Jason Reed

Phone: (412) 600-5284
Email: jcreed@gmail.com
Web: http://jcreed.org/

Education

B.S. Computer Science and B.S. Mathematics, Carnegie Mellon University, 2002.

Ph.D. Computer Science, Carnegie Mellon University, 2009.

Thesis: A Hybrid Logical Framework
Implementation in SML, added features to Twelf system

Employment

Google

Google Wallet (Java, Python) Database programming, test frameworks, distributed system backends.

Facebook

Monitoring/alerting tools (Javascript, C++) Improved performance of and made front-end visualizations for low-latency data aggregation tool.

Build tools Redesigned and rewrote legacy build system that produced generated code for facebook's production website by leveraging Hack toolchain's knowledge of PHP codebase. Worked remote, reconciled untyped legacy code with formal constraints, solved challenges at confluence of competing interests of many different teams. (OCaml, PHP)

Chef

Infrastructure Management Tools (Go, Javascript, Erlang, Ruby) Full-stack development of tools in the chef ecosystem. Focus on tools for compliance checking.

AWS

Security Tools Research (Scala, Datalog, Python, Javascript) Designed and implemented logic-based query language compiler for AWS network security property verification system, worked directly with customers to refine and extend feature set.

GitHub

Language Tools (CodeQL, Java, Typescript) Developed CodeQL libraries for customers to find security bugs and analyze the structure of complex codebases. Led team that implemented VS Code extension to enable security research community use CodeQL effectively.

Aurora Innovation

Autonomous Vehicle Simulation (C++, Go, Typescript, Wasm) Led team that designed and implemented new hybrid simulation modality that used data from real-world logs. Required extensive cooperation with other teams, negotiating design requirements, proposing and negotiating design changes to underlying infrastructure we depended on, and user interfaces that depended on us.

Research

Published Work

Reachability Analysis for AWS-Based Networks. With John Backes et al. (CAV 2019)

Distance Makes the Types Grow Stronger: A Calculus for Differential Privacy. With B. Pierce. (ICFP'10)

Differential Privacy for Collaborative Security. With Adam J. Aviv, Daniel Wagner, Andreas Haeberlen, Benjamin C. Pierce, and Jonathan M. Smith. (EuroSec'10)

A Hybrid Logical Framework (PhD Thesis, CMU tech report CMU-CS-09-155)

Intuitionistic Letcc via Labelled Deduction. With F. Pfenning, in *Methods for Modalities* (M4M'07).

Hybridizing a Logical Framework. In *Hybrid Logic* (HyLo'06).

Redundancy Elimination for LF. In *Logical Frameworks and Meta-Languages* (LFM'04)

Extending Higher-Order Unification to support Proof Irrelevance. In *Theorem Proving in Higher-Order Logics* (TPHOLs'03)

Higher-Order Pattern Unification and Proof Irrelevance. In *Theorem Proving in Higher-Order Logics* (TPHOLs'02, in NASA tech report CP-2002-211736)

Proof Irrelevance and Strict Definitions in a Logical Framework (Senior Thesis, published as CMU tech report CMU-CS-02-153)

Selected Unpublished Work

(Available at `http://jcreed.org/papers/`)

A Constructive Approach to the Resource Semantics of Substructural Logics (with F. Pfenning), 2009

A Judgmental Deconstruction of Modal Logic, 2009

Focalizing Linear Logic in Itself, 2008

Names are (mostly) Useless. Talk given at *Workshop on Mechanized Metatheory* (WMM'08)

Higher Order Constraint Simplification in a Dependent Type Theory, 2008

Recursive Datatypes and Diamond Inference, 2001

Formalizing the Construction of Exponentials in an Elementary Topos, 2001