Craig Chambers

Research Interests

Programming language design and implementation, object-oriented systems, programming environments

Academic History

1992: Ph.D., Computer Science, Stanford University
1986: S.B., Computer Science, MIT

Recent Professional Experience

9/97 to present: Associate Professor, Department of Computer Science and Engineering, University of Washington
8/99 to 3/00: Visiting Faculty, School of Computer Science, Carnegie Mellon University
4/99 to 7/99: Visiting Scholar, IBM T.J. Watson Research Center
8/91 to 8/97: Assistant Professor, Department of Computer Science and Engineering, University of Washington

Selected Recent Publications

Craig Chambers, William Harrison, and John Vlissides. Language-Tools-Patterns ⇔ Rock-Scissors-Paper, or Does One Dominate? In *Proceedings of the 27th ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL '00)*, Boston, MA, January 2000.

Craig Chambers and Weimin Chen. Efficient Multiple and Predicate Dispatching. In *Proceedings of the 1999 ACM Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA '99)*, Denver, CO, November 1999. Also available as Efficient Predicate Dispatching, technical report UW-CSE-98-12-02, Department of Computer Science and Engineering, University of Washington, December 1998.

Jonathan Aldrich, Craig Chambers, Emin Gün Sirer, and Susan Eggers. Eliminating Unnecessary Synchronization from Java Programs. In *Proceedings of the 1999 International Symposium on Static Analysis (SAS '99)*, Venice, Italy, September 1999. Also appeared as a poster presentation at the *1999 ACM Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA '99)*, Denver, CO, November 1999.

Todd Millstein and Craig Chambers. Modular Statically Typed Multimethods. Accepted to *Journal of Information and Computation*. Earlier versions appeared in *Proceedings of the European Conference on Object-Oriented Programming (ECOOP '99)*, Lisbon, Portugal, June 1999, and in *Proceedings of the Sixth International Workshop on Foundations of Object-Oriented Languages (FOOL '99)*, San Antonio, TX, January 1999.

Brian Grant, Matthai Philipose, Markus Mock, Craig Chambers, and Susan Eggers. An Evaluation of Staged Run-Time Optimizations in DyC. In *Proceedings of the 1999 SIGPLAN Conference on Programming Language Design and Implementation (PLDI '99)*, Atlanta, GA, May 1999.

Michael Ernst, Craig Kaplan, and Craig Chambers. Predicate Dispatching: A Unified Theory of Dispatch. In *Proceedings of the European Conference on Object-Oriented Programming (ECOOP '98)*, Brussels, Belgium, July 1998.

Brian Grant, Markus Mock, Matthai Philipose, Craig Chambers, and Susan Eggers. DyC: An Expressive Annotation-Directed Dynamic Compiler for C. Accepted to *Journal of Theoretical Computer Science*. Also available as technical report UW-CSE-97-03-03, Department of Computer Science and Engineering, University of Washington, January 1998.

Greg DeFouw, David Grove, and Craig Chambers. Fast Interprocedural Class Analysis. In *Proceedings of the 25th ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL '98)*, San Diego, CA, January 1998.

David Grove, Greg DeFouw, Jeffrey Dean, and Craig Chambers. Call Graph Construction in Object-Oriented Languages. In *Proceedings of the 1997 ACM Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA '97)*, Atlanta, GA, October 1997.

Brian Grant, Markus Mock, Matthai Philipose, Craig Chambers, and Susan Eggers. Annotation-Directed Run-Time Specialization in C. In *Proceedings of the ACM SIGPLAN Symposium on Partial Evaluation and Semantics-Based Program Manipulation (PEPM'97)*, Amsterdam, the Netherlands, June 1997.

Jeffrey Dean, Greg DeFouw, David Grove, Vassily Litvinov, and Craig Chambers. Vortex: An Optimizing Compiler for Object-Oriented Languages. In *Proceedings of the 1996 ACM Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA '96)*, San Jose, CA, October 1996.

Joel Auslander, Matthai Philipose, Craig Chambers, Susan J. Eggers, and Brian N. Bershad. Fast, Effective Dynamic Compilation. In *Proceedings of the 1996 SIGPLAN Conference on Programming Language Design and Implementation (PLDI '96)*, Philadelphia, PA, May 1996.

Brian N. Bershad, Stefan Savage, Przemyslaw Pardyak, Emin Gün Sirer, Marc E. Fiuczynski, David Becker, Craig Chambers, and Susan Eggers. Extensibility, Safety and Performance in the *SPIN* Operating System. In *Proceedings of the Fifteenth Symposium on Operating Systems Principles (SOSP '95)*, December 1995.

Craig Chambers and Gary T. Leavens. Typechecking and Modules for Multi-Methods. In *ACM Transactions on Programming Languages and Systems (TOPLAS)*, Vol. 17, No. 6, November 1995. An earlier version appeared in *Proceedings of the 1994 ACM Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA '94)*, Portland, OR, October 1994. Also available as a video-lecture from University Video Communications.

