Curriculum Vitae **Jens Palsberg** May 31, 2023

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1 General Information

1.1 Personal

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Born in 1964 in Denmark. Permanent resident of the United States.

1.2 Brief Biography

Jens Palsberg is a Professor of Computer Science at University of California, Los Angeles (UCLA). His research interests span the areas of compilers, embedded systems, programming languages, software engineering, and information security. He is the editor-in-chief of ACM Transactions of Programming Languages and Systems, a member of the editorial board of Information and Computation, a former member of the editorial board of IEEE Transactions on Software Engineering, and a former conference program chair of ACM Symposium on Principles of Programming Languages (POPL), Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), the Static Analysis Symposium (SAS), Conference on Embedded Systems Software (EMSOFT), Conference on Formal Methods and Programming Models for Co-Design (MEMOCODE), ACM Workshop on Program Analysis for Software Tools and Engineering (PASTE), and Symposium on Requirements Engineering for Information Security (SREIS). In 2012 he received the ACM SIGPLAN Distinguished Service Award.

Jens Palsberg received a Ph.D. in Computer Science from University of Aarhus, Denmark in 1992. In 1992–1996 he was a visiting scientist at various institutions, including MIT. In 1996–2002 he was an Associate Professor and, in 2002–2003, Professor of Computer Science at Purdue University, after which he moved to UCLA. He has authored over 80 technical papers, co-authored the book Object-Oriented Type Systems, and co-authored the 2002 revision of Appel's textbook on Modern Compiler Implementation in Java. He is the recipient of National Science Foundation CAREER and ITR awards, a Purdue University Faculty Scholar award, an IBM Faculty Award, and an Okawa Foundation research award. His research has also been supported by DARPA, Intel, and British Telecom. He has served as chair of computer science at UCLA, as associate head of computer science at Purdue University, as the general chair of POPL and International Workshop on Model Checking of Software (SPIN), as the conference chair of the IEEE Symposium on Logic in Computer Science (LICS), and as the vice chair of ACM SIGBED, Special Interest Group on Embedded Systems.

1.3 Education

Ph.D.	Computer Science, University of Aarhus, Denmark, 1992. Thesis title: “Provably correct compiler generation”. Advisor: Peter Mosses.
M.Sc.	Computer Science and Mathematics, University of Aarhus, Denmark, 1988.

1.4 Professional Appointments

7/03–present	Professor of Computer Science, UCLA, USA.
9/10–6/15	Chair of Computer Science, UCLA, USA.
4/10–9/10	Visiting Professor, University of Aarhus, Denmark
7/05–9/07	Graduate Vice Chair, Computer Science, UCLA, USA.
7/03–5/06	Adjunct Professor of Computer Science, Purdue University, USA.
8/02–7/03	Professor and Associate Head of Computer Science, Purdue University, USA.
5/02–8/02	Visiting Scholar, University of California, San Diego, USA.
8/96–7/02	Associate Professor of Computer Science, Purdue University, USA.
6/95–8/96	Visiting Scientist, Massachusetts Institute of Technology, USA.
7/94–6/95	Research Assistant Professor, University of Aarhus, Denmark.
9/93–6/94	Visiting Assistant Professor, Northeastern University, USA.
8/91–8/93	Research Associate, University of Aarhus, Denmark.

1.5 Honors

- National Science Foundation CAREER Award, 1998.
- Purdue University Faculty Scholar, 1999–2004, in recognition of outstanding academic distinction.
- One of the Ten Best Teachers of Undergraduates in the School of Science, Purdue University, for 2001, as selected by junior and senior science students.
- Okawa Foundation Research Award, 2003.
- IBM Faculty Award, 2005.
- ACM Distinguished Speaker 2006–2014.
- ACM SIGPLAN Distinguished Service Award, 2012.
- Eon Instrumentation Inc. Excellence in Teaching Award at UCLA, 2023.

1.6 Professional and Scholarly Associations

Association for Computing Machinery (ACM), ACM SIGPLAN, ACM SIGBED.

2 Research

2.1 Research Summary

Publications:	**35** papers in top conferences.
Citations:	h-index **42** (42 papers that each has at least 42 citations in Google Scholar).
Lectures:	**12** invited conference talks and **10** distinguished university lectures.
Funding:	**7** NSF grants and **4** DARPA contracts.
Honors:	NSF CAREER award and ACM Distinguished Speaker.

I have published **41** papers in top conferences, namely OOPSLA(11), POPL(9), PLDI(5), FSE(5), ICSE(4), LICS(3), CAV(1), ICFP(1), FOCS(1), RTAS(1). My conference list spans widely across programming languages and software engineering, and it reflects well the breadth of my interests. My interests include compilers, embedded systems, and programming languages, and have led to contributions to object-oriented programming, functional programming, and parallel programming.

My ten most cited papers all have between 130 and 500+ citations in Google Scholar. Those papers are a good sample of my research output and their significance can be summarized as follows.

- *Avrora: Scalable sensor network simulation with precise timing, IPSN 2005.* Avrora is a cycle- and energy-accurate instruction-level sensor network simulator that is 20 times faster than previous simulators. A much-used tool in research efforts around the world, Avrora can handle networks of 25 sensor nodes in real time and shed light on design issues for large-scale sensor networks, particularly time-sensitive phenomena.

- *A denotational semantics of inheritance and its correctness, OOPSLA 1989 and Information & Computation.* The paper presents a denotational semantics of inheritance and shows that the semantics is equivalent to method lookup in object-oriented languages. The paper is one of the early foundational papers on semantics of objects that helped bring the area on a sound theoretical footing.

- *Object-oriented type inference, OOPSLA 1991.* The paper presents a static analysis of classes and objects that in today's terminology would be called flow-insensitive and context-insensitive. The paper shows that accurate type information can be found statically without type annotations of variables, arguments, or results. The analysis became an integral part of numerous virtual machines and software engineering tools. Aiken (University of California, Berkeley) and Heintze (Bell Laboratories, Lucent Technologies) wrote in their tutorial notes a section about the analysis:

  > "This analysis was discovered by Palsberg and Schwartzbach ... very efficient in practice." [On p.16,27 of the tutorial notes by Alex Aiken and Nevin Heintze, distributed at their 1995 tutorial on constraint-based program analysis given at the ACM Symposium on Principles of Programming Languages.]

- *Object-oriented type systems, book published in 1994.* The book is based on three tutorials given at OOPSLA and ECOOP, and summarizes and expands the results of several conference papers, including the one in OOPSLA 1991 listed above. The book came with software that enabled the reader to experiment with a suite of algorithms for type checking and type inference.

- *Scalable propagation-based call graph construction algorithms, OOPSLA 2000 and a patent.* The paper presents the ideas behind Frank Tip's JAX tool for Java-application extraction. The key contribution is a scalable static analysis that produces significantly better results than previous work, including the OOPSLA 1991 paper listed above. The paper also showed how to integrate reachability into a wide range of static analyses of objects.

- *The essence of the visitor pattern, COMPSAC 1998.* The paper explains and generalizes the visitor pattern in object-oriented programming. The generalization is called Walkabout and doesn't rely on accept methods and doesn't require knowledge of all classes in advance. The original Walkabout uses the slow technique of reflection, yet many follow-up papers by other researchers have shown how to implement more efficient versions of Walkabout.

- *A type system equivalent to flow analysis, POPL 1995 and TOPLAS.* The paper shows a surprising connection between (1) flow-insensitive and context-insensitive static analysis, and (2) a type system with subtyping and recursive types [Amadio and Cardelli, 1991]. In particular, the connection shows that data flow and subtyping are closely related. The paper was a step towards unifying the rather separate fields of static analysis and type systems.

- *Encapsulating objects with confined types, OOPSLA 2001 and TOPLAS.* The paper presents a scalable tool that infers object encapsulation properties of Java programs. The tool can prove that all instances of a given class are encapsulated in the enclosing package. This simple property can be used to identify accidental leaks of sensitive objects. The tool was one of the first to successfully control aliasing in object-oriented programs.

- *Complexity results for 1-safe nets, FST&TCS 1993 and Theoretical Computer Science.* The paper proves surprising complexity results for Petri nets. (1) Reachability, liveness, and deadlock are PSPACE-complete for 1-safe nets; (2) deadlock is NP-complete for 1-safe free-choice nets; and (3) in the general case, deadlock is equivalent to reachability. The results put an end to various efforts to find efficient algorithms.

- *Efficient recursive subtyping, POPL 1993 and Mathematical Structures in Computer Science.* The paper presents an $O(n^2)$ algorithm to decide subtyping of recursive types. The previous best algorithm was given by Amadio and Cardelli in 1991 and ran in exponential time and exponential space. The $O(n^2)$ algorithm showed that recursive types can be handled by an efficient type checker.

My research also include major efforts on type inference, register allocation, compiler generators, partial evaluation, software watermarking, compilation to FGPAs, interrupt-driven software, type-preserving program transformations, async-finish parallelism, trace compilation, transactional memory, and other topics. Let me give a couple of quotes from other researchers about some of this work. First a quote from Abadi and Cardelli who wrote in their book, with reference to my paper [28] on type inference for object-oriented programs:

> "Thus the absence of minimum typings poses practical problems for type inference. Palsberg has described an ingenious algorithm for type inference that surmounts these problems." [On p.97 of "A Theory of Objects", by Martín Abadi and Luca Cardelli, Springer-Verlag, New York, 1996.]

Second a quote from Heinzte and Riecke who wrote in a paper, with reference to my paper with Ørbæk [36] on trust analysis:

> "Type systems have been also used for the related problem of reasoning about trustworthiness of data. For instance, [the paper by Palsberg and Ørbæk] introduces a calculus in which one can explicitly annotate expressions as trusted or distrusted and check their trust/distrust status; this system enforces consistent use of these annotations." [On p.373 of "The SLam Calculus: Programming with Secrecy and Integrity", by Nevin Heintze and Jon Riecke, in Proceedings of POPL'98, 25th ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages, pp.365–377, ACM, New York.]

I have given 12 invited conference talks about my research, including at (1) CASES (International Conference on Compilers, Architectures and Synthesis for Embedded Systems) in a joint session with EMSOFT, (2) VMCAI (International Conference on Verification, Model Checking and Abstract Interpretation), and (3) SAS (Static Analysis Symposium). I have also given 14 conference tutorials and summer school lectures.

I have given 10 distinguished university lectures including at University of Chicago, University of Utah, and University of Technology, Sydney, and including six lectures that I gave as an ACM Distinguished Speaker. Additionally, I have given more than 90 other invited talks at universities and research institutions, including at MIT, Stanford, CMU, and Berkeley.

I have had 7 NSF grants, including an NSF CAREER award, two ITR awards (I was the PI), and a share of an NSF Expeditions award (Jason Cong is the PI). I have also had four DARPA contracts, including one as the PI. Additionally, I have had support from various companies, including IBM, Intel, Mozilla, and British Telecom, and also from such entities as Sandia National Laboratories and China's National Science Foundation.

Microsoft Academic Search ranked me number 34 in the world among researchers in the area of programming languages in 2013.

2.2 Publications

Books

[1] “Object-oriented type systems”, with Michael I. Schwartzbach. John Wiley & Sons, 1994. ISBN 0 471 94128 X. 180 pp.

[2] “Modern compiler implementation in Java”. Cambridge University Press, 2002. Main author: Andrew W. Appel; co-author: Jens Palsberg.

Editor of Conference Proceedings

[3] “Static Analysis: Proceedings of SAS’00, 7th International Static Analysis Symposium”, Springer-Verlag (*LNCS* 1824), 2000.

[4] “Proceedings of PASTE’02, ACM SIGPLAN-SIGSOFT Workshop on Program Analysis for Software Tools and Engineering”, with Matthew B. Dwyer. ACM Press, 2002.

[5] “Proceedings of POPL’05, ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages”. ACM Press, 2005. General chair: Jens Palsberg. Program chair: Martín Abadi.

[6] “Proceedings of TACAS’06, International Conference on Tools and Algorithms for the Construction and Analysis of Systems”, with Holger Hermanns. Springer-Verlag, 2006.

[7] “Proceedings of MEMOCODE’06, ACM-IEEE Conference on Formal Methods and Programming Models for Co-Design”, with James Hoe. IEEE Press, 2006.

[8] “Proceedings of SPIN’08, Model Checking Software, 15th International SPIN Workshop”, with Klaus Havelund and Rupak Majumdar. Springer-Verlag, 2008.

[9] “Proceedings of EMSOFT’08, International Conference on Embedded Software”, with Luca de Alfaro. ACM Press, 2008.

[10] “Static Analysis: Proceedings of SAS’09, 16th International Static Analysis Symposium”, with Zhendong Su. Springer-Verlag (*LNCS* 5673), 2009.

[11] “Semantics and Algebraic Specification, Essays Dedicated to Peter D. Mosses on the Occasion of His 60th Birthday”, Springer (*LNCS* 5700), 2009.

[12] “Proceedings of POPL’10, ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages”. ACM Press, 2010. General chair: Manuel Hermenegildo. Program chair: Jens Palsberg.

Refereed Journal Articles

[13] “Safety analysis versus type inference for partial types”, with Michael I. Schwartzbach. *Information Processing Letters*, 43:175–180, 1992.

[14] “Normal forms have partial types”. *Information Processing Letters*, 45:1–3, 1993.

[15] "Correctness of binding-time analysis". *Journal of Functional Programming*, 3(3):347–363, 1993.

[16] "A denotational semantics of inheritance and its correctness", with William Cook. *Information and Computation*, 114(2):329–350, 1994.

[Preliminary version in Proceedings of OOPSLA'89, ACM SIGPLAN Fourth Annual Conference on Object-Oriented Programming Systems, Languages and Applications, pages 433–443, New Orleans, Louisiana, October 1989].

