ACM Trans. on Program. Lang. and Syst. (TOPLAS)* 32(6): 24:1–24:55 (2010).
- Balakrishnan, G. and Reps, T., WYSINWYX: What You See Is Not What You eXecute. In *ACM Trans. on Program. Lang. and Syst. (TOPLAS)* 32(6): 23:1–23:84 (2010).
- Jeannet, B., Loginov, A., Reps, T., and Sagiv, M., A relational approach to interprocedural shape analysis. In *ACM Trans. on Program. Lang. and Syst. (TOPLAS)* 32(2): 5:1–5:52 (2010).
- Lal, A. and Reps, T., Reducing concurrent analysis under a context bound to sequential analysis. In *Formal Methods in System Design* 35, 1 (2009), 73–97.
- Lev-Ami, T., Immerman, N., Reps, T., Sagiv, M., Srivastava, S., and Yorsh, G., Simulating reachability using first-order logic with applications to verification of linked data structures. In *Logical Methods in Computer Science* 5, 2 (2009).
- Yorsh, G., Reps, T., Sagiv, M., and Wilhelm, R., Logical characterizations of heap abstractions. In *ACM Transactions on Computational Logic* 8(1): 5:1–5:27 (2007).
- Yahav, E., Reps, T., Sagiv, M., and Wilhelm, R., Verifying temporal heap properties specified via evolution logic. *Logic Journal of the IGPL* 14, 5 (Oct. 2006), 755-784.
- Reps, T., Schwoon, S., Jha, S., and Melski, D., Weighted pushdown systems and their application to interprocedural dataflow analysis. *Science of Computer Programming* 58, 1-2 (Oct. 2005), 206-263.
- Alur, R., Benedikt, M., Etessami, K., Godefroid, P., Reps, T., and Yannakakis, M., Analysis of recursive state machines. In *ACM Trans. on Prog. Lang. and Syst. (TOPLAS)* 27, 4 (2005), 786-818.
- Yorsh, G., Skidanov, A., Reps, T., and Sagiv, M., Assume/guarantee reasoning for heap-manipulating programs. In *Electr. Notes Theor. Comput. Sci.* 131, 24 (May 2005), 125-138.
- Jha, S. and Reps, T., Model checking SPKI/SDSI. In *Journal of Computer Security* 12, 3-4 (2004), 317-353.
- Anderson, P., Reps, T., and Teitelbaum, T., Design and implementation of a fine-grained software inspection tool. In *IEEE Trans. on Softw. Eng. (TSE)* 29, 8 (Aug. 2003), 721-733.
- Reps, T.W. and Rall, L.B., Computational divided differencing and divided-difference arithmetics. In *Higher-Order and Symbolic Computation* 16, 1-2 (2003), 93-149.
- Clarke, E.M., Fujita, M., Rajan, P.S., Reps, T., Shankar, S., and Teitelbaum, T., Program slicing for VHDL. In *Software Tools for Technology Transfer (STTT)* 4(1), Oct. 2002, 125-137.
- Sagiv, M., Reps, T., and Wilhelm, R., Parametric shape analysis via 3-valued logic. In *ACM Trans. on Program. Lang. and Syst. (TOPLAS)* 24(3), 2002, 217-298.
- Reps, T., Undecidability of context-sensitive data-dependence analysis. In *ACM Trans. on Program. Lang. and Syst. (TOPLAS)* 22, 1 (Jan. 2000), pp. 162-186.
- Melski, D. and Reps, T., Interconvertibility of a class of set constraints and context-free language reachability. In *Theoretical Computer Science* 248, 1-2 (Nov. 2000), pp. 29-98.
- Siff, M. and Reps, T., Identifying modules via concept analysis. In *IEEE Trans. on Softw. Eng. (TSE)* 25, 6 (Nov./Dec. 1999), pp. 749-768.
- Reps, T., Program analysis via graph reachability. *Information and Software Technology* 40, 11-12 (November/December 1998), pp. 701-726.
- Reps, T., “Maximal-munch” tokenization in linear time. *ACM Trans. on Program. Lang. and Syst. (TOPLAS)* 20, 2 (March 1998), pp. 259-273.
- Sagiv, M., Reps, T. and Wilhelm, R., Solving shape-analysis problems in languages with destructive updating. *ACM Trans. on Program. Lang. and Syst. (TOPLAS)* 20, 1 (January 1998), pp. 1-50.

- Sagiv, M., Reps, T., and Horwitz, S., Precise interprocedural dataflow analysis with applications to constant propagation. *Theoretical Computer Science* 167 (1996), pp. 131-170.
- Reps, T., On the sequential nature of interprocedural program-analysis problems. *Acta Informatica* 33 (1996), pp. 739-757.
- Ramalingam, G. and Reps, T., An incremental algorithm for a generalization of the shortest-path problem. *Journal of Algorithms* 21 (1996), pp. 267-305.
- Ramalingam, G. and Reps, T., On the computational complexity of dynamic graph problems. *Theoretical Computer Science A* 158 (May 1996), pp. 233-277.
- Binkley, D., Horwitz, S., and Reps, T., Program integration for languages with procedure calls. *ACM Trans. on Softw. Eng. and Methodology (TOSEM)* 4, 1 (January 1995), pp. 3-35.
- Ramalingam, G. and Reps, T., On competitive on-line algorithms for the dynamic priority-ordering problem. *Information Processing Letters* 51 (1994), 155-161.
- Yang, W., Horwitz, S., and Reps, T., A program integration algorithm that accommodates semantics-preserving transformations. *ACM Trans. on Softw. Eng. and Methodology (TOSEM)* 1, 3 (July 1992), 310-354.
- Reps, T., Algebraic properties of program integration. *Science of Computer Programming* 17 (1991), 139-215.
- Horwitz, S. and Reps, T., Efficient comparison of program slices. *Acta Informatica* 28 (1991), 713-732.
- Horwitz, S., Reps, T., and Binkley, D., Interprocedural slicing using dependence graphs. *ACM Trans. on Program. Lang. and Syst. (TOPLAS)* 12, 1 (January 1990), 26-60.
- Horwitz, S., Prins, J., and Reps, T., Integrating non-interfering versions of programs. *ACM Trans. on Program. Lang. and Syst. (TOPLAS)* 11, 3 (July 1989), 345-387.
- Reps, T. Incremental evaluation for attribute grammars with unrestricted movement between tree modifications. *Acta Informatica* 25 (1988), 155-178.
- Reps, T. and Demers, A., Sublinear-space evaluation algorithms for attribute grammars. *ACM Trans. on Program. Lang. and Syst. (TOPLAS)* 9, 3 (July 1987), 408-440.
- Reps, T., Teitelbaum, T., and Demers, A., Incremental context-dependent analysis for language-based editors. *ACM Trans. on Program. Lang. and Syst. (TOPLAS)* 5, 3 (July 1983), 449-477.
- Teitelbaum, T. and Reps, T., The Cornell Program Synthesizer: A syntax-directed programming environment. *Communications of the ACM* 24, 9 (September 1981), 563-573.

### Invited Papers

- Reps, T. and Thakur, A., Automating abstract interpretation. In *Proc. Verification, Model Checking, and Abstract Interpretation (VMCAI)*, Jan. 2016.
- McCloskey, B., Reps, T., and Sagiv, M., Statically inferring complex heap, array, and numeric invariants. In *Proc. Static Analysis Symposium (SAS)*, Sept. 2010.
- Reps, T., Lim, J., Thakur, A., Balakrishnan, G., and Lal, A., There's plenty of room at the bottom: Analyzing and verifying machine code (Invited tutorial). In *Proc. Computer Aided Verification (CAV)*, July 2010.
- Reps, T. and Balakrishnan, G., Improved memory-access analysis for x86 executables. (Paper accompanying a “unifying” invited talk at ETAPS 2008.) In *Proc. Int. Conf. on Compiler Construction (CC)*, April 2008.
- Reps, T., Lal, A., and Kidd, N., Program analysis using weighted pushdown systems. In *Proc. 27th Conf. on Foundations of Software Technology and Theoretical Computer Science (FSTTCS)*, (New Delhi, India, Dec. 12–14, 2007).

