

# Zhong Shao

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- Address** Department of Computer Science  
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- Home:*  
5 Autumn Ridge Road  
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Tel: +1 203 481 2569
- Interests** Programming languages and compilers, with a focus on language-based support for safety and security, proof-carrying code, certifying compilation, typed intermediate languages, and formal methods.
- Education** Ph.D. in Computer Science, Princeton University, September 1994.  
Thesis title: *Compiling Standard ML for efficient execution on modern machines*.  
Advisor: Professor Andrew W. Appel.
- M.A. in Computer Science, Princeton University, May 1991.
- B.S. in Computer Science, University of Science and Technology of China, July 1988.
- Professional Experience** Yale University, Department of Computer Science, Assistant Professor, 1994–2000; Associate Professor, 2000–2003; Professor, since July 2003.
- Bell Laboratories, Computing Sciences Research Center, Murray Hill, NJ, 1995–2001, Consultant. Worked on the Standard ML of New Jersey (SML/NJ) project.
- Xerox Palo Alto Research Center, Summer 1993, Research Intern for Dr. Hans Boehm and Dr. John Ellis. Developed a set of runtime optimizations for Boehm’s conservative garbage collector; built its interfaces in the GNU GCC and SRC Modula-3 compilers.
- Bell Laboratories, Computing Sciences Research Center, Murray Hill, NJ, Summer 1991, Research Intern for Dr. David MacQueen. Designed a new separate compilation system for Standard ML; developed tools and optimizations for the SML/NJ project.
- Princeton University, Department of Computer Science, 1989–1994, Research Assistant for Prof. Andrew W. Appel; Teaching Assistant for courses on systems programming and theory of algorithms.
- Chinese Academy of Science, Institute of Software, Beijing, China, 1988–1989. Research Assistant. Worked for Prof. C.S. Tang and Prof. Huimin Lin on algebraic specifications of abstract datatypes and semantics-based programming environments.
- University of Science and Technology of China, Hefei, China, 1986–1988, Research Staff and Team Leader. Designed, developed, and commercialized a software system on educational management and timetable scheduling.
- Personal** Born on August 19, 1968. Permanent Resident of United States. Citizen of People’s Republic of China. Married, two children.

- Honors**
- National Science Foundation Faculty Early CAREER Development Award, 1995–1998.
- Guo Mo-Ruo Award (for the best undergraduate student in computer science), University of Science and Technology of China, 1988.
- Special Class for the Gifted Young, University of Science and Technology of China, 1983–1986.
- Professional Activities**
- Member of Program Committee, *Sixteenth International Conference on Compiler Construction (CC'07)*, Braga, Portugal, March 2007.
- Member of Program Committee, *Fourth Asian Symposium on Programming Languages and Systems (APLAS'06)*, Sydney, Australia, November 2006.
- Member of Program Committee, *IJCAR Workshop on Programming Languages meets Program Verification (PLPV'06)*, Seattle, Washington, August 2006.
- Member of Program Committee, *Seventh International Symposium on Trends in Functional Programming (TFP'06)*, Nottingham, UK, April, 2006.
- Panel Organizer and Moderator, *The Future of Programming*, Yale Computer Science 35th Anniversary and Alumni Conference: Computer Science in the New Information Society, November 2005.
- Member of Program Committee, *2005 ACM SIGPLAN Workshop on ML*, Tallinn, Estonia, September 2005.
- Invited Speaker at the New England Programming Languages and Systems Symposium Series (NEPLS), Boston, MA, February 2005.
- Member of Program Committee, *Thirty-second ACM Symposium on Principles of Programming Languages (POPL'05)*, Long Beach, CA, January 2005.
- Invited Speaker on “The Essence of Proof-Carrying Code” at the *TYPES 2004 Conference*, Jouy-en-Josas, France, December 2004.
- Member of Steering Committee, *ACM SIGPLAN International Conference on Functional Programming (ICFP)*, July 2004–present.
- Member of Advisory Board, Asian Association for Foundation of Software, 2003–present.
- Member of Program Committee, *First Asian Symposium on Programming Languages and Systems (APLAS'03)*, Beijing, China, November 2003.
- Member of Program Committee, *2003 ACM Workshop on Survivable and Self-Regenerative Systems (SSRS'03)*, Fairfax, VA, October 2003.
- Member of Program Committee, *Eighth ACM SIGPLAN International Conference on Functional Programming (ICFP'03)*, Uppsala, Sweden, August 2003.
- Member of Workshop Selection Committee, *2003 Conferences and Workshops on Principles*,

