

Research Interests

Programming languages, type systems, operational semantics, program logics, compilers, security, and network programming.

Education

Ph.D., Computer Science

Princeton University

2011 - 2015

M.A., Computer Science

Princeton University

2009 - 2011

B.S., Computer Science

Ithaca College

2001 - 2005

Publications

Type Inference for Static Compilation of JavaScript

Satish Chandra, Colin Gordon, Jean-Baptiste Jeannin, Cole Schlesinger, Manu Sridharan, Frank Tip, Yong-Il Choi. OOPSLA 2016.

A Practical Framework for Type Inference Error Explanation

Calvin Loncaric, Satish Chandra, Cole Schlesinger, Manu Sridharan. OOPSLA 2016.

Transparent, Live Migration of a Software-defined Network

Soudeh Ghorbani, Cole Schlesinger, Matthew Monaco, Eric Keller, Matthew Caesar, Jennifer Rexford, David Walker. ACM Symposium on Cloud Computing (SoCC), August 2015.

Concurrent NetCore: From Policies to Pipelines

Cole Schlesinger, Michael Greenberg, and David Walker. International Conference on Functional Programming (ICFP). September, 2014.

Programming Protocol-Independent Packet Processors

Pat Bosshart, Dan Daly, Martin Izzard, Nick McKeown, Jennifer Rexford, Cole Schlesinger, Dan Talayco, Amin Vahdat, George Varghese, and David Walker. <http://arxiv.org/abs/1312.1719v2>.

NetKAT: Semantic Foundations for Networks

Carolyn Jane Anderson, Nate Foster, Arjun Guha, Jean-Baptiste Jeannin, Dexter Kozen, Cole Schlesinger, and David Walker. ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL), 2014

The Frenetic Network Controller

github.com/frenetic-lang/frenetic/contributors

The OCaml Users and Developers Workshop 2013

Towards JavaScript Verification with the Dijkstra State Monad

Nikhil Swamy, Joel Weinberger, Cole Schlesinger, Juan Chen, and Ben Livshits. ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI), 2013.

Publications
(continued)

Languages for Software-defined Networks

Nate Foster, Arjun Guha, Mark Reitblatt, Alec Story, Michael J. Freedman, Naga Praveen Katta, Christopher Monsanto, Joshua Reich, Jennifer Rexford, Cole Schlesinger, David Walker, and Rob Harrison. IEEE Communications Magazine, Vol. 51, No. 2. February 2013.

Abstractions for Network Update

Mark Reitblatt, Nate Foster, Jen Rexford, Cole Schlesinger, and David Walker. SIGCOMM, August 2012.

Splendid Isolation: A Slice Abstraction for Software-defined Networks

Stephen Gutz, Alec Story, Cole Schlesinger, Nate Foster. Hot Topics in Software-defined Networks (HotSDN), August 2012.

Modular Protections against Non-control Data Attacks

Cole Schlesinger, Karthik Pattabiraman, Nikhil Swamy, David Walker, and Benjamin Zorn. Computer Security Foundations Symposium (CSF), July 2011.

Professional Experience

Research Engineer

2015 - Present

Samsung Research America, Mountain View, CA
Advanced Programming Tools

Developed new tools, analyses, and optimizations for JavaScript, home automation for the Internet of Things, and software-defined networks that had practical internal impact as well as academic publications.

Research Intern

Summer 2014

Microsoft Research, Cambridge, UK
Systems and Networking Group

Designed a semantics for quality of service in software-defined networks based on network calculus, along with a prototype for statically analyzing delay and backlog. Joint work with Hitesh Ballani, Thomas Karagiannis, and Dimitrios Vytiniotis.

Research Intern

Summer 2011

Microsoft Research, Redmond, WA
Research in Software Engineering (RiSE) Group

Developed the Dijkstra State Monad, a variant of the Hoare State Monad based on predicate transformers, and an associated type inference algorithm for automated verification of stateful, higher-order programs.

Software Engineer

2005 - 2009

GammaTech, Inc., Ithaca, NY

Designed and implemented research prototypes leveraging GammaTech's static-analysis platform under grants from the US government's SBIR program. Assisted in drafting funding proposals for developing static-analysis technologies into marketable tools.

Research Assistant
Carnegie Mellon University/Ithaca College
Ithaca, NY

Summer 2003

Worked with Dr. Wanda Dann on the Alice Project, an interactive, 3D learning environment for teaching fundamental concepts in computer science. Wrote prose and exercises for the Alice textbook. Designed and implemented accompanying code exercises.

Teaching Experience

Teaching Assistant
Princeton University, Princeton, NJ
COS 333: Advanced Programming Techniques

Spring 2011

Played the role of “project manager/boss” for teams of students tasked with a semester-long “programming in the large” project, and evaluated projects submitted at the semester’s end.

Teaching Assistant
Princeton University, Princeton, NJ
COS 217: Introduction to Programming Systems

Fall, 2010

Presented weekly supplemental lectures and administered programming assignments. Topics included: machine organization and assembly language programming, program design and development, and software tools.

Instructor
W.E.B. Dubois Scholars Institute
Princeton University, Princeton, NJ
Introduction to Computer Science

Summer 2010

Taught a condensed version of a freshman-level, introductory computer science course, covering basic hardware and software systems, basic algorithms and data structures, and programming in Java.

Teaching Assistant
Ithaca College, Ithaca, NY

Summer 2002, Summer 2003

Developed and lectured on the technical content of an introductory course on web design as part of a partnership between Ithaca College and the Frederick Douglass Academy.

Presentations

Quality of Service Abstractions for Software-defined Networks
Programming Languages and Verification Technology for Networking (PLVNET).
January, 2015.

Concurrent NetCore: From Policies to Pipelines
International Conference on Functional Programming (ICFP). September, 2014.

Network Programming in Frenetic
Tutorial, ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI), 2013. Nate Foster, Arjun Guha, Mark Reitblatt, Cole Schlesinger.

Programming Data Centers Declaratively
Open Networking Summit, poster session, 2013.

Presentations
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Splendid Isolation: A Slice Abstraction for Software-Defined Networks
Hot Topics in Software Defined Networks (HotSDN), 2012.

Verification Condition Generation with the Dijkstra State Monad
Presented at Microsoft Research, 2011.

Modular Protection against Non-control Data Attacks
Computer Security Foundations Symposium (CSF), 2011.

Yarra: An Extension to C for Data Integrity and Partial Safety
New Jersey Programming Languages Symposium, December 2010.

Honors and Awards

Siebel Scholar
Inducted September, 2013

President's Scholarship
Ithaca College, 2001 - 2005.

Phi Kappa Phi
Inducted May, 2005.

Oracle Society
Inducted May, 2005.

Upsilon Pi Epsilon
Founding member and Secretary, 2003.