- Balakrishnan, G. and Reps, T., DIVINE: DIScovering Variables IN Executables. In *Proc. Int. Conf. on Verification, Model Checking and Abstract Interpretation (VMCAI)*, (Nice, France, Jan. 14–16, 2007).
- Jha, S., Schwoon, S., Wang, H., and Reps, T., Weighted pushdown systems and trust-management systems. In *Proc. Int. Conf. on Tools and Algorithms for the Construction and Analysis of Systems (TACAS)*, (Vienna, Austria, Mar. 25 – Apr. 2, 2006).
- Reps, T., Balakrishnan, G., and Lim, J., Intermediate-representation recovery from low-level code. In *Proc. Workshop on Partial Evaluation and Program Manipulation (PEPM)*, (Charleston, SC, Jan. 9-10, 2006).
- Reps, T., Balakrishnan, G., Lim, J., and Teitelbaum, T., A next-generation platform for analyzing executables. In *Proc. 3rd Asian Symposium on Programming Languages and Systems (APLAS)*, (Tsukuba, Japan, Nov. 3-5, 2005), 212-229.
- Reps, T., Sagiv, M., and Wilhelm, R., Static program analysis via 3-valued logic. In *Proc. Int. Conf. on Computer-Aided Verification (CAV)*, 2004, 15-30.
- Rall, L.B. and Reps, T.W., Algorithmic differencing. In *Perspectives on Enclosure Methods*, U. Kulisch, R. Lohner, and A. Facius (eds.), Springer-Verlag, Vienna, 2001, 133-147. (Invited paper presented at SCAN 2000: 9th GAMM-IMACS Int. Symp. on Sci. Comput., Comp. Arith., and Validated Numerics, (Karlsruhe, Ger., Sept. 19-22, 2000).)
- Wilhelm, R., Sagiv, M., and Reps, T., Shape analysis. In *Proc. 9th Int. Conf. on Compiler Construction (CC)*, (Berlin, Ger., Mar. 27 – Apr. 2, 2000).
- Reps, T., Program analysis via graph reachability. In *Proc. Int. Logic Programming Symposium (ILPS)*, (Port Jefferson, NY, Oct. 12-16, 1997), J. Maluszynski (ed.), The M.I.T. Press, Cambridge, MA, 1997, pp. 5-19.
- Reps, T., The use of program profiling in software testing. In *Proc. of Informatik '97* (Aachen, Germany, Sept. 24-27, 1997), M. Jarke, K. Pasedach, and K. Pohl (eds.), Springer-Verlag, Berlin, Ger., 1997, pp. 4-16.
- Horwitz, S. and Reps, T., The use of program dependence graphs in software engineering. In *Proc. 14th Int. Conference on Software Engineering (ICSE)*, (Melbourne, Australia, May 11-15, 1992), ACM, New York, NY, 1992, pp. 392-411.
- Reps, T. and Horwitz, S., Semantics-based program integration. In *Proc. 2nd European Symposium on Programming (ESOP)*, (Nancy, France, March 21-25, 1988), *Lecture Notes in Computer Science*, Vol. 300, H. Ganzinger (ed.), Springer-Verlag, New York, NY, 1988, pp. 1-20.

### **Refereed Conference and Workshop Publications**

- Sharma, T. and Reps, T., A new abstraction framework for affine transformers. To appear in *Proc. Static Analysis Symposium (SAS)*, 2017.
- Brown, D.B., Vaughn, M., Liblit, B., and Reps, T., The care and feeding of wild-caught mutants. To appear in *Proc. Joint Meeting of the European Software Eng. Conf. and the ACM SIGSOFT Symp. on the Foundations of Software Engineering (ESEC/FSE)*, 2017.
- Carbonneaux, Q., Hoffmann, J., Reps, T., and Shao, Z., Automated resource analysis with Coq proof objects. To appear in *Proc. Int. Conf. on Computer Aided Verifications (CAV)*, 2017.
- Kincaid, Z., Breck, J., Forouhi Boroujeni, A., and Reps, T., Compositional recurrence analysis revisited. To appear in *Proc. ACM Conference on Programming Language Design and Implementation (PLDI)*, 2017.
- Sharma, T. and Reps, T., Sound bit-precise numerical domains. In *Proc. Verification, Model Checking, and Abstract Interpretation (VMCAI)*, 2017.
- Feng, Y., Martins, R., Wang, Y., Dillig, I., and Reps, T.W., Component-based synthesis for complex APIs. In *Proc. ACM Symposium on Principles of Programming Languages (POPL)*, 2017.

- Srinivasan, V., Sharma, T., and Reps, T., Speeding up machine-code synthesis. In *Proc. ACM SIGPLAN Conf. on Systems, Programming, Languages and Applications: Software for Humanity (SPLASH/OOPSLA)*, 2016.
- Srinivasan, V. and Reps, T., An improved algorithm for slicing machine code. In *Proc. ACM SIGPLAN Conf. on Systems, Programming, Languages and Applications: Software for Humanity (SPLASH/OOPSLA)*, 2016.
- Mine, A., Breck, J., and Reps, T., An algorithm inspired by constraint solvers to infer inductive invariants in numeric programs. In *Proc. European Symp. on Programming (ESOP)*, Apr. 2016.
- Nominated for the EASST Best-Paper Award at ETAPS 2016.
- Reps, T., Turetsky, E., and Prabhu, P., Newtonian program analysis via tensor product. In *Conference Record of the ACM Symposium on Principles of Programming Languages (POPL)*, 2016.
- Ohmann, P., Brown, D.B., Liblit, B., and Reps, T., Recovering execution data from incomplete observations. In *Proc. 13th Int. Workshop on Dynamic Analysis (WODA)*, 2015.
- Srinivasan, V. and Reps, T., Partial evaluation of machine code. In *Proc. ACM SIGPLAN Conference on Systems, Programming, Languages and Applications: Software for Humanity (SPLASH/OOPSLA)*, 2015.
- Srinivasan, V. and Reps, T., Synthesis of machine code from semantics. In *Proc. ACM Conference on Programming Language Design and Implementation (PLDI)*, 2015.
- Joiner, R., Reps, T., Jha, S., Dhawan, M., and Ganapathy, V., Efficient runtime enforcement techniques for policy weaving. In *Proc. Found. of Software Engineering (FSE)*, 2014.
- Thakur, A., Breck, J., and Reps, T., Satisfiability modulo abstraction for separation logic with linked lists. In *Proc. Int. SPIN Symposium on Model Checking of Software (SPIN)*, 2014.
- Itzhaky, S., N. Bjørner, Reps, T., Sagiv, M., and Thakur, A., Property-directed shape analysis. In *Proc. Computer-Aided Verification (CAV)*, 2014.
- Srinivasan, V. and Reps, T., Recovery of class hierarchies and composition relationships from machine code. In *Proc. Int. Conf. on Compiler Construction (CC)*, 2014.
- Kreiker, J., Reps, T., Rinetzky, N., Sagiv, M., Wilhelm, R., and Yahav, E., Interprocedural shape analysis for effectively cutpoint-free programs. In *Programming Logics: Essays in Memory of Harald Ganzinger*, LNCS 7797, Springer, 2013.
- Harris, W.R., Jha, S., Reps, T., Anderson, J., and Watson, R.N.M., Declarative, temporal, and practical programming with capabilities. In *Proc. IEEE Symposium on Security and Privacy (SP)*, 2013.
- Thakur, A., Elder, M., and Reps, T., Bilateral algorithms for symbolic abstraction. In *Proc. Static Analysis Symposium (SAS)*, 2012.
- Thakur, A. and Reps, T., A generalization of Staalmarck’s method. In *Proc. Static Analysis Symposium (SAS)*, 2012.
- Harris, W.R., Jha, S., and Reps, T., Secure programming via visibly pushdown safety games. In *Proc. Computer-Aided Verification (CAV)*, 2012.
- Fredrikson, M., Joiner, R., Jha, S., Reps, T., Porras, P., Saidi, H., and Yegneswaran, V., Efficient runtime policy enforcement using counterexample-guided abstraction refinement. In *Proc. Computer-Aided Verification (CAV)*, 2012.
- Thakur, A. and Reps, T., A method for symbolic computation of abstract operations. In *Proc. Computer-Aided Verification (CAV)*, 2012.
- Driscoll, E., Thakur, A., and Reps, T., OpenNWA: A nested-word-automaton library (tool paper). In *Proc. Computer-Aided Verification (CAV)*, 2012.
- Elder, M., Lim, J., Sharma, T., Andersen, T., and Reps, T., Abstract domains of affine relations. In *Proc. Static Analysis Symposium (SAS)*, 2011.

Invited for special submission to *ACM Trans. on Program. Lang. and Syst. (TOPLAS)*.

Driscoll, E., Burton, A., and Reps, T., Checking conformance of a producer and a consumer. In *Proc. Found. of Software Engineering (FSE)*, 2011.

Zhang, W., Lim, J., Olichandran, R., Scherpelz, J., Jin, G., Lu, S., and Reps, T., ConSeq: Detecting concurrency bugs through sequential errors. In *Proc. Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, 2011.

Harris, W., Jha, S., and Reps, T., DIFC programs by automatic instrumentation. In *Proc. ACM Conf. on Computer and Communications Security (CCS)*, 2010.