*Logics, and Implementations of High-Level Programming Languages (PLI'03)*, Uppsala, Sweden, August 2003.

General Chair, *ACM SIGPLAN Workshop on Types in Language Design and Implementation (TLDI'03)*, New Orleans, LA, January 2003.

Member of Program Committee, *First International Workshop on Types in Programming (TIP'02)*, Dagstuhl, Germany, July 2002.

Member of Steering Committee, *ACM SIGPLAN Workshops on Types in Language Design and Implementation*, March 2002–present.

Invited Speaker, *Intel Research Forum on Language-Based Security*, Santa Clara, CA, January 2002.

Invited Speaker, *First International Workshop on Multi-Language Infrastructure and Interoperability (BABEL'01)*, Firenze, Italy, September 2001.

Invited Speaker, *Dagstuhl Seminar No. 01341 on Dependent Type Theory meets Practical Programming*, Dagstuhl, Germany, August 2001.

Members at Large, *ACM SIGPLAN Executive Committee*, 2001–2005.

Invited Tutorial on Type-Based Certifying Compilation, *ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI'01)*, Snowbird, UT, June 2001.

Member of Editorial Board, *Journal of Functional Programming*, 2001–present.

Moderator, *Programming Languages: Theory vs. Practice*, Alan J. Perlis Symposium, Sponsored by Department of Computer Science, Yale University, April 2000.

Panelist, *Typed Intermediate Languages for Compiling Object-Oriented Languages*, Seventh International Workshop on Foundations of Object-Oriented Languages, Boston, MA, January 2000.

Member of Program Committee, *ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI'99)*, Atlanta, GA, May 1999.

Member of Program Committee, *Second ACM SIGPLAN International Workshop on Types in Compilation (TIC'98)*, Kyoto, Japan, March 1998.

Member of Program Committee, *Twenty-third ACM Symposium on Principles of Programming Languages (POPL'96)*, St. Petersburg, FL, January 1996.

Member of the ML2000 Working Group, 1993–2000.

Member of various review panels for National Science Foundation, 1996–present.

Reviewer for *Journal of Functional Programming*, *Software: Practice and Experience*, *ACM Transactions on Programming Languages and Systems*, *Journal of Information and Computation*, *ACM Transactions on Software Engineering and Methodology*, and a num-

ber of conferences on programming languages and compilers. Reviewer for *Cambridge University Press*, *Prentice Hall*, *McGraw Hill*, *Addison Wesley*, *Thomson* in the area of introductory programming, compilers, and programming languages. 1993–present.

Member of ACM, USENIX, and IEEE Computer Society, 1990–present

## Grants

Modular Development of Certified Concurrent Code, National Science Foundation Program on Cyber Trust, CCR-0524545, \$400,000, August 2005–July 2008.

Intel Corporation Research Grant, \$80,000, July 2004–June 2006.

Microsoft Corporation Research Grant, \$72,000, April 2004–June 2006.

High-Assurance Common Language Runtime (with Valery Trifonov), National Science Foundation Program on Trusted Computing (TC), CCR-0208618, \$400,000, August 2002–July 2005.

Microsoft Corporation Research Grant on Content and Curriculum, \$35,000. January 2003–December 2004.

Scaling Proof-Carrying Code to Production Compilers and Security Policies—Technology Transfer Extension (with Andrew Appel, Valery Trifonov, and David Walker), Defense Advanced Research Projects Agency, \$1,346,386 (Yale FLINT component: \$636,154), June 2002–June 2004.