David Grove, Jeffrey Dean, Charles Garrett, and Craig Chambers. Profile-Guided Receiver Class Prediction. In *Proceedings of the 1995 ACM Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA '95)*, Austin, TX, October 1995.

Jeffrey Dean, David Grove, and Craig Chambers. Optimization of Object-Oriented Programs Using Static Class Hierarchy Analysis. In *Proceedings of the European Conference on Object-Oriented Programming (ECOOP '95)*, Århus, Denmark, August 1995.

Jeffrey Dean, Craig Chambers, and David Grove. Selective Specialization in Object-Oriented Languages. In *Proceedings of the 1995 SIGPLAN Conference on Programming Language Design and Implementation (PLDI '95)*, La Jolla, CA, June 1995. An earlier version of this work appeared in *Proceedings of the ACM SIGPLAN Workshop on Partial Evaluation and Semantics-Based Program Manipulation (PEPM '94)*, Orlando, FL, June 1994.

Craig Chambers, Jeffrey Dean, and David Grove. A Framework for Selective Recompilation in the Presence of Complex Intermodule Dependencies. In *Proceedings of the 17th International Conference on Software Engineering (ICSE '95)*, pp. 221-230, Seattle, WA, April 1995.

Jeffrey Dean and Craig Chambers. Towards Better Inlining Decisions Using Inlining Trials. In *Proceedings of the ACM Symposium on Lisp and Functional Programming Languages (LFP '94)*, Orlando, FL, June 1994.

Craig Chambers. Predicate Classes. In *Proceedings of the European Conference on Object-Oriented Programming (ECOOP '93)*, Kaiserslautern, Germany, July 1993.

Craig Chambers. The Cecil Language: Specification and Rationale. Technical report UW-CSE-93-03-05, Department of Computer Science and Engineering, University of Washington, March 1993. Revised December 1995 and March 1997.

Craig Chambers. Object-Oriented Multi-Methods in Cecil. In *Proceedings of the European Conference on Object-Oriented Programming (ECOOP '92)*, Utrecht, the Netherlands, July 1992.

Urs Hölzle, Craig Chambers, and David Ungar. Debugging Optimized Code with Dynamic Deoptimization. In *Proceedings of the 1992 SIGPLAN Conference on Programming Language Design and Implementation (PLDI '92)*, San Francisco, CA, June 1992.

Craig Chambers and David Ungar. Making Pure Object-Oriented Languages Practical. In *Proceedings of the 1991 ACM Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA '91)*, Phoenix, AZ, October 1991.

Urs Hölzle, Craig Chambers, and David Ungar. Optimizing Dynamically-Typed Object-Oriented Programming Languages with Polymorphic Inline Caches. In *Proceedings of the 1991 European Conference on Object-Oriented Programming (ECOOP '91)*, Geneva, Switzerland, July 1991.

Craig Chambers and David Ungar. Iterative Type Analysis and Extended Message Splitting: Optimizing Dynamically-Typed Object-Oriented Programs. In *Proceedings of the 1990 SIGPLAN Conference on Programming Language Design and Implementation (PLDI '90)*, White Plains, NY, June 1990. Revised version in *Journal of Lisp and Symbolic Computation 4(3)*, Kluwer Academic Publishers, June 1991.

Craig Chambers, David Ungar, and Elgin Lee. An Efficient Implementation of Self, a Dynamically-Typed Object-Oriented Language Based on Prototypes. In *Proceedings of the 1989 ACM Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA '89)*, New Orleans, LA, October 1989. Revised version in *Journal of Lisp and Symbolic Computation 4(3)*, Kluwer Academic Publishers, June 1991.

Craig Chambers and David Ungar. Customization: Optimizing Compiler Technology for Self, a Dynamically-Typed Object-Oriented Programming Language. In *Proceedings of the 1989 SIGPLAN Conference on Programming Language Design and Implementation (PLDI '89)*, Portland, OR, June 1989.

Selected Recent Talks

"Whirlwind: A Staged Compilation Infrastructure"

- 12/99 Sun Microsystems Laboratories, Burlington, MA
- 12/99 Department of Computer Science, Rutgers, the State University of New Jersey
- 5/99 Invited talk, *Java Server Performance Workshop*, IBM T.J. Watson Research Center, Hawthorne, NY
- 4/99 IBM T.J. Watson Research Center, Hawthorne, NY

"Modular, Statically Typed Multimethods in Dubious"

- 9/99 Principles of Programming Languages Seminar, School of Computer Science, CMU
- 5/99 Invited talk, *Workshop on Static Analysis and Types*, Padova, Italy

"Intermediate Representations and Optimizations for Object-Oriented Languages"

- 3/98 Invited talk, *Second International Workshop on Types in Compilation (TiC '98)*, Kyoto, Japan

"Towards Diesel, a Next-Generation Object-Oriented Language after Cecil"

