Shrutarshi Basu

CONTACT INFORMATION

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RESEARCH INTERESTS

Programming languages, programmable systems and program analysis.
Computational techniques for legal reasoning and analysis.

EDUCATION

2011 – 2018	PhD in Computer Science Applied Programming Languages and Programmable Networks	Cornell University
2007 – 2011	Dual Bachelors degree, *Magna Cum Laude* B.S. in Electrical and Computer Engineering with Honors B.A. in Computer Science with Honors	Lafayette College

EXPERIENCE

Fall 2020	Lecturer Organizing & Teaching a senior course on compiler design & implementation	Tufts University
2018-now	Post-Doctoral Fellow Developing tools and techniques for modeling legal domains and verifying software with respect to the legal environment in which they operate	Harvard University
2012–2014 2016–2018	Graduate Research Assistant Researched novel network management systems leveraging tools and techniques from programming languages theory and practice	Cornell University
05-08 2015	Research Intern Developed a programmable management system for packet-optical networks	Fujitsu Labs of America
2011 – 2012 2013 & 2015	Teaching Assistant Teaching Assistant for various graduate & undergraduate courses (see below)	Cornell University
05-08 2011 01-05 2015	Software Engineering Intern Performance and interface improvements to the CodeSonar static analyser	GrammaTech Inc
06-12 2009	Computer Science Undergraduate Researcher Researched dynamic program representations for use in blended analysis	Virginia Tech

HONORS AND AWARDS

2011	J.J. Ebers Memorial Award Awarded for "high academic achievement and noteworthy professional interest in the field of electrical engineering."	Lafayette College, ECE Dept.
2010	Outstanding Research Award *Honorable mention* for research in static analysis and computer generated art	Computer Research Association
2010	James P. Schwar Prize Awarded to a computer science student on faculty nomination	Lafayette College, CS Dept.
2009	McClean Tau Beta Pi Engineering Prize Awarded for "excelling in academics & extra-curricular activities"	Lafayette College
2009 – 2011	Honor Society Memberships Tau Beta Pi (Engineering), Eta Kappa Nu (Electrical and Computer Engineering) Upsilon Pi Epsilon (Computer Science)	

IN SUBMISSION

Notational Programming for Notebook Environments:
A Case Study with Quantum Circuits
Ian Arawjo, Michael Roberts, *Shrutarshi Basu*, Tapan Parikh
Proceedings of the 35th Annual ACM Symposium on User Interface Software and Technology (UIST '22)

JOURNAL PAPERS

A Programming Language for Estates and Future Interests
James Grimmelmann, *Shrutarshi Basu*, Nate Foster, Shan Parikh, Ryan Richardson
(To appear) Yale Journal of Law and Technology (2022). Yale Law School, 2022

Merlin: A Language for Provisioning Network Resources
Robert Soulé, *Shrutarshi Basu*, Parisa Jalili Marandi, Fernando Pedone, Robert D. Kleinberg, Emin Gün Sirer, Nate Foster
IEEE/ACM Trans. Netw. 26 (2017). 2017

PEER-REVIEWED CONFERENCE PROCEEDINGS

Property Conveyances as a Programming Language
Shrutarshi Basu, Nate Foster, James Grimmelmann
Proceedings of the 2019 ACM SIGPLAN International Symposium on New Ideas, New Paradigms, and Reflections on Programming and Software, Onward! 2019, Athens, Greece, October 23-24, 2019

Life on the Edge: Unraveling Policies into Configurations
Shrutarshi Basu, Nate Foster, Hossein Hojjat, Paparao Palacharla, Christian Skalka, Xi Wang
Proceedings of the 2017 Symposium on Architectures for Networking and Communications Systems, ANCS 2017, Beijing, China, May 18-19, 2017

Merlin: A Language for Provisioning Network Resources
Robert Soulé, *Shrutarshi Basu*, Parisa Jalili Marandi, Fernando Pedone, Robert D. Kleinberg, Emin Gün Sirer, Nate Foster
Proceedings of the 10th ACM International on Conference on emerging Networking Experiments and Technologies, CoNEXT 2014, Sydney, Australia, December 2-5, 2014

Managing the Network with Merlin
Robert Soulé, *Shrutarshi Basu*, Robert Kleinberg, Emin Gün Sirer, Nate Foster
Twelfth ACM Workshop on Hot Topics in Networks, HotNets-XII, College Park, MD, USA, November 21-22, 2013

Exploring the impact of context sensitivity on blended analysis
Marc Fisher II, Bruno Dufour, *Shrutarshi Basu*, Barbara G. Ryder
26th IEEE International Conference on Software Maintenance, Timisoara, Romania, September 12-18, 2010

PEER-REVIEWED WORKSHOP PRESENTATIONS

Legal Calculi
Shrutarshi Basu, Anshuman Mohan, James Grimmelmann, Nate Foster
Programming Languages and the Law (ProLaLa 2022), Workshop Presentation, 2022, Philadelphia

Littleton: An Educational Environment for Property Law
Shrutarshi Basu, Anshuman Mohan, James Grimmelmann, Nate Foster
Programming Languages and the Law (ProLaLa 2022), Workshop Presentation, 2022, Philadelphia

Merlin: Programming the Big Switch
Robert Soulé, *Shrutarshi Basu*, Robert Kleinberg, Emin Gün Sirer, Nate Foster
Open Networking Summit (ONS '14), Workshop Presentation, 2014

A Language Based Approach to Computational Art
Shrutarshi Basu, Chun Wai Liew
Off the Beaten Track Workshop, Workshop Presentation, 2012, Philadelphia