[17] "Static typing for object-oriented programming", with Michael I. Schwartzbach. *Science of Computer Programming*, 23(1):19–53, 1994.

[18] "Efficient inference of partial types", with Dexter Kozen and Michael I. Schwartzbach. *Journal of Computer and System Sciences*, 49(2):306–324, 1994.

[Preliminary version in Proceedings of FOCS'92, 33rd IEEE Symposium on Foundations of Computer Science, pages 363–371, Pittsburgh, Pennsylvania, October 1992].

[19] "Safety analysis versus type inference", with Michael I. Schwartzbach. *Information and Computation*, 118(1):128–141, 1995.

[20] "Efficient recursive subtyping", with Dexter Kozen and Michael I. Schwartzbach. *Mathematical Structures in Computer Science*, 5(1):113–125, 1995.

[Preliminary version in Proceedings of POPL'93, Twentieth Annual SIGPLAN–SIGACT Symposium on Principles of Programming Languages, pages 419–428, Charleston, South Carolina, January 1993].

[21] "Complexity results for 1-safe nets", with Allan Cheng and Javier Esparza. *Theoretical Computer Science*, 147(1–2):117–136, 1995.

[Preliminary version in Proceedings of FST&TCS 13, Thirteenth Conference on the Foundations of Software Technology & Theoretical Computer Science, Springer-Verlag (*LNCS* 761), pages 326–337, Bombay, India, December 1993].

[22] "The essence of eta-expansion in partial evaluation", with Olivier Danvy and Karoline Malmkjær. *Lisp and Symbolic Computation*, 8(3):209–227, 1995.

[Preliminary version in Proceedings of PEPM'94, ACM SIGPLAN Workshop on Partial Evaluation and Semantics-Based Program Manipulation, pages 11–20, Orlando, Florida, June 1994].

[23] "Closure analysis in constraint form". *ACM Transactions on Programming Languages and Systems*, 17(1):47–62, January 1995.

[Preliminary version in Proceedings of CAAP'94, Colloquium on Trees in Algebra and Programming, Springer-Verlag (*LNCS* 787), pages 276–290, Edinburgh, Scotland, April 1994].

[24] "Efficient implementation of adaptive software", with Cun Xiao and Karl Lieberherr. *ACM Transactions on Programming Languages and Systems*, 17(2):264–292, March 1995.

[25] "A type system equivalent to flow analysis", with Patrick M. O'Keefe. *ACM Transactions on Programming Languages and Systems*, 17(4):576–599, July 1995.

[Preliminary version in Proceedings of POPL'95, 22nd Annual SIGPLAN–SIGACT Symposium on Principles of Programming Languages, pages 367–378, San Francisco, California, January 1995].

[26] "Type inference of Self: Analysis of objects with dynamic and multiple inheritance", with Ole Agesen and Michael I. Schwartzbach. *Software – Practice & Experience*, 25(9):975–995, September 1995.

[Preliminary version in Proceedings of ECOOP'93, Seventh European Conference on Object-Oriented Programming, Springer-Verlag (*LNCS* 707), pages 247–267, Kaiserslautern, Germany, July 1993].

[27] "Strong normalization with non-structural subtyping", with Mitchell Wand and Patrick M. O'Keefe. *Mathematical Structures in Computer Science*, 5(3):419–430, 1995.

[28] "Efficient inference of object types". *Information and Computation*, 123(2):198–209, 1995.

[Preliminary version in Proceedings of LICS'94, Ninth Annual IEEE Symposium on Logic in Computer Science, pages 186–195, Paris, France, July 1994].

[29] "Generating action compilers by partial evaluation", with Anders Bondorf. *Journal of Functional Programming*, 6(2):269–298, 1996.

[Preliminary version in Proceedings of FPCA'93, Sixth ACM Conference on Functional Programming Languages and Computer Architecture, pages 308–317, Copenhagen, Denmark, June 1993].

[30] "Constrained types and their expressiveness", with Scott Smith. *ACM Transactions on Programming Languages and Systems*, 18(5):519–527, September 1996.

[31] "Eta-expansion does the Trick", with Olivier Danvy and Karoline Malmkjær. *ACM Transactions on Programming Languages and Systems*, 18(6):730–751, November 1996.

[32] "Type inference with non-structural subtyping", with Mitchell Wand and Patrick M. O'Keefe. *Formal Aspects of Computing*, 9:49–67, 1997.

[33] "Class-graph inference for adaptive programs". *Theory and Practice of Object Systems*, 3(2):75–85, 1997.

[34] "Type inference with simple selftypes is NP-complete", with Trevor Jim. *Nordic Journal of Computing*, 4(3):259–286, Fall 1997.

[35] "A new approach to compiling adaptive programs", with Boaz Patt-Shamir and Karl Lieberherr. *Science of Computer Programming*, 29(3):303–326, September 1997.

[Preliminary version in Proceedings of ESOP'96, European Symposium on Programming, Springer-Verlag (*LNCS* 1058), pages 280–295, Linkoeping, Sweden, April 1996.].

[36] "Trust in the λ-calculus", with Peter Ørbæk. *Journal of Functional Programming*, 7(6):557–591, November 1997.

[Preliminary version in Proceedings of SAS'95, International Static Analysis Symposium, Springer-Verlag (*LNCS* 983), pages 314–330, Glasgow, Scotland, September 1995].

[37] "Evolution of object behavior using context relations", with Linda Seiter and Karl Lieberherr. *IEEE Transactions on Software Engineering*, 24(1):79–92, 1998.

[Preliminary version in Proceedings of ACM FSE'96, Fourth Symposium on the Foundations of Software Engineering, pages 46–57, San Francisco, California, October 1996].

[38] "Equality-based flow analysis versus recursive types". *ACM Transactions on Programming Languages and Systems*, 20(6):1251–1264, 1998.

[39] "Optimal representations of polymorphic types with subtyping", with Alexander Aiken and Edward L. Wimmers. *Higher-Order and Symbolic Computation*, 12(3):1–46, October 1999.

[Preliminary version in Proceedings of TACS'97, International Symposium on Theoretical Aspects of Computer Software, Springer-Verlag (*LNCS* 1281), pages 47–76, Sendai, Japan, September 1997].

[40] "From polyvariant flow information to intersection and union types", with Christina Pavlopoulou. *Journal of Functional Programming*, 11(3):263–317, May 2001.

[Preliminary version in Proceedings of POPL'98, 25th Annual SIGPLAN–SIGACT Symposium on Principles of Programming Languages, pages 197–208, San Diego, California, January 1998].

[41] "Efficient and flexible matching of recursive types", with Tian Zhao. *Information and Computation*, 171:364–387, 2001.

[Preliminary version in Proceedings of LICS'00, Fifteenth Annual IEEE Symposium on Logic in Computer Science, pages 388–398, Santa Barbara, California, June 2000].

[42] "CPS transformation of flow information", with Mitchell Wand. *Journal of Functional Programming*, 13(5):905–923, 2003.

[43] "Type inference for record concatenation and subtyping", with Tian Zhao. *Information and Computation*, 189:54–86, 2004.

[Preliminary version in Proceedings of LICS'02, IEEE Symposium on Logic in Computer Science, pages 125–136, Copenhagen, Denmark, July 2002].

[44] "Compiling with code-size constraints", with Mayur Naik. *ACM Transactions on Embedded Computing Systems*, 3(1):163–181, 2004.

[Preliminary version in Proceedings of LCTES'02, Languages, Compilers, and Tools for Embedded Systems joint with SCOPES'02, Software and Compilers for Embedded Systems, pages 120–129, Berlin, Germany, June 2002].

[45] "Type-safe method inlining", with Neal Glew. *Science of Computer Programming*, 52:281–306, 2004.

[Preliminary version in Proceedings of ECOOP'02, European Conference on Object-Oriented Programming, pages 525–544, Springer-Verlag (*LNCS* 2374), Malaga, Spain, June 2002].

[46] "Stack size analysis of interrupt driven software", with Krishnendu Chatterjee, Di Ma, Rupak Majumdar and Tian Zhao and Thomas A. Henzinger. *Information and Computation*, 194(2):144–174, 2004. Special issue dedicated to Paris Kanellakis.

[Preliminary version in Proceedings of SAS'03, International Static Analysis Symposium, Springer-Verlag (*LNCS* 2694), pages 109–126, San Diego, June 2003].

[47] "Deadline analysis of interrupt-driven software", with Dennis Brylow. *IEEE Transactions on Software Engineering*, 30(10):634–655, 2004.

[Preliminary version in Proceedings of FSE'03, ACM SIGSOFT International Symposium on the Foundations of Software Engineering joint with ESEC'03, European Software Engineering Conference, 198–207, Helsinki, Finland, September, 2003].

[48] "Automatic discovery of covariant read-only fields", with Tian Zhao and Trevor Jim. *ACM Transactions on Programming Languages and Systems*, 27(1):126–162, January 2005.

[Preliminary version in Informal Proceedings of FOOL'02, Ninth International Workshop on Foundations of Object-Oriented Languages, Portland, Oregon, 2002].

[49] "Method inlining, dynamic class loading, and type soundness", with Neal Glew. *Journal of Object Technology*, 4(8):33–53, 2005.

[Preliminary version in Sixth Workshop on Formal Techniques for Java-like Programs, Oslo, Norway, June 2004].

[50] "Type-based confinement", with Tian Zhao and Jan Vitek. *Journal of Functional Programming*, 16(1):83–128, 2006.

[Preliminary version, entitled "Lightweight confinement for Featherweight Java", in Proceedings of OOPSLA'03, ACM SIGPLAN Conference on Object-Oriented Programming Systems, Languages and Applications, pages 135-148, Anaheim, California, October 2003].

[51] "Encapsulating objects with confined types", with Christian Grothoff and Jan Vitek. *ACM Transactions on Programming Languages and Systems*, 29(6), 2007.

[Preliminary version in Proceedings of OOPSLA'01, ACM SIGPLAN Conference on Object-Oriented Programming Systems, Languages and Applications, pages 241–253, Tampa Bay, Florida, October 2001].

[52] "A type system equivalent to a model checker", with Mayur Naik. *ACM Transactions on Programming Languages and Systems*, 30(5), 2008.

[Preliminary version in Proceedings of ESOP'05, European Symposium on Programming, pages 374–388, Edinburgh, Scotland, April 2005].

[53] "Aliased register allocation for straight-line programs is NP-complete", with Jonathan K. Lee and Fernando Magno Quintão Pereira. *Theoretical Computer Science*, 407:258–273, 2008.

[Preliminary version in Proceedings of ICALP'07, 34th International Colloquium on Automata, Languages and Programming, pages 680–691, Wroclaw, Poland, July 2007.].

[54] "Concurrent collections", with Zoran Budimlić, Michael Burke, Vincent Cavé, Kathleen Knobe, Geoff Lowney, Ryan Newton, David Peixotto, Vivek Sarkar, Frank Schlimbach, and Sağnak Taşırlar. *Scientific Programming*, 18:203–217, August 2010.

[55] "A decoupled local memory allocator", with Boubacar Diouf, Can Hantas and Albert Cohen and Ozcan Ozturk. *ACM Transactions on Architecture and Code Optimization*, 9(4), 2013.

[56] "Jones-optimal partial evaluation by specialization-safe normalization", with Matt Brown. *Proceedings of the ACM on Programming Languages*, 2(POPL), 2018.

[57] "Sound deadlock prediction", with Christian Gram Kalhauge. *Proceedings of the ACM on Programming Languages*, 2(POPL), 2018.

[58] "A formalization of Java's concurrent access modes", with John Bender. *Proceedings of the ACM on Programming Languages*, 3(OOPSLA), 2019.

[59] "Toward a universal quantum programming language". *ACM XRDS Crossroads*, 26(1), Fall 2019.

[60] "What is decidable about gradual types?", with Zeina Migeed. *Proceedings of the ACM on Programming Languages*, 4(POPL), 2020.

[61] "Conferences in an era of expensive carbon", with Benjamin C. Pierce and Michael Hicks and Crista Lopes. *Communications of the ACM*, 63(3):35–37, 2020. ,

[62] "Achieving a quantum smart workforce", with Clarice D. Aiello, D. D. Awschalom, Hannes Bernien, Tina Brower-Thomas, Kenneth R. Brown, Todd A. Brun, Justin R. Caram, Eric Chitambar, Rosa Di Felice, Michael F. J. Fox, Stephan Haas, Alexander W. Holleitner, Eric R. Hudson, Jeffrey H. Hunt, Robert Joynt, Scott Koziol, H. J. Lewandowski, Douglas T. McClure, Gina Passante, Kristen L. Pudenz, Christopher J. K. Richardson, Jessica L. Rosenberg, R. S. Ross, Mark Saffman, M. Singh, David W. Steuerman, Chad Stark, Jos Thijssen, A. Nick Vamivakas, James D. Whitfield, and Benjamin M. Zwickl. *Quantum Science and Technology*, 6(3), 2021.

[63] "Building a quantum engineering undergraduate program", with Abraham Asfaw, Alexandre Blais, Kenneth R. Brown, Jonathan Candelaria, Christopher Cantwell, Lincoln D. Carr, Joshua Combes, Dripto M. Debroy, John M. Donohue, Sophia E. Economou, Emily Edwards, Michael F. J. Fox, Steven M. Girvin, Alan Ho, Hilary M. Hurst, Zubin Jacob, Blake R. Johnson, Ezekiel Johnston-Halperin, Robert Joynt, Eliot Kapit, Judith Klein-Seetharaman, Martin Laforest, H. J. Lewandowski, Theresa W.