Thakur, A., Lim, J., Lal, A., Burton, A., Driscoll, E., Elder, M., Andersen, T., and Reps, T., Directed proof generation for machine code. In *Proc. Computer-Aided Verification (CAV)*, 2010.

Harris, W., Kidd, N., Chaki, S., Jha, S., and Reps, T., Verifying information flow over unbounded processes. In *Proc. Int. Symp. on Formal Methods (FM)*, 2009.

Kidd, N., Lammich, P., Touili, T., and Reps, T., A decision procedure for detecting atomicity violations for communicating processes with locks. In *Proc. SPIN Workshop*, 2009, 125–142.

Invited for special submission to the *Int. Journal on Software Tools for Tech. Transfer*.

Lim, J., Lal, A., and Reps, T., Symbolic analysis via semantic reinterpretation. In *Proc. SPIN Workshop*, 2009, 148–168.

Invited for special submission to the *Int. Journal on Software Tools for Tech. Transfer*.

Kidd, N., Reps, T., Dolby, J., and Vaziri, M., Finding concurrency-related bugs using random isolation. In *Proc. Verification, Model Checking, and Abstract Interpretation (VMCAI)*, 2009.

Invited for special submission to the *Int. Journal on Software Tools for Tech. Transfer*.

Lal, A. and Reps, T., Reducing concurrent analysis under a context bound to sequential analysis. In *Proc. Computer-Aided Verification (CAV)*, 2008.

Invited for special submission to the *Int. Journal on Formal Methods in System Design*.

Lal, A. and Reps, T., Solving multiple dataflow queries using WPDSs. In *Proc. Static Analysis Symposium (SAS)*, July 2008.

Kidd, N., Lal A., and Reps, T., Language strength reduction. In *Proc. Static Analysis Symposium (SAS)*, July 2008.

Lim, J. and Reps, T., A system for generating static analyzers for machine instructions. In *Proc. Int. Conf. on Compiler Construction (CC)*, April 2008.

Received the ETAPS Best-Paper Award for 2008 from the European Association for Programming Languages and Systems (EAPLS).

Balakrishnan, G. and Reps, T., Analyzing stripped device-driver executables. In *Proc. Int. Conf. on Tools and Algorithms for the Construction and Analysis of Systems (TACAS)*, Springer-Verlag, New York, NY, April 2008.

Lal, A., Touili, T., Kidd, N., and Reps, T., Interprocedural analysis of concurrent programs under a context bound. In *Proc. Int. Conf. on Tools and Algorithms for the Construction and Analysis of Systems (TACAS)*, Springer-Verlag, New York, NY, April 2008.

Lal, A., Kidd, N., Reps, T., and Touili, T., Abstract error projection. In *Proc. Static Analysis Symposium (SAS)*, August 2007.

Gopan, D. and Reps, T., Guided static analysis. In *Proc. Static Analysis Symposium (SAS)*, August 2007.

Lev-Ami, T., Weidenbach, C., Reps, T., and Sagiv, M., Labelled clauses. In *Proc. Conference on Automated Deduction (CADE)*, 2007.

- Gopan, D. and Reps, T., Low-level library analysis and summarization. In *Proc. Computer-Aided Verification (CAV)*, 2007.
- Amit, D., Rinetzky, N., Reps, T., Sagiv, M., and Yahav, E., Comparison under abstraction for verifying linearizability. In *Proc. Computer-Aided Verification (CAV)*, 2007.
- Bogudlov, I., Lev-Ami, T., Reps, T., and Sagiv, M., Revamping TVLA: Making parametric shape analysis competitive (tool paper). In *Proc. Computer-Aided Verification (CAV)*, 2007.
- Loginov, A., Reps, T., and Sagiv, M., Refinement-based verification for possibly-cyclic lists. In *Program Analysis and Compilation, Theory and Practice: Essays Dedicated to Reinhard Wilhelm*, Springer-Verlag, 2007.
- Balakrishnan, G., Reps, T., Melski, D., and Teitelbaum, T., WYSINWYX: What You See Is Not What You eXecute. In *Verified Software: Theories, Tools, Experiments (VSTTE)*, Springer-Verlag, 2007.
- Dor, N., Field, J., Gopan, D., Lev-Ami, T., Loginov, A., Manevich, R., Ramalingam, G., Reps, T., Rinetzky, N., Sagiv, M., Wilhelm, R., Yahav, E., and Yorsh, G., Automatic verification of strongly dynamic software systems. In *Verified Software: Theories, Tools, Experiments (VSTTE)*, Springer-Verlag, 2007.
- Lev-Ami, T., Sagiv, M., Immerman, N., and Reps, T., Shape analysis of uniform change. In *Proc. Int. Conf. on Verification, Model Checking and Abstract Interpretation, (VMCAI)* (Nice, France, Jan. 14–16, 2007).
- Lim, J., Reps, T., and Liblit, B., Extracting output formats from executables. In *Proc. IEEE Working Conference on Reverse Engineering (WCRE)*, (Benevento, Italy, Oct. 23-27, 2006).
- Wang, H., Jha, S., Reps, T., Schwoon, S., and Stubblebine, S., Reducing the dependence of SPKI/SDSI on PKI. In *Proc. European Symp. on Research in Computer Security (ESORICS)*, 2006.
- Balakrishnan, G. and Reps, T., Recency-abstraction for heap-allocated storage. In *Proc. Static Analysis Symposium (SAS)*, Springer-Verlag, New York, NY, 2006.
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### Other Publications and Reports

Kashyap, B., Brown, D.B., Liblit, B., Melski, D., and Reps, T., Source Forager: A search engine for similar source code. arXiv:1706.02769, June 2017.

Amodio, M., Chaudhuri, S., and Reps, T., Neural attribute machines for program generation. arXiv:1705.09231v2, May 2017.

Henry, J., Thakur, A., Kidd, N., and Reps, T., Dissolve: A distributed SAT solver based on Staalmarck's method. TR-1839, Computer Sciences Department, University of Wisconsin, Madison, WI, Aug. 2016.

- Srinivasan, V. and Reps, T., Slicing machine code. TR-1824, Computer Sciences Department, University of Wisconsin, Madison, WI, Oct. 2015.
- Srinivasan, V. and Reps, T., Synthesis of machine code from semantics. TR-1814, Computer Sciences Department, University of Wisconsin, Madison, WI, Feb. 2015.
- Kroening, D., Reps, T.W., Seshia, S.A., and Thakur, A. (eds.), Decision procedures and abstract interpretation (Dagstuhl Seminar 14351), Dagstuhl Seminar Report 4, 8 (Dec. 2014) International Conference and Research Center for Computer Science (IBFI), Schloss Dagstuhl, Wadern, Germany, 2014.
- Aung, M., Horwitz, S., Joiner, R., and Reps, T., Specialization slicing. In *Proc. ACM Conf. on Programming Language Design and Implementation (PLDI)*, (Edinburgh, UK, June 9-11, 2014), pp. 19. (Summary to accompany oral presentation of TOPLAS journal paper of the same title.)
- Sharma, T., Thakur, A., and Reps, T., An abstract domain for bit-vector inequalities. TR-1789, Computer Sciences Department, University of Wisconsin, Madison, WI, April 2013.
- Srinivasan, V.K. and Reps, T., Software-architecture recovery from machine code. TR-1781, Computer Sciences Department, University of Wisconsin, Madison, WI, March 2013.
- King, A.M., Mycroft, A., Reps, T.W., and Simon, A. (eds.), Analysis of executables: Benefits and challenges (Dagstuhl Seminar 12051) Dagstuhl Seminar Report 2, 1 (May 2012) International Conference and Research Center for Computer Science (IBFI), Schloss Dagstuhl, Wadern, Germany, 2012.
- Harris, W.R., Farley, B., Jha, S., and Reps, T., Programming for a capability system via safety games, TR-1705, Computer Sciences Department, University of Wisconsin, Madison, WI, March 2012.
- Prabhu, P., Reps, T., Lal, A., and Kidd, N., Verifying concurrent programs via bounded context-switching and induction. TR-1701, Computer Sciences Department, University of Wisconsin, Madison, WI, November 2011.
- Driscoll, E., Thakur, A., Burton, A., and Reps, T., WALi: Nested-word automata. TR-1675r, Computer Sciences Department, University of Wisconsin, Madison, WI, July 2010; revised Sept. 2011.
- Lim, J. and Reps, T., BCE: Extracting botnet commands from bot executables. TR-1668, Computer Sciences Department, University of Wisconsin, Madison, WI, February 2010.
- Lal, A., Lim, J., and Reps, T., McDash: Refinement-based property verification for machine code. TR-1659, Computer Sciences Department, University of Wisconsin, Madison, WI, June 2009.
- Lev-Ami, T., Sagiv, M., Reps, T., and Gulwani, S., Backward analysis for inferring quantified preconditions. Tech. Rep. TR-2007-12-01, Tel Aviv University, Dec. 2007.
- Kidd, N., Moore, K., Wood, D., and Reps, T., Towards the analysis of transactional software. TR-1624, Computer Sciences Department, University of Wisconsin, Madison, WI, October 2007.
- Kidd, N., Reps, T., Dolby, J., and Vaziri, M., Static detection of atomic-set serializability violations. TR-1623, Computer Sciences Department, University of Wisconsin, Madison, WI, October 2007.
- Kidd, N., Lal, A., and Reps, T., Advanced querying for property checking. TR-1621, Computer Sciences Department, University of Wisconsin, Madison, WI, October 2007.
- Reps, T., Sagiv, M., and Bauer, J., An appreciation of the work of Reinhard Wilhelm. In *Program Analysis and Compilation, Theory and Practice: Essays Dedicated to Reinhard Wilhelm*, Springer-Verlag, 2007.
- Lal, A., Touili, T., Kidd, N., and Reps, T. Weighted pushdown systems and weighted transducers. TR-1581, Computer Sciences Department, University of Wisconsin, Madison, WI, Oct. 2006.
- Lal, A., Kidd, N., Reps, T., and Touili, T., Abstract error projection. TR-1579, Computer Sciences Department, University of Wisconsin, Madison, WI, Sept. 2006.
- Reps, T.W., Teitelbaum, T., Anderson, P., and Melski, D., Static analysis of binary executable code. Proceedings of *Defining the State of the Art in Software Security Tools Workshop*, (Gaithersburg, MD, Aug. 10-11, 2005), NIST Special Publication 500-264, Nat. Inst. of Standards and Technology,