OTHER PUBLICATIONS AND PRESENTATIONS

Introducing Cyber-Legal Systems
Shrutarshi Basu
Ninth Annual Internet Law Works-in-Progress Conference, 2019

MCEther: Verifying Legal Properties of Smart Contracts
Shrutarshi Basu
Ninth Annual Internet Law Works-in-Progress Conference, 2019

Languages for Path-based Network Programming
Shrutarshi Basu
Dissertation as requirement for PhD degree at Cornell University, 2018

Software-Programmed Optical Networking with Integrated NFV Service Provisioning
Victor Mehmeri, Xi Wang, *Shrutarshi Basu*, Qiong Zhang, Paparao Palacharla, Tadashi Ikeuchi, Idelfonso Tafur Monroy, Juan José Vegas Olmos, Nate Foster
Optical Fiber Communication Conference (OFC); SDN/NFV Demonstration Zone, 2017

Property Law as a Programming Language
Shrutarshi Basu, James Grimmelmann, Nate Foster
5th Annual Works-in-Progress Roundtable on Law and Computer Science, 2017

Merlin: Unified Management for Diverse Networks
Shrutarshi Basu, Robert Soulé, Robert Kleinberg, Emin Gün Sirer, Nate Foster
24th ACM Symposium on Operating Systems Principles (SOSP '13), Poster Session., 2013

Application of formal grammars to complex patterns and evolving systems
Shrutarshi Basu, Rhodes Baker, Khine Lin
Proceedings of the National Conference on Undergraduate Research, 2009

TEACHING	2020	**Compilers**	Tufts University

Instructor of record for a senior undergraduate course on compiler design and implementation at Tufts University. Duties included preparing lecture materials, twice-weekly lectures and office hours, designing and evaluating homeworks and course projects. Adapted course materials and structure for remote, online education due to COVID-19 pandemic.

2015 — Software Engineering — Cornell University
Teaching assistant for a course on the practical problems of specifying, designing, building, testing, and delivering software systems. Topics included professionalism, project management, and the legal framework for software development. Helped manage student teams developing projects for real clients.

2013 — Advanced Programming Languages — Cornell University
Teaching assistant for a course introducing the mathematical foundations and tools of programming languages. Topics include inductive definitions, fixed points, formal semantics, type systems, polymorphism, program transformations, and program logics.

2012 — Functional Programming & Data Structures — Cornell University
Teaching assistant for an intermediate programming course focused on software design and functional programming. Topics include functional and concurrent programming, writing and using specifications, modularity and data abstraction, reasoning about program correctness and system performance.

2011 — Object-Oriented Programming & Data Structures — Cornell University
Teaching assistant for an advanced beginner programming course and an introduction to computer science. Topics include program design and development, object-oriented programming, proofs of correctness, complexity analysis, recursion, and commonly used data structures.

SERVICE	2021	**Reviewer & Program Committee Member** Workshop on Programming Languages and the Law (ProLaLa 2022)
	2020	**Organizer & Website Administrator** Harvard CRCS Workshop on AI for Social Impact
	2020	**Reviewer & Session Chair** International Symposium on Foundations and Applications of Blockchain
	2020	**Reviewer on the Artifact Evaluation Commitee** ACM Conference on Programming Language Design and Implementation
	2019–2020	**Organizer & Speaker Coordinator** Harvard Security, Programming Languages and Systems Seminar
	2018	**Reviewer on the Artifact Evaluation Commitee** ACM International Conference on Functional Programming

PROJECTS	2018	**Model Checking for Ethereum Smart Contracts** Harvard University Implementing a BLAST-like model checker for Ethereum bytecode, which allows for the verification of logical assertions about Ethereum smart contracts. This model checker will be extended to incorporate legal models for relevant legislation governing smart contracts, so that contracts can be checked for compliance with legal restrictions.
	2017	**Conveyances as a programming language** Cornell University The syntactic conventions used to transfer ownerships in property have been codified, but only in informal and potentially ambiguous ways. Both the syntactic structure and underlying semantics of conveyances are amenable to analysis using tools from programming language theory and practice. This preliminary work develops a language and core calculus for expressing conveyances, and a query language for analyzing the resulting property transfers.
	2016	**EdgeNetKAT: Unraveling policies into edge configurations** Cornell University Implementation of high-level policies by pushing functionality to the edge and using the core merely for transit. Building on the NetKAT framework and linear programming solvers, we analyze and transform policies into configurations that can be installed at the edge of the network.
	2015	**SPN OS: Software-Programmable Hybrid Networks** Fujitsu Labs of America A framework for controlling hybrid packet optical networks, using the NetKAT programming language for specifying policies, and a novel virtualization layer targeting both packet switches and optical circuit devices.
	2012–2014	**Merlin: Unified Management for Diverse Networks** Cornell University A network management framework for expressing policies in a high-level, declarative language based on regular expressions. A compiler partitions policies into configurations for switches, middleboxes, and end hosts using a constraint-solver to determine the optimal placement strategy.
	2011	**Freon: Network control from the edge** Cornell University A novel architecture for datacenter network management using end hosts to perform the majority of the packet processing work.
	2011	**Proctor: An Actor library for Ruby** Lafayette College Threaded, concurrent Actors in Ruby using a prototype-based programming style. Makes extensive use of Ruby's metaprogramming abilities
	2008–2010	**Metaphor: A declarative approach to computational art** Lafayette College Software for visual artists to leverage computational tools. A declarative programming language used as an interface to graphical libraries.