Olin Shivers

College of Computer and Information Science
Northeastern University

Spring 2015

Educational background

May 1991   Carnegie Mellon University

Awarded Ph.D. in Computer Science.
Thesis title: *Control-Flow Analysis of Higher-Order Languages.*
Advisors: Professors Peter Lee and Allen Newell.

May 1983   Yale University

Awarded B.S. with double major in Computer Science and Mathematics.

Employment History

2014–present   Northeastern University

Professor, College of Computer and Information Science.

Fall 2006–2014   Northeastern University

Associate professor, College of Computer and Information Science.
Granted tenure 2006.

Fall 1999–2006   Georgia Institute of Technology

Associate Professor, College of Computing.
Granted tenure 2006.

Fall 2004   University of Århus, Denmark

Visiting professor, on leave from Georgia Tech.
Taught 60-student undergraduate course, collaborated with research colleagues.

Summer 1999–Summer 2001   Smartleaf Corp.

Founder and Chief Technology Officer

Directed creation of first three generations of Smartleaf's portfolio-optimization software and rollout
of server facility, using dynamic languages to reduce development time for critical components of
system. The company's clients are currently managing $50B of assets with Smartleaf technology.

1999–2000   ArsDigita

Founder and software engineer

Developed database-backed Web server infrastructure. ArsDigita constructed large, database-backed
Web services for clients such as Levi Strauss, Hewlett-Packard, the Environmental Defense Fund
and Siemens AG. In 2000, when the founders sold the company, ArsDigita had 80 employees and
an annual revenue of 20M$.

Fall 1993–Spring 1999   MIT

Research Scientist, Express project and PIA group.

Co-founded Personal Information Architecture group (joint LCS/Media Lab group); project leader of Express Project in the AI Lab.

Supervised group's doctoral and master's students. Principal author and PI or co-PI of the two DARPA contracts and one NSF grant that funded the Express Project. Express is concerned with the interaction between operating systems, advanced programming languages, compilers, and formal semantics. Our principal research vehicle is ML/OS, an implementation of SML that runs on a bare processor with no OS support.

1992–Summer 1993   University of Hong Kong
Member of the faculty, Computer Science Department.

Fall 1991   AT&T Bell Labs
Post-doc in language research with David MacQueen's Software Principles group.

Summer 1986   Information Technology Center, CMU
Ported Orbit Scheme compiler to the IBM ROMP processor.

Summer 1985   *Centre Mondial Informatique et Ressource Humaine*, Paris
Designed and implemented object-oriented 3D-graphics system.

Summer 1984   DEC Western Research Lab
Member of Jonathan Rees's T group. The group designed and implemented version 3 of the Scheme dialect T, and its optimising compiler, ORBIT. Worked on flow analysis, language design, runtime internals, and the linker.

Summer 1982   MIT AI Lab
Worked for Prof. Randy Davis' Hardware Troubleshooting project. Wrote constraint compiler for DPL implementation language. Designed language extensions. Systems/language work on the Lisp programming environment.

Current fields of interest

My principal research interests are
- The task of constructing robust, complex software artifacts, and the design of tools that assist programmers in this task;
- the design, analysis and implementation of programming languages, and the interaction between these three elements;
- the interaction between systems and programming languages, primarily higher-order typed languages;
- the semantics of programming languages; and
- compilers.

I. Teaching

A. Courses taught

2006–present   Northeastern University

Semester	Course	Subject	Students
2016 Spring	CS U4410/G6410	Compilers	18
2015 Fall	CS2500	Introduction to Programming and Computing	405
2015 Spring	CS2800	Logic and Computation	90
2014 Fall	CS2500	Introduction to Programming and Computing	400
2014 Spring		On sabbatical	
2013 Fall		On sabbatical	
2013 Spring	CS7480	Program Analysis	16
2012 Fall	CS2500	Introduction to Programming and Computing	290
2012 Spring	CS4410/6410	Compilers	19
2011 Fall	CS2500	Introduction to Programming and Computing	202
2010 Fall	CS2500	Introduction to Programming and Computing	190
2010 Spring	CS 4410/6410	Compilers	32
2009 Fall	CS2500	Introduction to Programming and Computing	146
2009 Spring	CSU390	Theory of Computation	34
2008 Fall	CS U211	Introduction to Programming and Computing	168
2008 Spring	CS G272	Analysis of Software Artifacts	12
2007 Fall	CS U211	Introduction to Programming and Computing	160
2007 Spring	CS U665/G262	Compilers	15
2006 Fall	CS U211	Introduction to Programming and Computing	160

2000–2006   Georgia Institute of Technology

Semester	Course	Subject	Students
2006 Spring	CS8803SPL	Semantics of Programming Languages	12
2005 Fall	CS4240	Compilers	15
2005 Fall	CS3240	Languages and computation	27
2004 Spring	CS8803	Semantics of Programming Languages	12
2003 Fall	CS4240	Compilers	21
2003 Spring	CS8803	Semantics of Programming Languages	20
2002 Fall	CS4240	Compilers	20
2001 Fall	CS4240	Compilers	30
2001 Spring	CS2340	Objects and design	240
2000 Fall	CS4240	Compilers	25

Fall 2004   University of Århus, Denmark

Undergraduate compilers course, with enrollment of 60 students.

