Vita

Benjamin G. Zorn

June 2021

Partner Researcher
Research in Software Engineering (RiSE) Group
Microsoft Research, Redmond Lab
Microsoft Corporation
One Microsoft Way, Redmond WA 98052

URL: http://aka.ms/zorn
Telephone: (425) 703-6290, Cell: on-request
Fax: (425) 936-7329
Email: zorn@microsoft.com, benzorn@acm.org

Research Interests

Programming language design and implementation, program runtime systems and memory management, performance evaluation, compilers, error recovery, software fault tolerance, security, malware detection, software development, computer architecture

Education

- Ph.D. (Computer Science) December 1989, University of California, Berkeley. Thesis: *Comparative Performance Evaluation of Garbage Collection Algorithms*. Advisor: Paul N. Hilfinger.
- M.S. (Computer Science) 1984, University of California, Berkeley. Master's Thesis: *Experiences with Ada Code Generation*. Advisor: Paul N. Hilfinger.
- B.S. (Mathematics/Computer Science) *summa cum laude* 1982. Rensselaer Polytechnic Institute.

Professional Experience

- May 2019 – present**. Partner Researcher**, Research in Software Engineering (RiSE) group, Microsoft Research, Redmond Lab.
- January 2012 – May 2019, **Research Manager and Principal Researcher**, Research in Software Engineering (RiSE) group, Microsoft Research, Redmond. I co-managed the Research in Software Engineering (RiSE) group, a group of almost 30 researchers and developers working on programming languages and software engineering research.
- January 2006 – 2012, **Principal Researcher**, Microsoft Research, Redmond.
- August 1998 – January 2006, **Senior Researcher**, Microsoft Research.
- June 1999 – present, **Adjoint Associate Professor**, University of Colorado at Boulder.
- August 1996 – Junes 1999, **Associate Professor**, University of Colorado at Boulder.
- January 1990 – July 1996, **Assistant Professor**, University of Colorado at Boulder.
- May 1983 – December 1989, **Research Assistant**, University of California at Berkeley.
- December 1985 – December 1989, **Course Instructor**, Franz Incorporated.
- August 1982 – May 1983, **Teaching Assistant**, University of California at Berkeley.

Awards and Honors

- Co-author of 37 patents submitted and/or granted, https://patents.google.com/?inventor=benjamin+zorn
- PLDI 2016 Most Influential Paper Award for the 2006 PLDI paper "DieHard: probabilistic memory safety for unsafe languages" by Emery Berger and Benjamin G. Zorn
- Keynote speaker, PLDI 2016, keynote talk "Programming Languages and Technical Disruption" available at: https://www.youtube.com/watch?v=qTRh6LhZPKg&t=8s
- Co-chair and co-founder, Computing Research Association Industry (CRA-Industry) Committee, 2020-present
- Member, Computing Research Association, Strategic Planning Committee, 2019-2020
- Member, Computing Research Association, Industry Working Group, 2019-2020
- Member, Computing Community Consortium (CCC) Council, 2014-2020
    - Member, CCC Executive Committee, 2016- 2019

    - Co-chair, Computing in the Physical World Task Force 2015-2018
    - Chair, Industry Working Group, 2018-2020
    - Chair, Future of the Research Enterprise Task Force, 2019-2020
- PLDI 2015 Distinguished Artifact Award, for FlashRelate artifact, awarded June 2015
- Member, National Science Foundation Expeditions in Computing Blue Ribbon Panel
- Most Influential OOPSLA Paper Award 2012 (for an OOPLSA paper published in 2002), for the paper "Reconsidering Custom Memory Allocation" by Emery Berger, Benjamin G. Zorn, and Kathryn S. McKinley
- Member, ACM Software System Award Committee, 2010-2014
- ACM Recognition of Service Award for serving as SIGPLAN Member-at-Large, 1997-1999, 2007-2012
- ACM Recognition of Service Award for serving as General Chair of PLDI 2010
- ACM Recognition of Service Award for serving as co-Program Chair for PACT'06
- ACM Recognition of Service Award for serving as Program Chair for MSP'05
- ACM Recognition of Service Award for serving as Program Chair for PLDI 1999
- Best Student Paper Award: Summer 1988 USENIX Conference
- Lockheed Leadership Fellowship, 1985-1986
- National Science Foundation Fellowship, 1982-1985

Professional Activities

Associate Editor

- Associate Editor, ACM Transactions on Architecture and Compiler Optimization, 2003-2007
- Associate Editor, ACM Transactions on Programming Languages and Systems, 2000-2007

Chair

- Co-organizer, 2016 Workshop on Approximate Computing Across the Stack (WAX 2016)
- Co-organizer, Dagstuhl Seminar Approaches and Applications of Inductive Programming, October 2015
- Co-organizer, 2015 Workshop on Approximate Computing Across the Stack (WAX 2015)
- Co-chair, First SIGPLAN Workshop on Probabilistic and Approximate Computing (Approx'14), June 2014
- General Chair, 2010 ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI'10)
- Chair, CGO Steering Committee, 2010-2013
- Chair, SIGPLAN CACM Research Highlights Nominating Committee, 2009-2013
- Co-chair, SIGPLAN Professional Activities Committee, 2007-present
- Program co-Chair, 2008 IEEE International Symposium on Workload Characterization (IISWC'08)
- Program co-Chair, Fifteenth International Conference on Parallel Architectures and Compilation Techniques (PACT-2006), September 2006
- Program Chair, 2005 ACM SIGPLAN Workshop on Memory Systems Performance (MSP'05), June 2005
- Co-chair, 2nd Workshop on Managed Runtime Environments (MRE'04), March, 2004
- Co-organizer, University of Washington/Microsoft Research Summer Institute on Accelerating the Pace of Software Tools Research, August 2000
- Program Chair, 1999 ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI'99)
- Chair, OOPSLA'95 Workshop on Object Database Behavior, Benchmarks, and Performance
- Co-organizer, OOPSLA'93 Workshop on Memory Management and Garbage Collection
- President, Rensselaer Student Chapter of the ACM, 1980-1981.