- Gaithersburg, MD, Sept. 2005.
- Balakrishnan, G., Reps, T., Kidd, N., Lal, A., Lim, J., Melski, D., Gruian, R., Yong, S., Chen, C.-H., and Teitelbaum, T., Model checking x86 executables with CodeSurfer/x86 and WPDS++. In *Proc. Workshop on the Evaluation of Software Defect Detection Tools*, June 2005.
- Yahav, E., Reps, T., and Sagiv, M., LTL model checking for systems with unbounded number of dynamically created threads and objects. TR-1424, Computer Sciences Department, University of Wisconsin, Madison, WI, March 2001.
- Chandra, S. and Reps, T., Physical type checking for C. Bell Labs. Tech. Rep. BL0113590-990302-04, Lucent Technologies, Inc., Naperville, IL, Mar. 1999.
- Siff, M., Chandra, S., Ball, T., Kunchithapadam, K., and Reps, T., Coping with type casts in C. Bell Labs. Tech. Rep. BL0113590-990202-03, Lucent Technologies, Inc., Naperville, IL, Feb. 1999.
- Clarke, E.M., Fujita, M., Rajan, P.S., Reps, T., Shankar, S., and Teitelbaum, T., Program slicing for design automation: An automatic technique for speeding-up hardware design, simulation, testing, and verification. Unpublished report, October 1998.
- Mueller, H., Reps, T., and Snelling, G. (eds.), Program comprehension and software reengineering. Dagstuhl Seminar Report, International Conference and Research Center for Computer Science (IBFI), Schloss Dagstuhl, Wadern, Germany, 1998.
- The Wisconsin Program-Slicing Tool 1.0, Reference Manual*. Computer Sciences Department, University of Wisconsin-Madison, August 1997.
- Das, M. and Reps, T. BTA termination using CFL-reachability. TR-1329, Computer Sciences Department, University of Wisconsin, Madison, WI, November 1996.
- Horwitz, S., Reps, T., and Sagiv, M., Demand interprocedural dataflow analysis. TR-1283, Computer Sciences Department, University of Wisconsin, Madison, WI, August 1995.
- van Leeuwen, J., Mehlhorn, K., and Reps, T. (eds.), Incremental computation and dynamic algorithms. Dagstuhl Seminar Report 88, International Conference and Research Center for Computer Science (IBFI), Schloss Dagstuhl, Wadern, Germany, 1994.
- Reps, T., Sagiv, M., and Horwitz S., Interprocedural dataflow analysis via graph reachability. TR 94-14, Datalogisk Institut, University of Copenhagen, Copenhagen, Denmark, April 1994.
- Reps, T., *The Wisconsin Program-Integration System Reference Manual: Release 2.0*. Computer Sciences Department, University of Wisconsin, Madison, WI, July 1993.
- Ramalingam, G. and Reps, T., A categorized bibliography on incremental computation. In *Conference Record of the Twentieth ACM Symposium on Principles of Programming Languages*, (Charleston, SC, Jan. 11-13, 1993), ACM, New York, NY, 1993, pp. 502-510.
- Reps, T., Incremental computation. Unpublished tutorial notes, 1993. (Presented at the Twentieth ACM Symposium on Principles of Programming Languages, (Charleston, SC, Jan. 11-13, 1993).)
- Klint, P., Reps, T., and Snelling, G. (eds.), Programming environments. Dagstuhl Seminar Report 34, International Conference and Research Center for Computer Science (IBFI), Schloss Dagstuhl, Wadern, Germany, 1992.
- Ramalingam, G. and Reps, T., New programs from old. TR-1057, Computer Sciences Department, University of Wisconsin Madison, WI, November 1991.
- Binkley, D., Horwitz, S., and Reps, T., Identifying semantic differences in programs with procedures (Extended abstract). Computer Sciences Department, University of Wisconsin, Madison, WI, September 1991.
- Ball, T., Horwitz, S., and Reps, T., Correctness of an algorithm for reconstituting a program from a dependence graph. TR-947, Computer Sciences Department, University of Wisconsin, Madison, WI, July 1990.

- Binkley, D., Horwitz, S., and Reps, T., The multi-procedure equivalence theorem. TR-890, Computer Sciences Department, University of Wisconsin, Madison, WI, November 1989.
- Yang, W., Horwitz, S., and Reps, T., Detecting program components with equivalent behaviors. TR-840, Computer Sciences Department, University of Wisconsin, Madison, WI, April 1989.
- Horwitz, S., Prins, J., and Reps, T., On the suitability of dependence graphs for representing programs. Computer Sciences Department, University of Wisconsin, Madison, WI, August 1988.
- Reps, T., Guest editor's introduction. *ACM Trans. on Program. Lang. and Syst. (TOPLAS)* 8, 4 (October 1986), 417-418.
- Teitelbaum, T. and Reps, T., Release of the Synthesizer Generator. *ACM Software Engineering Notes* 11, 1 (January 1986), 109-110.
- Teitelbaum, T. and Reps, T., Immediate computation. *Engineering: Cornell Quarterly*, College of Engineering, Cornell University, Ithaca, NY, November 1985.
- Teitelbaum, T. and Reps, T., Correspondence: On the value of syntax-directed editors. *Communications of the ACM* 25, 5 (May 1982), 351-352.

## SOFTWARE

- Kidd, N., Lal, A., and Reps, T., *WALi: The Weighted Automaton Library*, December 2007. (Available for download from <http://www.cs.wisc.edu/wpis/wpds/wali/>.)
- Kidd, N., Reps, T., Melski, D., and Lal, A., *WPDS++: A C++ Library for Weighted Pushdown Systems*, 2004. (Available for download from <http://www.cs.wisc.edu/wpis/wpds/wpds++/>.)
- Reps, T., Rosay, G., and Horwitz, S., *The Wisconsin Program-Slicing Tool*. Release 1.0, August 1997; Release 1.1, January 1998.
- Reps, T., Bricker, T., Rosay, G., *et al.*, *The Wisconsin Program-Integration System*. Release 0.5, April 1990; Release 1.0, April 1992. Release 2.0, July 1993. Licensed to 9 sites.
- Reps, T., Teitelbaum, T., *et al.*, *The Synthesizer Generator*. Release 1.0, December 1985; Release 2.0, July 1987; Release 3.0, April 1989. Licensed to approximately 325 sites.
- Teitelbaum, T., Reps, T., *et al.*, *The Cornell Program Synthesizer*. Version 1, June 1979; Version 1.02, September 1980; Version 1.03, September 1981. Licensed to approximately 110 sites.

## PATENTS

- Reps, T., Horwitz, S., and Binkley, D., Interprocedural slicing of computer programs using dependence graphs. U.S. Patent Number 5,161,216, issued November 3, 1992.

## LECTURES

### Invited Addresses

1. Semantics-based program integration. Second European Symposium on Programming (ESOP '88), Nancy, France, March 24, 1988.
2. The use of program dependence graphs in software engineering. Fourteenth International Conference on Software Engineering, Melbourne, Australia, May 15, 1992.
3. The use of program profiling in software testing. Informatik '97, Aachen, Germany, Sept. 24, 1997.
4. Program analysis via graph reachability. Fourteenth International Logic Programming Symposium, Port Jefferson, NY, Oct. 14, 1997.
5. Program analysis via graph reachability. Distinguished Lecture Series, Department of Computer and Information Science, Ohio State University, Columbus, OH, April 1, 1998.