Lynn, Corey Rae H. McRae, Celia Merzbacher, Spyridon Michalakis, Prineha Narang, William D. Oliver, David P. Pappas, Michael G. Raymer, David J. Reilly, Mark Saffman, Thomas A. Searles, Jeffrey H. Shapiro, and Chandralekha Singh. *IEEE Transactions on Education*, 65, 2022.

Refereed Conference Papers

The following papers are *not* preliminary versions of the journal articles listed above.

[64] "Type substitution for object-oriented programming", with Michael I. Schwartzbach. In *Proceedings of OOPSLA/ECOOP'90, ACM SIGPLAN Fifth Annual Conference on Object-Oriented Programming Systems, Languages and Applications; European Conference on Object-Oriented Programming*, pages 151–160, Ottawa, Canada, October 1990.

[65] "What is type-safe code reuse?", with Michael I. Schwartzbach. In *Proceedings of ECOOP'91, Fifth European Conference on Object-Oriented Programming*, pages 325–341. Springer-Verlag (*LNCS* 512), Geneva, Switzerland, July 1991.

[66] "Object-oriented type inference", with Michael I. Schwartzbach. In *Proceedings of OOPSLA'91, ACM SIGPLAN Sixth Annual Conference on Object-Oriented Programming Systems, Languages and Applications*, pages 146–161, Phoenix, Arizona, October 1991.

[67] "A provably correct compiler generator". In *Proceedings of ESOP'92, European Symposium on Programming*, pages 418–434. Springer-Verlag (*LNCS* 582), Rennes, France, February 1992.

[68] "An automatically generated and provably correct compiler for a subset of Ada". In *Proceedings of ICCL'92, Fourth IEEE International Conference on Computer Languages*, pages 117–126, Oakland, California, April 1992.

[69] "Making type inference practical", with Nicholas Oxhøj and Michael I. Schwartzbach. In *Proceedings of ECOOP'92, Sixth European Conference on Object-Oriented Programming*, pages 329–349. Springer-Verlag (*LNCS* 615), Utrecht, The Netherlands, July 1992.

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[72] "The essence of the visitor pattern", with C. Barry Jay. In *Proceedings of COMPSAC'98, 22nd Annual International Computer Software and Applications Conference*, pages 9–15, Vienna, Austria, August 1998.

[73] “Program optimization for faster genetic programming”, with Bradley Lucier and Sudhakar Mamillapalli. In *Proceedings of GP’98, Genetic Programming*, pages 202–207, Madison, Wisconsin, July 1998.

[74] “Scalable propagation-based call graph construction algorithms”, with Frank Tip. In *Proceedings of OOPSLA’00, ACM SIGPLAN Conference on Object-Oriented Programming Systems, Languages and Applications*, pages 281–293, Minneapolis, Minnesota, October 2000.

[75] “Experience with software watermarking”, with Sowmya Krishnaswamy, Minseok Kwon, Di Ma, Qiuyun Shao, and Yi Zhang. In *Proceedings of ACSAC’00, 16th Annual Computer Security Applications Conference*, pages 308–316, New Orleans, Louisiana, December 2000.

[76] “Static checking of interrupt-driven software”, with Dennis Brylow and Niels Damgaard. In *Proceedings of ICSE’01, 23rd International Conference on Software Engineering*, pages 47–56, Toronto, May 2001.

[77] “Efficient type matching”, with Somesh Jha and Tian Zhao. In *Proceedings of FOSSACS’02, Foundations of Software Science and Computation Structures*, pages 187–204. Springer-Verlag (*LNCS* 2303), Grenoble, France, April 2002. An expanded version of the paper, co-authored with Fritz Henglein, is to appear in the book *Automatic Program Development: a Tribute to Robert Paige.*

[78] “A typed interrupt calculus”, with Di Ma. In *Proceedings of FTRTFT’02, 7th International Symposium on Formal Techniques in Real-Time and Fault Tolerant Systems*, pages 291–310. Springer-Verlag (*LNCS* 2469), Oldenburg, Germany, September 2002.

[79] “Efficient spill code for SDRAM”, with V. Krishna Nandivada. In *Proceedings of CASES’03, International Conference on Compilers, Architecture and Synthesis for Embedded Systems*, pages 24–31, San Jose, California, October 2003.

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[81] “Avrora: Scalable sensor network simulation with precise timing”, with Ben L. Titzer and Daniel K. Lee. In *Proceedings of IPSN’05, Fourth International Conference on Information Processing in Sensor Networks*, pages 477–482, Los Angeles, April 2005.

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[83] “Type-safe optimisation of plugin architectures”, with Neal Glew and Christian Grothoff. In *Proceedings of SAS’05, Static Analysis Symposium*, pages 135–154. Springer-Verlag (*LNCS* 3672), London, UK, September 2005.

[84] "Register allocation via coloring of chordal graphs", with Fernando Magno Quintão Pereira. In *Proceedings of APLAS'05, Asian Symposium on Programming Languages and Systems*, pages 315–329. Springer-Verlag (*LNCS* 3780), Tsukuba, Japan, November 2005.

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[94] "Featherweight X10: a core calculus for async-finish parallelism", with Jonathan K. Lee. In *Proceedings of PPOPP'10, 15th ACM SIGPLAN Annual Symposium on Principles and Practice of Parallel Programming*, Bangalore, India, January 2010.

[95] "Punctual coalescing", with Fernando Magno Quintão Pereira. In *Proceedings of CC'10, International Conference on Compiler Construction*. Springer-Verlag (*LNCS*), Paphos, Cyprus, March 2010.

[96] "From OO to FPGA: Fitting round objects into square hardware?", with Stephen Kou. In *Proceedings of OOPSLA'10, ACM SIGPLAN Conference on Object-Oriented Programming Systems, Languages and Applications*, Reno, Nevada, Oct 2010.

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[98] "Communicating memory transactions", with Mohsen Lesani. In *Proceedings of PPOPP'11, 15th ACM SIGPLAN Annual Symposium on Principles and Practice of Parallel Programming*, San Antonio, Texas, February 2011.

[99] "Typed self-interpretation by pattern matching", with Barry Jay. In *Proceedings of ICFP'11, ACM SIGPLAN International Conference on Functional Programming*, pages 247–258, Tokyo, September 2011.

[100] "Testing versus static analysis of maximum stack size", with Mahdi Eslamimehr. In *Proceedings of COMPSAC'13, 37nd Annual International Computer Software and Applications Conference*, Kyoto, Japan, July 2013.

[101] "Proving non-opacity", with Mohsen Lesani. In *Proceedings of DISC'13, International Symposium on Distributed Computing*, Jerusalem, October 2013. A preliminary version was presented at TRANSACT'13, Workshop on Transactional Computing, March 2013.

[102] "Agnostic protocol translation for cross-domain information sharin g", with Chen Liu, Bao-Hong Shen, Soon Y. Oh, Mario Gerla, Clif Banner, and Richard Butler. In *Proceedings of MILCOM'13*, 2013.

[103] "Race directed scheduling of concurrent programs", with Mahdi Eslamimehr. In *Proceedings of PPOPP'14, ACM Annual Symposium on Principles and Practice of Parallel Programming*, 2014.

[104] "Automatic atomicity verification for clients of concurrent data structures", with Mohsen Lesani and Todd Millstein. In *Proceedings of CAV'14, Computer-Aided Verification*, 2014.

[105] "Sherlock: Scalable deadlock detection for concurrent programs", with Mahdi Eslamimehr. In *Proceedings of FSE'14, ACM SIGSOFT International Symposium on the Foundations of Software Engineering*, Hong Kong, Nov 2014 2014.

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[107] "Self-representation in Girard's System U", with Matt Brown. In *Proceedings of POPL'15, SIGPLAN–SIGACT Symposium on Principles of Programming Languages*, Mumbai, India, Jan 2015.

[108] "Type inference for place-oblivious objects", with Riyaz Haque. In *Proceedings of ECOOP'15, European Conference on Object-Oriented Programming*, Prague, Jul 2015.

[109] "Declarative fence insertion", with John Bender and Mohsen Lesani. In *Proceedings of OOPSLA'15, ACM SIGPLAN Conference on Object-Oriented Programming Systems, Languages and Applications*, Pittsburgh, Pennsylvania, Oct 2015.

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[113] "NJR: A normalized Java resource", with Cristina Lopes. In *SOAP'18, Proceedings of ACM SIGPLAN International Workshop on State Of the Art in Program Analysis*, 2018.

[114] "Binary reduction of dependency graphs", with Christian Gram Kalhauge. In *Proceedings of FSE'19, ACM SIGSOFT International Symposium on the Foundations of Software Engineering*, Tallinn, Estonia, Sep 2019.

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[116] "Quantum abstract interpretation", with Nengkun Yu. In *Proceedings of PLDI'21, ACM SIGPLAN Conference on Programming Language Design and Implementation*, June 2021.

[117] "Logical bytecode reduction", with Christian Gram Kalhauge. In *Proceedings of PLDI'21, ACM SIGPLAN Conference on Programming Language Design and Implementation*, June 2021.

[118] "Sound and efficient concurrency bug prediction", with Yan Cai, Hao Yun and Jinqiu Wang and Lei Qiao. In *Proceedings of FSE'21, ACM SIGSOFT International Symposium on the Foundations of Software Engineering*, 2021.

[119] "Quartz: Superoptimization of quantum circuits", with Mingkuan Xu, Zikun Li, Oded Padon, Sina Lin, Jessica Pointing, Auguste Hirth, Henry Ma, Alex Aiken, Umut A. Acar, and Zhihao Jia. In *Proceedings of PLDI'22, ACM SIGPLAN Conference on Programming Language Design and Implementation*, pages 625–640, June 2022.

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[121] "Fast and precise application code analysis using a partial library", with Akshay Utture. In *Proceedings of ICSE'22, 23rd International Conference on Software Engineering*, pages 934–945, 2022.

[122] "Compiling volatile correctly in Java", with Shuyang Liu and John Bender. In *Proceedings of ECOOP'22, European Conference on Object-Oriented Programming*, Prague, Jul 2022.

Refereed Survey Papers

[123] "Type inference for objects". *ACM Computing Surveys*, 28(2):358–359, June 1996.

[124] "Strategic directions for research on programming languages", with Chris Hankin and Hanne Riis Nielson. *ACM Computing Surveys*, 28(4):644–652, December 1996.

[125] "Compiler technology for object-oriented languages". *ACM Computing Surveys*, 28A(4), December 1996. www.acm.org/pubs/citations/journals/surveys/1996-28-4es/a161-palsberg/.

[126] "Software evolution and integration". *ACM Computing Surveys*, 28A(4), December 1996. www.acm.org/pubs/citations/journals/surveys/1996-28-4es/a200-palsberg/.

Other Papers

[127] "Three discussions on object-oriented typing", with Michael I. Schwartzbach. *ACM SIGPLAN OOPS Messenger*, 3(2):31–38, 1992.

[128] "Foundations of object-oriented languages", with Andrew Black. *ACM SIGPLAN Notices*, 29(3):3–11, 1994.

[129] "Eta-redexes in partial evaluation". In John Hatcliff, Torben Æ. Mogensen, and Peter Thiemann, editors, *Partial Evaluation: Practice and Theory*, pages 356–366. Springer-Verlag, 1999.

[130] "Type-based analysis and applications". In *Proceedings of PASTE'01, ACM SIGPLAN/SIGSOFT Workshop on Program Analysis for Software Tools and Engineering*, pages 20–27, Snowbird, Utah, June 2001. Invited paper.

[131] "Teaching reviewing to graduate students", with Scott J. Baxter. *Communications of the ACM*, 45(12):22–24, December 2002.

[132] "ILP-based resource-aware compilation", with Mayur Naik. In Ahmed Jerraya and Wayne Wolf, editors, *Multiprocessor Systems-on-Chips*, chapter 12, pages 337–354. Elsevier, 2004.

[133] "Programming languages". In Richard C. Dorf, editor, *The Engineering Handbook*, chapter 145. CRC Press, 2004.

[134] "Enabling detailed modeling and analysis of sensor networks", with Olaf Landsiedel and Klaus Wehrle and Ben L. Titzer. *Praxis der Informationsverarbeitung und Kommunikation*, 28(2):10–15, 2005.

[135] "Type systems: Advances and applications", with Todd Millstein. In Y. N. Srikant and Priti Shankar, editors, *The Compiler Design Handbook*, chapter 9. CRC Press, 2007.

[136] "Overloading is NP-complete, a tutorial dedicated to Dexter Kozen". In *Logic and Program Semantics*, pages 204–218. Springer-Verlag (*LNCS* 7230), 2012.

[137] "Efficient may happen in parallel analysis for async-finish parallelism", with Jonathan K. Lee, Rupak Majumdar, and Hong Hong. In *Proceedings of SAS'12, International Static Analysis Symposium*, 2012. Invited paper.

[138] "Write-observation and read-preservation TM correctness invarian ts", with Mohsen Lesani. In *5th Workshop on the Theory of Transactional Memory*, Jerusalem, October 2013.

Unpublished Papers

[139] "Layout construction: A case study in algorithm engineering", with Gudmund Skovbjerg Frandsen, Erik Meineche Schmidt, and Steen Sjøgaard. Technical Report DAIMI PB–450, Computer Science Department, Aarhus University, August 1993.

[140] "Type inference in systems of recursive types with subtyping", with Trevor Jim. Manuscript, 1997.

[141] "Reducing loads and stores in stack architectures", with Thomas VanDrunen and Antony L. Hosking. Manuscript, 2000.

[142] "Reverse engineering of real-time assembly code", with Matthew Wallace. Manuscript, 2002.

