Sam Tobin-Hochstadt

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Research Interests

My research focuses on the design and analysis of software and programming languages. I am particularly interested in how programs grow from prototype scripts to robust software, and how programming language design can support this process.

Appointments

2013—	Assistant Professor, School of Informatics and Computing, Indiana University
2011—2013	Research Assistant Professor, CCIS, Northeastern University
2009—2011	Mozilla Postdoctoral Research Fellow, CCIS, Northeastern University
2003—2009	Research & Teaching Assistant, CCIS, Northeastern University
2004—2006	Intern, Programming Languages Research Group, Sun Microsystems Labs

Education

2010	PH.D in Computer Science, Northeastern University
	  Thesis title: *Typed Scheme: From Scripts to Programs*
	  Received CCIS Outstanding Research Award

2006	MA in Computer Science, Northeastern University
2003	BS in Computer Science with Honors, University of Chicago

Grants

2014—2017	Compiler Coaching, Co-Principal Investigator (PI Matthias Felleisen). Grant awarded by NSF Division of Computer and Communication Foundations. $150,000
2014—2017	Science of Security Lablet, Co-PI for Lablet grant to University of Maryland (PI Jonathan Katz). Grant awarded by National Security Agency. $150,000
2012—2015	Behavioral Software Contract Verification, Principal Investigator (Co-PI David Van Horn). Grant awarded by NSF Division of Computer and Communication Foundations. $399,992
2011—2012	Gift from the Mozilla Foundation, $74,900
2009—2011	2-year Mozilla Research Fellowship, Mozilla Foundation, $200,000

Publications: Journals & Selective Conferences

2015	Monotonic References for efficient gradual typing, with Jeremy Siek, Matteo Cimini, Michael M. Vitousek, and Ronald Garcia, *Proc. of the 24th European Symposium on Programming (ESOP)*, to appear.
	The Design and Implementation of Typed Scheme, with Matthias Felleisen, *Higher Order and Symbolic Computation (HOSC)*, to appear.

2014	Soft Contract Verification, with Phuc C. Nguyen and David Van Horn, *Proc. 19th ACM International Conference on Functional Programming (ICFP).*
	Taming the Parallel Effect Zoo: Extensible Deterministic Parallelism with LVish, with Lindsey Kuper, Aaron Todd, and Ryan Newton, *Proc. 35th ACM Conference on Programming Language Design and Implementation (PLDI).* **Artifact successfully evaluated**
	The Network as a Language Construct, with Tony Garnock-Jones and Matthias Felleisen, *Proceedings 22nd European Symposium on Programming (ESOP).*
2013	From Principles to Practice with Class in the First Year, with David Van Horn, *Proceedings Second Workshop on Trends in Functional Programming In Education (TFPIE), EPTCS Vol. 136.*
	Constraining Delimited Control with Contracts, with Asumu Takikawa and T. Stephen Strickland, *Proc. of the 22nd European Symposium on Programming (ESOP).*
2012	Gradual Typing for First-Class Classes, with Asumu Takikawa, T. Stephen Strickland, Christos Dimoulas, and Matthias Felleisen, *Proc. of the 2012 ACM Conference on Object Oriented Programming Systems, Languages, and Applications (OOPSLA).* **Best Student Paper**
	Higher-Order Symbolic Execution via Contracts, with David Van Horn, *Proc. of the 2012 ACM Conference on Object Oriented Programming Systems, Languages, and Applications (OOPSLA).*
	Optimization Coaching, with Vincent St-Amour and Matthias Felleisen, *Proc. of the 2012 ACM Conference on Object Oriented Programming Systems, Languages, and Applications (OOPSLA).*
	Chaperones and Impersonators: Runtime Support for Reasonable Interposition, with T. Stephen Strickland, Robert Bruce Findler, and Matthew Flatt, *Proc. of the 2012 ACM Conference on Object Oriented Programming Systems, Languages, and Applications (OOPSLA).*
	Complete Monitoring for Behavioral Contracts, with Christos Dimoulas and Matthias Felleisen, *Proc. 21st European Symposium on Programming (ESOP).*
	Run Your Research: On the Effectiveness of Lightweight Mechanization, with Casey Klein, John Clements, Christos Dimoulas, Carl Eastlund, Matthias Felleisen, Matthew Flatt, Jay A. McCarthy, Jon Rafkind, and Robert Bruce Findler, *Proc. 39th ACM Symposium on Principles of Programming Languages (POPL).*
	Typing the Numeric Tower, with Vincent St-Amour, Matthew Flatt, and Matthias Felleisen, *2012 Symposium on Practical Aspects of Declarative Languages (PADL).*
2011	Languages as Libraries, with Vincent St-Amour, Ryan Culpepper, Matthew Flatt, and Matthias Felleisen, *Proc. 32nd ACM Conference on Programming Language Design and Implementation (PLDI).*
2010	Logical Types for Untyped Languages, with Matthias Felleisen, *Proc. 15th ACM International Conference on Functional Programming (ICFP).*
2009	Practical Variable-Arity Polymorphism, with Matthias Felleisen and T. Stephen Strickland, *Proc. Eighteenth European Symposium on Programming (ESOP).*
2008	The Design and Implementation of Typed Scheme, with Matthias Felleisen, *Proc. 35th ACM Symposium on Principles of Programming Languages (POPL).*
2006	Interlanguage Migration: From Scripts to Programs, with Matthias Felleisen, *Dynamic Languages Symposium at OOPSLA (DLS).*