1997   University of Århus, Denmark

Invited mini-course for graduate students on systems programming in advanced programming languages.

1996   MIT

Taught 6.821, graduate student course on programming language semantics, with Prof. David Gifford. Received excellent student evaluations.

1992–1993   University of Hong Kong

Classes included an "Advanced Language Implementation Technology" graduate seminar, "Principles of Programming Languages" undergraduate class, and introductory programming in C. Class sizes varied from 25 to 400. Received excellent student evaluations.

Spring 1986   Carnegie Mellon University

Taught *Introduction to Lisp* undergraduate course. Had sole responsibility for course: wrote and gave all lectures, wrote and graded all assignments and programming projects, assigned final grades. Received outstanding student evaluations.

B. Curriculum development

2009
CS 2500: Fundamentals of Computer Science 1 – honors
New "honors" track for freshman. Covers standard material at double pace, then spends second half of semester exploring advanced concepts in greater depth: interpreters, syntax and semantics, little languages, lambda calculus, stream processing.

2004
CS3240: Languages & computation
New required undergraduate course; approved Spring 2004.

2003
Applied semantics of programming languages
New graduate course at Georgia Tech.

C. Individual student guidance

The following list shows the students I've advised, along with the time spent as my advisee, and the title of the student's finished thesis or dissertation.

Doctoral students:
Andrew Cobb, 2014–present
Alex Marquez, 2012–2013.
Jonathan Schuster, 2011–present.
Justin Slepak, 2011–present.
Ian Johnson, 2011–2015.
Tony Garnock-Jones, 2011–2012.
Dimitris Vardoulakis, 2008–2012, *CFA2: A Context-free Approach to Control-flow Analysis*.
David Fisher, 2002–2010, *Ziggurat: Adding Static Semantics to Macros*.
Mathew Might, 2002–2007, *Environment Analysis of Higher-order Languages*.
David Zurow, 2003–2007.
Alexander Spoon, 2000–2005, *Demand-driven Type Inference with Subgoal Pruning*.
Kostas Arkoudas, 1996–2000, *Denotational Proof Languages*.

Masters students:
Zane Shelby. Fall 2009–Spring 2010. Optimising CPS conversion.
Derek Coetzee. Spring 2003. Independent study in type theory.
Andrew Hilton. Summer 2003–present. Project: *Certified program analysis.*
Brett Lucey. Spring 2003. Project: *Analysis and optimisation of push-down automata.*
Ilya Bagrak. Fall 2003–present. Project: *Matching regular trees.*
Steven Strickland, Summer 2002–present. Thesis: *Bottom-up β-reduction.*
Matthew Might and David Egers. Spring 2003. Project: *Call-strings and higher-order control-flow analysis in CPS.*
Brian Carlstrom, 1999–2000. Thesis: *Embedding Scheme in Java.*
Ravi Nanavati, 2000. Thesis: *Extensible syntax in the presence of static analysis.*
James Clark, 1998–2000. Thesis: *Fine-grain interrupts and atomic heap transactions.*
Alexander Vladimirov, 1996–1998. Thesis: *Using FoxNet for TCP/IP Networking in ML/OS.*
Albert Lin, 1996–1998. Thesis: *Concurrency in ML/OS.*

Undergraduate students:
Milo Davis, William Meehan, Summer 2015–present, *No-brainer CPS conversion.*

Dan King, Summer 2011–Spring 2012, *PDA-based flow analysis and optimising parser generation.*

Roderic Morris, Fall 2010, *Implementing scsh on a multi-threaded, 64-bit platform.*

James Shargo and Ryan Schwers, Summer 2010. *Design and implementation of a loop facility in Scheme.*

Ken McGready and Yarian Gomez, Spring 2010. *Data-flow analysis of push-down automata.*

Ben Chambers and Daniel Harvey, Spring 2006. *Design and implementation of an optimising CPS-based compiler.*

Benjamin McMullan. Fall 2003. *Design and implementation of an embedded LALR parser.*

Mike Panetta. Spring 2003. *Design and implementation of an interactive Unix shell based on scsh.*

David Zurow. Fall 2002–present. *Architecture support for low-overhead generational storage management.* David's work is jointly supervised with Ken MacKenzie. I expect this work to become David's Master's thesis.