[143] "Visitor-oriented programming", with Thomas VanDrunen. In *Informal Proceedings of FOOL'04, Eleventh International Workshop on Foundations of Object-Oriented Languages*, Venice, Italy, January 2004.

[144] "Flow analysis of an intermediate language for object-oriented languages", with Neal Glew and Ben L. Titzer. Manuscript, 2005.

[145] "Automatic generation of flexible simulators that support updatable code", with Ben L. Titzer and Jonathan K. Lee. Submitted for publication, 2006.

Papers Submitted for Publication

[146] "Correctness of ILP-based register allocation", with Mayur Naik. Manuscript, 2004.

[147] "Efficient type-2 puzzle solving", with Siddharth Tiwary. Submitted for publication, 2009.

[148] "From textual use cases to service component models", with Zuohua Ding and Mingyue Jiang. 2010.

[149] "Complexity results for may-happen-in-parallel analysis", with Riyaz Haque, Oren Freiberg and Jonathan K. Lee and Mohsen Lesani. 2010.

[150] "Typed self-optimization", with Matt Brown and Barry Jay. Submitted for publication, 2013.

[151] "History-oriented concurrent program logic", with Mohsen Lesani. Submitted for publication, 2013.

2.3 Patents and Software Systems

[152] "Automata-theoretic approach compiler for adaptive software", with Karl Lieberherr and Boaz Patt-Shamir. US Patent 5,946,490, August 1999.

[153] "Scalable propagation-based methods for call graph construction", with Frank Tip. US Patent 7,003,507, February 2006.

[154] "Register allocation by puzzle solving", with Fernando Magno Quintão Pereira. US Patent 8,225,295, 2012.

The patent with Frank Tip is on an algorithm for static analysis of object-oriented software. It is incorporated into an IBM product, WebSphere Studio Device Developer (WSDD). WSDD has a link-time optimizer component called SmartLinker which embodies our algorithm.

JTB. Kevin Tao and I developed the Java Tree Builder (JTB), which is a freely available frontend for The Java Compiler Compiler from Sun Microsystems www.cs.purdue.edu/homes/taokr/jtb/ It supports interaction with syntax trees using the Visitor design pattern. A survey of user comments is available from the webpage; they received many enthusiastic comments from users both in industry and in academia. Sankar (formerly Sun Microsystems), the principal developer of the Java Compiler Compiler, wrote in an open letter:

> "JTB has clearly shown its impact on the user community." [Sriram Sankar, open letter, May 14, 1998.]

2.4 Talks, Tutorials, and Summer School Lectures

The talks listed here are not mentioned otherwise.

Invited talks at international meetings

- The Newton Institute Euroconference on *Advances in Type Systems for Computing*, Newton Institute, Cambridge, UK (Aug 1995).
- The workshop *Logic and Semantics of Programming Languages* organized by the ESPRIT project *Categorical Logic in Computer Science*, Birmingham, UK (Sep 1996).
- PASTE, ACM SIGPLAN–SIGSOFT Workshop on *Program Analysis for Software Tools and Engineering*, Snowbird, Utah (Jun 2001).
- MFPS, Eighteenth Workshop on the *Mathematical Foundations of Programming Semantics*, New Orleans (Mar 2002).
- CASES, International Conference on *Compilers, Architectures and Synthesis for Embedded Systems* in a joint session with EMSOFT, *Workshop on Embedded Software*, Grenoble, France (Oct 2002).
- SBLP, *Brazilian Symposium on Programming Languages*, Itatiaia, Rio de Janeiro, Brazil (May 2006).
- APLAS, *Fourth Asian Symposium on Programming Languages and Systems*, Sydney, Australia (Nov 2006).
- CATS, *Computing: The Australasian Theory Symposium*, Ballarat, Australia (Jan 2007). Keynote speaker.
- VMCAI, *International Conference on Verification, Model Checking and Abstract Interpretation*, San Francisco (Jan 2008). Invited 2-hour tutorial on “verification of register allocators.”
- ICESS, *IEEE International Conference on Embedded Software and Systems*, Hangzhou, China (May 2009).
- FTFJP, *Formal Techniques for Java-like Programs*, Beijing, China (Jun 2012).
- SAS, *Static Analysis Symposium*, Deauville, France (Sep 2012).
- PEPM, *ACM Workshop on Partial Evaluation and Program Manipulation*, Cascais, Portugal (Jan 2019).
- GameSec, *Conference on Decision and Game Theory for Security*, virtual, Oct 2020.
- BuildStuff, *Software Development Conference*, virtual, Nov 2020.
- Google Quantum Summer Symposium, virtual, Jul 2021.
- IBM Quantum Educator Summit, virtual, Aug 2022.

Other talks at international meetings

- The meeting of the ESPRIT project *Semantique*, Mont St. Michel, France (Oct 1991).
- The ESPRIT/NSF sponsored workshop *Foundations of Object-Oriented Languages*, Stanford University, California (Oct 1993).
- The ESPRIT/NSF sponsored workshop *Foundations of Object-Oriented Languages*, Paris, France (Jun 1994).
- The 6th *Nordic Workshop on Programming Theory*, Aarhus, Denmark (Oct 1994).
- The Dagstuhl-Seminar on *Object-Orientation with Parallelism and Persistence*, Schloss Dagstuhl, Germany (Apr 1995).
- The Dagstuhl-Seminar on *Abstract Interpretation*, Schloss Dagstuhl, Germany (Aug 1995).
- The *Fifth Workshop on Specification of Behavioral Semantics* held in conjunction with OOPSLA'96, ACM SIGPLAN 11th Annual Conference on Object-Oriented Programming Systems, Languages and Applications, San Jose, California (Oct 1996).
- The Dagstuhl-Seminar on *Applications of Tree Automata in Rewriting, Logic and Programming*, Schloss Dagstuhl, Germany (Oct 1997).
- The 2nd Workshop on *Distributed Object Security* held in conjunction with OOPSLA'99, ACM SIGPLAN 14th Annual Conference on Object-Oriented Programming Systems, Languages and Applications, Denver, Colorado (Nov 1999).
- The Dagstuhl-Seminar on *Effective Implementation of Object-Oriented Programming Languages*, Schloss Dagstuhl, Germany (Nov 2000).
- The University of Washington/Microsoft Research Summer Workshop on *Specifying and Checking Properties of Software*, Sleeping Lady, Washington (Aug 2001).
- NSF/SIGDA Embedded Systems Workshop, Atlanta (Nov 2001).
- Workshop on *Determinism and Correctness in Parallel Programming*, Seattle (Nov 2009).
- Workshop on *Usable Verification*, Redmond, Washington (Nov 2010).

Invited talks at national meetings

- DANSAS, Danish Static Analysis Symposium, Odense (Aug 2010).
- Northwest Quantum Nexus, Online (Sep 2020).

Tutorials and summer school lectures

- "Types for the language designer", with Michael I. Schwartzbach. Half-day tutorial (75 participants) given at OOPSLA'92, ACM SIGPLAN Seventh Annual Conference on Object-Oriented Programming Systems, Languages and Applications, Vancouver, Canada, October 1992.

- "Object-oriented type systems", with Michael I. Schwartzbach. Half-day tutorial (16 participants) given at ECOOP'93, European Conference on Object-Oriented Programming, Kaiserslautern, Germany, July 1993.

- "Types for the language designer", with Michael I. Schwartzbach. Half-day tutorial (47 participants) given at OOPSLA'93, ACM SIGPLAN Eighth Annual Conference on Object-Oriented Programming Systems, Languages and Applications, Washington D.C., USA, October 1993.

- "Types for the language designer", with Michael I. Schwartzbach. Half-day tutorial (48 participants) given at OOPSLA'95, ACM SIGPLAN Tenth Annual Conference on Object-Oriented Programming Systems, Languages and Applications, Austin, Texas, October 1995.

- "Type inference for objects". A series of lectures (48 participants) given at the ACM State of the Art Summer School on Functional and Object-Oriented Programming, Sobótka, Poland, September 1996.

- "Types for the language designer", with Michael I. Schwartzbach. Half-day tutorial (32 participants) given at OOPSLA'96, ACM SIGPLAN 11th Annual Conference on Object-Oriented Programming Systems, Languages and Applications, San Jose, California, October 1996.

- "The essence of eta-expansion in partial evaluation". A series of lectures (40 participants) given at the Summer School on Partial Evaluation: Practice and Theory, Copenhagen, Denmark, July 1998.

- "Four Compiler Courses at Purdue University". Half-day tutorial (15 participants) given at PLDI'02, ACM SIGPLAN Conference on Programming Language Design and Implementation, Berlin, Germany, June 2002.

- "Compiling with time and space constraints". A one-hour tutorial (90 participants) given at the Summer School on Application-Specific Multi-Processor System-on-Chip, Château de Pizay, France, July 2002.

- "Programming Sensor Networks", with Mani Srivastava. Half-day tutorial (28 participants) given at EMSOFT'05, ACM Conference on Embedded Software, Jersey City, New Jersey, September 2005.

- "Programming Sensor Networks". Half-day tutorial (60 participants) given at Summer School in Wireless Sensor Networks, co-located with 5th International Conference on AD-HOC Networks & Wireless, Ottawa, Canada, August 2006.

- "SSA-based Register Allocation", with Philip Brisk, Sebastian Hack, Fernando Pereira, and Fabrice Rastello. Half-day tutorial (22 participants) given at CASES'08, Embedded Systems Week 2008, Atlanta, October 2008.
- "SSA-based Register Allocation", with Philip Brisk, Alan Darte, and Fabrice Rastello. Half-day tutorial (11 participants) given at CGO'09, International Symposium on Code Generation and Optimization, Seattle, March 2009.
- "SSA-based Register Allocation", with Florent Bouchez, Philip Brisk, Sebastian Hack, and Fabrice Rastello. Half-day tutorial (21 participants) given at LCPC'09, International Workshop on Languages and Compilers for Parallel Computing, Newark, Delaware, October 2009.
- "Quantum Computer Programming". Full-day tutorial (38 participants) given at University of Aarhus, Denmark, August 2019.
- "Classical Error Correction". The NSF Challenge Institute for Quantum Computation, Spring School on *Quantum Error Correction*, virtual, Apr 2021.
- "Introduction to Quantum Algorithms". The NSF Challenge Institute for Quantum Computation, Winter School on *Contemporary Quantum Algorithms and Applications*, at Institute for Pure and Applied Mathematics, UCLA, Feb 2023.

Distinguished talks at universities and research institutions.

- "Sensor Network Programming Tools". A lecture in the Evans and Sutherland Distinguished Lecture Series at the University of Utah, Salt Lake City, Utah, March 2006.
- "Event Driven Software Quality". ACM Distinguished Lecture, at University of Canterbury, Christchurch, New Zealand, Feb 2008.
- "Event Driven Software Quality". ACM Distinguished Lecture, at University of Waikato, Hamilton, New Zealand, Feb 2008.
- "Event Driven Software Quality". ACM Distinguished Lecture, at University of Alberta, Edmonton, Canada, Sep 2008.
- "Event Driven Software Quality". ACM Distinguished Lecture, at University of Victoria, British Columbia, Canada, Sep 2008.
- "Towards 2020 Parallel Programming". Distinguished Friday Lecture at Aarhus University, Department of Computer Science, Sep 2010.
- "Towards 2020 Parallel Programming". ACM Distinguished Lecture at University of Arkansas, Department of Computer Science & Computer Engineering, Apr 2011.
- "Towards 2020 Parallel Programming". Distinguished Lecture at University of Chicago, May 2011.

- "Towards 2020 Parallel Programming". Distinguished Lecture at University of Technology, Sydney, Aug 2011.
- "How to find Concurrency Bugs". ACM Distinguished Lecture at Auburn University, Nov 2013.

Talks at universities and research institutions. The talks listed next were given at institutions with which I was not affiliated at the time.