FLINT—A Mobile-Code Infrastructure for Advanced Languages, National Science Foundation Program on Information Technology Research, CCR-0081590, \$300,000, September 2000–August 2003.

Scaling Proof-Carrying Code to Production Compilers and Security Policies (with Andrew Appel and Edward Felten), Defense Advanced Research Projects Agency, \$2,224,772 (Yale FLINT component: \$1,058,951), June 1999–June 2002.

Typed Common Intermediate Format, National Science Foundation Program on Software Engineering and Languages, CCR-9901011, \$320,000, August 1999–July 2002.

Software Evolution using HOT Language Technology (with Paul Hudak and John Peterson), Defense Advanced Research Projects Agency, \$698,837, August 1996–July 1999.

Foundations of HOT Languages and Software Evolution (with Paul Hudak), National Science Foundation Grant CCR-9633390, \$450,000, August 1996–July 1999.

Type-Directed Compilation, National Science Foundation Faculty Early CAREER Development Award CCR-9501624, \$105,000, June 1995–May 1998.

## Software

Key developer of the Standard ML of New Jersey (SML/NJ) compiler since 1990. Main architect and implementor of several latest releases (including version 110). SML/NJ is a production-quality compiler for Standard ML 1997 currently used by thousands of students, researchers, and developers worldwide. Worked on the compiler front-end (type-checker, module elaborator, abstract syntax, semantic analysis), the middle-end (FLINT-based intermediate languages, representation analysis, FLINT optimizations, CPS-based

intermediate languages, CPS conversion, CPS optimizations, space-efficient closure conversion), and the backend and the runtime system (generation of abstract machine code, callee-save registers).

Leader of the Yale FLINT Project which develops the systems software (i.e., compiler infrastructure, runtime systems) for advanced type-safe languages such as ML, Java, and safe dialects of C. FLINT is the first production-quality type-preserving compiler infrastructure. The FLINT system is currently used inside the SML/NJ compiler and by several research groups working on type-directed compilation and proof-carrying code.

**Publications**    *Refereed journal and highly selective, refereed conference papers:*

- [1] Z. Ni and Z. Shao. Certified Assembly Programming with Embedded Code Pointers, *Proceedings of the 33rd ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL'06)*, Charleston, SC, pages (to appear), January 2006.
- [2] X. Feng and Z. Shao. Modular Verification of Concurrent Assembly Code with Dynamic Thread Creation and Termination, *Proceedings of the Tenth ACM SIGPLAN International Conference on Functional Programming (ICFP'05)*, Tallinn, Estonia, pages 254–267, September 2005.
- [3] Z. Shao, V. Trifonov, B. Saha, and N. Papaspyrou. A Type System for Certified Binaries. *ACM Transactions on Programming Languages and Systems (TOPLAS)*, 27(1), pages 1–45, January 2005.
- [4] D. Yu and Z. Shao. Verification of Safety Properties for Concurrent Assembly Code, *Proceedings of the Ninth ACM SIGPLAN International Conference on Functional Programming (ICFP'04)*, Snowbird, Utah, pages 175–188, September 2004.
- [5] D. Yu, N.A. Hamid, and Z. Shao. Building Certified Libraries for PCC: Dynamic Storage Allocation. In *Science of Computer Programming*, 50(1-3), pages 101-127, 2004. An early version of this paper appeared in *Proceedings of the 2003 European Symposium on Programming (ESOP'03)*, Warsaw, Poland, April 2003. Published in Pierpaolo Degano, editor, *Lecture Notes in Computer Science*, volume 2618, pages 363–379, Springer-Verlag, 2003.
- [6] B. Saha, V. Trifonov, and Z. Shao. Intensional Analysis of Quantified Types. *ACM Transactions on Programming Languages and Systems (TOPLAS)*, 25(2), pages 159–209, March 2003.
- [7] S. Monnier and Z. Shao. Inlining as Staged Computation. *Journal of Functional Programming (JFP)*, 13(3), pages 647–676, May 2003.
- [8] N.A. Hamid, Z. Shao, V. Trifonov, S. Monnier, and Z. Ni. A Syntactic Approach to Foundational Proof-Carrying Code. *Proceedings of the 17th IEEE Annual Symposium on Logic in Computer Science (LICS'02)*, Copenhagen, Denmark, pages 89–100, July 2002. An extended version of this paper appeared in *Journal of Automated Reasoning (JAR)*, 31(3-4), pages 191-229, October 2003.
- [9] C. League, Z. Shao, and V. Trifonov. Type-Preserving Compilation of Featherweight Java. *ACM Transactions on Programming Languages and Systems (TOPLAS)*, 24(2), pages 112–152, March 2002.

