

# Curriculum Vitæ— Kathleen Fisher

Principal Member of Technical Staff

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## RESEARCH INTERESTS

**Programming languages**, with emphasis on the design and analysis of languages and tools that support programming at large scale in two different dimensions: programs that manipulate massive data sets and programs that are themselves very large.

## PERSONAL

Born April 14, 1969. Citizen of the United States.

## EDUCATION

**Ph.D.** Computer Science, **Stanford University**, September 1996.

**Dissertation:** Type Systems for Object-Oriented Languages

**Advisor:** Professor John C. Mitchell

**B.Sc.** Math & Computational Science with Distinction, **Stanford University**, June 1991.

## RESEARCH EXPERIENCE

**Pads, AT&T Labs** (2002 – present)

Design and implementation of the PADS system for managing *ad hoc* data formats, including a data description language for declaratively specifying the physical layout and semantic constraints of such data. From such a description, the PADS system generates a broad collection of tools for manipulating the data, including parsers, pretty-printers, statistical analyses, and query-language support. Joint work with Robert Gruber, Mary Fernandez, David Walker, Yitzhak Mandelbaum, Mark Daly, Artem Gleyzer, Kenny Zhu, David Burke, Peter White, and Michael Greenberg.

**Moby, AT&T Labs** (1997 – present)

Design and implementation of a ML-like language with support for class-based object-oriented features and CML-style concurrency. Work includes developing a formal semantics and building a prototype implementation. Joint work with John Reppy.

**Hancock, AT&T Labs** (1997 – 2004)

Design and implementation of a C-based domain-specific programming language to support programming with massive transactional data. Joint work with Anne Rogers.

**Concurrent Object-Oriented Calculus, Stanford University** (1995 – 1997)

Development of a model object-oriented language with concurrency primitives. Joint work with Paolo DiBlasio.

**Type Systems for Object-Oriented Languages, Stanford University** (1991 – 1996)

Thesis work investigating the design of flexible type systems for object-oriented languages.  
Joint work with John Mitchell.

**TEACHING EXPERIENCE**

**Guest Lecturer, Stanford University** (Fall 2008)

Gave six lectures in cs242, *Programming Languages*, Stanford's required masters' level course on programming language fundamentals. Topics included an introduction to functional programming, type inference, type classes, the IO Monad in Haskell, monads, and software transactional memory.

**Master's Student Advisor, Stanford University** (Winter 2006 – Spring 2007)

Supervised Pascal Perez's Master's degree with a specialization in research. Pascal developed an efficient type inferencing algorithm for a higher-order functional language extended with positive subtyping.

**Guest Lecturer, Stanford University** (Fall 2005)

Gave five lectures in cs242, *Programming Languages*, Stanford's required masters' level course on programming language fundamentals. Topics included scripting languages, domain-specific languages, object-oriented languages, and support for interoperability.

**Teaching Fellow, Stanford University** (Fall 1995)

Sole instructor for cs242, *Programming Languages*, Stanford's required masters' level course on programming language fundamentals. Approximate enrollment of 120, including 20 industry professionals taking the course through the Stanford Instructional Television Network.

**Teaching Assistant, Stanford University** (1993 – 1994)

Courses: *Automata and Complexity Theory*, *Programming Languages*.  
Responsibilities included course design, section leading, weekly office hours, and grading.

**Teaching Fellow, Stanford University** (Summer 1990)

Co-instructor for accelerated introductory programming course, cs106x.

**Section Coordinator, Stanford University** (1990 – 1991)

Prepared and taught seminar on teaching sections for introductory programming courses.

**Section Leader, Stanford University** (1989 – 1990)

Prepared and taught a weekly section for beginning programming courses.

**PROFESSIONAL ACTIVITIES**

**CRA Board:** Elected to a three-year term, June 2009 - June 2012.

**ACM SIG Governing Board, Vice Chair for SIG Development:** Elected to a two-year term, June 2008 - June 2010.

**SIGPLAN, Past Chair:** Serving three-year term, June 2009 - June 2012.

**SIGPLAN, Chair:** Elected to a two-year term, June 2007 - June 2009.

**CRA-W Board:** October 2003 – present. Chair (October 2008 - 2010). Elected to CRA-W Steering Committee, June 2006.

**Consulting Faculty, Computer Science Department, Stanford University:** July 2008 - present.

**Journal of Functional Programming:** Editor: June 2005 - present. Editorial Board

Member: April 2004 – June 2005.