6. Static analysis for software-engineering tools: Issues and Opportunities. University of Washington/Microsoft Research Workshop on Technologies to Improve Software Development, Seattle, WA, August 2, 1999.
7. Static analysis and linked data structures. Distinguished Lecture Series, University of Louisiana at Lafayette, Lafayette, LA, April 26, 2002.
8. Static program analysis via 3-valued logic. Static Analysis Symposium. Madrid, Spain, Sept. 18, 2002.
9. Finite differencing of logical formulas for static analysis, Workshop on Dynamic Algorithms and Applications. New Orleans, LA, Jan. 14, 2004.
10. Weighted pushdown systems and their applications. 3rd Int. Workshop on Automated Verification of Infinite-State Systems. Barcelona, Spain, April 3, 2004.
11. CodeSurfer/x86: A platform for analyzing x86 executables. Infosec Research Council, Arlington, VA, July 8, 2004.
12. Static program analysis via three-valued logic. Int. Conf. on Computer-Aided Verification, Boston, MA, July 16, 2004.
13. Static analysis of executables. Distinguished Lecture Series, U. Minn., Nov. 8, 2004.
14. Abstraction and analysis for dynamically changing resources. IFIP Working Conference on Verified Software: Theories, Tools, Experiments, Zurich, Switzerland, Oct. 11, 2005.
15. A next-generation platform for analyzing executables. 3rd Asian Symposium on Programming Languages and Systems, Tsukuba, Japan, Nov. 5, 2005.
16. -----. ACM SIGPLAN Workshop on Partial Evaluation and Program Manipulation (PEPM) Charleston, SC, Jan. 10, 2006.
17. WYSINWYX: What You See Is Not What You eXecute. Infosec Research Council, Washington, DC, March 9, 2006.
18. DIVINE: DIScovering Variables IN Executables. Eighth Int. Conf. on Verification, Model Checking and Abstract Interpretation (VMCAI), (Nice, France, Jan. 2007).
19. WYSINWYX: What You See Is Not What You eXecute. Workshop on Compiler Techniques and Applications, New Delhi, India, Dec. 11, 2007.
20. Program analysis using weighted pushdown systems. 27th Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS), New Delhi, India, Dec. 14, 2007.
21. WYSINWYX: What You See Is Not What You eXecute. “Unifying” invited talk at the European Joint Conferences on Theory and Practice of Software (ETAPS), Budapest, Hungary, Apr. 2, 2008.
22. -----. Distinguished Lecture Series, Max Planck Institute for Software Systems, Saarbruecken, Germany, May 5, 2008.
23. -----. Distinguished Lecture Series, Department of Computer and Information Science, Univ. of Pennsylvania, April 2, 2009.
24. -----. Keynote talk, Int. Symp. on Software Testing and Analysis (ISSTA), Chicago, IL, July 21, 2009.
25. -----. Distinguished Lecture Series, Computer Science Department, Stony Brook University. Sept. 11, 2009.
26. There’s plenty of room at the bottom: Analyzing and verifying machine code. Systems Distinguished Lecture Series, Department of Computer Science, Purdue University, Dec. 6, 2010.
27. Automating abstract interpretation. Triangle CS Distinguished Lecture Series, Department of Computer Science, University of North Carolina, Apr. 6, 2015.

29. ----- . Keynote talk, IEEE/ACM Conference on Automated Software Engineering (ASE), Nov. 2015
29. ----- . IAS Distinguished Lecture, HKUST Jockey Club Institute for Advanced Study, Hong Kong, Jan. 5, 2016.
30. ----- . Int. Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI), Jan. 17, 2016.

### **Tutorials**

1. Incremental computation. Twentieth ACM Symposium on Principles of Programming Languages, Charleston, SC, January 10, 1993.
2. Program analysis via graph reachability. PLDI '00: ACM Conference on Programming Language Design and Implementation (PLDI), Vancouver B.C., Canada, June 18, 2000.
3. There's plenty of room at the bottom: Analyzing and verifying machine code. 22nd Int. Conf. on Computer-Aided Verification (CAV), Edinburgh, Scotland. July 2010.

### **Presentations at Symposia, Workshops, etc.**

1. The why and wherefore of the Cornell Program Synthesizer. ACM SIGPLAN/SIGOA Symposium on Text Manipulation, Portland, OR, June 8, 1981.
2. Optimal-time incremental semantic analysis for syntax-directed editors. Ninth ACM Symposium on Principles of Programming Languages, Albuquerque, NM, January 26, 1982.
3. Static-semantic analysis in language-based editors. IEEE Spring CompCon 83, San Francisco, CA, March 3, 1983.
4. ----- . International course on syntax-directed editing, Aussois, France, April 20, 1983.
5. Optimal-time incremental semantic analysis for syntax-directed editors. International course on syntax-directed editing, Aussois, France, April 21, 1983.
6. Interactive proof checking. Eleventh ACM Symposium on Principles of Programming Languages, Salt Lake City, Utah, January 16, 1984.
7. The Synthesizer Generator. ACM SIGSOFT/SIGPLAN Software Engineering Symposium on Practical Software Development Environments, Pittsburgh, PA, April 23, 1984.
8. ----- . Workshop on Programs as Data Objects, Copenhagen, Denmark, October 18, 1985.
9. Remote attribute updating for language-based editors. Thirteenth ACM Symposium on Principles of Programming Languages, St. Petersburg, FL, January 13, 1986.
10. The Synthesizer Generator. IBM Academic Information Systems 1986 University Study Conference, Ft. Lauderdale, FL, November 18, 1986.
11. Integrating non-interfering versions of programs. IFIP Working Group 2.4, Niagara-on-the-Lake, Ontario, May 5, 1987.
12. ----- . First Meeting of the Midwest Society for Programming Languages and Systems, Chicago, IL, October 24, 1987.
13. Semantics-based program integration. NSF–Industry–University Symposium, IBM T. J. Watson Research Center, Yorktown Heights, NY, April 25, 1989.
14. ----- . First Annual Meeting of the David and Lucile Packard Fellowships Program, Monterey, CA, September 8, 1989.
15. Algebraic properties of program integration. Fifth Meeting of the Midwest Society for Programming Languages and Systems, Chicago, IL, October 21, 1989.
16. Illustrating interference in interfering versions of programs. Second International Workshop on Software Configuration Management, Princeton, NJ, October 25, 1989.

17. Algebraic properties of program integration. Third European Symposium on Programming (ESOP '90), Copenhagen, Denmark, May 18, 1990.
18. Semantics-based program integration. DARPA/ISTO Software Principal Investigators' Meeting, Warwick, R.I., February 27, 1991.
19. The computational complexity of incremental algorithms. Seminar on Programming Environments, International Conference and Research Center for Computer Science (IBFI) at Dagstuhl Castle, Wadern, Germany, March 9, 1992.
20. Semantics-based program integration. International Workshop on Feature Interactions in Telecommunications Software Systems, St. Petersburg, FL, December 4, 1992.
21. Scan grammars: Parallel attribute evaluation via data-parallelism. Twelfth Meeting of the Midwest Society for Programming Languages and Systems, Iowa City, IA, April 10, 1993.
22. ----- . Fifth ACM Symposium on Parallel Algorithms and Architectures, Velen, Germany, July 2, 1993.
23. Bounded incremental computation. Fifth Annual Meeting of the David and Lucile Packard Fellowships Program, Monterey, CA, September 11, 1993.
24. Solving demand versions of interprocedural analysis problems. Fifth International Conference on Compiler Construction, Edinburgh, Scotland, April 9, 1994.
25. From “incremental attribute evaluation” to “bounded incremental computation”. Seminar on Incremental Computation and Dynamic Algorithms, International Conference and Research Center for Computer Science (IBFI) at Dagstuhl Castle, Wadern, Germany, May 4, 1994.
26. Incremental interprocedural dataflow analysis. Seminar on Incremental Computation and Dynamic Algorithms, International Conference and Research Center for Computer Science (IBFI) at Dagstuhl Castle, Wadern, Germany, May 5, 1994.
27. Speeding up slicing. SIGSOFT 94: Second ACM SIGSOFT Symposium on the Foundations of Software Engineering, New Orleans, LA, December 7, 1994.
28. Precise interprocedural dataflow analysis via graph reachability. Twenty-Second ACM Symposium on Principles of Programming Languages, San Francisco, CA, January 23, 1995.
29. Shape analysis as a generalized path problem. PEPM '95: ACM SIGPLAN Symposium on Partial Evaluation and Semantics-Based Program Manipulation, La Jolla, California, June 21, 1995.
30. Precise interprocedural chopping. Third ACM SIGSOFT Symposium on the Foundations of Software Engineering, Washington, DC, October 11, 1995.
31. Program specialization via program slicing. Seminar on Partial Evaluation, International Conference and Research Center for Computer Science (IBFI) at Dagstuhl Castle, Wadern, Germany, February 15, 1996.
32. Program profiling in debugging and testing. Quest Annual Technology Awareness Symposium, Motorola Museum, Schaumburg, IL, April 29, 1997.
33. The use of program profiling for software maintenance with applications to the Year 2000 Problem. Fourteenth Int. Conf. on Testing Computer Software, Tysons Corner, VA, June 18, 1997.
34. ----- . Sixth European Software Engineering Conference and Fifth ACM SIGSOFT Symposium on the Foundations of Software Engineering, Zurich, Switzerland, Sept. 25, 1997.
35. Program analysis via graph reachability. Seminar on Program Comprehension and Software Reengineering, International Conference and Research Center for Computer Science (IBFI) at Dagstuhl Castle, Wadern, Germany, March 10, 1998.
36. Parametric shape analysis via 3-valued logic. Seminar on Programs with Recursively Defined Data Structures, International Conference and Research Center for Computer Science (IBFI) at Dagstuhl Castle, Wadern, Germany, April 23, 1998.