- [10] Z. Shao, B. Saha, V. Trifonov, and N. Papaspyrou. A Type System for Certified Binaries. *Proceedings of the 29th ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL'02)*, Portland, OR, pages 217–232, January 2002.
- [11] S. Monnier, B. Saha, and Z. Shao. Principled Scavenging. *Proceedings of the 2001 ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI'01)*, Snowbird, UT, pages 81–91, June 2001.
- [12] V. Trifonov, B. Saha, and Z. Shao. Fully Reflexive Intensional Type Analysis. *Proceedings of the Fifth ACM SIGPLAN International Conference on Functional Programming (ICFP'00)*, Montreal, Canada, pages 82–93, September 2000.
- [13] Z. Shao and A.W. Appel. Efficient and Safe-for-Space Closure Conversion. *ACM Transactions on Programming Languages and Systems (TOPLAS)*, 22(1), pages 129–161, January 2000.
- [14] C. League, Z. Shao, and V. Trifonov. Representing Java Classes in a Typed Intermediate Language. *Proceedings of the Fourth ACM SIGPLAN International Conference on Functional Programming (ICFP'99)*, Paris, France, pages 183–196, September 1999.
- [15] Z. Shao. Transparent Modules with Fully Syntactic Signatures. *Proceedings of the Fourth ACM SIGPLAN International Conference on Functional Programming (ICFP'99)*, Paris, France, pages 220–232, September 1999.
- [16] Z. Shao, C. League, and S. Monnier. Implementing Typed Intermediate Languages. *Proceedings of the Third ACM SIGPLAN International Conference on Functional Programming (ICFP'98)*, Baltimore, MD, pages 313–323, September 1998.
- [17] Z. Shao. Typed Cross-Module Compilation. *Proceedings of the Third ACM SIGPLAN International Conference on Functional Programming (ICFP'98)*, Baltimore, MD, pages 141–152, September 1998.
- [18] Z. Shao. Flexible Representation Analysis. *Proceedings of the Second ACM SIGPLAN International Conference on Functional Programming (ICFP'97)*, Amsterdam, The Netherlands, pages 85–98, June 1997.
- [19] A.W. Appel and Z. Shao. Empirical and Analytic Study of Stack vs. Heap Cost for Languages with Closures. *Journal of Functional Programming (JFP)*, 6(1), pages 47–74, January 1996.
- [20] Z. Shao and A.W. Appel. A Type-Based Compiler for Standard ML. *Proceedings of the 1995 ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI'95)*, La Jolla, California, pages 116–129, June 1995.
- [21] Z. Shao and A.W. Appel. Space Efficient Closure Representations. *Proceedings of the ACM SIGPLAN Conference on Lisp and Functional Programming (LFP'94)*, Orlando, FL, pages 150–161, June 1994.
- [22] Z. Shao, J.H. Reppy, and A.W. Appel. Unrolling Lists. *Proceedings of the ACM SIGPLAN Conference on Lisp and Functional Programming (LFP'94)*, Orlando, FL, pages 185–195, June 1994.
- [23] Z. Shao and A.W. Appel. Smartest Recompile. *Proceedings of the 20th ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL'93)*, Charleston, SC, pages 439–450, January 1993.