**SIGPLAN, Vice Chair:** Elected to a two year term, June 2003 - June 2005. Re-elected to a second two year term, June 2005 - June 2007.

**Chair, FCRC'03 Educator's Grant Program:** Chaired committee to provide travel grants for 100 educators at institutions with high percentages of women and minorities.

**SIGPLAN, Member-at-large:** Elected to a two year term, June 2001 - June 2003.

**NSF Panels:** 2002, 2003, 2004, 2006, 2007, and 2009.

**Steering Committees:** FOOL/WOOD 2001 – present (chair, 2006-2007), ICFP 2003 – present, POPL 2003 – present, PLDI 2003 – present, OOPSLA 2003 – present, CUFP 2007 – present (chair 2008-2010).

**Program Committees:** PLDI '10 (extended review committee), CUFP '09, ICFP '08, ECOOP '08, CUFP '07, (program co-chair), PLDI '07, HOPL '07, CUFP '06 (program co-chair), OOPSLA '05, FOAL '05, ICFP '04 (program chair), FOAL '04, WOOD '03, PADL '02, POPL '02, PLDI '01, FOOL '01 (program chair), FMOODS '00, ICFP '99, MFPS '99, OOPSLA '98, FOOL '98, and OOPSLA '97.

**Refereeing:** CONCUR, ECOOP, FPCA, ICFP, LICS, OOPSLA, POPL, PLDI, *Journal of the ACM*, *ACM Transactions on Programming Languages and Systems*, *ACM Computing Surveys*, *Information and Software Technology*, *Journal of Functional Programming*, *Information and Computation*, *Lisp and Symbolic Computation*, *IEEE Transactions on Software Engineering*, *IEEE Transactions on Programming Languages and Systems*, *Theory and Practice of Object Systems*.

**Seminar coordination:**

- New Jersey Programming Languages and Systems Seminar, 2001 – 2005.
- Stanford Theory Distinguished Speaker Colloquium, 1995 – 1996.

**Other activities:**

- Member of Working Group 2.8, 2004 – present.
- Member of the Grace Hopper Industrial Affiliates Advisory Committee, 2006.
- Speaker, CRA-W graduate cohort program, 2004, 2005, 2006, and 2007.
- Speaker, CRA-W mentoring workshop, 2002, 2004, and 2007.
- Member of Association for Computing Machinery (ACM).
- Faculty search committee member, Stanford University, 1995.
- Ph.D. admissions committee member, Stanford University, 1994.

## LECTURES

**Invited Talks:**

- DoD Computer Network Defense Research and Technology Workshop 2009
- High Confidence Software Systems 2009
- Grace Hopper 2008, Invited Technical Talk
- High Confidence Software Systems 2008
- TLDI 2007
- Summer School on Software Reliability
- Kansas State University's Distinguished Lecture Series
- Pomona College Computer Science Colloquium
- Summer School on Reliable Computing

- High Confidence Software and Systems Conference
- Williams College Computer Science Colloquium
- Foundations of Object-Oriented Languages 3

#### **Seminars:**

- University of Central Florida
- Stanford University
- University of Washington
- Microsoft
- Harvard
- University of California at San Diego
- University of Arizona
- Intertrust
- IBM T.J. Watson
- MIT
- Carnegie Mellon University
- Princeton University
- New Jersey Programming Languages Seminar
- University of Pennsylvania
- University of California, Berkeley
- Cornell University
- AT&T Bell Labs
- Purdue University
- Loyola University of Chicago
- Iowa State University

#### **AWARDS AND HONORS**

- ACM Distinguished Scientist, 2007.
- NSF Mathematical Sciences Postdoctoral Research Fellowship, 1996, declined.
- The University of California President's Postdoctoral Fellowship, 1996, declined.
- The Student Service Award, Stanford Computer Science Department, 1995
- Hertz Foundation Fellowship, 1994 – 1996
- Finch Fellowship, 1993
- NSF Graduate Research Fellowship, 1991 – 1994
- Phi Beta Kappa, 1991
- National Merit Scholar, 1987

#### **INDUSTRY EXPERIENCE**

##### **Macintosh Programmer, Apple Computer** (April 1991 – September 1991)

Designed and implemented the word processor for Merlin, Apple's internal human resources system. Features include: rich text, spell-checker, and translators for importing foreign documents. Designed Merlin's security system.

#### **PAPERS AND PUBLICATIONS**

##### **REFEREED JOURNALS**

- [1] "The Next 700 Data Description Languages," Fisher, K., Y. Mandelbaum, and D. Walker.