37. Program analysis via graph reachability. Seminar on Programs with Recursively Defined Data Structures, International Conference and Research Center for Computer Science (IBFI) at Dagstuhl Castle, Wadern, Germany, April 24, 1998.
38. Parametric shape analysis via 3-valued logic. Seminar on Program Analysis, International Conference and Research Center for Computer Science (IBFI) at Dagstuhl Castle, Wadern, Germany, April 13, 1999.
39. Program analysis via graph reachability. Seminar on Model Checking and Program Analysis, Schloss Ringberg, Tegernsee, Germany, Feb. 22, 2000.
40. Semantic minimization of 3-valued propositional formulae. IEEE Symp. on Logic in Computer Science, Copenhagen, Denmark, July 22, 2002.
41. Static program analysis via 3-valued logic. Seminar on Reasoning about Shape, International Conference and Research Center for Computer Science (IBFI) at Dagstuhl Castle, Wadern, Germany, March 3, 2003.
42. Symbolic implementation of the best transformer. Seminar on Reasoning about Shape, International Conference and Research Center for Computer Science (IBFI) at Dagstuhl Castle, Wadern, Germany, March 5, 2003.
43. Weighted pushdown systems and their application to interprocedural dataflow analysis. 10th Int. Static Analysis Symp., San Diego, CA, June 12, 2003.
44. On generalized authorization problems. 16th IEEE Computer Security Foundations Workshop, Pacific Grove, CA, July 1, 2003.
45. Weighted pushdown systems, Seminar on Language-Based Security, International Conference and Research Center for Computer Science (IBFI) at Dagstuhl Castle, Wadern, Germany, Oct. 2003.
46. Numeric analysis of array operations. Thirty-Second ACM Symposium on Principles of Programming Languages, Long Beach, CA, Jan. 2005.
47. CodeSurfer/x86 -- A next-generation platform for analyzing executables. National Security Agency's 5th Conference on High Confidence Software and Systems, Linthicum Heights, MD, March 2005.
48. A next-generation platform for analyzing executables. Software Assurance Forum, Alexandria, VA, April 2005.
49. Model checking x86 executables with CodeSurfer/x86 and WPDS++. Workshop on the Evaluation of Software Defect Detection Tools, June 12, 2005.
50. A next-generation platform for analyzing executables. ARO-DHS Workshop on Malware Detection, Aug. 10, 2005.
51. WYSINWYX: What You See Is Not What You eXecute. IFIP Working Conference on Verified Software: Theories, Tools, Experiments, Zurich, Switzerland, Oct. 12, 2005.
52. -----. Dagstuhl Seminar on "Software Verification: Infinite-State Model Checking and Static Program Analysis", Feb. 19, 2006.
53. A system for generating static analyzers for machine instructions. Dagstuhl Seminar on "Types, Logics and Semantics for State", Feb. 5, 2008.
53. WYSINWYX: What You See Is Not What You eXecute. Summer School on MOdelling and VERification of parallel Processes (MOVEP), Orleans, France, June 23-28, 2008.
54. "There's plenty of room at the bottom: Analyzing and verifying machine code", Dagstuhl Seminar on Analysis of Executables: Benefits and Challenges, Jan. 30, 2012.
55. "Setting the Scene: Decision Procedures and Abstract Interpretation", Dagstuhl Seminar on Decision Procedures and Abstract Interpretation, Aug. 25, 2014.

### **Demonstrations of Software at Symposia, Workshops, etc.**

1. The Synthesizer Generator. ACM SIGSOFT/SIGPLAN Software Engineering Symposium on Practical Software Development Environments, Pittsburgh, PA, April 24, 1984.
2. The Wisconsin Program-Integration System. Third European Symposium on Programming (ESOP '90), Copenhagen, Denmark, May 15-18, 1990.
3. ----- . ACM SIGSOFT '90: Fourth Symposium on Software Development Environments, Irvine, CA, December 4-5, 1990.
4. ----- . Second International Conference on Algebraic Methodology and Software Technology (AMAST), Iowa City, Iowa, May 22-24, 1991.
5. ----- . Third Annual Meeting of the David and Lucile Packard Fellowships Program, Monterey, CA, September 6, 1991.
6. ----- . Seminar on Programming Environments, International Conference and Research Center for Computer Science (IBFI) at Dagstuhl Castle, Wadern, Germany, March 11, 1992.
7. The Synthesizer Generator. Fifteenth International Conference on Software Engineering, Baltimore, MD, May 19, 1993.
8. The Wisconsin Program-Integration System. Fifteenth International Conference on Software Engineering, Baltimore, MD, May 19, 1993.
9. ----- . Seminar on Partial Evaluation, International Conference and Research Center for Computer Science (IBFI) at Dagstuhl Castle, Wadern, Germany, February 15, 1996.

### **Lectures at Universities and Research Institutes**

Approximately 155 seminar talks at universities and research institutes in North America, Europe, Asia, and Australia.

## **SUPERVISORY ACTIVITIES**

### **Ph.D. Students Supervised as Major Dissertation Advisor**

1. Wu Yang, 1990. (Supervised jointly with S. Horwitz.) *Dissertation*: A new algorithm for semantics-based program integration. Tech. Rep. TR-962, Computer Sciences Department, University of Wisconsin, Madison, WI, August 1990.
2. Phillip Pfeiffer, 1991. *Dissertation*: Dependence-based representations for programs with reference variables. Tech. Rep. TR-1037, Computer Sciences Department, University of Wisconsin, Madison, WI, August 1991.
3. David Binkley, 1991. *Dissertation*: Multi-procedure program integration. Tech. Rep. TR-1038, Computer Sciences Department, University of Wisconsin, Madison, WI, August 1991.
4. G. Ramalingam, 1993. *Dissertation*: Bounded incremental computation. Tech. Rep. TR-1172, Computer Sciences Department, University of Wisconsin, Madison, WI, August 1993.  
Dissertation published as: Ramalingam, G., *Bounded Incremental Computation*. Lecture Notes in Computer Science, Vol. 1089, Springer-Verlag, New York, NY, 1996.
5. Manuvir Das, 1998. *Dissertation*: Partial evaluation using dependence graphs. Tech. Rep. TR-1362, Computer Sciences Department, University of Wisconsin, Madison, WI, February 1998.
6. Michael Siff, 1998. *Dissertation*: Techniques for software renovation. Tech. Rep. TR-1384, Computer Sciences Department, University of Wisconsin, Madison, WI, August 1998.
7. Zhichen Xu, 2000. (Supervised jointly with B. Miller.) *Dissertation*: Safety checking of machine code.

8. David Melski, 2002. *Dissertation*: Interprocedural path profiling and the interprocedural express-lane transformation. TR-1435, Computer Sciences Department, University of Wisconsin, Madison, WI, Feb. 2002.
9. Alexey Loginov, 2006. *Dissertation*: Refinement-based program verification via three-valued-logic analysis. Ph.D. dissertation and Tech. Rep. TR-1574, Computer Sciences Department, University of Wisconsin, Madison, WI, August 2006.
10. Denis Gopan, 2007. *Dissertation*: Numeric program analysis techniques with applications to array analysis and library summarization. Ph.D. dissertation and Tech. Rep. TR-1602, Computer Sciences Department, University of Wisconsin, Madison, WI, August 2007.
11. Gogul Balakrishnan, 2007. *Dissertation*: WYSINWYX: What You See Is Not What You eXecute. Ph.D. dissertation and Tech. Rep. TR-1603, Computer Sciences Department, University of Wisconsin, Madison, WI, August 2007.