- [24] A.W. Appel and Z. Shao. Callee-save Registers in Continuation-Passing Style. *Lisp and Symbolic Computation*, 5(3), pages 189–219, 1992.

***Other refereed conference and workshop papers:***

- [25] N. Hamid and Z. Shao. Interfacing Hoare Logic and Type Systems for Foundational Proof-Carrying Code. *Proceedings of the 17th International Conference on the Applications of Higher Order Logic Theorem Proving (TPHOLs'04)*, Park City, Utah, September 2004. Published in Konrad Slind, editor, *Lecture Notes in Computer Science*, volume 3223, pages 118–135, Springer-Verlag, 2004.
- [26] C. League, Z. Shao, and V. Trifonov. Precision in Practice: A Type-Preserving Java Compiler. *Proceedings of the 12th International Conference on Compiler Construction (CC'03)*, Warsaw, Poland, April 2003. Published in Gorel Hedin, editor, *Lecture Notes in Computer Science*, volume 2622, pages 106–120, Springer-Verlag, 2003.
- [27] D. Yu, Z. Shao, and V. Trifonov. Supporting Binary Compatibility with Static Compilation. *Proceedings of the Second USENIX Java Virtual Machine Research and Technology Symposium (JVM'02)*, San Francisco, CA, pages 165–180, August 2002. *Winner of the Best Student Paper Award.*
- [28] D. Yu, V. Trifonov, and Z. Shao. Type-Preserving Compilation of Featherweight IL (Extended Abstract). *Proceedings of the 2002 International Workshop on Formal Techniques for Java-like Programs (FTfJP'02)*, June 2002.
- [29] C. League, V. Trifonov, and Z. Shao. Functional Java Bytecode. *Proceedings of the 2001 Workshop on Intermediate Representation Engineering for the Java Virtual Machine (IRE'01) at the 5th World Multi-conference on Systemics, Cybernetics, and Informatics*, Orlando, Florida, July 2001.
- [30] C. League, V. Trifonov, and Z. Shao. Type-Preserving Compilation of Featherweight Java. *Proceedings of the Eighth ACM SIGPLAN International Workshop on Foundations of Object-Oriented Languages (FOOL'01)*, London, UK, January 2001.
- [31] B. Saha, V. Trifonov, and Z. Shao. Fully Reflexive Intensional Type Analysis with Type Erasure Semantics. *Proceedings of the Third International Workshop on Types in Compilation (TIC'00)*, Montreal, Canada, September 2000.
- [32] V. Trifonov and Z. Shao. Safe and Principled Language Interoperation. *Proceedings of the 1999 European Symposium on Programming (ESOP'99)*, Amsterdam, The Netherlands, March 1999. Published in S. Doaitse Swierstra, editor, *Lecture Notes in Computer Science*, volume 1576, pages 128–146, Springer-Verlag, 1999.
- [33] B. Saha and Z. Shao. Optimal Type Lifting. *Proceedings of the Second International Workshop on Types in Compilation (TIC'98)*, Kyoto, Japan, March 1998. Published in Xavier Leroy and Astushi Ohori, editors, *Lecture Notes in Computer Science*, volume 1473, pages 156–177, Springer-Verlag, 1998.
- [34] Z. Shao and V. Trifonov. Type-Directed Continuation Allocation. *Proceedings of the Second International Workshop on Types in Compilation (TIC'98)*, Kyoto, Japan, March 1998. Published in Xavier Leroy and Astushi Ohori, editors, *Lecture Notes in Computer Science*, volume 1473, pages 116–135, Springer-Verlag, 1998.

- [35] Z. Shao. Typed Common Intermediate Format. *Proceedings of the 1997 USENIX Conference on Domain-Specific Languages (DSL'97)*, Santa Barbara, CA, pages 89–102, October 1997.
- [36] Z. Shao. An Overview of the FLINT/ML Compiler. *Proceedings of the First International Workshop on Types in Compilation (TIC'97)*, Amsterdam, The Netherlands, June 1997.
- [37] H. Boehm and Z. Shao. Inferring Type Maps during Garbage Collection. *Proceedings of the OOPSLA'93 Workshop on Memory Management and Garbage Collection*, Washington, DC, September 1993.
- [38] Z. Shao. The Practical University Timetable Problem and its Timetabling Algorithm. *Proceedings of the First National Conference for Young Computer Scientists*, Harbin, China, August 1987.

