Rijnard van Tonder, Ph.D.

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About Me

Engineering leader with 8+ years of expertise in building and pushing the frontier of developer tools. I have deep experience in design and implementation of tool configuration, protocol and query interfaces, programming languages, and program analysis. I am currently building an agentic formal verification system from the ground up—designing the agent loop, tool orchestration, and programmatic skill framework that drives automated theorem proving for smart contracts.
My work and research specializes in enabling developer productivity. I've worked extensively with developing package ecosystems (tooling, registry discovery, adoption), devtool protocol implementations (LSP/LSIF), and robust versioning solutions.
I have rich start-up experience (small to midsize, series A through D) and value shipping rapidly while maintaining high software quality standards. I keep my work close to direct user desires, product pain points, and measurably impactful features.

Personal—I've been previously employed on an O-1 Extraordinary Ability visa in the USA (Mysten Labs, Sourcegraph). I am a South African citizen. This document is current as of January 2026.

Education

Ph.D. Computer Science, Carnegie Mellon University, 2014–2019

M. Software Engineering, Carnegie Mellon University, 2014–2017

M. Eng. & BSc. (Hons) Computer Science, Stellenbosch University, 2009–2014

Experience

Formal Verification, Software Engineer under Contract, Jul 2025–current
Building an agentic formal verification platform from scratch for the Move programming language with Asymptotic.tech. I develop end-to-end system design and implementation alongside a small team (4 engineers, closely collaborating with two co-founders). Enabled comprehensive formal verification for multiple software packages and projects.

Career Break, Oct 2024–Jul 2025
Explored AI models and agentic workflows for code transformation and document processing.

Mysten Labs, Engineer & Research Scientist, Palo Alto CA, Dec 2022–Oct 2024
I focused on improving developer experience and removing friction in smart contract development at this blockchain unicorn. I worked in public (↗ commits), engaged directly with developers (in Discord, GitHub), and solved major pain points in package management and smart contract verification. Key work:

- Co-lead design and implementation of the Move Package Registry for the Sui blockchain enabling package cross-referencing, discovery, and smart contract verification.
- Schema design and configuration implementation to manage smart contract package dependencies and publishing (`Move.toml` analogous to `Cargo.toml`, but with unique constraints and requirements).
- Lead end-to-end effort from prototyping through deployment of the Move smart contract source viewer, including technical documentation.

Sourcegraph, Engineer & Research Scientist, San Francisco CA, Oct 2019–Dec 2022

I maintained and extended Sourcegraph's search query language used by tens of thousands of developers daily. I was an early adopter and implementer of LSP/LSIF, recognizing how decoupling tools with server-based protocols enables powerful new capabilities (see, e.g., my article on enabling find and replace with type information). I designed syntax extensions, improved query planning, and ensured backward compatibility during API migrations (↗ commits). Additional key work:

Authored detailed technical RFCs for complex feature development, balancing user asks and engineering constraints with product needs (example RFC).

Solo-authored a Best Industry Paper at the top Software Engineering conference (ICSE-SEIP) out of 700 authors, showcasing my ability to balance product engineering practical research including user study and empirical methods [2].

Published engaging technical content for the developer community that consistently reached the front page of Hacker News (sample post at #6).

Facebook, Software Eng. Intern, Menlo Park CA, May–Aug2018 and May–Aug 2017

Added 5× speedup and advanced taint analysis to Pyre, the Python type checker behind Instagram's codebase (↗ commits).

Open Source Maintenance, Leadership, & Developer Community Engagement

Published The Code-Only Agent (Jan 2026), a widely-read article on agent design that reached the front page of Hacker News. Argues for a single-tool "execute code" paradigm that produces code witnesses instead of tool-call traces.

I'm the creator and proud maintainer of Comby (2.5K GitHub stars), a popular tool for rewriting code. I grew Comby through direct community engagement and feedback to address the need for automated refactoring tools.

I've presented numerous successful industry and academic talks (e.g., Strangeloop talk with 12K views).

Significant public contributions to Mysten Labs, Sourcegraph, and Facebook repositories, as well as 40+ merged contributions to open source projects resulting from my own developer tool Comby [5].

Technical Skills

Programming Languages: Rust, Go, TypeScript, Python, OCaml, Elm.

AI & Agents: Custom agent loop design and implementation, LLM-driven tool orchestration, programmatic skill frameworks, agentic formal verification. Hands-on experience with frontier model APIs.

Developer Tooling: Language Server Protocol (LSP/LSIF), code search at scale (Zoekt), editor extensions (Visual Studio Code, Emacs, Vim), static analyzers, type checkers.

Research: Software quality, developer experience, automated program repair, software testing, program transformation, static analysis, compilers, program analysis, formal verification.

Selected Publications

1. Sebastian Baltes, ..., Rijnard van Tonder, ... (20 authors), Guidelines for Empirical Studies in Software Engineering involving Large Language Models. *arXiv preprint*, 2025.
2. Rijnard van Tonder, Verifying and Displaying Move Smart Contract Source Code for the Sui Blockchain. *International Conference on Software Engineering, Demonstrations (ICSE-DEMO)*, 2024.
3. Rijnard van Tonder, You Don't Know Search: Helping Users Find Code by Automatically Evaluating Alternative Queries. **IEEE Best Industry Paper Award**, *International Conference on Software Engineering, Software Engineering in Practice (ICSE-SEIP)*, 2023.

4. Alex Groce, Rijnard van Tonder, Goutamkumar Tulajappa Kalburgi, Claire Le Goues, Making No-fuss Compiler Fuzzing Effective. *Compiler Construction (CC)*, 2022.

5. Rijnard van Tonder, Claire Le Goues, Tailoring Programs for Static Analysis via Program Transformation. *International Conference on Software Engineering (ICSE)*, 2020.

6. Rijnard van Tonder, Claire Le Goues, Lightweight Multi-language Syntax Transformation with Parser Parser Combinators. *Programming Language Design and Implementation (PLDI)*, 2019.

7. Rijnard van Tonder and Claire Le Goues, Towards s/engineer/bot: Principles for Program Repair Bots. *Bots in Software Engineering (BotSE@ICSE)*, 2019.

8. Rijnard van Tonder, Claire Le Goues, Static Automated Program Repair for Heap Properties. **ACM Distinguished Paper Award**, *International Conference on Software Engineering (ICSE)*, 2018.

My citation count is 404 (h-index 10) on Google Scholar.

Professional Activity

Co-Chair, International Conference on Mining Software Repositories (**MSR**), **Industry Track**, 2023.

Invited Presentation, Dagstuhl Seminar 24172 on Code Search, 2024.

PC Member, ICSE-SEIP, ICSE-NIER, ESEC/FSE Industrial Track, ASE, ASE Industry Showcase, MSR Data Showcase, 2022–2024.

Domain Expert Reviewer, Dutch Research Council Veni Talent Programme 320,000€ grant, 2024.

Journal Reviewer, TSE, EMSE, INFSOF, TOSEM, JSS, 2019–2024.