*Journal of the ACM*. To appear.

- [2] “Hancock: A language for analyzing transactional data streams,” Cortes, C. , K. Fisher, D. Pregibon, A. Rogers, and F. Smith. *ACM Transactions on Programming Languages and Systems* 26, 2 (March 2004), 263–300.
- [3] “Inheritance-based subtyping,” Fisher, K. and J. Reppy. *Information and Computation* 177, 1 (August 2002), 28–55. (Full version of [19].)
- [4] “A control-flow analysis for a calculus of concurrent objects,” P. di Blasio, K. Fisher, and C. Talcott. *IEEE Transactions on Software Engineering*, 26(7), July 2000. (Full version of [24].)
- [5] “On the relationship between classes, objects, and data abstraction,” K. Fisher and J.C. Mitchell. *Theory and Practice of Object Systems*, 4(1):3–25, 1998. Special Issue on Third Workshop on Foundations of Object-Oriented Languages (FOOL 3). Preliminary version appeared in Marktoberdorf ’97 proceedings.
- [6] “A Lambda Calculus of Objects and Method Specialization,” K. Fisher, F. Honsell, and J. C. Mitchell. *Nordic Journal of Computing*, 1, 1994, pages 3–37. (Full version of [28].)
- [7] “The Development of Type Systems for Object-Oriented Languages,” K. Fisher and J.C. Mitchell. *Theory and Practice of Object Systems, Special Issue on Types*, 1(3):189–220, 1995. (An updated version of [27]).

#### **CONFERENCE PUBLICATIONS**

- [8] “Language Support for Processing Distributed Ad Hoc Data.” K. Zhu, D. Dantas, K. Fisher, L. Jia, Y. Mandelbaum, V. Pai, and D. Walker In *ACM SIGPLAN Symposium on Principles and Practice of Declarative Programming*, 2009.
- [9] “Ad Hoc Data and the Token Ambiguity Problem.” Q. Xi, K. Fisher, D. Walker, and K.Q. Zhu. In *Practical Applications of Declarative Languages*, 2009.
- [10] “From Dirt to Shovels: Fully Automatic Tool Generation from Ad Hoc Data.” K. Fisher, D. Walker, K.Q. Zhu, and P. White. In *SIGPLAN-SIGACT Symp. on Principles of Programming Languages*, 2008.
- [11] “A Generic Programming Toolkit for PADS/ML: First-Class Upgrades for Third-Party Developers.” M. Fernandez, K. Fisher, N. Foster, M. Greenberg, and Y. Mandelbaum. In *Practical Applications of Declarative Languages*, 2008.
- [12] “A Dual Semantics for the Data Description Calculus.” K. Fisher, Y. Mandelbaum, and D. Walker. In *Draft Proceedings of Trends in Functional Programming*, 2007.
- [13] “PADS/ML: A Functional Data Description Language.” Y. Mandelbaum, K. Fisher, D. Walker, M. Fernandez, and A. Gleyzer. In *SIGPLAN-SIGACT Symp. on Principles of Programming Languages*, pages 77-83, 2007.
- [14] “PADS: An End-to-end System for Processing Ad Hoc Data.” M. Daly, M. Fernandez, K. Fisher, Y. Mandelbaum, and D. Walker. In *ACM SigMOD Demonstration Program*, 2006.
- [15] “The Next 700 Data Description Languages.” K. Fisher, Y. Mandelbaum, and D. Walker. In *SIGPLAN-SIGACT Symp. on Principles of Programming Languages*, pages 2-15, 2006.