***Unrefereed papers and technical reports not published elsewhere:***

- [39] S. Monnier and Z. Shao. Typed Regions. Technical Report YALEU DCS TR–1242, Dept. of Computer Science, Yale University, October 2002.
- [40] G. Collins and Z. Shao. Intensional Analysis of Higher-Kinded Recursive Types. Technical Report YALEU DCS TR–1240, Dept. of Computer Science, Yale University, October 2002.
- [41] D. Yu, V. Trifonov, and Z. Shao. Type-Preserving Compilation of Featherweight IL. Technical Report YALEU DCS TR–1228, Dept. of Computer Science, Yale University, April 2002.
- [42] A.W. Appel, Z. Shao, V. Trifonov, and D. Walker. High-Assurance Common Language Runtime. Technical Report YALEU DCS TR–1225, Dept. of Computer Science, Yale University, December 2001.
- [43] D. Teller and Z. Shao. Algorithm-Independent Framework for Verifying Integer Constraints. Technical Report YALEU DCS TR–1195, Dept. of Computer Science, Yale University, June 2000.
- [44] A.W. Appel, E. Felten, and Z. Shao. Scaling Proof-Carrying Code to Production Compilers and Security Policies. Technical Report YALEU DCS TR–1182, Dept. of Computer Science, Yale University, January 1999.
- [45] The ML2000 Working Group. Principles and a Preliminary Design for ML2000. March 1999.
- [46] S. Monnier, M. Blume, and Z. Shao. Cross-Function Inlining in FLINT. Technical Report YALEU DCS TR–1189, Dept. of Computer Science, Yale University, March 1999.
- [47] C. League, Z. Shao, and V. Trifonov. Encoding Java Classes in a Typed Intermediate Language. Technical Report YALEU DCS TR–1173, Dept. of Computer Science, Yale University, December 1998.
- [48] S. Monnier and Z. Shao. The FLINT Optimizer. Technical Report YALEU DCS TR–1172, Dept. of Computer Science, Yale University, December 1998.

- [49] C. League and Z. Shao. Formal Semantics of the FLINT Intermediate Language. Technical Report YALEU DCS TR-1171, Dept. of Computer Science, Yale University, May 1998.
- [50] Z. Shao. Parameterized Signatures and Higher-Order Modules. Technical Report YALEU DCS TR-1161, Dept. of Computer Science, Yale University, August 1998.
- [51] Z. Shao. Compiling Standard ML for Efficient Execution on Modern Machines. Ph.D. Thesis. Technical Report CS-TR-475-94, Dept. of Computer Science, Princeton University, September 1994.
- [52] Z. Shao. A Practical University Timetabling System. Zhong Shao. Bachelor's Thesis (in Chinese), University of Science and Technology of China, June 1988.

### Teaching Experience

- CS112 Introduction to Programming (four semesters).
- CS210 A Second Course in Programming (two semesters).
- CS421/521 Compilers and Interpreters (eight semesters).
- CS422/522 Operating Systems (one semester).
- CS428/528 Language-Based Security (one semester).
- CS430/530 Formal Semantics (two semesters).
- CS535 Advanced Topics in Modern Compiler Implementation (one semester).
- Graduate seminar on functional languages (two semesters).
- Graduate seminar on secure internet programming (one semester).
- Graduate seminar on understanding Java virtual machine (two semesters).