Steering / Executive Committee Member

- PLDI Steering Committee, 2010-2012
- ACM SIGPLAN Executive Committee, 1997-1999, 2007-2012
- PACT Steering Committee, 2006-2010
- CGO Steering Committee, 2005-2013
- MSP Steering Committee, 2005-2012
- ISMM Steering Committee, 1998-2004
- OOPSLA Steering Committee, 1997-1999

Program Committee Member

- PC member, 2021 Conference on Programming Language Design and Implementation (PLDI'21)
- External PC member, 2019 Conference on Programming Language Design and Implementation (PLDI'19)
- 2019 Conference on Code Generation and Optimization (CGO 2019), February 2019
- External PC member, 2018 Conference on Programming Language Design and Implementation (PLDI'18)
- External PC member, 2016 Conference on Programming Language Design and Implementation (PLDI'16)
- 2015 Conference on Code Generation and Optimization (CGO 2015), March 2015
- 2014 ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI'14), June 2014
- 2013 Conference on Code Generation and Optimization (CGO 2013), February 2013
- 3rd ACM SIGPLAN History of Programming Languages Conference (HOPL-III), June 2007
- 2007 Conference on Languages, Compilers, and Tools for Embedded Systems (LCTES'07), June 2007
- 2007 Conference on Code Generation and Optimization (CGO 2007), March 2007
- 2006 Conference on Code Generation and Optimization (CGO 2006), March 2006
- 2005 Conference on Code Generation and Optimization (CGO 2005), March 2005
- 2nd Value Prediction and Value-Based Optimization Workshop (VPW2), October 2004
- 1st annual Conference on Code Generation and Optimization (CGO 2003), March 2003
- 13th International Conference on Compiler Construction (CC'04), March 2004
- 4th Workshop on Feedback-Directed and Dynamic Optimization (FDDO'01), December 2001
- Member, Committee to Select the Most Influential Paper from the Proceedings of the 1990 SIGPLAN Conference on Programming Language and Implementation, June 2000
- Binary Translation Workshop, October 2000
- Ninth International Workshop on Persistent Object Systems (POS9), Sept. 2000
- 1998 International Conference on Functional Programming (ICFP98)
- 1998 USENIX Annual Technical Conference (USENIX98)
- Seventh International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS-VII), October 1996
- Seventh International Workshop on Persistent Object Systems (POS7), June1996
- 1996 ACM SIGPLAN Conference on Principles of Programming Languages (POPL'96)
- 1994 ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI'94)

Member / Participant

- Microsoft Research Webinar, "The next generation of developer tools for data programming", February 2020, https://note.microsoft.com/MSR-Webinar-Data-Programming-Registration-on-demand.html

- Invited presentation at Purdue PurPLFest, Sept. 2019. Talk title: "What is a program? What is a PL? What is a programmer?" https://www.youtube.com/watch?v=U1wuf1tZpkM
- Microsoft Research Podcast, "How Programming Languages Quietly Run the World", January 2018, https://www.microsoft.com/en-us/research/blog/programming-languages-quietly-run-world-dr-ben-zorn/
- Presentation at AAAS 2017 Annual Meeting, Boston, MA, February 2017. Talk title: "Programming a Secure, Robust, and Sustainable Internet of Things"
- Invited talk, 2017 Conference on Dependable Systems and Networking (DSN'17), Denver Colorado, June 2017. Talk title: "Technical Disruption, Agility, and Dependability", http://dsn2017.github.io/
- Attendee, ASU Origins Project Challenges in Artificial Intelligence Workshop, February 2017 (chaired by Eric Horvitz, Jaan Tallinn, and Lawrence Krauss)
- Panel member, Center for Information Technology Policy (CITP) (CITP) Conference on Security and Privacy for the Internet of Things (Oct. 2016), Panel 1: Consumer Security and Protection
- Attendee, Leadership in Science Policy Institute (LiSPI), April 2015.
- Participant, Invitational Workshop on the Future of Virtual Execution Environments, September 2004
- Department of Computer Science Executive Committee, 1996-1998
- Department of Computer Science Promotion and Tenure Committee, 1997-1998
- College of Engineering Women in Engineering Program (WIEP) Faculty Advisory Board, 1996-1997
- Department of Computer Science Undergraduate Committee, 1991-1996
- College of Engineering Undergraduate Scholarship Committee, 1991-1996
- College of Engineering Task Force on Sexual Harassment, 1994-1995
- ACM, SIGPLAN, SIGARCH, SIGMETRICS, and SIGCOMM
- U.C. Berkeley Computer Science Graduate Admissions Committee, 1986-1987
- Eta Kappa Nu (EECS honors society), 1982
- Pi Mu Epsilon (mathematics honors society), 1981
- Board Member (appointed), Rensselaer Alumni Association Board of Directors, 1979-1981

Refereeing and Reviewing

- NSF panels (Compilers, Programming Languages, Software Engineering, SBIR)
- Referee for journals: ACM Transactions on Programming Languages and Systems (TOPLAS), ACM Transactions on Computer Systems (TOCS), ACM Transactions on Databases Systems (TODS), ACM Letters on Programming Languages and Systems (LOPLAS), IEEE Transactions on Knowledge and Data Engineering (TKDE), IEEE Transactions on Software Engineering, IEEE Transactions on VLSI, IEEE Software, IBM Systems Journal, Software-Practice and Experience, Information Processing Letters, Journal of Programming Languages, Journal of Systems and Software, International Journal of Parallel Programming, Journal of Parallel and Distributed Computing.
- Referee for conferences: International Conference on Architectural Support for Programming Languages and Operating Systems, Annual International Symposium on Computer Architecture (ISCA'91), SIGPLAN Conference on Programming Language Design and Implementation (PLDI), Symposium on Operating Systems Design and Implementation (OSDI), Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPLSLA), Distributed Computing Conference (DCS), ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL)