Steven Strickland and Bryan Kennedy. Summer 2002–Fall 2002. *Bottom-up β-reduction.*

Shyamsundar Jayaraman and Eric Mickley. Summer 2002–Fall 2002. *The multi-return λ calculus.*

Luke Olbrish and Andrew Hilton. Summer 2002–present. *Certifiable program analysis.*

Shyamsundar Jayaraman, Ryan Collins, Tim Snyder. 2001–2002. *Sake, a minimal-recompilation system.*

Bryan Harden. Spring 2002. *Scheme support for ODBC.*

Matt Might, John Hall, Daniel Larsen, Anthony Chen. Fall 2001. CS3911 Senior Design Project: "Civil Engineering Tricorder Project."

I worked with undergraduates at MIT continuously during my time there. The serious projects that actually came to fruition were

David Albertz	Embedding the AWK language into Scheme
Wandy Saetan	Functional PostScript
Brian Carlstrom	Unix sockets API for scsh
David Fisher	Dialogue scripting in Scheme

Some of these were summer UROP projects; Saetan and Carlstrom spent significant for-credit time over several years on their projects. Besides educational value, all of these projects led to software that is actively used.

D. Teaching Honors and Awards

Spring 2003 & 2004 College of Computing nominee for institute-wide Class of 1940 W. Roane Beard Outstanding Teacher Award

Spring 2003
College of Computing's William A. "Gus" Baird Faculty Teaching Award.

II. Research and creative scholarship

A. Doctoral thesis

Control-Flow Analysis of Higher-Order Languages.
I develop techniques for analysing the control-flow structure of languages with first-class procedures and side-effects, such as Scheme or ML. I use the method of non-standard abstract semantic interpretations on a CPS intermediate representation. In the dissertation I (1) develop the control-flow analysis, (2) prove formal properties of the analysis, (3) develop several program optimisations based on the analysis (*e.g.*, induction variable elimination, type recovery), and (4) demonstrate a working implementation of the analysis and optimisation algorithms.

This dissertation was nominated for the 1991 ACM Distinguished Dissertation Prize, and has defined the vocabulary of subsequent inquiry in the area.

B. Published journal papers (refereed)

Modular Rollback through Control Logging.
Olin Shivers, Aaron Turon, and Conor McBride.
Invited for submission to *Higher-order and Symbolic Computation.*
Submitted.

Higher-order Flow Analysis with DDP.
Olin Shivers, Alexander Spoon and Dimitris Vardoulakis.
Invited for submission to *Higher-order and Symbolic Computation*,
special issue in honor of Mitchell Wand.
In preparation.

CFA2: A Context-free Approach to Control-flow Analysis.
Dimitrios Vardoulakis and Olin Shivers.
Logical Methods in Computer Science,
In *Logical Methods in Computer Science*, 7(2:3) pages 1–39, 2011.

Bottom-up β-reduction: Uplinks and λ-DAGs.
Olin Shivers and Mitch Wand.
Fundamenta Informaticae, 103(1–4) pages 247–287, 2010,
special issue in honor of Jurek Tiuryn.

Building language towers with Ziggurat.
David Fisher and Olin Shivers.
Journal of Functional Programming, 18(5-6):707–780, May/June 2008.

Exploiting reachability and cardinality in higher-order flow analysis.
Matthew Might and Olin Shivers.
Journal of Functional Programming, 18(5-6):821–864 (2008).

Analysing the environment structure of higher-order languages using frame strings.
Matthew Might and Olin Shivers.
Theoretical Computer Science, 375(1–3) pages 137–168, May 2007.

Multi-return function call.
Olin Shivers and David Fisher.
Journal of Functional Programming, 16(4) pages 547–582, July/September 2006.

A Scheme shell.
Olin Shivers.
Lisp and Symbolic Computation.
(to appear).

C. Published books and parts of books

Data-flow analysis and type recovery in Scheme.
Chapter 3 of *Topics in Advanced Language Implementation*, ed. Peter Lee, MIT Press, 1991.

D. Conference publications

D.1. Conference papers with proceedings (refereed)

Justin Slepak, Olin Shivers and Panagiotis Manolios.
An array-oriented language with static rank polymorphism.
In *Proceedings of the 23rd European Symposium on Programming (ESOP'14)*, Grenoble, France, April 2014. *Lecture Notes in Computer Science*, volume 8410, Springer.

André DeHon, *et al.*
Preliminary design of the SAFE platform.
In *Proceedings of the 6th Workshop on Programming Languages and Operating Systems (PLOS'11)*, Cascais, Portugal, October 2011.

Pushdown flow analysis of first-class control.
Dimitrios Vardoulakis and Olin Shivers.
In *Proceedings of the Sixteenth ACM SIGPLAN International Conference on Functional Programming (ICFP '11)*, Tokyo, September, 2011.

Modular rollback through control logging: a pair of twin functional pearls.
Olin Shivers and Aaron Turon.
Control to correct: a recipe for robustness.
In *Proceedings of the Sixteenth ACM SIGPLAN International Conference on Functional Programming (ICFP '11)*, Tokyo, September, 2011.