Queens University, Kingston, Canada (Oct 1990), University of Toronto (Oct 1990), Concordia University, Montreal (Oct 1990), Aalborg University, Denmark (Mar 1991), RWTH Aachen, Germany (Feb 1992), Stanford University (Apr 1992), Sun Microsystems, California (Apr 1992), Kansas State University (May 1992), Yale University (May 1992), Odense University, Denmark (May 1992), University of Copenhagen, Denmark (Nov 1992), AT&T Bell Labs, New Jersey (Jan 1993), University of Karlsruhe, Germany (Jul 1993), University of Passau, Germany (Jul 1993), Brown University (Nov 1993), Carnegie Mellon University (Nov 1993), University of Pennsylvania (Nov 1993), Williams College, Massachusetts (May 1994), Harvard University (May 1994), Massachusetts Institute of Technology (Jun 1994), AT&T Bell Labs, New Jersey (Jun 1994), Massachusetts Institute of Technology (Jun 1994), Yale University (Jun 1994), Aalborg University, Denmark (Nov 1994), UC Berkeley (Feb 1995), Northeastern University (Jul 1995), Princeton University (Jul 1995), Northeastern University (Nov 1995), University of Pennsylvania (Dec 1995), North Carolina State University (Feb 1996), Kansas State University (Feb 1996), Indiana University (Mar 1996), Purdue University, Indiana (Mar 1996), Johns Hopkins University, Baltimore (Apr 1996), Princeton University (Apr 1996), Bell Labs, New Jersey (Apr 1996), Harvard University (Apr 1996), University of California, Santa Barbara (May 1996), University of Aarhus (Dec 1996), University of Technology, Sydney (Jul 1997), University of Sydney (Jul 1997), University of California, Riverside (Oct 1997), University of Aarhus (May 1998), Ball State University, Indiana (Oct 1998), Boston University (Mar 1999), Princeton University (Mar 1999), University of Padova, Italy (May 1999), BT Labs, England (May 1999), University of Aarhus (May 1999), University of Copenhagen (Jun 1999), University of Illinois at Urbana-Champaign (Oct 1999), IBM T.J. Watson Research Center (Dec 1999), University of California, Riverside (Jan 2000), University of Copenhagen (Nov 2000), University of Aarhus (Nov 2000), Colorado State University (Dec 2000), Chalmers University of Technology (Jan 2001), Boston University (Mar 2001), Massachusetts Institute of Technology (Mar 2001), Northeastern University (Mar 2001), University of California, San Diego (Oct 2001), Georgia Institute of Technology (Nov 2001), Microsoft Research, Redmond (Mar 2002), UCLA (Mar 2002), U.C. Irvine (Mar 2002), École Normale Supérieure, Paris (Jul 2002), UCLA (Feb 2003), Rensselaer Polytechnic Institute, New York (May 2003), UC Berkeley (Dec 2003), U.C. Irvine (May 2004), Intel Research Laboratory, Berkeley (Jul 2004), Symantec, Santa Monica, California (Mar 2005), University Federal, Rio de Janeiro (May 2006), PUC, Rio de Janeiro (May 2006), University of Sydney (Nov 2006), University of Aarhus, Denmark (Feb 2007), Intel, Santa Clara (July 2007), University of California, Riverside (Oct 2007), University of Freiburg, Germany [four talks] (Oct 2007), Google, Montain View, California (Dec 2007), Apple, Cupertino, California (Dec 2007), University of Aarhus, Denmark (Jun 2008), Sun Microsystems, California

(Aug 2008), National University of Singapore (Sep 2008), Pomona College, Los Angeles (Oct 2008), Zhejiang University, Hangzhou, China (May 2009), Rice University (Oct 2009), University Complutense of Madrid (Jan 2010), Hewlett-Packard, Palo Alto (Mar 2010), Roskilde University (Aug 2010), Aalborg University (Aug 2010), Qualcomm, San Diego (Oct 2010), National Taiwan University (Dec 2011), Imperial College, London (Feb 2012), University of Aarhus, Denmark (Aug 2012), University of Aarhus, Denmark (Aug 2013), Lawrence Livermore National Laboratory (Sep 2013), Georgia Institute of Technology (Nov 2013), National Taiwan University (Nov 2014), University of Aarhus, Denmark (Aug 2015), Harvey Mudd College (Oct 2015), Carnegie Mellon University (Oct 2015), Qatar Computing Research Institute (Dec 2016), University of California, Riverside (Apr 2018), University of Aarhus, Denmark (Aug 2018), Harvey Mudd College (Apr 2019), Northwestern University (Dec 2019), University of Wisconsin, Milwaukee (Dec 2019), Google (May 2021), Tsinghua University, Beijing (Apr 2022).

2.5 Funding

Research Grants

- 1/98–12/99, “Software Evolution”, British Telecom, $50,000.
- 4/98–3/02, “CAREER: Type Inference for Object-Oriented Software”, U.S. National Science Foundation Faculty Early Career Development Award, CCR–9734265, $230,000.
- 7/98–6/99, “Evolution of Software via Adaptive Programming”, DARPA via subcontract from Northeastern University, $24,000.
- 1/99–12/99, “Type Inference for Java: Supporting the Transition From Rapid Prototype to Product”, IBM, $35,000.
- 7/99–6/04, Purdue University Faculty Scholar Award, $50,000.
- 7/99–6/00, “Software Security in Distributed Systems”, Lilly Endowment Inc. via subcontract from Center for Education and Research in Information Assurance and Security, Purdue University, $50,000.
- 10/99–09/00, “Software Security in Distributed Systems”, IBM, $35,000.
- 7/00–6/02, “Secure Assembly of Software Systems from Components”, Lilly Endowment Inc. via subcontract from Center for Education and Research in Information Assurance and Security, Purdue University, $76,037.
- 08/00–05/03, “GAANN: Fellowship Initiative in the Development of the Next Generation Computing Infrastructure”, with Susanne Hambrusch (PI) and Ananth Grama (co-PI). U.S. Department of Education, $486,750.
- 6/01–8/04, “DCMF/NES: Dynamic Compositional Middleware Frameworks for Networked Embedded Systems”, with Jan Vitek (PI), Tony Hosking (co-PI), Douglas Lea (co-PI), William Pugh (co-PI). DARPA, $3,274,680.

- 9/01–8/06, "ITR: Static Timing of Interrupt-Driven Software", U.S. National Science Foundation Information Technology Research Award, CCR–0112628. $432,900.

- 9/01–8/02, "Efficient Crypto Implementations for Low-Power Devices", with T. N. Vijaykumar. Lilly Endowment Inc. via subcontract from Center for Education and Research in Information Assurance and Security, Purdue University, $75,000.

- 8/02–7/03, "A Model for Surviving Denial of Service Attacks". Lilly Endowment Inc. via subcontract from Center for Education and Research in Information Assurance and Security, Purdue University, $40,000.

- 1/03–12/03, "Resource-Aware Compilation for IXP Network Processors", Intel, $30,000.

- 1/03–12/03, "A Simplified Eclipse IDE for Computer Science Freshmen", IBM Eclipse Innovation Award, $28,000.

- 9/03–8/06, "Foundations of ILP-based Static Analysis", U.S. National Science Foundation, CCR–0306401, $270,000.

- 08/03–07/06, "GAANN: Development of the Next-Generation Computing Infrastructure", with Greg Frederickson (PI) and Ananth Grama (co-PI). U.S. Department of Education, $793,344.

- 08/03, "Resource-Aware Compilation", Okawa Research Foundation, $10,000.

- 07/04, "Curriculum Development in Software Engineering", Lockheed Martin, $5,000.

- 09/04–08/07, "ITR: Event Driven Software Quality", with Edward Kohler, Rupak Majumdar, and Todd Millstein. U.S. National Science Foundation, CCF–0427202, $1040,000.

- 08/05–6/08, "Avrora: Sensor Network Simulation", U.S. National Science Foundation via subcontract from Center for Embedded Networked Sensing, UCLA, $75,000.

- 12/05, IBM Faculty Award, $30,000.

- 8/06, IBM Equipment Award, $220,000.

- 7/07–06/10, "SoD: An Electronic Design Automation Approach to Embedded Networked Software", U.S. National Science Foundation, with Todd Millstein (PI), Jason Cong (co-PI), and Ramesh Govindan (co-PI). CNS–0725354, $800,000.

- 07/08–06/10, "Virgil: towards certified sensor nodes", U.S. National Science Foundation via subcontract from Center for Embedded Networked Sensing, UCLA, $60,000.

- 9/08–8/11, "Certification of Medical Device Software", U.S. National Science Foundation, with Majid Sarrafzadeh. $700,000.

- 9/09–8/14, “Customizable Domain-Specific Computing”, with Jason Cong (PI), Vivek Sarkar, Denise Aberle, Richard Baraniuk, Alex Bui, M. C. Frank Chang, Tim Cheng, Miodrag Potkonjak, Glenn Reinman, Saday Sadayappan, Luminita Vese; U.S. National Science Foundation, $10,000,000.

- 1/10–12/10, “Optimization and Verification of X10 Programs”, IBM Innovation Award, $30,000.

- 1/11–12/11, “Research on JavaScript”, Mozilla Research Award, $36,000.

- 6/11–8/12, “Generative Waveform Agnostic Gateway (GENWAG) Architecture”, Subcontract of United States Navy Phase II N2-3334 program via Utopia Compression, $75,000.

- 7/11–8/12, “Energy-Efficient Heterogenous Computing Systems”, Sandia National Laboratories, $40,000.

- 7/12–6/15, “Defensive Optimizing Compilation”, with Kedar Namjoshi (co-PI), Venkat Venkatakrishnan (co-PI), and Lenore Zuck (co-PI), DARPA (CSFV), $2,765,587.

- 9/12–8/15, Typed Self-Application, U.S. National Science Foundation, $493,612.

- 9/12–8/16, “The Theory and Methodology of Online Software Reliability Engineering”, with Zuohua Ding (PI) and Mei-Hwa Chen, China’s National Science Foundation, 2,600,000 yuan = approximately $409,643.

- 4/13–4/14, “Workshop on High-Level Programming Models for Parallelism”, with Suresh Jagannathan (co-PI), U.S. National Science Foundation, $81,302.

- 7/13–6/14, Faculty Award, IBM, $18,000.

- 10/14–9/18, “PetaBlox: Large-Scale Software Analysis and Analytics Using Datalog”, with Mayur Naik (PI) and Molham Aref (co-PI), DARPA (MUSE), $4,234,220.

- 6/17–6/18, “NJR: A National Java Resource”, with Crista Lopes (co-PI), U.S. National Science Foundation, $120,000.

- 1/18–12/22, “Synergistic Software Customization: Framework, Algorithms, and Tools”, with Miryung Kim (PI) and Harry Xu (co-PI), Office of Naval Research, $4,924,195.

- 8/18–7/21, “NJR: A Normalized Java Resource”, with Crista Lopes (co-PI), U.S. National Science Foundation, $1,100,000.

- 10/18–9/21, “Concurrency with Specified Orders”, U.S. National Science Foundation, $396,028.

- 1/20–12/20, “Total Protection Cyber Platform (TPCP) Workshop”, Office of Naval Research, $16,586.

- 9/20–8/25, "QLCI-CI: NSF Quantum Leap Challenge Institute for Present and Future Quantum Computing", with Dan Stamper-Kurn (PI) and many others, National Science Foundation, $24,936,988.
- 2/23–1/24, "Growing a Quantum-Smart Workforce", with Richard Ross (PI) and Eric Hudson (co-PI), DOD-DA-Army, $501,449.

Stipends

Competitive Selection based on Merit.

- 7/94–6/95, Danish Natural Science Research Council's Post Doctoral Stipend, 11–1225, DKR 335,075 (approx. $55,000).
- 7/89–6/91, Danish Natural Science Research Council's Graduate Stipend, 11–7859, DKR 490,000 (approx. $81,000).
- 7/88–6/89, Danish Research Academy's Introductory Stipend, 1988–218/5–20, DKR 230,000 (approx. $38,000).

3 Teaching

3.1 Teaching Summary

Students:	**10** graduated PhDs including 5 who are now academics.
Honors:	One of the Ten Best Teachers of Science Undergraduates, Purdue University.

I love teaching and take pride in educating the next generation. In 2001 I received an award as One of the Ten Best Teachers of Science Undergraduates at Purdue University, after teaching Compiler Construction to a class of well over 100 students.

I have taught Compiler Construction to undergraduate students at Aarhus University (Denmark), Northeastern University, Purdue University, and UCLA. My course has a substantial project component and is based on Appel's text book; I am a co-author of the second edition of that book. The course requires a student who wants an A to individually implement a compiler from a Java subset to MIPS assembly code, for a total of about 5,000 lines of Java. The compiler project is divided into four independent subprojects that allow a student to get partial credit by completing some of the subprojects. I have graded the students on the same absolute scale for thirteen years, in an effort to fight grade inflation. Overall, the student comments strongly suggest that many of the students like the course despite (or in some cases perhaps because of) all the work I assign them.

I have taught (1) Programming Languages (see below), (2) Static Program Analysis, and (3) Parallel Programming Languages, as well as some other courses, to graduate students. For example, the most recent offering of my course on parallel programming languages covered 13 parallel languages and showed some compiler and run-time-systems techniques. The students implemented various programs and techniques, and installed and ran implementations of various languages. I am happy with the substantial interest in the course, which I have offered four times so far.

I incorporated the principles and practices of formal review into the Purdue computer science Ph.D. education, smoothly and inexpensively, as part of the existing course work.

I have graduated 10 PhDs including five who are now academics, two who are post docs, two who work at Google, and one who works at Synopsys. I have three current PhD students. Additionally, I have been a member of more than 70 other PhD committees, including eleven outside my home institution.

3.2 Vision for Teaching

My professors were excited about the field, and I wanted to have a piece of the excitement. Now I have the chance to pass on the excitement by being a good role model for my students. When I teach a course, I try to show the students that I care about the *topic*, that I care about the *course*, and that I care about *them.* Caring about the topic leads to a lecturing style where I want to radiate a sense of pride that says: "this topic is important, I want you to learn it, and now is your chance to learn it from an expert; ask me questions, and ask me again." Good lecture planning includes planning for questions. Caring about the course leads to a good course structure, interesting homework, and a well-organized effort by the teaching assistants. A badly organized course can introduce doubt, uncertainty, frustration, and sometimes extra work for the students. The efforts of the students should be to learn the material and not to find their way through a maze created by lack of information, constant corrections to information already given, etc. Caring about the students themselves leads to a generous open-door policy. In every course I have taught, I have told the students: stop by any time. In practice, this means: day and night! While most students come to me during the day, it happens on a regular basis that the students come to me late evening, or 2 am, or whenever they see I am here. If I am in the office, then my door is open, and my students know that they can come in any time. In my courses, I usually have a two-hour midterm exam, and I insist that the students come to my office to pick up the graded exam if they want to know their score. This gives me opportunity to chat with all of the students over a few days and find out how things are going. Such time is well spent and it helps me get a snapshot of what the students think about the course while it is going on, rather than afterwards when I receive the written course evaluations.

The key to good teaching is to understand that a good course can be many, many times better than "learn it on your own." The professor is the role model, both in the way of thinking and talking about the topic, in the way of handling the course, and in the way of interacting with the students. Paraphrasing a famous advertising campaign: "textbook: $50; pencil and paper: $5; a professor who is a good role model: priceless."

3.3 Student Comments

Here are a few quotes from the anonymous evaluations written by the students in my compilers course in Fall 2000.