Publications: Workshops & Technical Reports

2014	Meta-tracing makes a fast Racket, with Carl Friedrich Bolz, Jeremy Siek, and Tobias Pape, *8th Workshop on Dynamic Languages and Applications (DYLA).*
2011	Semantic Solutions to Program Analysis Problems (Abstract), with David Van Horn, *2011 Fun Ideas and Thoughts Session at the 32nd ACM Conference on Programming Language Design and Implementation (FIT).*

2010	Extensible Pattern Matching for Extensible Languages (Abstract), *2010 Symposium on Implementation and Application of Functional Languages (IFL).*
	Where are you going with those types? (Abstract), with Vincent St-Amour, Matthias Felleisen, and Matthew Flatt, *2010 Symposium on Implementation and Application of Functional Languages (IFL).*
	Purely Functional Data Structures for Typed Racket, with Hari Prashanth K R, *2010 Workshop on Scheme and Functional Programming.*
2009	Cycles without pollution: a gradual typing poem, with Robert Bruce Findler, *First Workshop on Script to Program Evolution (STOP).*
2007	Advanced Macrology and the Implementation of Typed Scheme, with Ryan Culpepper and Matthew Flatt, *2007 Workshop on Scheme and Functional Programming.*
2005	A Core Calculus of Metaclasses, with Eric Allen, *Twelfth Workshop on Foundations of Object-Oriented Languages (FOOL).*
2004—2008	Fortress Language Specification, with Eric Allen, David Chase, Joe Hallet, Victor Luchangco, Jan-Willem Maessen, Sukyoung Ryu, and Guy L. Steele Jr., versions 0.618-1.0, Sun Microsystems Technical Report.

Patents

2006	Method and apparatus for expressing and checking relationships between types, with Sukyoung Ryu, Eric Allen, Victor Luchangco, and Joe Hallet, US Patent 8,225,294.

Teaching

At Indiana

2015	Topics in Programming Languages: Metaprogramming
2014	Introduction to Computer Science
	Object-Oriented Software Management
2013	Object-Oriented Software Development

At Northeastern

2011—2013	Fundamentals of Computer Science 2 (Honors)
2005	Fundamentals of Computer Science 2

Students

2014—	Ambrose-Bonnaire-Sergeant, Ph.D student
2014—	Andrew Kent, Ph.D student
2014—	Spenser Bauman, Ph.D student
2011—	Tony Garnock-Jones, Ph.D student, Northeastern University (Co-advisor)
2010—	Vincent St-Amour, Ph.D student, Northeastern University (Co-advisor)
2012—2013	Phil Nguyen, MS student, Northeastern University
2009—2011	Hari Prashanth K R, MS Thesis, Northeastern University
2007	Ivan Gazeau, Ph.D student from École normale supérieure (Paris)

Selected Talks

2014	Typing Scheme to Typing Racket. Dagstuhl Meeting on Scripting Languages
	Typed Racket: a playground for language design. IFIP Working Group 2.16 (Language Design)
	Typed Racket and Contracts. Shonan Meeting on Behavioral Specification
	Typed Racket as a Research Agenda. EPFL Department of Computer Science
2013	From Principles to Practice with Class in the First Year. OOPSLA PC Meeting Workshop
	Evolving Software from Scripts to Programs. ETH Zurich Department of Computer Science, Indiana University Department of Computer Science, Iowa State University Software Engineering Seminar, University of Idaho Department of Computer Science, University of Iowa Department of Computer Science
2012	Research meets Application: Life on the EcmaScript Committee. Northeastern University Ph.D Seminar
	Occurrence Typing. Dagstuhl meeting on Foundation of Scripting Languages
	Languages as Libraries. Dagstuhl meeting on Foundation of Scripting Languages
2011	Domain-Specific Languages for GnoSys. DARPA CRASH PI Meeting
	Evolving Software from Scripts to Programs. Oregon State University Department of Computer Science
2010	From Scripts to Programs. Indiana University Department of Computer Science
	Logical Types for Scheme. New England Programming Languages and Systems Symposium
2010	Typed Scheme: From Scripts to Programs. Harvard Programming Languages Seminar
2009	Types for Scheme, in Scheme. Boston Lisp Meeting
	Typed Scheme: From Scripts to Programs. Sun Microsystems Laboratories
	The Design and Implementation of Typed Scheme. Symposium in Honor of Mitchell Wand
2008	To Type or Not to Type. Northeastern University ACM Lecture Series

Professional Activities

2015	Conference on Programming Language Design and Implementation, Program Committee
	Symposium on Princples of Programming Languages, External Review Committee
2014	Symposium on Implementation and Application of Functional Languages, Chair
	Student Research Competition at ICFP, Program Committee
	Dynamic Languages Symposium, Program Committee
	Scala Workshop, Program Committee
	International Lisp Conference, Program Committee
2013—2014	International Conference on Functional Programming, Workshop Co-Chair
2013	Foundations of Software Engineering 2013 New Ideas Track, Program Committee
	SPLASH: OOPSLA, Program Committee
2012	Dynamic Languages Symposium, Program Committee
	International Conference on Functional Programming, Program Committee
	Workshop on Script to Program Evolution, Chair
2010—	TC39 - ECMAScript (Standards Committee for JavaScript), Member
2011	Workshop on Scheme and Functional Programming, Program Committee
	New England Programming Languages and Systems Symposium, Chair
	Workshop on Script to Program Evolution, Program Committee
	Workshop on Types in Language Design and Implementation, Program Committee
2010	Workshop on Foundations of Object-Oriented Languages, Program Committee
	Symposium on Trends in Functional Programming, Program Committee
	Reviewer for J. of Functional Programming, TOPLAS, ESOP, POPL, OOPSLA, ECOOP, VMCAI, ICFP

Professional Associations

Association for Computing Machinery, SIGPLAN