Ordering multiple continuations on the stack.
Dimitrios Vardoulakis and Olin Shivers.
In *Proceedings of the 2011 ACM SIGPLAN Workshop on Partial Evaluation and Program Manipulation (PEPM 2011)*, pages 13–22, Austin, Texas, January 2011.

CFA2: A context-free approach to control-flow analysis.
Dimitris Vardoulakis and Olin Shivers.
In *Proceedings of the 19th European Symposium on Programming (ESOP 2010)*, Paphos, Cyprus, March 2010. Springer Lecture Notes in Computer Science 6012.

Trusted Theorem Proving: A Case Study in SLD-Resolution.
Konstantine Arkoudas and Olin Shivers.
In *Proceeding of the Third International Symposium on Leveraging Applications of Formal Methods, Verification and Validation (ISoLA 2008)*, Greece, October 2008.

Model checking via ΓCFA.

Matthew Might, Benjamin Chambers and Olin Shivers.
In *Proceedings of the Eighth International Conference on Verification, Model Checking and Abstract Interpretation (VMCAI'07)*, pages 59–73, Nice, France, January, 2007. Springer LNCS 4349.

Improving flow analyses via ΓCFA: Abstract garbage collection and counting.
Matthew Might and Olin Shivers.
In *Proceedings of the Eleventh ACM SIGPLAN International Conference on Functional Programming (ICFP'06)*, pages 13–25, Portland, Oregon, September 2006.
Invited for submission to special issue of Journal of Functional Programming.

Static analysis for syntax objects.
David Fisher and Olin Shivers.
In *Proceedings of the Eleventh ACM SIGPLAN International Conference on Functional Programming (ICFP'06)*, pages 111–121, Portland, Oregon, September 2006.
Invited for submission to special issue of Journal of Functional Programming.

Continuations and transducer composition.
Olin Shivers and Matthew Might.
In *Proceedings of the 2006 ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI 2006)*, Ottawa, Canada, June 2006.

Environment analysis via ΔCFA.
Matthew Might and Olin Shivers.
In *Proceedings of the 33rd Annual ACM Symposium on Principles of Programming Languages (POPL 2006)*, Charleston, South Carolina, January 2006.

Semantic navigation of large code bases in higher-order, dynamically typed languages.
S. Alexander Spoon and Olin Shivers.
In *Proceedings of the 12th Working Conference on Reverse Engineering* (WCRE 2005), Pittsburgh, Penn., November 2005.

Dynamic data polyvariance using source-tagged classes.
S. Alexander Spoon and Olin Shivers.
In *Proceedings of the Dynamic Languages Symposium (DLS05)*, San Diego, California, October 2005.

The anatomy of a loop: a story of scope and control.
Olin Shivers.
In *Proceedings of the 10th ACM SIGPLAN International Conference on Functional Programming* (ICFP 2005), Tallinn, Estonia, September 2005.

Bottom-up β-reduction: uplinks and λ-DAGs.
Olin Shivers and Mitchell Wand.
In *Proceedings of the European Symposium on Programming* (ESOP), April 2005.

Multi-return function call.
Olin Shivers and David Fisher.
In *Proceedings of the 2004 International Conference on Functional Programming*, September, 2004.
Paper selected by program committee for invited submission to special issue of *Journal of Functional Programming*.

Lexer and parser generators in Scheme.
Matthew Flatt, Benjamin McMullan, Scott Owens and Olin Shivers.
In *Proceedings of the 2004 Workshop on Scheme and Functional Programming*, September 2004.

trx: Regular-tree expressions, now in Scheme.
Ilya Bagrak and Olin Shivers.
In *Proceedings of the 2004 Workshop on Scheme and Functional Programming*, September 2004.

Demand-driven type inference with subgoal pruning: trading precision for scalability.
S. Alexander Spoon and Olin Shivers.
In *Proceedings of the 18th European Conference on Object-Oriented Programming*, June 2004.

Higher-order control-flow analysis in retrospect: Lessons learned, lessons abandoned.
Olin Shivers.
In *20 Years of the ACM/SIGPLAN Conference on Programming Language Design and Implementation (1979–1999): A Selection*, April 2004.

Atomic heap transactions and fine-grain interrupts.
Olin Shivers, James W. Clark and Roland McGrath.
In *Proceedings of the 1999 ACM International Conference on Functional Programming (ICFP)*, September, 1999, Paris, France.

The Flux OSKit: A substrate for kernel and language research.
Bryan Ford, Godmar Back, Greg Benson, Jay Lepreau, Albert Lin and Olin Shivers.
In *Proceedings of the Sixteenth ACM Symposium on Operating Systems Principles (SOSP-16)*, October 1997, Saint-Malo, France.

Automatic management of operating-system resources.
In *Proceedings of the Second ACM SIGPLAN International Conference on Functional Programming (ICFP '97)*, June 1997, Amsterdam.