- Best CS class ever.
- Good job. Professor Palsberg is DA MAN!
- Dr. Palsberg was the best CS professor. He showed concern for the students and was available at all hours. Jens was the best professor, and I hope I have him for some other class.
- This course was, by far, the best CS course I have taken. Jens was able to explain difficult subject matter in a way easy to understand. Jens is the best CS prof. Give this man a raise.
- Jens Palsberg was the best CS prof so far and CS 352 was the first well-organized CS class I've taken. In fact I wrote him a haiku:

  You are the coolest
  Compilers are the coolest
  Good Good, Good Good Good.
- Even though my grade in this class is fairly low (average) I feel that I've learned so much this semester. I wish I could redo the early programs! I would not want to take this class without Palsberg teaching it.

- This class was the most organized CS class, I have been in.

- Jens Palsberg is a name that to me is more than a name. Not many men can bring to the CS ”table” what Jens Palsberg can. His incredible style is unmatched by any previous or future CS professor, including Monster Mav or Smooth Sammy Wagstaff. In closing, I would like to say that the CS 352 website was a remarkable one. Thank you for your time, and blessed be this man we call Jens. Good bless Denmark, and her true son, Jens Palsberg.

- Dr. Palsberg is the freaking best professor in this school! I have never seen a professor care more about his students than Jens. My own *mother* shows less concern for my well being than Jens. The projects in this course were *smoothly* designed, quite possibly making this *best* CS class I have *ever* taken. Give this man a raise! He utterly destroys every other professor I've ever had.

- It has been obvious that you and the TA's did a lot of work on the projects. They were well organized. The TA's were really great. They were always available to help us. They always answered questions promptly, even if there were a whole lot. The projects were reasonable, and clearly designed to help us understand the material. It as a hard course but it is probably the best I've taken so far. I'd never want to take this class with a different set of TA's and professor. Great job!

- Professor Palsberg was an extremely good instructor for this course. From what I have heard from past compilers classes, this one seems to have been handled much better than the course has been in the past.

- You rock :-) The TA's and you both seemed very concerned that we learn the concepts. Rock on, homeslice :-)

- This is the best course I ever took at Purdue. The instructor is very good in the sense that he cares the student's learning, sets up a very good (best) TA team, and is very responsible. The TA's are the best I ever met. Very responsible and well prepared. The course materials are well prepared, well designed. The loads for course projects are reasonable; not too low and not too high either.

- Overall, this course is excellent. I'm more than 100% satisfied.

3.4 My Course on Programming Languages

Several times at Purdue University, I taught the graduate course *CS 565 Programming Languages*, 3 credit hours. From the students' course evaluations of CS 565, we have the following average numbers, where 5 is best and 1 is worst.

Semester	Year	Overall Rating of the Instructor	Overall Rating of the Course	Number of Students
Fall	1996	4.5	4.1	41
Spring	1997	4.1	3.9	37
Fall	1997	3.9	3.6	27
Spring	1998	4.3	3.8	28
Fall	1998	4.9	4.6	14
Spring	1999	4.6	4.1	47
Fall	1999	4.5	3.9	26
Spring	2000	4.3	4.0	35
Spring	2001	4.8	4.4	24
Spring	2002	4.7	4.7	24

The course is required in the sense that all M.S. and Ph.D. students in the Department of Computer Science must take this course. I completely revised the course when I started teaching it in 1996. I presented an outline of the course (including homework) at a teaching session of a workshop in 1997, and I got many enthusiastic comments.

The course is a hands-on course on programming languages. The two example languages are Java and Scheme.

> **Syllabus:** Interpreters, operational semantics, type systems, type soundness, decision procedures for subtyping, type inference, principal types, typed assembly languages, continuation-passing-style transformation, closure conversion, flow analysis, method inlining, secure information flow, software obfuscation, software watermarking.

The homework includes the implementation of

1. an interpreter for a subset of Java called MiniJava,
2. a decision procedure for a flexible subtype ordering on Java interfaces,
3. a translation of MiniJava to continuation passing style, that is, a form where all method calls are in tail position,
4. a type inference algorithm for a subset of Scheme,
5. a flow-directed inlining algorithm for MiniJava, and
6. a security checker for Java bytecode.

Currently, all programming is in Java. The homeworks can be completed by writing about 10,000 lines of Java.

The course (1) relies on undergraduate-level knowledge of data structures and compilers, (2) covers a fair mix of implementation techniques, algorithms, and theorems, and (3) touches on recent research. I have successfully taught this course to people with diverse backgrounds, and it seems to be a good preparation for taking other graduate courses in computer science. The course can also stand alone as a course on object-oriented and functional programming, and it seems to serve well as preparation for advanced courses and research on programming languages.

3.5 My Course on Formal Compiling Methods

In Fall 2001, I taught a seminar course called *CS 661 Formal Compiling Methods*, 3 credit hours, that had presentations of 22 recent papers. Each student presented one paper, and four of the authors of the papers (Matthew Dwyer (Kansas State University), Kathleen Fisher (AT&T Labs-Research), Neal Glew (Intertrust Technologies), and Jakob Rehof (Microsoft Research)) visited Purdue and presented five of their papers. Each week every student wrote a review of a paper, for a total of 11 reviews. The students were asked to write the reviews in the style of a review of a submission to ACM Transactions on Programming Languages and Systems. In the beginning of the course, I gave an introduction to reviewing. The teaching assistant for the course was a Ph.D. student from Purdue's Department of English. Every week, the students would send him a draft of their review, and then he would give them feedback on the writing style, sentence structure, etc. After that, the students could revise their reviews before sending them to me. I would then give them comments on the technical aspects of their reviews.

At the end of the semester, we had a mock program-committee meeting at which we selected those papers we liked best. During the final exam week, the students wrote a summary review of one of those top papers, in the style of the reviews in ACM Computing Reviews.

A report on the experience with teaching this course has appeared in Communications of the ACM [131].

3.6 Other Courses

Compiler Construction, University of Aarhus, Fall 1992, Spring 1993. *Analysis of Programming Languages*, Northeastern University, Spring 1994.

Graduate courses. *Object-Oriented Type Systems*, University of Aarhus, Spring 1993, Spring 1995. *Compiler Design*, Northeastern University, Winter 1994. *Principles of Programming Languages*, Northeastern University, Winter 1994. *Topics in Programming Languages*, Northeastern University, Spring 1994.

Of these courses, I introduced the *Compiler Construction* course at University of Aarhus. The *Object-Oriented Type Systems* at University of Aarhus course lead to my book with Schwartzbach, and the *Topics in Programming Languages* course at Northeastern University was an advanced graduate course.

I have also been the course administrator for the first-year undergraduate course *CS 180 An Introduction to Computer Science*, 4 credit hours, at Purdue University.

3.7 Current Students

Ph.D. students, past qualifiers: Zeina Migeed (UCLA), Shuyang Liu (UCLA).

Ph.D. students, not past qualifiers: Micky Abir (UCLA).

3.8 Former Students

Ph.D. students:

- Tian Zhao (Purdue University, 2002). "Type matching and type inference for object-oriented systems". Now an associate professor at University of Wisconsin, Milwaukee.
- Dennis Brylow (Purdue University, 2003). "Static checking of interrupt-driven software". Now an associate professor at Marquette University, Milwaukee.
- Ma, Di (Purdue University, 2004). "Bounding the stack size of interrupt-driven programs". Now at Synopsys.
- Krishna Nandivada (UCLA, 2005). "Combining Stack Location Allocation with Register Allocation". Now a researcher at IBM India Research Laboratory, Bangalore.
- Christian Grothoff (UCLA, 2006), "Expressive Type Systems for Object-Oriented Languages". Now a researcher at Technical University Munich, Germany.
- Benjamin Titzer (UCLA, 2007), "Objects to Bits: Efficient Implementation of Object-oriented Languages on Very Small Devices". Now a researcher at Sun Microsystems Laboratories, Menlo Park, California.
- Fernando Pereira (UCLA, 2008), "Register Allocation by Puzzle Solving". Now a professor at UFMG, Brazil.
- Jonathan K. Lee (UCLA, 2010), "Static Analysis of Parallel Languages". Now at Google.
- Mahdi Eslamimehr (UCLA, 2014), "Directed Testing of Event-Driven and Parallel Programs".
- Mohsen Lesani (UCLA, 2014), "On the Specification, Testing and Verification of Transactional Memory Algorithms".
- Matt Brown (UCLA, 2017), "Typed Self-Applicable Meta-Programming". He received the Outstanding Graduating Ph.D. Student in Computer Science award.
- John Bender (UCLA, 2019), "Prove Once, Run Efficiently Anywhere: Tools for Lock-free Concurrent Algorithms".
- Christian Kalhauge (UCLA, 2020), "Reporting Bugs in Metaprograms".
- Akshay Utture (UCLA, 2023), "Adapting Static Analysis Tools to Meet User Expectations".

M.S. thesis students: Nicholas Oxhøj (University of Aarhus, 1992), Carsten Pedersen (University of Aarhus, 1996), Mayur Naik (Purdue University, 2003), Haoqing Wang (UCLA, 2015), Joe Cox (UCLA, 2016), Liran Xiao (UCLA, 2021).

External Member, habilitation committee: Franz Puntigam (Technical University of Vienna, 2001).

External Member, Ph.D. thesis committees: Francois Pottier (Université Paris 7, 1998), Ole Hougaard (University of Aarhus, 1998), William Harrison (University of Illinois, Urbana-Champaign, 2000), Igor Siveroni (Northeastern University, 2002), Galen Williamson (Northeastern University, 2004), Francesco Logozzo (Ecole Polytechnique, Paris, 2004), Florin Craciun (National University of Singapore, 2008), Florent Bouchez (ENS Lyon, 2009), Simone Campanoni (Politecnico di Milano, 2009), Goh Lee Kee (National University of Singapore, 2012).

Opponent, Ph.D. thesis: Johan Agat (Chalmers University of Technology, 2001).

Member, Ph.D. thesis committees: Ignacio Silva-Lepe (Northeastern University, 1994), Paul Bergstein (Northeastern University, 1994), Paul Steckler (Northeastern University, 1994), Cun Xiao (Northeastern University, 1994), Walter Hürsch (Northeastern University, 1995), Linda Seiter (Northeastern University, 1996), Neelam Gupta (Purdue University, 1999), Ladislau-Lehel Bölöni (Purdue University, 2000), Yung-Pin Cheng (Purdue University, 2000), Sudipto Ghosh (Purdue University, 2000), Matthew Knepley (Purdue University, 2000), Yonghong Song (Purdue University, 2000), Kevin Du (Purdue University, 2001), Diego Zamboni (Purdue University, 2001), Joao Cangussu (Purdue University, 2002), Tom Daniels (Purdue University, 2002), Christopher Telfer (Purdue University, 2003), Hoi Chang (Purdue University, 2003), Thomas VanDrunen (Purdue University, 2004), Radu Sion (Purdue University, 2004), Benjamin Kuperman (Purdue University, 2004), Alan Fern (Purdue University, 2004), Bo-Kyung Choi (UCLA, 2004), Krzysztof Palacz (Purdue University, 2004), Yonghua Ding (Purdue University, 2004), Florian Buchholz (Purdue University, 2005), Rong Xu (Purdue University, 2005), Benjamin Greenstein (UCLA, 2006), Anahita Shayesteh (UCLA, 2006), SungWook Yoon (Purdue University, 2006), Philip Brisk (UCLA, 2006), Yizhou Lin (UCLA, 2006), Ramkumar Rengaswamy (UCLA, 2007), Guoling Han (UCLA, 2007), Foad Dabiri (UCLA, 2008), Jeffrey Fischer (UCLA, 2008), Petros Efstathopoulos (UCLA, 2008), Alessandro Warth (UCLA, 2008), Tammara Massey (UCLA, 2009), Shane Markstrum (UCLA, 2009), Ru-Gang Xu (UCLA, 2009), Macneil Shonle (UCSD, 2009), Steve VanDeBogart (UCLA, 2009), Brian Chin (UCLA, 2009), Eitan Mendelowitz (UCLA, 2009), Michael Emmi (UCLA, 2010), Jamie Macbeth (UCLA, 2010), Mishali Naik (UCLA, 2010), Michael Youssef (UCLA, 2010), Rahul Balani (UCLA, 2011), Dan Marino (UCLA, 2011), Owen Sizemore (UCLA, 2012), Adam Winchester (UCLA, 2012), Pat Rondon (UCSD, 2012), Navid Amini (UCLA, 2012), Vidyut Samanta (UCLA, 2012), Indranil Saha (UCLA, 2013; I was nominally chair in place on Rupak Majumdar who had moved to Max-Planck in Germany), Maryam Moazeni (UCLA, 2013), Charles Fleming (UCLA, 2013), Mars Lan (UCLA, 2013), Hesam Samimi (UCLA, 2013), Wenyao Xu (UCLA, 2013), Vishwatma Goudar (UCLA, 2013), Lucas Wanner (UCLA, 2014), Hui Huang (UCLA, 2014), James Xu (UCLA, 2015), James Wendt (UCLA, 2015), Chenguang Shen (UCLA, 2016), Faisal Alquaddoomi (UCLA, 2018; I was nominally chair in place of Deboran Estrin who had moved to Cornell Tech), Tianyi Zhang (UCLA, 2019), Jia Guo (UCLA, 2019), Hongxiang Gu (UCLA, 2019), Hao (Cody) Yu (UCLA, 2019), Khanh Nguyen (UCLA, 2019), Kai Wang (UCLA, 2019), Saswat Padhi (UCLA, 2020), Lun Liu (UCLA, 2020), Renju Liu (UCLA, 2020), Steven Holtzen (UCLA, 2021), Jie Wang (UCLA, 2021), Aishwarya Sivaraman (UCLA, 2022), Alan Litteneker (UCLA, 2022), Alan Tang (UCLA, 2023).