Journal Publications

1. Cole Schlesinger, Karthik Pattabiraman, Nikhil Swamy, David Walker, Benjamin G. Zorn: Modular protections against non-control data attacks. *Journal of Computer Security* (JCS) 22(5):699-742 (2014).
2. Paruj Ratanaworabhan, Martin Burtscher, Darko Kirovski, Benjamin G. Zorn, Rahul Nagpal, Karthik Pattabiraman: Efficient Runtime Detection and Toleration of Asymmetric Races. *IEEE Trans. Computers* (TC) 61(4):548-562 (2012).
3. Martin Burtscher and Benjamin G. Zorn. "Hybrid Load Value Predictors", *IEEE Transactions on Computers* (TOCS), 51(7), pp. 759-774, 2002.
4. Matthew Seidl and Benjamin G. Zorn, "Implementing Heap-Object Behavior Prediction Efficiently and Effectively", *Software: Practice and Experience* (SP&E), 31(9):869-892. 2001.

5. Thorna Humphries, Artur Klauser, Alexander L. Wolf, and Benjamin G. Zorn, "An Infrastructure for Generating and Sharing Experimental Workloads for Persistent Object Systems", *Software: Practice and Experience*, 30:387-417, 2000.
6. Martin Burtscher and Benjamin G. Zorn, "Prediction Outcome History-based Confidence Estimation for Load Value Prediction," *Journal of Instruction-Level Parallelism (JILP)*, Volume 1, May 1999.
7. Wayne Citrin, Soraya Ghiasi, and Benjamin Zorn, "VIPR and the Visual Programming Challenge," *The Journal of Visual Languages and Computing*, 9:241-258, 1998.
8. Jonathon E. Cook, Alexander L. Wolf, and Benjamin G. Zorn, "A Highly Effective Partition Selection Policy for Object Database Garbage Collection," *IEEE Transactions on Knowledge and Data Engineering*, 10(1):153-172, January/February 1998.
9. Brad Calder, Dirk Grunwald, Michael Jones, Donald Lindsay, James Martin, Michael Mozer, and Benjamin Zorn, "Evidence-based Static Branch Prediction using Machine Learning," *ACM Transactions on Programming Languages and Systems* , 19(1):188-222, 1997.
10. Wayne Citrin, Michael Doherty, and Benjamin Zorn, "A Graphical Semantics for Graphical Transformation Languages," *The Journal of Visual Languages and Computing*, 8:147-173, 1997.
11. Thomas Derby, Robert Schnabel, and Benjamin Zorn, "A New Language Design for Prototyping Numerical Computation," *Scientific Programming*, 5:279-300, 1996.
12. Steven J. Sullivan and Benjamin G. Zorn, "Numerical Analysis Using Nonprocedural Paradigms," *ACM Transactions on Mathematical Software*. 21(3):267-298. September 1995.
13. Brad Calder, Dirk Grunwald, and Benjamin Zorn, "Quantifying Behavioral Differences Between C and C++ Programs," *Journal of Programming Languages*. 2(4):313-351, 1994.
14. Robert Henderson and Benjamin Zorn, "A Comparison of Object-Oriented Programming in Four Modern Languages," *Software: Practice and Experience*. 24(11):1077-1095. November 1994.
15. David Detlefs, Al Dosser, and Benjamin Zorn, "Memory Allocation Costs in Large C and C++ Programs," *Software: Practice and Experience*. 24(6):527-542, June 1994.
16. Benjamin Zorn and Dirk Grunwald, "Evaluating Models of Memory Allocation," *ACM Transactions on Modeling and Computer Simulation*. 4(1):107-131, January 1994.
17. Brigham Bell, Wayne Citrin, Clayton Lewis, John Rieman, Robert Weaver, Nick Wilde, and Benjamin Zorn, "Using the Programming Walkthrough to Aid in Programming Language Design," *Software: Practice and Experience*. 24(1):1-25, January 1994.
18. Dirk Grunwald and Benjamin Zorn, "CustoMalloc: Efficient Synthesized Memory Allocators," *Software-Practice and Experience*. 23(8):851-869, August 1993.
19. Benjamin Zorn, "The Measured Cost of Conservative Garbage Collection," *Software: Practice and Experience*. 23(7):733-756, July 1993.
20. Benjamin Zorn and Paul Hilfinger, "Direct Function Calls in Lisp," *Lisp and Symbolic Computation, An International Journal*, 3:13-20, 1990.
21. Benjamin Zorn, Paul Hilfinger, Kinson Ho, James Larus, and Luigi Semenzato, "Multiprocessing Extensions in Spur Lisp," *IEEE Software*, 6(4):41-49, July 1989.
22. Mark Hill, Susan Eggers, James Larus, George Taylor, Benjamin Zorn, et al., "SPUR: A VLSI Multiprocessor Workstation," *IEEE Computer*, 19(11):8-22, November 1986.
23. Frederick Phelps III, Frederick Phelps IV, Jay Gormley, and Benjamin Zorn, "An Experimental Study of the Brachistochrone," *European Journal of Physics*, 3(1):1-4, January 1982.