Continuations and threads: Expressing machine concurrency directly in advanced languages.
In *Proceedings of the Second ACM SIGPLAN Workshop on Continuations,* January 1997, Paris.
Also available as BRICS Notes Series NS-96-13, University of Århus, Denmark.

A universal scripting framework.
In *Concurrency and Parallelism, Programming, Networking, and Security,* Lecture Notes in Computer Science #1179, pages 254–265, Editors Joxan Jaffar and Roland H. C. Yap, 1996, Springer.

Supporting dynamic languages on the Java virtual machine.
In *Proceedings of the Dynamic Objects Workshop*, May 1996, Boston.
Also available as technical report AIM-1576, MIT Artificial Intelligence Laboratory.

Useless-variable elimination. In *Proceedings of the Workshop on Static Analysis of Equational, Functional and Logic Programs (JTASPEFL'91)*, pages 197–201, October 1991, Rennes, France.
Published as *Bigre* vol. 74, Atelier Irisa, IRISA Campus de Beaulieu.

The semantics of Scheme control-flow analysis.
In *Proceedings of the First ACM SIGPLAN and IFIP Symposium on Partial Evaluation and Semantics-Based Program Manipulation*, June 1991. Published as *SIGPLAN Notices* 26(9):190–198, Association for Computing Machinery, September 1991.
(Also available as Technical Report CMU-CS-91-119, CMU School of Computer Science, Pittsburgh, Penn.)

Control-flow analysis in Scheme.
In *Proceedings of the SIGPLAN '88 Conference on Programming Language Design and Implementation*, June 1988.
(Also available as Technical Report ERGO-88-60, CMU School of Computer Science, Pittsburgh,

Penn.)

Varieties of learning in Soar: 1987.
D Steier, G. Yost, J. Laird, A. Newell, P. Rosenbloom, R. Flynn, A. Golding, T. Polk, O. Shivers, A. Unruh.
In *Proceedings of the Fourth International Workshop on Machine Learning*, Pat Langley (editor), Morgan Kaufmann, June 1987.

D.2. Conference papers (non-refereed)

Constraint satisfaction and problem-space structure in Soar.
In *Proceedings of the Fifth Soar Workshop,* September 17, 1988.

Modelling cryptarithmetic puzzle solving for subject S3 of *Human Problem Solving*.
In *Proceedings of the Soar Spring 87 Workshop*, June 20, 1987.

Constraint propagation and macro-compilation in Soar.
In *Proceedings of the Soar Fall 86 Workshop*, November 22, 1986.

D.3. Conference presentations without proceedings

2006. The role of functional languages in high-assurance software.
Invited talk at NSF/NSA Secure Computation Workshop, Sandia National Labs, November 2006.

2002. The multi-return lambda calculus.
IFIP WG 2.8 Workshop on Functional Programming, Las Vegas.

1999. A simple and efficient natural merge sort.
IFIP WG 2.8 Workshop on Functional Programming, St. Malo, France.

1998. Stack types.
IFIP WG 2.8 Workshop on Functional Programming, Warm Springs, Oregon.

1997. Transducer composition and CPS.
IFIP WG 2.8 Workshop on Functional Programming, Harrowgate, England.

E. Invited keynote addresses

2015   ACM SIGPLAN Scheme Workshop
Keynote address, "An introduction to rank polymorphism."

2011   Brandeis
Distinguished lecture, "Higher-order flow analysis."

2010   University of Montreal
Keynote talk, "Prompt reading and effect logging."
Workshop on Scheme and Functional Programmming.

2009   MIT
Invited talk, "The anatomy of a loop: a story of scope and control."

International Lisp Conference, March 2009 (ILC'09).

2005   Harvard University

Invited talk, "A random walk through startup space."
Y Combinator "Startup School." Y Combinator (`ycombinator.com`) is a Boston-area VC partnership with Harvard and MIT roots.

2004   Indiana University

Invited talk, "The anatomy of a loop: A story of scope and control."
Daniel P. Friedman: A Celebration, December 2004.

2004   Northeastern University

Keynote address, "Bottom-up β-substitution: λ-DAGs and uplinks."
New England Programming Languages and Systems Symposium.

2001   MIT AI Lab

Keynote address, "Lambda: the ultimate lightweight language."
Lightweight Languages Workshop.

1997   San Antonio, Texas

Invited talk, "Rehabilitating CPS."
ACM SIGPLAN Workshop on Partial Evaluation and Semantics-Based Program Manipulation (PEPM'99)

1995   St. Petersburg, Florida

Keynote address, "The future of Scheme."
ACM SIGPLAN Scheme Workshop

F. Other

F.3 Software

2003

Provided reference SML implementation of bottom-up β-reduction algorithm for efficiently manipulating λ-calculus terms to Zhong Shao's group at Yale University for evaluation in FLINT compiler internals.