4 Service

4.1 Service Summary

Department:	Chair ('10–'15), vice chair ('05–'07), associate head (Purdue U. '02–'03).
Journals:	Editor-in-chief of TOPLAS; editorial board of Information & Computation.
Conferences:	Program chair of POPL, TACAS, SAS, EMSOFT, etc.; member of 100+ PCs.
Organizer:	General chair of POPL, LICS, and SPIN.
Honors:	ACM SIGPLAN Distinguished Service Award.

I enjoy to volunteer for tasks of many kinds. In 2012 I received the ACM SIGPLAN Distinguished Service Award.

In 2010 I became Chair of the UCLA Computer Science Department. I have also served two years as graduate vice chair, and, at Purdue University, one year as associate head of the Computer Science Department. As chair I have run promotion cases, formed committees, led the process to hire professors, visited companies, and managed budget, space, and teaching. I have also started a department *bank* for depositing funding that otherwise would go back to the sponsor, and I have contributed to the design of Building E6 that, when built in 2017, will house most of the Computer Science Department.

As vice chair I started progress tracking of our approximately 200 PhD students, I led the effort to change our written qualifying exam for PhD students, and I started an annual visit day for prospective PhD students.

In 2010 I became editor-in-chief of ACM TOPLAS, Transactions on Programming Languages and Systems; I also served as an Associate editor of ACM TOPLAS 2003–2010. As editor-in-chief I have made two efforts to attract high-quality submissions. First I have invited authors of selected papers from the top conferences POPL, OOPSLA, ASPLOS to revise, extend, and submit their papers to TOPLAS. Second, TOPLAS has a new collaboration with the top conference PLDI such that original papers submitted to TOPLAS before September 1, 2013 can be considered for presentation at PLDI 2014 (and similarly in other years).

I am also a member of the editorial board of Information & Computation (2003–present). Both TOPLAS and I&C are top journals in the area of software systems.

I was the program chair of ACM POPL, Symposium on Principles of Programming Languages 2010. POPL is one of the top conferences in Computer Science. I have also been the program chair of TACAS, SAS, EMSOFT, and five other conferences and workshops. In total, I have been a member of more than 100 program committees, including for the top conferences DAC, ECOOP, FSE, ICALP, ICSE, LICS, OOPSLA, PLDI, POPL. I don't submit a paper to a conference if I am a member of the PC. I have also been a member of 16 NSF review panels. In the period 1996–2010 before I became department chair, I wrote on average 150 reviews per year.

I was the general chair for three conferences: POPL 2005, SPIN 2008, and LICS 2009. LICS is the IEEE Symposium on Logic in Computer Science. As general chair I chose to also be the local organizer of those conferences. Each of POPL 2005 and LICS 2009 had about 200 participants.

In 2005–2009 I was first the secretary/treasurer and then the vice chair of ACM SIGBED, Special Interest Group on Embedded Systems. In 2004–2012, I was a member of the steering committee of POPL, ACM Symposium on Principles of Programming Languages; I chaired the steering committee in 2005–2006.

I have written letters of recommendation for more than 250 people seeking jobs, tenure, promotion, awards, or green cards. My letters include recommendations of people for up for promotion to full professor at ETH Zurich, Harvard, Imperial College London, Princeton, U. Illinois Urbana-Champaign, UC Berkeley, UC Irvine, UC Santa Barbara, University of Maryland, and University of Virginia.

My PhD advisor, Peter Mosses turned 60 years old in 2008, and in 2009 I chaired a celebration of him in Udine, Italy. I also edited a Springer Festschrift for Mosses, LNCS 5700.

4.2 Service to Purdue University

Department of Computer Science

- Associate Head, Department of Computer Science, Purdue University, 2002–2003.
- Chair, The Faculty Search Committee, Department of Computer Science, Purdue University, 2002–2003. The effort led to the hiring of one full professor, Elisa Bertino, and four assistant professors, Daniel Aliaga, Ninghui Li, Cristina Nita-Rotaru, and Daisuke Kihara.
- Chair, Admission Steering Committee, Department of Computer Science, Purdue University, 2001–2002.
- Chair, Lower Division Curriculum Committee, Department of Computer Science, Purdue University, 2000. The committee designed a revision of the undergraduate curriculum, leading to the introduction of two new courses, CS 182 Foundations of Computer Science and CS 240 C Programming Laboratory, and the deletion of an existing course.
- Member, Advisory Committee to the Department Head, Department of Computer Science, Purdue University, 1997–2001.
- Member, The Graduate Committee, Department of Computer Science, Purdue University, 1997–2000.
- Co-author, Strategic Plan, Department of Computer Science, Purdue University, 1999, 2002.
- Member, The Faculty Search Committee, Department of Computer Science, Purdue University, 1999–2002.
- Member, Admission Steering Committee, Department of Computer Science, Purdue University, 2000–2001.
- Member, Building Campaign Committee, Department of Computer Science, Purdue University, 2001–2003.

School of Science

- Co-chair, Strategic Planning Committee consisting of the University Faculty Scholars, School of Science, Purdue University, 2002–2003.
- Member, School of Science committee to select University Faculty Scholars, Purdue University, 1999, 2002.
- Member, Computer Science Head Search Committee, School of Science, Purdue University, 2001–2002.
- Member, School of Science Faculty Council, Purdue University, 2002.
- Member, Educational Policy and Curriculum Committee, School of Science, Purdue University, 2002.
- Member, Promotions Committee, School of Science, Purdue University, 2002.

Other Services to Purdue University

- Member, Internal Advisory Board, Center for Education and Research in Information Assurance and Security, Purdue University, 1998–2002.

4.3 Service to UCLA

UCLA-wide

- Member, IDRE Executive Committee, 2007–2020.
- Member, IDRE Executive Board, 2020–2022.
- Member, Advisory Committee for the UCLA Academic Recruit program, 2012–2015.
- Member, Academic Senate's Council on Planning and Budget, 2017–2020.
- Chair, Academic Senate's Council on Planning and Budget, 2018–2019.
- Member, Search/Advisory Committee, UCLA Vice Chancellor and Chief Financial Officer position, 2018.
- Member, Faculty Search Committee, Department of Computational Medicine, 2018–2020.
- Representative, University of California Committee on Planning and Budget (UCPB), 2018–2019.
- Member, Search/Advisory Committee, Dean of Continuing Education and UCLA Extension, 2019.
- Member, Committee on Development, 2018–2019.

- Member, Senate Executive Board, 2018–2019.
- Member, Working Group on Self-Supporting Degree Programs, 2018–2019.
- Attendee, the Provost's Enrollment Planning meetings, 2018–2019.
- Attendee, the Provost's Campus Space Committee meetings, 2018–2019.
- Member, the Ascend Steering Committee, 2019–2022. The goal of the Ascend project is to modernize UCLA's financial backbone.
- Member, the UCLA Mobile Steering Committee, 2019–2021.
- Member, the Graduate Division Faculty Review Committee for the Cota-Robles Fellowship and the Graduate Opportunity Fellowship Program, 2021, 2023.
- Member, Senate Advisory Committee on Self-Supporting Graduate Professional Degree Programs, 2021–present. The mission of the committee is to help with proposals for new degree programs, champion academic quality, diversity, and access to graduate education, and help implement a diversity-related grant program.
- Member, Master of Quantum Science and Technology Committee, Physics and Astronomy Department, 2021–present.
- Director, Science Hub for Humanity and Artificial Intelligence, 2021–. The mission of the science hub is to address humanity's pressing challenges by cross-pollinating academic and industry research that harnesses the power of artificial intelligence.
- Member, The Future of Graduate Programs and Graduate Student Support Joint Task Force, 2023–.

School of Engineering

- Chair, Engineering Committee on Strategic Opportunities in Computational Medicine, 2018.

Department of Computer Science

- Chair, Faculty Search Committee, Department of Computer Science, UCLA, 2003–2004, 2007–2008, 2016–2022.
- Member, Interim Chair Search Committee, Department of Computer Science, UCLA, 2019-2022.
- Member, Academic Policy Committee, Department of Computer Science, UCLA, 2003–2004.
- Member, Undergraduate Program Review Committee, Department of Computer Science, UCLA, 2003–2005.

- Chair, Software Systems Field Committee, Department of Computer Science, UCLA, 2004–2015, 2018–19, 2022–23.
- Chair, Graduate Admissions/Fellowships/TA Committee Department of Computer Science, UCLA, 2004–2007.
- Graduate Vice Chair, Department of Computer Science, UCLA, 2005–2007.
- Member, Policy and Planning Committee, Department of Computer Science, UCLA, 2005–2010, 2015–2020, 2022–2023.
- Member, Faculty Search Committee, Department of Computer Science, UCLA, 2008–2009.
- Chair, Awards Committee, Department of Computer Science, UCLA, 2008–2010.
- Member, By-Law 55 Committee, Department of Computer Science, UCLA, 2009–2010, 2021–2023.
- Department Chair, Department of Computer Science, UCLA, 2010–2015.
- Lead author of a proposal to NSF that led to an award of $750,000 for a Quantum Computing and Information Science Faculty Fellowship, UCLA, 2018–19.

4.4 Service to Research Centers

- Member, CIQC Executive Committee, NSF Challenge Institute for Quantum Computation, 2021–present.

4.5 Journal Editor in Chief

- ACM Transactions on Programming Languages and Systems, 2010–2016.

4.6 Journal Editorial Boards

- ACM Transactions on Quantum Computing, 2021–present.
- ACM Transactions on Programming Languages and Systems, 2003–2010.
- IEEE Transactions on Software Engineering, 1997–2001.
- IEEE Transactions on Computers, 2022–present.
- Information and Computation, 2003–present.
- Science of Computer Programming, 2020–present.
- Theory and Practice of Object Systems, John Wiley & Sons, 1994–1999.

4.7 Guest Editor

- Guest editor, with Martín Abadi, of ACM Transactions on Programming Languages and Systems, volume 29:3, a special issue on POPL 2005, ACM Press, 2007.
- Guest editor, with Michael Schwartzbach, of Theory and Practice of Object Systems, volume 1:3, a special issue on type systems, John Wiley & Sons, 1995,

4.8 External Review Committees

- Member, first-year external review committee: NSF Large ITR Project, hosted in the Center for Hybrid and Embedded Software and Systems (CHESS) at the University of California, Berkeley, and in the Institute for Software Integrated Systems (ISIS) at Vanderbilt University, 2003.
- Member, five-year external review committee: Institute for Software Research (ISR) at UC Irvine, 2004.
- Member, second-year external review committee: NSF Large ITR Project, hosted in the Center for Hybrid and Embedded Software and Systems (CHESS) at the University of California, Berkeley, and in the Institute for Software Integrated Systems (ISIS) at Vanderbilt University, 2004.
- Member, external review committee: University of California, Riverside, Computer Science Department, Graduate Program, 2007.
- Member, external review committee: University of Arizona, Tucson, Computer Science Department, 2013.
- Chair, external review committee: University of Texas, Dallas, Computer Science Department, 2015.
- Member, external review committee: University of Copenhagen, Denmark, Computer Science Department (DIKU), 2017.
- Chair, external review committee: Aarhus University, Denmark, Computer Science Department, 2019.
- Member, external review committee: Master of Science Program at Information Technology University, Copenhagen, Denmark, 2021.

4.9 U.S. National Science Foundation Review Panels

In the Computer and Information Science and Engineering directorate:

- Embedded and Hybrid Systems: 2001 (CAREER), 2003, 2007, 2009 (CAREER).
- Information Technology Research: 2000.

- Postdoctoral Research Grants: 1997.
- Professional Opportunities for Women in Research and Education: 1998, 1999, 2000.
- Programming Languages, Compilers, and Concurrency: 2021.
- Science of Design: 2004.
- Software and Hardware Foundations: 2013, 2014, 2015 (CAREER), 2017, 2019, 2022 (CAREER).
- Software Engineering and Languages: 1996, 1999, 2001, 2005.
- Theory of Computing: 2001.

4.10 France's National Research Agency Evaluation Committees

France's National Research Agency is in French called *Agence Nationale pour la Recherche (ANR).*

Member

- Security, Embedded Systems and Ambient Intelligence (*securite, systemes embarques et intelligence ambiante*): 2005.

4.11 Conference Program Committees

Chair

- EMSOFT, International Conference on Embedded Software: 2008 (Atlanta) [co-chair with Luca de Alfaro].
- MEMOCODE, ACM-IEEE Conference on Formal Methods and Programming Models for Co-Design: 2006 (Napa Valley, California) [co-chair with James Hoe].
- PASTE, ACM Workshop on Program Analysis for Software Tools and Engineering: 2002 (Charleston, South Carolina) [co-chair with Matthew Dwyer].
- PEPM, ACM Conference on Partial Evaluation and Semantics-Based Program Manipulation: 2023 (Boston) [co-chair with Edwin Brady].
- POPL, ACM Symposium on Principles of Programming Languages: 2010 (Madrid).
- SAS, Static Analysis Symposium: 2000 (Santa Barbara), 2009 (Los Angeles) [co-chair with Zhendong Su].
- SREIS, Symposium on Requirements Engineering for Information Security: 2002 (Raleigh, North Carolina).

- TACAS, International Conference on Tools and Algorithms for the Construction and Analysis of Systems: 2006 (Vienna, Austria) [co-chair with Holger Hermanns].
- VMCAI, International Conference on Verification, Model Checking, and Abstract Interpretation: 2018 (Los Angeles) [co-chair with Isil Dillig].
- X10, ACM SIGPLAN X10 Workshop: 2012 (Beijing).