Refereed Conference Publications

24. Leijen, Daan, Benjamin Zorn, and Leonardo de Moura. "Mimalloc: Free List Sharding in Action." Asian Symposium on Programming Languages and Systems (APLAS 2019). Springer. 2019.
25. Xu, Guoqing Harry, Margus Veanes, Michael Barnett, Madan Musuvathi, Todd Mytkowicz, Ben Zorn, Huan He, and Haibo Lin. "Niijima: sound and automated computation consolidation for efficient multilingual data-parallel pipelines." In Proceedings of the 27th ACM Symposium on Operating Systems Principles, pp. 306-321. 2019.
26. Daniel Barowy, Emery Berger, Benjamin Zorn, "ExceLint: Automatically Finding Spreadsheet Errors", OOPSLA 2018.
27. Ben Stock, Benjamin Livshits, and Benjamin Zorn, "Kizzle: A signature compiler for exploit kits." International Conference on Dependable Systems and Networks (DSN). 2015

28. Mikal Mayer, Gustavo Soares, Maxim Grechkin, Vu Le, Mark Marron, Oleksandr Polozov, Rishabh Singh, Benjamin Zorn, and Sumit Gulwani, "User Interaction Models for Disambiguation in Programming by Example", 28th ACM User Interface Software and Technology Symposium (UIST 2015), November 2015.
29. Sumit Gulwani, Jose Hernandez-Orallo, Emanuel Kitzelmann, Stephen Muggleton, Ute Schmid, Benjamin Zorn, "Inductive Programming Meets the Real World", Communications of the ACM, November 2015.
30. Dan Barowy, Sumit Gulwani, Ted Hart, Benjamin Zorn, "FlashRelate: Extracting Relational Data from Semi-Structured Spreadsheets Using Examples", ACM SIGPLAN 2015 Conference on Programming Language Design and Implementation (PLDI'15), Portland, OR, June 2015.
31. Thomas Ball and Benjamin Zorn, "Teach Foundational Language Principles", Communications of the ACM, May 2015.
32. Paruj Ratanaworabhan, Martin Burtscher, Darko Kirovski, Benjamin G. Zorn: Hardware support for enforcing isolation in lock-based parallel programs. Proceedings of the 26th ACM International Conference on Supercomputing (ICS'12), pp.301-310, 2012.
33. Clemens Kolbitsch, Benjamin Livshits, Benjamin G. Zorn, Christian Seifert: Rozzle: De-cloaking Internet Malware. IEEE Symposium on Security and Privacy pp. 443-457, June 2012.
34. Charles Curtsinger, Benjamin Livshits, Benjamin Zorn, and Christian Seifert , Zozzle: Fast and Precise In-Browser JavaScript Malware Detection, Proceedings of the USENIX Security Symposium, August 2011.
35. Cole Schlesinger, Karthik Pattabiraman, Nikhil Swamy, David Walker and Benjamin Zorn, Modular Protections Against Non-control Data Attacks, 24th IEEE Computer Society Foundations Symposium (CSF'2011). June 2011.
36. Song Liu, Karthik Pattabiraman, Thomas Moscibroda, and Benjamin G. Zorn, Flikker: Saving DRAM Refresh-power through Critical Data Partitioning, Sixteenth International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS'11), March 2011.
37. Karthik Pattabiraman and Benjamin Zorn, DoDOM: Leveraging DOM Invariants for Web 2.0 Application Robustness Testing, International Symposium on Software Reliability Engineering (ISSRE'10), November 2010.
38. Paruj Ratanaworabhan, Benjamin Livshits, David Simmons, and Benjamin Zorn, JSMeter: Comparing the Behavior of JavaScript Benchmarks with Real Web Applications, USENIX 2010 Conference on Web Application Development. (WebApps'10), June 2010.
39. Martin Burtscher, Benjamin Livshits, Gaurav Sinha and Benjamin Zorn, JSZap: Compressing JavaScript Code, USENIX 2010 Conference on Web Application Development. (WebApps'10), June 2010.
40. Paruj Ratanaworabhan, Martin Burtscher, Darko Kirovski, Rahul Nagpal, Karthik Pattabiraman, and Benjamin Zorn, "Detecting and Tolerating Asymmetric Races", *14th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP 2009)*, Raleigh, NC, February 2009.
41. Karthik Pattabiraman, Vinod Grover and Benjamin Zorn, "Samurai: Protecting Critical Data in Unsafe Languages", *EuroSys 2008*, Glasgow, Scotland, April 2008.
42. Vitaliy B. Lvin, Gene Novark, Emery D. Berger, Benjamin G. Zorn, "Archipelago: Trading Address Space for Reliability and Security", *Thirteenth International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS '08)*, Seattle, WA, March 2008.
43. Gene Novark, Emery D. Berger and Benjamin G. Zorn, "Exterminator: Automatically Correcting Memory Errors with High Probability", *ACM SIGPLAN 2007 Conference on Programming Language Design and Implementation (PLDI'07)*, San Diego, CA, June 2007. (To appear.)
44. Emery D. Berger and Benjamin G. Zorn, "DieHard: Probabilistic Memory Safety for Unsafe Languages", *ACM SIGPLAN 2006 Conference on Programming Language Design and Implementation (PLDI'06)*, pp. 158-168, Ottawa, Canada, June 2006.
45. Emery D. Berger, Benjamin G. Zorn, and Kathryn S. McKinley, "Reconsidering Custom Memory Allocation", *17th ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA'02)*, pp. 1-12, Seattle, WA. November 2002.
46. Emery D. Berger, Benjamin G. Zorn, and Kathryn S. McKinley, "Composing High-Performance Memory Allocators", *ACM SIGPLAN 2001 Conference on Programming Languages Design and Implementation (PLDI'01)*, pp. 114-124, Snowbird, UT. June 2001.
47. Martin Burtscher and Benjamin Zorn, "Hybridizing and Coalescing Load Value Predictors", *International Conference on Computer Design (ICCD 2000)*, pp. 81-92, Austin, Texas, September 2000.
48. Trishul Chilimbi, Richard Jones, and Benjamin Zorn, "Designing a Trace Format for Heap Allocation Events", *Proceedings of the 2000 International Symposium on Memory Management (ISMM'00)*, pp. 35-49, May 2000.
49. Soraya Ghiasi, Matthew Seidl, and Benjamin Zorn, "A Generic Web-Based Teleoperation Architecture: Details and Experience", *Proceedings of SPIE Telemanipulator and Telepresence Technologies VI* , pp. 234-247, Boston, MA, September 1999.
50. Martin Burtscher and Benjamin G. Zorn, "Exploring Last *n* Value Prediction", *1999 International Conference on Parallel Architectures and Compilation Techniques (PACT'99)*, pp. 66-76, Newport Beach, CA, October 1999.