1993–present   http://scsh.net

Scsh, the Scheme Shell, is a widely-used sytems programming and scripting environment that runs on any generic Unix platform. Among its applications are VLSI CAD, metereology, financial analysis, system administration, and web servers. I use scsh as a mechanism to explore the issues of systems programming in advanced languages. I have been developing scsh, with my students, since 1993. The seventh major release occurred in January 2003, a significant step, making wide-spread, systemic changes throughout the implementation to accomodate concurrency.

1998   http://www.gnu.org

Author of the "comint" family of interactive process-management modules for the emacs text editor. These packages are now a standard part of emacs.

F.4 Published papers (non-refereed)

Why teach programming languages.
Olin Shivers.
Invited white paper for 2008 SIGPLAN Workshop on Programming Language Curriculum, May 2008.
SIGPLAN Notices 43(11) pages 130-132, November 2008.

Bottom-up β-reduction: uplinks and λ-DAGs (extended version).
Olin Shivers and Mitchell Wand.
Technical Report BRICS RS-04-38, DAIMI, Department of Computer Science, University of Århus, December 2004.

SRFIs (Scheme Requests For Implementation) are the current mechanism by which standards are produced for the Scheme language. I have been responsible for the development of five of these, including the core libraries for list- and string-processing. I am the primary designer and sole author of the final standards, which comprise about half a million characters of text and 7900 lines of supporting reference source code. SRFIs are not "refereed" publications, being standards specifications; the SRFI process, however, includes public review and an assigned editor. The standards can be accessed at `http://srfi.schemers.org`.

SRFI	Title	Date
SRFI-33	Integer Bitwise-operation library	2002/7/15
SRFI-32	Sort libraries	2002/7/15
SRFI-14	Character-set library	2000/12/28
SRFI-13	String library	2000/12/28
SRFI-1	List library	1999/10/9

The SRE regular-expression notation.
August, 1998, MIT AI Lab. Available at URL `http://www.ai.mit.edu/~shivers/sre.txt`.

The scsh manual.
Olin Shivers and Brian Carlstrom. November 1995, scsh release 0.4. MIT Laboratory for Computer Science. Also available as URL `ftp://www-swiss.ai.mit.edu/pub/su/scsh/scsh-manual.ps`.

BodyTalk and the BodyNet: A personal information infrastructure.
Personal Information Architecture Note 1 (December 1, 1993), MIT Laboratory for Computer Science.

G. Research proposals and grants (principal or co-principal investigator)

G.1 Funded

Date	Agency	Title	Amount	
2015	NSF	Specification and Verification of Actor Protocols	$500k	(submitted)
2013	DARPA	Probabalistic Programming Languages (PPAML program; joint with BAE and Tufts)	$1.52M	
2013	Cisco	Programming languages for networking	$150k	
2012	Cisco	Programming languages for networking	$200k	
2010	DARPA	Gnosys: Raising the level of discourse in programming systems (CRASH program; joint with University of Utah)	$4.4M	
2010	DARPA	SAFE: A Semantically Aware Foundation Environment for CRASH (CRASH program; joint with BAE, Harvard, UPenn)	$4M	
2009	NSF	Collaborative: Language Towers as Design Frameworks (continuing)	$133k	
2008	NSF	SoD: Collaborative: Language Towers as Design Frameworks (continuing)	$133k	
2004	NSF	Language towers as design frameworks (PI, with Matthew Flatt and Panagiotis Manolios)	$450k	
2004	NSF	Integrating functional computer-aided reasoning into the Computer-Science curriculum (co-PI, with Panagiotis Manolios and J Strother Moore)	$335k	
2003	Microsoft	Faculty support grant	$30k	
1998	IBM	Faculty support grant	$40k	
1997	ARPA	Dynamic domain architectures (co-PI, with Howard Shrobe)	$3M	
1996	NSF	Programming-language structures for representing and optimizing operating-system resources (PI)	$350k	
1995	ARPA	Express: A programming environment for evolutionary software development (PI)	$350k	

G.2 Declined

Date	Source	Title	Amount
2015	NSF	Rank-polymorphic Array Languages for Parallelism	$500k
2010	NSF	Shape-analysis-driven optimization of functional programs	$500k
2009	NSF	Collaborative Research: Shape-analysis-driven optimization of functional programs	$250k
2009/12	Google	Higher-order flow analysis with push-down control abstractions	$101k
2009/4	Google	Higher-order flow analysis with push-down control abstractions	$101k
2009	NSF	REU Site: Programming Systems for Reliable Software	$320k
2007	NSF	Analysis and optimisation of transducer structures in a CPS framework	$620k
2007	NSF	From Scripts to Programs	$914k
2006	NSF	Certification of Safety-Critical Control Software (co-PI, with Eric Feron & Santosh Pande)	$308k
2004	NSF	Extensible pattern-based reasonin for termination of imperative programs (co-PI, with Panagiotis Manolios and Yannis Smaragdakis)	$470k
2004	NSF	Analysis and optimisation of transducer structures in a CPS framework (PI, with Panagiotis Manolios)	$593k
2004	NSF	CycleFree software for robust real-time control (PI, with Richard LeBlanc)	$637k
2004	NSF	ReFlex: Fexible and reliable systems technologies for responding to massively disruptive events (co-PI, with Ling Liu, Ralph Merkle, Calton Pu, Andre dos Santos)	$4M
2002	NSF	Extensible languages and certified computation (PI, with H. Shrobe & K. Arkoudas)	$580k
2000	NSF	A high-level operating system for component software (co-PI, with K. Dybvig, M. Felleisen, M. Flatt, J. Lepreau, A. Sabry))	$5M
1998	ARPA	An evolutionary modeling and reasoning framework for evolutionary design of complex software (PI, with Howard Shrobe)	
1995	ARPA	Tactical BodyNet Technology: An open architecture, wearable computer system (PI, with Philip Alvelda)	$1,500k
1994	ARPA	BodyNet and BodyTalk: A personal information infrastructure (PI)	$2,100k

