

# Trevor Elliott

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## Experience

- 2022-Present **Principal Engineer**, *Fastly*, Portland, OR  
Working on the wasm team, contributing to a variety of projects centered around the running of WebAssembly
- Contributor to wasmtime and the cranelift code generator
  - Contributor to the js-compute-sdk, as well as the viceroy local testing environment
  - Helped with the implementation and specification of wasi-preview2, and wasi-http
  - Participated in the RFC process for wasmtime to help set the direction for debugging
- 2019–2022 **Infrastructure Engineer**, *Stripe*, Portland, OR  
Working on the sorbet typechecker and compiler for ruby.
- 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.
  - 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:
- Developed domain specific languages in Haskell, including the msf-haskell metasploit DSL and the Ivory DSL for memory-safe embedded programming
  - Developed and contributed to multiple full language implementations, including Cryptol and the Salty GR(1) reactive synthesis DSL
  - Implemented the HaNS network stack
  - 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.

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## Education

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

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## Open Source Projects

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|-------------|---|
| 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

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## 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

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## 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.
- 2014 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. 9. 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.