51. Soraya Ghiasi, David Keaton, Matthew Seidl, and Benjamin Zorn, "A Reusable Framework for Web-basedTeleoperation", *Proceedings of SPIE Telemanipulator and Telepresence Technologies V*, vol. 3524, pp. 218-229, Boston, MA, November 1998.
52. Matthew L. Seidl and Benjamin G. Zorn, "Segregating Heap Objects by Reference Behavior and Lifetime," *Proceedings of the Eighth International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS-VIII)*, pp. 12-23, San Jose, CA, October 1998.
53. Chandra Krintz, Brad Calder, Han Bok Lee, and Benjamin G. Zorn, "Overlapping Execution with Transfer Using Non-Strict Execution for Mobile Programs," *Proceedings of the Eighth International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS-VIII)*, pp. 159-169, San Jose, CA, October 1998.
54. Dirk Grunwald, Donald Lindsay, and Benjamin Zorn, "Static Methods in Hybrid Branch Prediction", *1998 International Conference on Parallel Architectures and Compilation Techniques (PACT'98)*, pp. 222-229, Paris, France, October, 1998.
55. Wayne Citrin, Richard Hall, Carlos Santiago, and Benjamin Zorn, "Addressing the Scalability Problem in Visual Programming through Containment, Zooming and Fisheyeing", *Proceedings of the 1998 IEEE Aerospace Conference*, Snowmass, Colorado, March 1998.
56. Han Bok Lee and Benjamin Zorn, "BIT: A Tool for Instrumenting Java Bytecodes", *Proceedings of the USENIX Symposium on Internet Technologies and Systems (USITS97)*, pp.73-82, Monterey, CA, December 1997.
57. Michael Doherty, Matthew Greene, David Keaton, Christian Och, Matthew Seidl, William Waite, and Benjamin Zorn, "Programmable Ubiquitous Telerobotic Devices", *Proceedings of SPIE Telemanipulator and Telepresence Technologies IV* , vol. 3206, pp. 150-157, Pittsburgh, PA, October 1997.
58. Jonathan Cook and Artur Klauser and Alexander Wolf and Benjamin Zorn, "Semi-automatic, Self-adaptive Control of Garbage Collection Rates in Object Databases," *1996 ACM SIGMOD International Conference on the Management of Data, (SIGMOD'96)*, pp 377-388. Montreal, Canada, June 1996.
59. Wayne Citrin, Carlos Santiago, and Benjamin Zorn, "Scalable Interfaces to Support Program Comprehension," *4th IEEE Workshop on Program Comprehension (WPC-96)*, pp. 123-132, Berlin, Germany, March 1996.
60. Wayne Citrin, Richard Hall, and Benjamin Zorn, "Programming with Visual Expressions," *11th International IEEE Symposium on Visual Languages*, pp. 294-301. Darmstadt, Germany. September 1995.
61. Brad Calder, Dirk Grunwald, Donald Lindsay, James Martin, Michael Mozer, and Benjamin Zorn, "Corpus-based Static Branch Prediction," *ACM SIGPLAN'95 Conference on Programming Language Design and Implementation*, pp 79-92. La Jolla, CA. June 1995.
62. David Barrett and Benjamin Zorn, "Garbage Collection Using a Dynamic Threatening Boundary," *ACM SIGPLAN'95 Conference on Programming Language Design and Implementation*, pp 301-314. La Jolla, CA. June 1995.
63. Thomas Derby, Robert Schnabel, Benjamin Zorn, "EQ: Overview of a New Language Approach for Prototyping Scientific Computation," *Languages and Compilers for Parallel Computing*, pp. 391-405. K. Pingali, U. Banerjee, D. Gelernter, A. Nicolau, P. Padua, eds., Springer-Verlag, 1995.
64. Wayne Citrin, Michael Doherty, and Benjamin Zorn, "Formal Semantics of Control in a Completely Visual Programming Language," *IEEE Symposium on Visual Languages*, pp 208-215. St. Louis, MO. October 1994.
65. Jonathan E. Cook, Alexander L. Wolf, and Benjamin G. Zorn, "Partition Selection Policies in Object Database Garbage Collection," *1994 ACM SIGMOD International Conference on the Management of Data* (SIGMOD'94), pp 371-382. Minneapolis, MN. May 1994.
66. David Barrett and Benjamin Zorn, "Using Lifetime Predictors to Improve Memory Allocation Performance," *ACM SIGPLAN'93 Conference on Programming Language Design and Implementation* (PLDI'93), pp 187-196. Albuquerque, NM. June 1993.
67. Dirk Grunwald, Benjamin Zorn, and Robert Henderson, "Improving the Cache Locality of Memory Allocation," *ACM SIGPLAN'93 Conference on Programming Language Design and Implementation* (PLDI'93), pp 177-186. Albuquerque, NM. June 1993.
68. Benjamin Zorn, "Comparing Mark-and-sweep and Stop-and-copy Garbage Collection," *1990 ACM Conference on Lisp and Functional Programming*, pp. 87-98. June 1990.
69. Benjamin Zorn and Paul Hilfinger, "A Memory Allocation Profiler for C and Lisp Programs," *Proceedings of the Summer 1988 USENIX Conference* (USENIX'88), pp. 223-237. June 1988.
70. George Taylor, Paul Hilfinger, James Larus, David Patterson, and Benjamin Zorn, "Evaluation of the SPUR Lisp Architecture," *Proceedings of the Thirteenth International Symposium on Computer Architecture* (ISCA'86), pp. 444-452. June 1986.

Book Contributions

71. Wayne Citrin, Michael Doherty, Benjamin Zorn, "Chapter 4: The Design of a Completely Visual Object-Oriented Programming Language," *Visual Object-Oriented Programming: Concepts and Environments*, Margaret Burnett, Adele Goldberg, Ted Lewis, editors. Manning Publications, Greenwich, CT. 1995.

