

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 Ralfkind, 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 Engi-
neering 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
- 2008 The Design and Implementation of Typed Scheme. Symposium in Honor of Mitchell Wand
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 Principles 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–
2011 TC39 - ECMAScript (Standards Committee for JavaScript), Member
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