For this work, Balakrishnan received the UW Computer Sciences Department's Outstanding Graduate Student Research Award for 2007–2008.

12. Akash Lal, 2009. *Dissertation*: Interprocedural analysis and the verification of concurrent programs. Ph.D. dissertation, Computer Sciences Department, University of Wisconsin, Madison, WI, August 2009.

For this work, Lal was a co-recipient of the 2009 SIGPLAN Outstanding Doctoral Dissertation Award. He was also a co-recipient of the UW Computer Sciences Department's Outstanding Graduate Student Research Award for 2008–2009. Lal was also named as one of the 18 awardees selected for the 2011 India TR-35 list (top innovators under 35).

13. Nicholas Kidd, 2009. *Dissertation*: Static verification of data-consistency properties. Ph.D. dissertation and Tech. Rep. TR-1665, Computer Sciences Department, University of Wisconsin, Madison, WI, August 2009.
14. Junghee Lim, 2011. *Dissertation*: Transformer Specification Language: A system for generating analyzers and its applications. Ph.D. dissertation and Tech. Rep. TR-1689, Computer Sciences Department, University of Wisconsin, Madison, WI, May 2011.

For this work, Lim received the UW Computer Sciences Department's Outstanding Graduate Student Research Award for 2010–2011.

15. Evan Driscoll, 2013. *Dissertation*: Checking format compatibility of programs using automata. Ph.D. dissertation and Tech. Rep. TR-1799, Computer Sciences Department, University of Wisconsin, Madison, WI, Aug. 2013.
16. Aditya V. Thakur, 2014. *Dissertation*: Symbolic abstraction: Algorithms and applications. Ph.D. dissertation and Tech. Rep. TR-1812, Computer Sciences Department, University of Wisconsin, Madison, WI, Aug. 2014.

For this work, Thakur was a co-recipient of the UW Computer Sciences Department's Outstanding Graduate Student Research Award for 2013–2014.

17. William Harris, 2014. (Supervised jointly with S. Jha.) *Dissertation*: Secure programming via game-based synthesis. Ph.D. dissertation and Tech. Rep. TR-1814, Computer Sciences Department, University of Wisconsin, Madison, WI, Dec. 2014.
18. Venkatesh Srinivasan, 2017. *Dissertation*: Synthesis of Machine Code: Algorithms and Applications. Ph.D. dissertation and Tech. Rep. TR-1844, Computer Sciences Department, University of Wisconsin, Madison, WI, Mar. 2017.

For this work, Srinivasan received the UW Computer Sciences Department's Outstanding Graduate Student Research Award for 2016–2017.



### **Post-Doctoral Associates and Visitors**

1. Jan Prins (Ph.D., Cornell Univ.), 1986–87. (Currently Professor, Department of Computer Science, University of North Carolina, Chapel Hill.)
2. Wu Yang (Ph.D., Univ. of Wisconsin), 1990–91. (Currently Professor, Department of Computer and Information Science, National Chiao-Tung University, Taiwan.)
3. Robert Paige (NYU), 1990–91.
4. Jiazhen Cai (NYU), 1990–91.
5. Mooly Sagiv (Ph.D., Technion), 1994–95. (Currently Professor, Computer Science Department, Tel-Aviv University, Israel.)
6. David Melski, (Ph.D, Univ. of Wisconsin) 2002.
7. Stefan Schwoon (Univ. of Stuttgart), Feb.–Mar., 2003.
8. Bertrand Jeannot (IRISA), Mar.–June, 2003.
9. Neil Immerman (U. Mass.), 2004–05.
10. Xin Li (Japan Advanced Institute of Science and Technology), Summer 2010.
11. Anders Moeller (Aarhus University), Oct.–Nov. 2010.
12. Junghee Lim (Ph.D., Univ. of Wisconsin) 2011–2013.

### **External Ph.D. Examiner**

1. Emma van der Meulen, Centrum voor Wiskunde en Informatica (The Mathematical Center), Amsterdam, The Netherlands, January 1994.
2. Frank Tip, Centrum voor Wiskunde en Informatica (The Mathematical Center), Amsterdam, The Netherlands, March 1995.
3. Laure Gonnord, University Joseph Fourier -- Grenoble I, Grenoble, France, Oct. 2007.
4. Xiao Xiao, Hong Kong University of Science and Technology (HKUST), Jan. 2016.
5. Ulrik Terp Rasmussen, University of Copenhagen, Denmark, Jan. 2017.

### **GRANTS**

- PI, *CURB: Calculating and Understanding Resource Bounds to Detect Space/Time Vulnerabilities* (UW Subcontract from GrammaTech, Inc.), DARPA STAC, 2015–2019. (Selected for award.)
- PI, *A Google-Scale SAT Solver*, Google Research Cloud Credits Award, 2014–2015.
- Co-PI, *CCF: Small: Collaborative Research: Transforming Natural Language to Programming Languages*, Ben Snyder, PI. NSF, 2014–2017.
- PI, *PLINY: An End-to-End Framework for Big Code Analytics* (UW Subcontract from Rice Univ.), DARPA MUSE, 2014–2018.
- PI, *Recovering Components from Executables*, DARPA BET, 2011–2015.
- PI, *Policy Weaving for System Security*, DARPA CRASH, 2010–2015.
- PI, *Mathematically Rigorous Methods for Determining Software Quality*, ONR STTR Phase I and Phase II (with GrammaTech, Inc.), 2010–2014,
- PI, *MACANTOK – a MACHine-Code-ANALYSIS TOOl Kit – and its Applications*, NSF, 2009–14.
- PI, *Automated Vulnerability Detection in Executables*, ARL, 2009–12.
- PI, *Mathematically Rigorous Methods for Determining Software Quality*, ONR STTR (with GrammaTech, Inc.), 2010–2011.

- PI (for UW subcontract from Purdue University), *A Systematic Defensive Framework for Combating Botnets*, ONR, 2009–10.
- PI, *Techniques to Address the Application/Library-Compatibility Problem*, ONR, 2009–12.
- PI, *Cross-Boundary Security Analysis*, AFOSR, 2009–12.
- PI, *Advanced Methods for Performing Static Analysis of Machine Code*, NSF, 2008–11.
- PI, *Advanced Static-Analysis Techniques for Ensuring Reliable Software*, NSF, 2006–2009.
- PI, *Reverse Engineering Kernel-Mode Rootkits*, GrammaTech, Inc., 2006–2007.
- PI, *Deobfuscating Tools for Validation and Verification of Tamper-Proofed Software*, GrammaTech, Inc., 2006–2007.
- PI (for UW subcontract from GrammaTech, Inc.), *Deep Static Analysis of Binaries*, IARPA, 2006–2008.
- PI (for UW subcontract from GrammaTech, Inc.), *Model Checking Software Binaries*, HSARPA, 2005–2007.
- PI, *Advanced Methods for Checking Information-Security Properties*, NSF Cybertrust, 2005–2009.
- PI (for UW subcontract from CMU), *Static Analysis to Enhance the Power of Model Checking for Concurrent Software*, ONR University Research Initiative, 2001–2006.
- Co-PI, *Vulnerability and Information Flow Analysis for COTS*, ONR University Research Initiative, 2001–2006.
- PI, *Investigation of a New Compressed Representation of Boolean Functions*, NSF, 2000–04.
- PI, *Investigation of a New Compressed Representation of Boolean Functions*, ONR, 2000–01.
- Co-PI, *Run-Time Type Checking of C Programs*, IBM Partnership Award, IBM Research, 2000–01.
- Co-PI, *Run-Time Type Checking of C Programs*, IBM Partnership Award, IBM Research, 1999–00.
- PI, *Software Diagnostics Using Path-Spectrum Information*, IBM Partnership Award, IBM Research, 1998–99.
- PI, *Shape-Analysis for Languages with Destructive Updating*, NSF, 1997–00.
- Co-PI, *Slicing Programs with Recursive Data Structures*, United States-Israel Binational Science Foundation, 1997–00.
- PI, *Improved Techniques for Program Analysis and Program Specialization*, Rockwell Foundation.
- PI, *Software Diagnostics Using Path-Spectrum Information*, IBM Partnership Award, IBM Research, 1997–98.
- PI, *A Preprocessor for Activity Analysis of ANSI-C Programs*, Argonne National Laboratories, 1997.
- PI, *Semantics-Based Program Manipulation*, NSF, 1996–98.
- PI, *Technical Opportunities to Help with the Year 2000 Problem*, Advanced Research Projects Agency, 1996–97.
- PI, *Improved Techniques for Program Analysis and Program Slicing*, Advanced Research Projects Agency, 1995–98.
- PI, *Software Support for Programming in the Large*, Advanced Research Projects Agency, 1992–97.
- PI, *Travel Support for U.S. Participants at an International Workshop*, National Science Foundation, 1992–93.
- PI, *Semantics-Based Program Integration*, National Science Foundation, 1991–96.
- David and Lucile Packard Fellowship for Science and Engineering*, David and Lucile Packard Foundation, 1988–93.
- PI, *Software Support for Programming in the Large*, Defense Advanced Research Projects Agency, 1988–91.