Workshop Publications

72. Johannes Helander and Benjamin Zorn, "Medina: Combining Evidence to Build Trust", Web 2.0 Security & Privacy 2007 (W2SP 2007), Oakland, CA, May 2007.
73. Rahul Nagpal, Karthik Pattabiraman, Darko Kirovski, and Benjamin Zorn, "ToleRace: Tolerating and Detecting Races", *Second Software Tools for Multi-Core Systems Workshop (STMCS'07)*, San Jose, CA, March 2007.
74. Martin Burtscher and Benjamin G. Zorn, "Profile-Supported Confidence Estimation for Load-Value-Prediction", *PACT98 Workshop on Profile and Feedback-Directed Compilation (PFDC98)*. Paris, France. October 1998.
75. Alexander L. Wolf and Benjamin G. Zorn, "The POSSE Project", *Proceedings of the 1998 NSF Information and Data Management Workshop*, pp. 261-264. Washington D.C., March 1998.
76. Thorna O. Humphries, Alexander L. Wolf, and Benjamin G. Zorn, "A Framework for Storage Management in Persistent Object Systems", *OOPSLA'97 Workshop on Memory Management and Garbage Collection*, Atlanta, GA, October 1997.
77. Han Bok Lee and Benjamin G. Zorn "Byte-code Instrumentation as an Aid in Understanding the Behavior of Java Persistent Stores," *OOPSLA'97 Workshop on Memory Management and Garbage Collection*, Atlanta, GA, October 1997.
78. Wayne Citrin, Michael Doherty, Benjamin Zorn, "The Design of a Completely Visual Object-Oriented Programming Language," *OOPSLA'93 Workshop on Visual Object-Oriented Programming*, pp. 19{35. Washington D.C. September 1993.
79. Dirk Grunwald, Gary J. Nutt, David Wagner, Anthony M. Sloane, and Benjamin Zorn, "A Test-bed for Studying Parallel Programs and Systems," *1993 International Workshop on Modeling, Analysis and Simulation of Computer and Telecommunication Systems (MASCOTS'93)*, pp. 95-106. La Jolla, San Diego. January 1993.
80. James Aragones and Benjamin Zorn, "Parallelizing an Expert System Application," *High Performance and Parallel Computing In Lisp: A EUROPAL Workshop*, pp 183-194. November 1990.
81. Benjamin Zorn, "Designing Systems for Evaluation: A Case Study of Garbage Collection," *Workshop on Garbage Collection in Object-Oriented Systems.* October 1990.

White Papers, Technical Reports and Other Publications

82. Benjamin Zorn, Tom Conte, Keith Marzullo, Suresh Venkatasubramania, "Evolving Methods for Evaluating and Disseminating Computing Research", CCC white paper, 2020, https://arxiv.org/abs/2007.01242.
83. Greg Morrisett, Shwetak Patel, Jennifer Rexford, Benjamin Zorn, "Evolving Academia/Industry Relations in Computing Research", arXiv preprint arXiv:1903.10375 (2019). https://arxiv.org/abs/1903.10375
84. Rishabh Singh, Benjamin Livshits, Benjamin Zorn, "Melford: Using Neural Networks to Find Errors in Spreadsheets", Microsoft Research Tech Report MSR-TR-2017-5, https://www.microsoft.com/en-us/research/publication/melford-using-neural-networks-find-spreadsheet-errors/
85. Fu, Kevin, Ann Drobnis, Greg Morrisett, Elizabeth Mynatt, Shwetak Patel, Radha Poovendran, and Ben Zorn. "Safety and Security for Intelligent Infrastructure." arXiv preprint arXiv:1705.02002 (2017).
86. Mynatt, Elizabeth, Jennifer Clark, Greg Hager, Dan Lopresti, Greg Morrisett, Klara Nahrstedt, George Pappas, Benjamin Zorn, et al. "A National Research Agenda for Intelligent Infrastructure." arXiv preprint arXiv:1705.01920 (2017).
87. Kevin Fu, Tadayoshi Kohno, Daniel Lopresti, Elizabeth Mynatt, Klara Nahrstedt, Shwetak Patel, Debra Richardson, Ben Zorn, "Safety, Security, and Privacy Threats Posed by Accelerating Trends in the Internet of Things", CCC white paper, 2017, http://cra.org/ccc/wp-content/uploads/sites/2/2017/02/Safety-Security-and-Privacy-Threats-in-IoT.pdf
88. Nahrstedt, Klara, Daniel Lopresti, Ben Zorn, Ann W. Drobnis, Beth Mynatt, Shwetak Patel, and Helen V. Wright. "Smart Communities Internet of Things." arXiv preprint arXiv:1604.02028 (2016).
89. Alur, Rajeev, Emery Berger, Ann W. Drobnis, Limor Fix, Kevin Fu, Gregory D. Hager, Daniel Lopresti, Benjamin Zorn, et al. "Systems computing challenges in the Internet of Things." arXiv preprint arXiv:1604.02980 (2016). https://arxiv.org/abs/1604.02980
90. Rajeev Alur, Emery Berger, Ann W. Drobnis, Limor Fix, Kevin Fu, Gregory D. Hager, Daniel Lopresti, Klara Nahrstedt, Elizabeth Mynatt, Shwetak Patel, Jennifer Rexford, John A. Stankovic, and Benjamin Zorn, "Systems Computing Challenges in the Internet of Things", a CCC white paper, September 2015.

