Trevor Elliott

Experience

2024-Present Infrastructure Engineer, Stripe, Portland, OR

Working on the sorbet typechecker for ruby.

2022-2024 Principal Engineer, Fastly, Portland, OR

Working on the wasm team, contributing to a variety of projects centered around the running of WebAssembly

- O Contributor to wasamtime and the cranelift code generator
- O Contributor to the js-compute-sdk, as well as the viceroy local testing environment
- o Helped with the implementation and specification of wasi-preview2, and wasi-http
- \circ Participated in the RFC process for was mtime to help set the direction for debugging

2019–2022 Infrastructure Engineer, Stripe, Portland, OR

Working on the sorbet typechecker and compiler for ruby.

- O Key contributor on the sorbet compiler, implementing optimizations and improving coverage for the ruby language. Generated native code with llvm, targeting the ruby vm's c api.
- o Implemented type-system features and improved type-checker runtime performance.
- Mentored an intern on the sorbet compiler project, and organized/ran regular meetings with external contributors from other companies.

2017–2019 Compiler Engineer, Groq, Inc., Portland, OR

Worked on a compiler for tensorflow models, targeting a custom ASIC that accelerates inference. Focused on compiler performance and optimization of results.

2007–2017 Engineer and Researcher, Galois, Inc., Portland, OR

Contributed to a broad range of projects, notably:

- o Developed domain specific languages in Haskell, including the msf-haskell metasploit DSL and the Ivory DSL for memory-safe embedded programming
- o Developed and contributed to multiple full language implementations, including Cryptol and the Salty GR(1) reactive synthesis DSL
- \odot Implemented the HaNS network stack
- o Aided ASIC design and verification for lightweight cryptographic primitives from Cryptol specifications

2004–2007 **Developer**, CollegeNET, Portland, OR

Helped to transition a large desktop application to a suite of web services, and developed tools based off of those web services. Also assisted with some front-end web development, and implemented an LDAP-based authentication system.

2002–2004 **Technical Support**, CollegeNET, Portland, OR

Provided technical support to a large client base.

Education

2008 B.S. Computer Science, Portland State University, Portland, OR

Skills

Languages haskell, c/c++, rust, java, javascript, fsharp, ocaml, python, ruby, lua, assembly (x86, arm), coq, isabelle/hol, shell scripting

Tools z3, smt-lib, lldb, gdb, bazel, gnu make, vim/neovim

Open Source Projects

sorbet The sorbet typechecker and compiler for ruby

cereal Haskell library for fast binary format parsing/rendering

ivory Haskell EDSL for memory-safe embedded programming

salty Reactive synthesis DSL for GR(1) specifications

HaNS A TCP/IP network stack implemented in haskell

Cryptol DSL for implementation and verification of cryptographic algorithms

HaLVM Port of the GHC runtime to the Xen hypervisor

llvm-pretty An EDSL for generating textual llvm bitcode

huff A fast-forward based classical planning EDSL

Publications

- 2019 Elliott, Trevor, Mohammed Alshiekh, Laura R. Humphrey, Lee Pike, and Ufuk Topcu (2019). "Salty-A Domain Specific Language for GR(1) Specifications and Designs". In: 2019 International Conference on Robotics and Automation (ICRA), pp. 4545–4551. DOI: 10.1109/ICRA.2019.8793722.
- 2016 Pike, Lee, Pat Hickey, Trevor Elliott, Eric Mertens, and Aaron Tomb (2016). "Trackos: A security-aware real-time operating system". In: *International Conference on Runtime Verification*. Springer, Cham, pp. 302–317.
- 2015 Elliott, Trevor, Lee Pike, Simon Winwood, Pat Hickey, James Bielman, Jamey Sharp, Eric Seidel, and John Launchbury (2015). "Guilt free ivory". In: *ACM SIGPLAN Notices*. Vol. 50. 12. ACM, pp. 189–200.
- Hickey, Patrick C, Lee Pike, Trevor Elliott, James Bielman, and John Launchbury (2014).
 "Building embedded systems with embedded DSLs". In: ACM SIGPLAN Notices. Vol. 49.
 ACM, pp. 3–9.

Pike, Lee, Patrick Hickey, James Bielman, Trevor Elliott, Thomas DuBuisson, and John Launchbury (2014). "Programming languages for high-assurance autonomous vehicles". In: *Proceedings of the ACM SIGPLAN 2014 Workshop on Programming Languages meets Program Verification*. ACM, pp. 1–2.

Ravitch, Tristan, E Rogan Creswick, Aaron Tomb, Adam Foltzer, Trevor Elliott, and Ledah Casburn (2014). "Multi-app security analysis with fuse: Statically detecting android app collusion". In: *Proceedings of the 4th Program Protection and Reverse Engineering Workshop*. ACM, p. 4.

- 2011 McNamee, Dylan and Trevor Elliott (2011). "Secure Historian Access in SCADA Systems". In: *Galios, White Paper*.
- 2010 Launchbury, John and Trevor Elliott (2010). "Concurrent orchestration in Haskell". In: *ACM Sigplan Notices*. Vol. 45. 11. ACM, pp. 79–90.