Subcommittee Chair

- CASES, International Conference on Compilers, Architectures and Synthesis for Embedded Systems: 2002 (Grenoble, France) [chair of the Compilers and Operating Systems subcommittee].
- DAC, Design Automation Conference: 2005 (San Diego) [chair of the Reconfigurable Computing subcommittee], 2006 (San Francisco) [chair of the FPGA Design Tools and Applications subcommittee],

Member

- ACSD, International Conference on Application of Concurrency to System Design: 2009 (Augsburg, Germany).
- AGERE, Workshop on Programming Languages, Applications and Systems based on Agents, Actors, and Decentralized Control: 2011 (Portland, Oregon), 2012 (Tucson, Arizona).
- AIOOL, Workshop on Abstract Interpretation for Object Oriented Languages: 2005 (Paris).
- AOSD, International Conference on Aspect-Oriented Software Development: 2002 (Enschede, The Netherlands).
- APLAS, Asian Symposium on Programming Languages and Systems: 2007 (Singapore).
- BenchWork: 2018 (Amsterdam)
- CATS, Computing: The Australasian Theory Symposium: 2006 (Hobart, Australia), 2008 (Wollongong, Australia).
- CC, International Conference on Compiler Construction: 2008 (Budapest, Hungary), 2011 (Saarbrucken, Germany), 2016 (Barcelona).
- CGO, International Symposium on Code Generation and Optimization: 2008 (Boston).
- CPS, International Workshop on Cyber-Physical Systems: 2008 (Beijing).
- DAC, Design Automation Conference: 2003 (Anaheim, California), 2004 (San Diego).

- ECOOP, European Conference on Object-Oriented Programming: 1994 (Bologna, Italy), 1995 (Aarhus, Denmark), 1996 (Linz, Austria), 1997 (Jyvaskyla, Finland), 1998 (Brussels, Belgium), 1999 (Lisboa, Portugal), 2000 (Cannes, France), 2001 (Budapest, Hungary), 2003 (Darmstadt, Germany), 2012 (Beijing, China), 2013 (Montpellier, France), 2014 (Uppsala, Sweden).

- EMSOFT, International Conference on Embedded Software: 2003 (Philadelphia), 2005 (Jersey City), 2007 (Salzburg, Austria).

- ESOP, European Symposium on Programming: 2013 (Rome, Italy)

- ETX, Eclipse Technology eXchange Workshop: 2004 (Barcelona, Spain).

- FHCP, ACM SIGPLAN Workshop on Functional High-Performance Computing: 2013 (Boston).

- FOAL, Workshop on Foundations of Aspect-Oriented Languages: 2002 (Enschede, The Netherlands), 2003 (Boston).

- FOOL, ACM Workshop on Foundations of Object-Oriented Languages: 2001 (London).

- FORMATS, Conference on Formal Modeling and Analysis of Timed Systems: 2005 (Uppsala, Sweden).

- FORMATS+FTRTFT, joint conference on Formal Modeling and Analysis of Timed Systems and Formal Techniques in Real-Time and Fault Tolerant Systems: 2004 (Grenoble, France).

- FOSSACS, Foundations of Software Science and Computation Structures: 2004 (Barcelona, Spain), 2010 (Paphos, Cyprus).

- FSE/ESEC, ACM Symposium on the Foundations of Software Engineering, joint with European Software Engineering Conference: 1997 (Zurich, Switzerland).

- FTFJP, Formal Techniques for Java-like Programs: 2012 (Beijing, China), 2017 (Barcelona, Spain).

- GPCE, International Conference on Generative Programming and Component Engineering: 2007 (Salzburg, Austria), 2012 (Dresden, Germany).

- HOPL, ACM SIGPLAN History of Programming Languages Conference: 2020 (location TBD).

- HotPar, USENIX Hot Topics in Parallelism: 2013 (San Jose).

- ICALP, International Colloquium on Automata, Languages and Programming: 2014 (Copenhagen).

- ICCL, IEEE International Conference on Computer Languages: 1998 (Chicago).

- ICCQ, IEEE International Conference on Code Quality: 2021 (Moscow).
- ICESS, International Conference on Embedded Software and Systems: 2005 (Xi'an, P. R. China).
- ICSE, International Conference on Software Engineering: 2000 (Limerick, Ireland), 2005 (St. Louis, Missouri).
- ICYCS, International Conference for Young Computer Scientists: 1999 (Nanjing, China).
- IEHSC, International Conference on Embedded and Hybrid Systems: 2005 (Singapore).
- ISOTAS, International Symposium on Object Technologies for Advanced Software: 1996 (Kanazawa, Japan).
- ITRS, Workshop on Intersection Types and Related Systems: 2000 (Geneva, Switzerland).
- IWAOOS, Intercontinental Workshop on Aliasing in Object-Oriented Systems: 1999 (Lisbon, Portugal).
- JJT, Conference on Java/Jini Technologies: 2001 (Denver, Colorado), 2002 (Boston).
- JMLC, Joint Modular Languages Conference: 2003 (Klagenfurt, Austria), 2006 (Oxford, England).
- JTRES, Workshop on Java Technologies for Real-time and Embedded Systems: 2005 (San Diego).
- LICS, IEEE Symposium on Logic in Computer Science: 1997 (Warsaw, Poland).
- MEMOCODE, ACM-IEEE Conference on Formal Methods and Programming Models for Co-Design: 2004 (San Diego), 2005 (Verona, Italy), 2007 (Nice, France).
- MobiVirt, Workshop on Mobile Computing and Virtualization: 2008 (Breckenridge, Colorado).
- OOIS, International Conference on Object-Oriented Information Systems: 1997 (Brisbane, Australia).
- OOPSLA, ACM Conference on Object-Oriented Programming, Languages, and Systems: 2002 (Seattle, Washington), 2004 (Vancouver), 2006 (Portland, Oregon), 2016 (Amsterdam).
- PEPM, ACM Conference on Partial Evaluation and Semantics-Based Program Manipulation: 1997 (Amsterdam, The Netherlands), 2019 (Lisbon, Portugal), 2020 (New Orleans).
- PLACES, Programming Language Approaches to Concurrency and Communication-cEntric Software: 2011 (Saarbrucken, Germany).

- PLDI, ACM Conference on Programming Language Design and Implementation: 2003 (San Diego), 2009 (Dublin), 2011 (San Jose), 2018 (Philadelphia), 2022 (San Diego).

- POPL, ACM Symposium on Principles of Programming Languages: 2000 (Boston), 2009 (Savannah, Georgia).

- PPOPP, ACM Symposium on Principles and Practice of Parallel Programming: 2013 (Shenzhen, China).

- PPPJ, International Conference on Principles and Practices of Programming in Java: 2013 (Stuttgart, Germany), 2015 (Melbourne, Florida).

- QA, Workshop on Quantitative Analysis of Software: 2009 (Grenoble, France).

- Q-CASA, Quantum Computing Algorithms, Systems, and Applications workshop: 2023 (St. Petersburg, Florida).

- QCE, IEEE International Conference on Quantum Computing and Engineering: 2021 (virtual), 2022 (Broomfield, Colorado), 2023 (Bellevue, Washington).

- SALAD, Workshop on Software Debloating and Delayering: 2018 (Amsterdam).

- SAS, Static Analysis Symposium: 1996 (Aachen, Germany), 1997 (Paris, France), 1999 (Venice, Italy), 2001 (Paris, France), 2006 (Seoul, Korea).

- SBLP, Brazilian Symposium on Programming Languages: 2006 (Itatiaia, Brazil), 2007 (Natal, Brazil), 2011 (Sao Paulo, Brazil).

- SCAM, IEEE International Working Conference on Source Code Analysis and Manipulation: 2020 (Adelaide, Australia), 2021 (Luxembourg City).

- SREIS, Symposium on Requirements Engineering for Information Security: 2001 (Indianapolis, Indiana), 2005 (Paris, France).

- TACAS, International Conference on Tools and Algorithms for the Construction and Analysis of Systems: 1998 (Lisbon, Portugal), 2005 (Edinburgh, Scotland).

- TLCA, International Conference on Typed Lambda Calculi and Applications: 2003 (Valencia, Spain).

- VMCAI, Workshop on Verification, Model Checking and Abstract Interpretation: 1998 (Pisa, Italy), 2006 (Charleston, South Carolina), 2019 (Lisbon, Portugal), 2022 (Philadelphia), 2024 (London).

- X10, ACM SIGPLAN X10 Workshop: 2011 (San Jose, California), 2015 (Portland, Oregon)

4.12 Conference Steering Committees

Chair

- POPL, ACM Symposium on Principles of Programming Languages: 2005–2006.

Member

- ETAPS, The European Joint Conferences on Theory and Practice of Software: 2005–2006.
- EMSOFT, ACM Conference on Embedded Software: 2008–2012.
- PASTE, ACM Workshop on Program Analysis for Software Tools and Engineering: 2002–2005.
- POPL, ACM Symposium on Principles of Programming Languages: 2004–2012.
- TLCA, Typed Lambda Calculus and Applications: 2014–2015.
- X10, ACM SIGPLAN X10 Workshop: 2011–present.
- FSCD, Formal Structures for Computation and Deduction: 2015–2016.

General Chair

- ICESS, IEEE International Conference on Embedded Software and Systems: 2010 (Bradford, UK), 2012 (Liverpool, UK).
- LICS, IEEE Symposium on Logic in Computer Science: 2009 (Los Angeles).
- POPL, ACM Symposium on Principles of Programming Languages: 2005 (Long Beach, California).
- SPIN, Workshop on Model Checking Software: 2008 (Los Angeles).

Organizer

- SoCal, Southern California Workshop on Parallel and Distributed Processing and Architecture: 2004 (Los Angeles).
- PDM, Symposium in Honor of Peter Mosses: 2009 (Udine, Italy)

Co-Organizer

- Types, Inheritance and Assignments: organizer, with Michael I. Schwartzbach, workshop held at ECOOP'91 in Geneva, Switzerland, July 1991. The collection of position papers is available from Computer Science Department, University of Aarhus as PB–357. A summary of the discussions at the workshop has been published as [127].

- Programming Languages: organizer, with Chris Hankin and Hanne Riis Nielson, working group at the ACM Workshop on Strategic Directions in Computing Research, MIT, June 1996.
- The Semantic Challenge of Object-Oriented Programming: organizer, with Luca Cardelli, Achim Jung, and Peter O'Hearn, Dagstuhl-Seminar, Schloss Dagstuhl, Germany, June 1998.
- Static Single-Assignment Form Seminar: organizer, with Christian Bertin, Alain Darte, Sebastian Hack, Alan Mycroft, and Fabrice Rastello; Autrans, France, April 2009.
- NSF Workshop on High-Level Programming Models for Parallelism: organizer with Suresh Jagannathan; Washington DC, July 2013.

Member of the Organizing Committee

- ECOOP, European Conference on Object-Oriented Programming: member of the executive committee, Kaiserslautern, Germany, 1993.
- International Workshop on Set Constraints and Constraint-based Program Analysis: member of the organizing committee, 1997 (Schloss Hagenberg, Austria), 1998 (Pisa, Italy).
- LCTES, Languages, Compilers, and Tools for Embedded Systems: web chair, with Mayur Naik, 2003 (San Diego).
- LICS, IEEE Symposium on Logic in Computer Science: 2009–2011.
- Kavli Futures Symposium: Achieving a Quantum Smart Workforce: 2019 (Los Angeles).

4.13 Service to Professional Societies

- Secretary/treasurer of ACM SIGBED, Special Interest Group on Embedded Systems, 2005–2007.
- Vicechair of ACM SIGBED, Special Interest Group on Embedded Systems, 2007–2009.
- Member of the SIGPLAN CACM Nomination Committee, 2008–2018.
- Associate Editor of the revision of the ACM Computing Classification System, 2010–2012.
- Member of the SIGPLAN Awards Committee, 2011–2012.
- Member of the SIGPLAN Milner Award selection committee, 2014–2015.
- Chair, ACM SIGPLAN, 2018–2021.

- Member-at-Large, SIG Viability Advisor, ACM SIG Governing Board Executive Committee, 2019–2020.
- Chair, ACM SIG Governing Board Executive Committee, 2020–2024.
- Member, ACM Executive Committee, 2020–2024.
- Member, ACM Council, 2020–2024.
- Chair, search committee for finding an Editor in Chief of ACM Transactions on Programming Languages and Systems, 2022.
- Member, ACM Presidential Taskforce on Special Interest Group Overhead, 2022.

4.14 Chair of Conference Panels

- Chair of the panel *Manifesto: a New Educational Programming Language*, held at OOPSLA 2010. Other panelists: Kim Bruce, James Noble, Andrew Black, and Alex Buckley.

4.15 Member of Conference Panels

- *Bringing Quantum Programming into Quantum Computing Education*, held at IEEE Quantum Week 2020 (QCE'20). Panel chair: Mark Tsang. Other panelists: Christopher Ferrie, Brian La Cour, George Siopsis, Mathias Soeken, and Rafael Sotelo.

4.16 Other Professional Services

- Member, the Danish national board of external examiners in computer science, 1993–.
- Moderator, the mailing list `objecttypes@daimi.aau.dk` for discussion of type systems for object-oriented programming, 1991–1999.
- Faculty Advisor, Purdue University Beta Chapter of Upsilon Pi Epsilon, International Honor Society for the Computing Sciences, 2002–2003.
- Member, Scientific committee, Summer School on Generative and Transformational Techniques in Software Engineering, July 2005 (Braga, Portugal), July 2007 (Braga, Portugal), July 2011 (Braga, Portugal).