91. Paruj Ratanaworabhan, Benjamin Livshits and Benjamin Zorn, "*Nozzle: A Defense Against Heap-spraying Code Injection Attacks*", Microsoft Research Technical Report MSR-TR-2008-176, November 2008 (submitted for publication).
92. Paruj Ratanaworabhan, Martin Burtscher, Darko Kirovski, Rahul Nagpal, Karthik Pattabiraman, and Benjamin Zorn, *Detecting and Tolerating Asymmetric Races*, ICES Tech Report Number 08-06. Institute for Computational Engineering & Sciences, University of Texas at Austin, April 2008.
93. Gene Novark, Emery D. Berger, Benjamin G. Zorn, "*Plug: Automatically Tolerating Memory Leaks in C and C++ Applications*", Department of Computer Science Tech Report 08-09, University of Massachusetts, April 2008 (submitted for publication).
94. Emery D. Berger and Benjamin G. Zorn, *DieHard: Efficient Probabilistic Memory Safety*, Department of Computer Science Tech Report 07-17, University of Massachusetts, April 2008 (submitted for publication, supersedes PLDI'06 paper).
95. D. Kirovski, B.G. Zorn, R. Nagpal, and K. Pattabiraman, *An Oracle for Tolerating and Detecting Asymmetric Races*, Microsoft Research Technical Report, MSR-TR-2007-122, October 2007.
96. Karthik Pattabiraman, Vinod Grover, and Benjamin G. Zorn, *Software Critical Memory - All Memory is Not Created Equal*, Microsoft Research, Tech Report MSR-TR-2006-128, September 2006.
97. Todd A. Proebsting and Benjamin G. Zorn, *Tangible Program Histories*, Microsoft Research, Tech. Report MSR-TR-2000-54, May 2000.
98. Todd A. Proebsting and Benjamin G. Zorn, *Programming Shorthands*, Microsoft Research, Tech. Report MSR-TR-2000-03, January 2000.
99. Martin Burtscher and Benjamin G. Zorn, *Profile-supported Confidence Estimation for Load Value Prediction*, Department of Computer Science, University of Colorado at Boulder, Tech. Report CU-CS-872-98, October 1998.
100. Martin Burtscher and Benjamin G. Zorn, *Load Value Prediction Using Prediction Outcome Histories*, Department of Computer Science, University of Colorado at Boulder, Tech. Report CU-CS-873-98, October 1998.
101. Thomas M. Derby and Benjamin G. Zorn, *A Type System for Languages with Dynamic Arrays*, Department of Computer Science, University of Colorado at Boulder, Tech. Report CU-CS-874-98, October 1998.
102. Brian F. Cooper, Han B. Lee, and Benjamin G. Zorn, *ProfBuilder: A Package for Rapidly Building Java Execution Profilers*, Department of Computer Science, University of Colorado at Boulder, Technical Report CU-CS-853-98, April 1998.
103. Dirk Grunwald, Donald Lindsay, and Benjamin Zorn, *Static Methods in Hybrid Branch Prediction*, Department of Computer Science, University of Colorado at Boulder, Technical Report CU-CS-831-97, February 1997.
104. Judith A. Stafford and Benjamin G. Zorn, *Choosing Program Collections for Performance Evaluation Experiments*, Department of Computer Science, University of Colorado at Boulder, Technical Report CU-CS-827-97, January 1997.
105. Matthew Seidl and Benjamin Zorn, *Predicting References to Dynamically Allocated Objects*, Department of Computer Science, University of Colorado at Boulder, Technical Report CU-CS-826-97, January 1997.
106. Benjamin G. Zorn and Akmal B. Chaudhri, "Object Database Behavior, Benchmarks, and Performance Workshop Addendum," *OOPSLA'95 Addendum to the Proceedings* OOPS Messenger 6(4): 159-163, October1995.
107. Wayne Citrin, Richard Hall, and Benjamin Zorn, *Addressing the Scalability Problem in Visual Programming*, Department of Computer Science, University of Colorado at Boulder, Technical Report CU-CS-768-95, April 1995.
108. Jonathan Cook, Alexander Wolf, and Benjamin Zorn, *The Design of a Simulation System for Persistent Object Storage Management*, Department of Computer Science, University of Colorado at Boulder, Technical Report CU-CS-647-93, March 1993.
109. Benjamin Zorn and Dirk Grunwald, "Empirical Measurements of Six Allocation-intensive C Programs," *SIGPLAN Notices*, 27(12):71{80, December 1992.
110. Benjamin Zorn, *The Effect of Garbage Collection on Cache Performance*, Department of Computer Science, University of Colorado at Boulder, Technical Report CU-CS-528-91, May 1991.
111. Dirk Grunwald, Gary Nutt, Anthony Sloane, David Wagner, William Waite, and Benjamin Zorn, *Execution Architecture Independent Program Tracing*, Department of Computer Science, University of Colorado at Boulder, Technical Report CU-CS-525-91, April 1991.
112. Dirk Grunwald, Gary Nutt, David Wagner, William Waite, and Benjamin Zorn, *A Test-bed for Improving the Performance of Parallel Programs and Systems*, Department of Computer Science, University of Colorado at Boulder, Technical Report CU-CS-512-91, February 1991.
113. Benjamin Zorn, *Barrier Methods for Garbage Collection*, Department of Computer Science, University of Colorado at Boulder, Technical Report CU-CS-494-90, November 1990.

114. Benjamin Zorn, *Comparative Performance Evaluation of Garbage Collection Algorithms*, Computer Science Division (EECS), U.C. Berkeley, Technical Report UCB/CSD 89/544 and PhD thesis, December 1989.

115. Benjamin Zorn and Tomoyuki Tanaka, "A Bibliography on Multiprocessor Lisp Systems and Applications," *Lisp Pointers*, 1(6):51{57. Spring 1988.

116. Benjamin Zorn, Paul Hilfinger, Kinson Ho, James Larus, and Luigi Semenzato, *Features for Multiprocessing in SPUR Lisp*, Computer Science Division (EECS), U.C. Berkeley, Technical Report UCB/CSD 88/406, March 1988.

117. Benjamin Zorn, Paul Hilfinger, Kinson Ho, and James Larus, *SPUR Lisp: Design and Implementation*, Computer Science Division (EECS), U.C. Berkeley, Technical Report UCB/CSD 87/373, September 1987.