- 1/98 Invited talk, *Fifth International Workshop on Foundations of Object-Oriented Languages (FOOL '98)*, San Diego, CA

"Synergistic Language Design and Implementation Research"

- 10/95 Department of Computer Science and Engineering, University of Washington
- 2/96 Programming Systems Seminar, School of Computer Science, CMU
- 3/96 Department of Computer Science, University of Tokyo
- 3/96 IBM Tokyo Research Laboratory
- 4/96 Computer Science Division, University of California at Berkeley
- 4/96 Department of Computer Sciences, University of Wisconsin
- 5/96 Computer Science Department, Stanford University
- 7/96 DEC Systems Research Center, Palo Alto, CA

"Optimizing Compiler Techniques for Dynamically-Typed Object-Oriented Programming Languages, or Making Pure Object-Oriented Languages Popular Through Good Performance"

- 2/91 Department of Computer Science and Engineering, University of Washington
- 3/91 Laboratory for Computer Science, MIT
- 3/91 Department of Computer and Information Sciences, University of Massachusetts at Amherst
- 3/91 DEC Systems Research Center, Palo Alto, CA
- 3/91 Advanced Technology Group, Apple Computer, Cupertino, CA
- 3/91 IBM T.J. Watson Research Center, Hawthorne, NY
- 3/91 AT&T Bell Laboratories, Murray Hill, NJ
- 6/91 Computer Systems Laboratory, Stanford University

Panels

- 1/00 ACM SIGPLAN Workshop on Dynamic and Adaptive Compilation and Optimization (Dynamo '00)
- 1/00 Seventh International Workshop on Foundations of Object-Oriented Languages (FOOL '00)

Selected Recent Program Committee Activities

General chair, *International Symposium on Memory Management (ISMM '00)*

Program committee, *International Conference on Functional Programming (ICFP '00)*

Program committee, *Seventh International Workshop on Foundations of Object-Oriented Languages (FOOL '00)*

Program committee, *1999 ACM Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA '99)*

Program committee, *International Symposium on Static Analysis (SAS '99)*

Chair, program committee, *1998 ACM Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA '98)*

Program committee, *1998 European Conference on Object-Oriented Programming (ECOOP '98)*

Organizing and program committee, *Second International Workshop on Types in Compilation (TiC '98)*

Program committee, *1997 ACM Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA '97)*

Program committee, *Seventh International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS '96)*

Program committee, *2nd International Symposium on Object Technologies for Advanced Software (ISOTAS '96)*

Program committee, *1995 ACM Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA '95)*

Program committee, *1995 ACM SIGPLAN Symposium on Partial Evaluation and Semantics-Based Program Manipulation (PEPM '95)*

Program committee, *1994 ACM Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA '94)*

Program committee, *1994 SIGPLAN Conference on Programming Language Design and Implementation (PLDI '94)*

Selected Recent Grants and Gifts

1999:	National Science Foundation grant, with Susan Eggers, $500,000
1999:	National Science Foundation grant, $199,972
1999:	IBM Research Award, $40,000 plus equipment
1998:	Sun Microsystems Academic Equipment Grant, $31,000 plus $30,580 of equipment
1997:	IBM Faculty Development Award, $40,000
1997:	Object Technology International, $22,000
1994-6:	Xerox PARC, $30,000
1997:	Sun Microsystems Academic Equipment Grant, $74,925 of equipment
1996:	IBM Faculty Development Award, $39,329 plus approximately $25,000 of equipment
1996:	IBM Centre for Advanced Studies, $25,000
1995:	National Science Foundation grant, $148,906
1995:	Office of Naval Research contract, with Susan Eggers, $380,664
1995:	IBM Centre for Advanced Studies, $25,000
1994:	National Science Foundation Young Investigator Award, $337,500
1994:	Office of Naval Research contract, with Brian Bershad and Susan Eggers, $3,096,620
1993:	Sun Microsystems Academic Equipment Grant, $62,880 of equipment
1992:	Sun Microsystems Laboratories, $25,000
1992:	National Science Foundation Research Initiation Award, $90,000

Courses Taught

UW CSE 143:	Computer Programming II (undergraduate)
UW CSE 341:	Programming Languages (undergraduate)
UW CSE 401:	Compilers (undergraduate)
UW CSE 501:	Compilers (graduate)
UW CSE 505:	Programming Languages (graduate)
UW CSE 583:	Programming Languages (graduate, professional masters program)
UW CSE 590:	Seminars in Object-Oriented Systems, in Denotational Semantics, in Compilers, in Programming Language Design, and in Parallel Programming Languages (all graduate)

Graduate Students Graduated

David Grove, Ph.D., October 1998

Jeffrey Dean, Ph.D., December 1996

Charles Garrett, Master's, March 1994

Jean Kaiser, Master's, June 1993

Stuart Williams, Master's, March 1993

Claudia Chiang, Master's, March 1993

Postdoctoral Students Supervised

Weimin Chen, 1998

Wilson Hsieh, 1995-1997