PI, *Software Support for Programming in the Large*, Digital Equipment Corporation, 1988–91.

*Presidential Young Investigator Award*, NSF, 1986–91.

PI, *Language-Based Program Development Environments*, Xerox Corporation, 1986–89.

*Faculty Development Award*, IBM Corporation, 1986–88.

PI, *Language-Based Program Development Environments*, Digital Equipment Corporation, 1986–88.,

PI, *Language-Based Program Development Environments*, Siemens Corporate Research, 1986–87.

Participating Faculty Member, *PRISM: A Laboratory for Research in Future High-Performance Parallel Computing*, NSF, 1991–96. (M.K. Vernon, M.J. Carey, C.R. Dyer, M.D. Hill, R.R. Meyer, and B.P. Miller, PIs.)

Participating Faculty Member, *TOPAZ: A Laboratory for Research in Distributed Computing*, NSF, 1986–91. (D. Dewitt, R. Finkel, C. Fischer, L. Landweber, O. Mangasarian, and M. Solomon, PIs.)

## PROFESSIONAL ACTIVITIES

### Government

Member, F/A-22 Avionics Advisory Team, Office of the Deputy Under Secretary for Defense (Science and Technology), 2003.

Consultant to the Defense Advanced Research Projects Agency (DARPA) to plan a project aimed at reducing the impact of the Year 2000 Problem on the Department of Defense, 1996–97.

### Editorial Activities

Co-editor, *Program Analysis and Compilation, Theory and Practice: Essays Dedicated to Reinhard Wilhelm*. (Festschrift for Prof. Reinhard Wilhelm, Univ. des Saarlandes), Springer-Verlag.

Editor, *Software–Practice & Experience*, 2003–present.

Associate Editor, *IEEE Trans. on Softw. Eng. (TSE)*, 2001–2003.

Guest editor, *ACM Trans. on Program. Lang. and Syst. (TOPLAS)* 8, 4 (October 1986). Special issue consisting of papers from the ACM SIGPLAN 85 Symposium on Languages Issues in Programming Environments (Seattle, WA, June 1985).

### Steering Committees

Member of Steering Committee, International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI), 2002–present.

### Organizer/Co-organizer

Seminar on “Decision Procedures and Abstract Interpretation”, International Conference and Research Center for Computer Science (IBFI) at Dagstuhl Castle, Wadern, Germany, Aug. 25–29, 2014. (With D. Kroening, S. Seshia, and A. Thakur.)

Seminar on “Analysis of Executables: Benefits and Challenges”, International Conference and Research Center for Computer Science (IBFI) at Dagstuhl Castle, Wadern, Germany, Jan. 30 – Feb. 3, 2012. (With A. Flexeder, A. King, A. Mycroft, and A. Simon.)

Seminar on “Program Comprehension and Software Reengineering”, International Conference and Research Center for Computer Science (IBFI) at Dagstuhl Castle, Wadern, Germany, March 9-13, 1998. (With G. Snelting and H. Mueller.)

NSF/DARPA/ARO Workshop on Software Engineering and Programming Languages, Cambridge, MA, June 1996. (With H. Gill, C. Gunter, I. Lee, P. Lee, J. Mitchell, D. Notkin, and V. Tannen.)

Seminar on “Incremental Computation and Dynamic Algorithms”, International Conference and Research Center for Computer Science (IBFI) at Dagstuhl Castle, Wadern, Germany, May 2-6, 1994. (With J. van Leeuwen and K. Mehlhorn.)

Seminar on “Programming Environments”, International Conference and Research Center for Computer Science (IBFI) at Dagstuhl Castle, Wadern, Germany, March 9-13, 1992. (With P. Klint and G. Snelling.)

#### **Chairman of Program Committee**

Twenty-Seventh ACM Symposium on Principles of Programming Languages, January 2000.

#### **Member of Program Committee**

7th Workshop on Numerical and Symbolic Abstract Domains, 2017.

Static Analysis Symposium (SAS), 2011.

17th ACM Conference on Computer and Communications Security (CCS), 2010.

Static Analysis Symposium (SAS), 2009.

18th Conference on Computer-Aided Verification (CAV), 2006.

7th International Workshop on Verification, Model Checking, and Abstract Interpretation (VMCAI), 2006.

European Symposium on Programming (ESOP), 2005.

ACM SIGPLAN '04: Conference on Programming Language Design and Implementation (PLDI), 2004.

ACM Workshop on Partial Evaluation and Semantics-Based Program Manipulation (PEPM), 2003.

3rd International Workshop on Verification, Model Checking, and Abstract Interpretation (VMCAI), 2002.

Eleventh International Conference on Compiler Construction, 2001.

First International Workshop on Automated Program Analysis, Testing and Verification, 2000.

Static Analysis Symposium, 1998.

IEEE International Conference on Computer Languages, 1998.

ACM PEPM '97: SIGPLAN Symposium on Partial Evaluation and Semantics-Based Program Manipulation, 1997.

ACM SIGPLAN '96: Conference on Programming Language Design and Implementation, 1996.

Sixth International Conference on Compiler Construction, 1996.

First ACM SIGSOFT Symposium on Foundations of Software Engineering, 1993.

ACM SIGSOFT '90: Fourth Symposium on Software Development Environments, Irvine, CA, 1990.

Sixteenth ACM Symposium on Principles of Programming Languages, Austin, TX, 1989.

Second European Symposium on Programming (ESOP '88), Nancy, France, 1988.

Fourteenth ACM Symposium on Principles of Programming Languages, Munich, West Germany, 1987.

ACM SIGPLAN 85 Symposium on Languages Issues in Programming Environments, Seattle, WA, 1985.

#### **Member of Selection Committee**

Ninth ACM George E. Forsythe Student Paper Competition, 1982.

#### **Review Committees**

Member, Review Committee for the U.S. Army Research Office Computing and Information Sciences Division, 2006.

### **Search Committees**

Chair, Search Committee for Editor-in-Chief of ACM Trans. on Program. Lang. and Syst. (TOPLAS), 2016.

### **Proposal-Review Panels**

Member, National Science Foundation proposal-review panels in 1987, 1989, and 2007.

### **Instructor**

International course on syntax-directed editing, Aussois, France, April 18-22, 1983.

Summer School on MOdelling and VERification of parallel Processes (MOVEP), Orleans, France, June 23-28, 2008.

### **Panelist**

“Panel on Software Development, Quality, and Metrics”, CIP/SW URI Workshop, Annapolis, MD, Aug. 18, 2004.

“Formal methods and software verification”, CAV 2000: 12th Int. Conf. on Computer Aided Verification, July 18, 2000.

“Programming environments and tools”, IFIP 12th World Computer Congress. Madrid, Spain, September 1992.

“Programming environments and tools”, IBM Academic Information Systems 1986 University Study Conference, Ft. Lauderdale, FL, November 1986.

### **Participant**

NSF Workshop on Symbolic Computation for Constraint Satisfaction Problems, Washington, DC, November 2008.

DARPA/ITO Workshop on Software-Enabled Control of Systems, Atlanta, GA, December 1997.

“Models of Programming Languages” Working Group, ACM Workshop on Strategic Directions in Computing Research, Cambridge, MA, June 1996.

Workshop on Foundational Studies for Software Engineering, NSF and ARPA, Palo Alto, CA, September 1995.

Workshop on the Future of Research in Programming Languages and Compilers, NSF, Charleston, SC, January 1993.

Workshop on Critical Research Directions in Programming Languages, Office of Naval Research, Miami Beach, FL, October 1988.

### **Referee/Reviewer**

*ACM Computing Surveys*

*ACM Trans. on Program. Lang. and Syst. (TOPLAS)*

*ACM Trans. on Softw. Eng. and Methodology (TOSEM)*

*Acta Informatica*

*IEEE Transactions on Computers*

*IEEE Trans. on Softw. Eng. (TSE)*

*Information Processing Letters*

*Lecture Notes in Computer Science*

*Mathematical Systems Theory*

*Science of Computer Programming*

*Software—Practice & Experience*

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National Research Council of the National Academy of Sciences

National Science Foundation

Netherlands Computer Science Research Foundation

Swedish Research Council for Engineering Sciences

**Professional Societies**

Association for Computing Machinery (ACM)