118. Benjamin Zorn and James Larus, *An Intensive Introduction to Franz Lisp*, Franz Incorporated, Alameda, California, 1986.

119. Benjamin Zorn, *Experiences with Ada Code Generation*, Computer Science Division (EECS), U.C. Berkeley, Technical Report UCB/CSD 85/249, June 1985.

Research Grants

- Benjamin Zorn, principal investigator. NSF Award number CCR-9711398, "Improving the Locality of Reference in Heap-Allocation Intensive Programs," 9/1/1997-8/31/2000, **$185,113**.
- Dirk Grunwald and Benjamin Zorn, principal investigators. Digital Equipment Corporation External Research Grant No. 2051 (amendment/extension), "Improving the Performance of Commercial C++ Programs," 9/16/1996-9/15/1997, **$140,137**.
- Dirk Grunwald, James Martin, William Waite, and Benjamin Zorn, principal investigators, Hewlett Packard University Grants Program, "Predicting Program Behavior to Support Instruction Level Parallelism," HP Gift No. 31041.1, 6/1/1996-5/31/1997, **$179,779.70**.
- Dirk Grunwald, James Martin, William Waite, and Benjamin Zorn, principal investigators, Tom Christian (Hewlett-Packard Laboratories), collaborating scientist. Colorado Advanced Software Institute award, "Predicting Program Behavior to Support Instruction Level Parallelism," 7/1/96-8/31/98, **$120,000**.
- Alexander L. Wolf and Benjamin G. Zorn, principal investigators. NSF Award number IRI-9521046, "Design and Evaluation of Algorithms for Storage Reclamation in Object Databases," 9/1/95-8/31/98, **$344,445**.
- Dirk Grunwald, Oliver McBryan, Robert Schnabel, and Michael Schwartz, principle investigators; Richard Byrd, Roger King, Xiao-Chuan Cai, and Benjamin Zorn, contributing investigators. NSF Award number CDA-9502956, "High Performance Infrastructure for Computational Science," 8/1/95-7/31/2000, **$1,500,000**.
- Dirk Grunwald and Benjamin Zorn, principal investigators. Hewlett Packard Research Grants Program ILP Research Project, "Improving the Performance of Branch Prediction using Real and Estimated Profiles" 3/1/1995-2/29/1996, **$71,265**.
- Dirk Grunwald and Benjamin Zorn, principal investigators. Digital Equipment Corporation External Research Grant No. 2051, "Improving the Performance of Commercial C++ Programs," 12/1/1994-11/30/1996, **$283,466**.
- Wayne Citrin and Benjamin Zorn, principal investigators. CASI Award, "A Completely Visual Language for Object-oriented Programming," 7/1/94-6/30/96, **$50,014**.
- Benjamin Zorn, principal investigator. NSF Award number CCR-9404669, "Improving the Performance of Dynamic Storage Allocation Using Behavior Prediction," 9/1/94-8/31/97, **$190,152**.
- Benjamin Zorn, principal investigator. Digital Equipment Corporation External Research Grant No. 1580, "Measuring Conservative Garbage Collection Performance in Commercial Programs," 8/12/92-8/12/93, **$58,028**.
- Benjamin Zorn, principal investigator. NSF Award number CCR-9121269, "Evaluating Algorithms for Conservative Generation Garbage Collection," 3/15/92-8/31/93, **$46,930**.

Students Supervised

- Member of committee, **Emery Berger**, "Memory Management for High-Performance Applications", PhD thesis, Kathryn S. McKinley, advisor, University of Texas at Austin, August 2002.
- Advisor, **Martin Burtscher**, "Improving Context-Based Load Value Prediction", PhD Thesis, University of Colorado at Boulder, May 2000.
- Co-advisor (with Alexander L. Wolf), **Thorna Humphries**, "Trace Generation and Management for Persistent Object System Performance Evaluation", PhD Thesis, University of Colorado at Boulder, June 2000.
- Advisor, **Matthew Seidl**, "Improving the Reference Locality of Dynamically Allocated Objects", PhD Thesis, University of Colorado at Boulder, June 2000.

- Advisor, **Soraya Ghiasi**, “A Reusable Framework for Web-Based Teleoperation of Robotic Devices", M.S. Thesis, University of Colorado at Boulder, December 1999.
- Co-advisor (with Bobby Schnabel), **Thomas Derby**, “A Study of Language Ideas for Prototyping Numerical Computations", PhD Thesis, University of Colorado at Boulder, December 1998.
- Co-advisor (with Dirk Grunwald), **Donald Lindsay**, “Static Methods in Branch Prediction", PhD Thesis, University of Colorado at Boulder, July 1998.
- Advisor, **Reinhard Stolle**, “Declarative Meta Control for Generalized Horn Clause Logic”, M.S. Thesis, University of Colorado at Boulder, April 1998.
- Advisor, **Heather Bryant**, “A Visualization Design for Linked Data Structures Comprising an Object-Oriented Database System”, M.S. Thesis, University of Colorado at Boulder, April 1998.
- Advisor**, Han Bok Lee**, “BIT: Bytecode Instrumentation Tool", M.S. Thesis, University of Colorado at Boulder, July 1997.
- Advisor, **David Barrett**, “Improving the Performance of Conservative Generational Garbage Collection," PhD Thesis, University of Colorado at Boulder, August 1995.
- Advisor, **Judith Stafford**, “Program Behavior Analysis Tools” M.S. Thesis, University of Colorado at Boulder, April 1995.
- Advisor, **Samuel Siewert**, “A Common Core Language Design for Layered Language Extension,” M.S. Thesis, University of Colorado at Boulder, November 1993.
- Advisor, **Stephen Sullivan**, “Numerical Analysis Using Non-Procedural Paradigms,” M.S. Thesis, University of Colorado at Boulder, November 1993.
- Advisor, **Thomas Schorsch**, “Increasing the Readability and Comprehensibility of Programs,” M.S. Thesis, University of Colorado at Boulder, November 1990.