- [16] “An Expressive Language of Signatures.” N. Ramsey, K. Fisher, and P. Govereau. In *International Conf. on Functional Programming*, pages 27–40, 2005.
- [17] “PADS: A Language for Processing Ad Hoc Data.” K. Fisher and R. Gruber. In *SIGPLAN '05 Conf. on Programming Language Design and Implementation*, pages 295–304, 2005.
- [18] “Hancock: A Language for Extracting Signatures from Data Streams.” C. Cortes, K. Fisher, D. Pregibon, A. Rogers, and F. Smith. In *Proceedings of the Sixth International Conference on Knowledge Discovery and Data Mining*, pages 9–17, 2000. Won KDD'00 Best Research Paper award.
- [19] “Extending Moby with inheritance-based subtyping.” K. Fisher and J. Reppy. In *ECOOP 2000— Object-Oriented Programming*, pages 83–107, 2000. A preliminary version appeared in FOOL 7. An extended version of [3].
- [20] “A calculus for compiling and linking classes.” K. Fisher, J. Reppy, and J.G. Riecke. In *Proc. of the European Symposium on Programming*, pages 135–149, 2000.
- [21] “Hancock: A language for processing very large-scale data.” D. Bonachea, K. Fisher, A. Rogers, and F. Smith. In *USENIX 2nd Conference on Domain-Specific Languages*, pages 163–176, October 1999.
- [22] “The design of a class mechanism for MOBY.” K. Fisher and J. Reppy. In *SIGPLAN '99 Conf. on Programming Language Design and Implementation*, pages 37–49, 1999.
- [23] “An imperative, first-order calculus with object extension,” V. Bono and K. Fisher. In *Proc. 12th European Conference on Object-Oriented Programming*, pages 462–497, July 1998. Extended version of [36]
- [24] “A control-flow analysis for a calculus of concurrent objects,” P. di Blasio, K. Fisher, and C. Talcott. In H. Bowman and J. Derrick, editors, *Formal Methods for Open Object-based Distributed Systems, Volume 2*, pages 73–88. Chapman & Hall, 1997.
- [25] “A Concurrent Object Calculus,” P. DiBlasio and K. Fisher. In *CONCUR '96 Proc.*, Springer LNCS 1119, pages 655–670, Pisa, 1996.
- [26] “A Delegation-Based Object Calculus with Subtyping,” K. Fisher, and J. C. Mitchell. *Proceedings of the 10th International Conference on Fundamentals of Computation Theory (FCT)* Springer LNCS 965, August 1995, pages 42–61.
- [27] “Notes on Typed Object-Oriented Programming,” K. Fisher and J. C. Mitchell. *Proceedings of Theoretical Aspects of Computer Software*, Springer LNCS 789, April 1994, pages 844–885.
- [28] “A Lambda Calculus of Objects and Method Specialization,” J. C. Mitchell, F. Honsell, and K. Fisher. *Proceedings of the 8th IEEE Symposium on Logic in Computer Science (LICS)*, Montreal, Canada, June 1993, pages 352–378.

## **OTHERS**

- [29] “Incremental Learning of System Log Formats.” K.Zhu, K. Fisher, and D. Walker. In *Workshop on Analysis of System Logs*, October 2009.
- [30] “Towards 1-click Tool Generation with PADS.” D. Burke, K. Fisher, D. Walker, P. White, and K.Zhu. In *Challenges and Applications of Grammar Induction Workshop*, June 2007.

- [31] “PADX: Querying Large-scale Ad Hoc Data with XQuery.” M. Fernandez, K. Fisher, R. Gruber, Y. Mandelbaum. In *Proc. PLAN-X Workshop*, January 2005.
- [32] “A Typed Calculus for Traits.” K. Fisher and J. Reppy. In *Proc. 11th Annual FOOL Workshop*, January 2004.
- [33] “PADS: Processing Arbitrary Data Streams.” K. Fisher and R. Gruber. In *Workshop on Management and Processing of Data Streams*, June 2003.
- [34] “An Application-Specific Database.” K. Fisher, C. Goodall, K. Högstedt, and A. Rogers. In *Proceedings of 8th Biennial Workshop on Data Bases and Programming Languages (DBPL '01)*, 2001.
- [35] “A Framework for Interoperability.” K. Fisher, R. Pucella, and J. Reppy. In N. Benton and A. Kennedy (eds.), *Electronic Notes in Theoretical Computer Science*, vol. 59, 2001.
- [36] “Inheritance-based subtyping.” K. Fisher and J. Reppy. In *Proc. 7th Annual FOOL Workshop*, pages 2.1–2.21, January 2000.
- [37] “An Imperative, First-Order Calculus with Object Extension,” V. Bono and K. Fisher. In *Proc. 5th Annual FOOL Workshop*, pages 8.1–8.13, January 1998.
- [38] “Type Systems For Object-Oriented Languages,” K. Fisher. Ph.D. Thesis. September 1996.
- [39] “Classes = Objects + Data Abstraction,” K. Fisher and J. C. Mitchell. Technical Note STAN-CS-TN-96-31, Stanford University, January 1996.
- [40] “What is an object-oriented programming language?” K. Fisher and J.C. Mitchell. Available by anonymous ftp from theory.stanford.edu in pub/jcm as whatis.dvi, 1995.