H. Research proposals and grants (contributor)

Date	Agency	Title	Amount
1997	ARPA	Computational Video for Collaborative Applications (with David Gifford)	$1.8M

III. Service

A. Professional activities

A.1 Memberships and activities in professional societies

September 1999–present
 IFIP WG2.8 Working Group on Functional Programming Languages.

A.2 Conference committee activites

Date	Committee	Role	Organisation
2016	Program	Member	International Conference on Functional Programming (ICFP)
2013	Program	Member	Practical Aspects of Declarative Languages (PADL)
2013	Program & Steering	Member	European Lisp Symposium (ELS 2013)
2012	Program	Member	Functional and Logic Programming (FLOPS) 2012
2010	Program	Member	Code Generation and Optimization (CGO)
2009	External Review	Member	Programming Language Design and Implementation (PLDI)
2008	Steering	Member	SIGPLAN Workshop on Undergraduate Programming Curricula
2008	Program	Member	Symposium on Trends in Functional Programming (TFP)
2007	Program	Member	Symposium on Trends in Functional Programming (TFP)
2007	Program	Member	European Conference on Object-oriented Programming (ECOOP)
2007	Program	Member	ACM SIGPLAN Symposium on Principles of Programming Languages
2004	Program	Co-chairman	Scheme Workshop
2003	Program	Chairman	ACM SIGPLAN International Conference on Functional Programming
2003	Program	Member	ACM SIGPLAN International Conference on Generative Programming and Component Engineering
2002–2006	Steering	Member	ACM SIGPLAN International Conference on Functional Programming
2000–present	Steering	Member	Scheme Workshop
2002	Program	Member	Lightweight Languages Workshop
2002	Program	Chairman	ACM SIGPLAN Scheme2002 Workshop
2002	Steering	Member	ACM SIGPLAN Scheme2002 Workshop
2002	Program	Member	ACM SIGPLAN International Conference on Functional Programming
2001	Program	Member	ACM SIGPLAN Continuations Workshop
2000	Program	Member	ACM SIGPLAN Scheme Workshop
1996–2000	Steering	Member	ACM SIGPLAN International Conference on Functional Programming
1995	Program	Member	ACM SIGPLAN International Conference on Functional Programming

B. University committees

Date	School	Committee
2015	Northeastern	Graduate
2015	Northeastern	Associate Dean Search (chairman)
2014	Northeastern	Graduate
2013	Northeastern	Interdisciplinary Science and Engineering Building
2013	Northeastern	Hiring
2013	Northeastern	Undergraduate curriculum
2012	Northeastern	Undergraduate curriculum
2012	Northeastern	Merit (chairman)
2012	Northeastern	Hiring
2011	Northeastern	Admissions
2011	Northeastern	Undergraduate curriculum
2011	Northeastern	Merit (chairman)
2010	Northeastern	Undergraduate curriculum
2010	Northeastern	*Ad hoc* committee on the introductory course sequence
2009	Northeastern	Ph.D. admissions
2008	Northeastern	Hiring
2007	Northeastern	Ph.D. admissions
2006	Northeastern	Ph.D. admissions
2005	Georgia Tech	Undergraduate "threads" curriculum
2004	Georgia Tech	Undergraduate curriculum
		Graduate
2003	Georgia Tech	Computing and Networking Services
2002	Georgia Tech	Faculty-hiring
2001	Georgia Tech	ACTB/Klaus building programming

D. Ph.D. examining committees

Harsh Chamarthi, 2015–present.
Advisor: Panagiotis Manolios.

Mitesh Jain, 2016–present.
Advisor: Panagiotis Manolios.

Paul Stansifer.
Advisor: Mitchell Wand.

Vincent St-Amour, 2013–2015.
Advisor: Matthias Felleisen.