### Students

- Post-Doctoral Research Associate: Valery Trifonov (1997-2000).
- Post-Doctoral Research Associate: Nikolaos Papaspyrou (2000-2001).
- Former Ph.D. students:
  - Bratin Saha, Ph.D.(2002). Thesis title: *A Type System for Certified Runtime Type Analysis*. Current Employment: Intel Research Labs, Santa Clara, CA.
  - Christopher League, Ph.D.(2002). Thesis title: *A Type-Preserving Compiler Infrastructure*. Current Employment: Assistant Professor, Long Island University.
  - Stefan Monnier, Ph.D.(2003). Thesis title: *Principled Compilation and Scavenging*. Current Employment: Assistant Professor, University of Montreal.
  - Dachuan Yu (2004). Thesis title: *Safety Verification of Low-Level Code*. Current Employment: DoCoMo USA Labs, San Jose, CA.
  - Nadeem A. Hamid (2004). Thesis title: *A Syntact Approach to Foundational Proof-Carrying Code*. Current Employment: Assistant Professor, Berry College.

Current Ph.D. students:

- Hai Fang (2000–present). Research interest: *Meta-Logical Framework; Foundations of PCC Logic*.
- Zhaozhong Ni (2000–present). Research interest: *Typed Floyd-Hoare Logic; Foundational Certified Code*.
- Andrew McCreight (2001–present). Research interest: *Type-Preserving Compilation of Object-Oriented Languages*.
- Xinyu Feng (2002–present). Research interest: *Design and Implementation of a Certifying Programming Language*.
- Rodrigo Ferreira (2003–present). Research interest: *Memory Consistency; Reasoning about Concurrent Programs*.
- Alexander Vaynberg (2004–present). Research interest: *Programming Languages; Proof-Carrying Code*.

Undergraduate students (advising their senior projects): Chris Volkert (1995), Jonathan Traupman (1996), Lujo Bauer (1997), Ben Zhao (1997), Alex Hehmeyer (1997), Kenny Wolf (1997), Jesse Heitler (1997), Bret Martin (1997), David Auerbach (1998), Neil Inala (1998), John Richter (1999), Benjamin Christen (2000), John Garvin (2000–2001), Yichen Xie (2000), and Daniel Dormont (2001).

Research interns: Rudi Seitz (1996), Neil Inala (1996), Sukyoung Ryu (1999), Oukseh Lee (1999), David Teller (2000), Yichen Xie (2000–2001), and John Garvin (2000–2001).

Member of the Ph.D. thesis committee: Jan-Jan Wu (1995), Satish Pai (1996), Rajiv Mirani (1996), Kevin Lynch (1996), Sheng Liang (1997), Chih-Ping Chen (1999), Martin Sulzmann (1999), Mark Tullsen (2001), Bratin Saha (2002), Christopher League (2002), Zhanyong Wan (2002), Stefan Monnier (2003), Juan Chen (2004), Anthony Courtney (2004), Dachuan Yu (2004), Nadeem A. Hamid (2004).

#### University Activities

Director of Undergraduate Studies, Yale Computer Science, 2003–present.  
 Acting Chair, Graduate Admission Committee, Yale Computer Science, 2001.  
 Member, Graduate Admission Committee, Yale Computer Science, 1995–1997, 2000.  
 Organizer, Weekly Systems Seminar (SPAM), Yale Computer Science, 1994–1996.  
 Organizer, Yale Computer Science Alan J. Perlis Symposium, 2000–2001.  
 Member, Ph.D. Comprehensive Exam Committee, Yale Computer Science, 1995–2001.  
 Member, Computing Committee, Yale Computer Science, 2003–2005.  
 Member, Financial Committee, Yale Computer Science, 2005–present.  
 Member, Faculty Recruiting Committee, Yale Computer Science, 2005–present.  
 Member, Teaching and Curriculum Committee, Yale Computer Science, 1996–present.  
 Member, Curriculum 200X Committee, Yale Computer Science, 2001–2003.  
 Member, Library Committee, Yale Computer Science, 1996–2001.  
 First-year Graduate Student Coordinator, Yale Computer Science, 1997–2000.  
 Fellow, Silliman College, Yale University, 1995–present.  
 Freshman Advisor, Silliman College, Yale University, 1995–1999, 2004.  
 Sophomore Advisor, Yale Computer Science, 1999–present.