Aaron Turon, 2011–2013.
Advisor: Mitch Wand.
Dissertation title: *Abstraction and composition for fine-grained concurrency*

Stephen Tharpe Strickland, 2010–2013.
Advisor: Matthias Felleisen.
Dissertation title: *Scaling Contracts to Realistic Languages*

Kevin Atkinson, 2005–2011.
Advisors: Matthew Flatt and Gary Lindstrom (University of Utah).
Dissertation title: *ABI Compatibility Through a Customizable Language*

Felix Klock, 2008–2011.
Advisor: Will Clinger.
Dissertation title: *Bounded-Latency Generational Garbage Collection*

David Herman, 2006–2010.
Advisor: Mitch Wand.
Dissertation title: *A Theory of Typed Hygienic Macros*

Ryan Culpepper, 2007–2010.
Advisor: Matthias Felleisen.
Dissertation title: *Taming Macros*

Sam Tobin-Hochstadt, 2007–2010.
Advisor: Matthias Felleisen.
Dissertation title: *Typed Scheme: Bringing Types to Untyped Languages*

Richard Cobbe, 2007–2009.
Advisor: Matthias Felleisen.
Dissertation title: *Putting Java's Null in its Place*

Mads Sig Ager, 2004–2006.
Advisor: Olivier Danvy (University of Aarhus).
Dissertation title: *Partial Evaluation of String Matchers and Constructions of Abstract Machines*

Galen Swint, 2005–present.
Advisor: Calton Pu.
Dissertation title: *Clearwater: Extensible, Flexible and Modular Code Generation of Infopipes*

Wei Han, Georgia Tech, 2004.
Advisor: Ling Liu.
Dissertation title: *Wrapper Application Generation for the Semantic Web: An XWRAP Approach*

Brian MacNamara, Georgia Tech, 2004.
Advisor: Yannis Smaragdakis.
Dissertation title: *Multi-paradigm programming*

Donglin Liang, Georgia Tech, 1999–2002.
Advisor: Mary Jean Harrold.
Dissertation title: *Developing Practical Program Analyses for Programs with Pointers*

Daniel Damian, University of Århus, defended August 2001.
Advisor: Olivier Danvy.
Dissertation title: *On Static and Dynamic Control-Flow Information in Program Analysis and Transformation*

Joanna Bryson, MIT Artificial Intelligence Lab, defended April 2001.
Advisor: Lynn Stein.
Dissertation title: *Intelligence by design*

Dominique Boucher, University of Montreal, defended December, 1999.
Advisor: Marc Feeley.
Dissertation title: *Analyse et optimisation globales de modules compilés séparément à l'édition des liens*

E. Consulting and advisory appointments

Summer 2005–2015   Blindsight Corp.
    Advisory board. Blindsight develops assistive technology for blind and visually impaired persons. The company was acquired by Amazon in 2015.

Fall 2000–present   Smartleaf, Inc.
    Technical oversight; advisor to CTO.

1999–2000   ArsDigita
    Technical consultant and advisor to chairman.

1992–1997   Perot Systems
    Advisor to Morton H. Meyerson, company chairman.

1997   Flash Communications
    Technical oversight; business strategy; raised all investment capital. Flash developed scalable instant-message services. Company purchased by Microsoft one year after founding; Microsoft's IM system is based on Flash technology.

F. Research project reviewer

April 2013	National Science Foundation
December 2011	National Science Foundation
December 2003	NSERC (Canada)
May 2003	National Science Foundation
January 2001	National Science Foundation

IV. National and international professional recognition

IV.D Patents

    "Portfolio Management System." Gerard Michael, Olin Shivers, Eugene Sorets, Mark Linker, Daniel Rie. US Utility Application #09/891,045, June 25, 2001,

IV.E Editorial and reviewer work for technical journals and publishers

September 2009-present   Higher-order and Symbolic Computation
    Co-editor of special issue dedicated to Mitchell Wand.

2001–2004   Journal of Functional Programming
    Editorial board.

November 2006–2007   Transactions on Programming Languages and Systems
    Editorial board.

2005   Higher-order and Symbolic Computation
    Co-editor of special issue on the Scheme programming language, issue 18(3/4).

V. Other contributions

V.A Invited papers at meetings and symposia

A partial list of my invited talks: Google Research, Sandia National Laboratory, École Normale Superieure, University of Copenhagen, Paris VI, Paris VII, Indiana University, Hamilton Institute, Yale, INRIA, University of Århus, Harvard, Y Combinator, NEC, Academia Sinica, Peking Software Institute, IFIP WG2.8 (three times, prior to election), Rice University, University of Hong Kong, University of Montreal, Carnegie-Mellon University, Northeastern University, Jane Street Capital.

V.B Special activities

2009–present
Scheme Language committee:
- Member steering committee
- Member Working Group 1
- Member Working Group 2

2009–2010
Steering committee for symposium in honor of Mitchell Wand and co-editor of special *festschrift* issue of *Higher-order and Symbolic Computation* collecting invited papers.

1998
ICFP '98 programming contest—ran first such contest at the SIGPLAN ACM International Conference on Functional Programming.