

# DONALD PINCKNEY

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## SKILLS

**Languages:** Rust, Python, JavaScript/TypeScript, SQL, C/C++, Swift, Haskell, Go, OCaml.

**Tools:** Docker, AWS (Lambda, S3, ECS), PostgreSQL, Redis, LangChain, VS Code Extension API, LSP, MCP, CI/CD (GitHub Actions)

**Specialties:** building agentic systems, coding agents, enterprise AI integrations, developer tooling / program analysis, dependency / package management, serverless computing, compilers, formal verification, distributed systems

## EXPERIENCE

**Gitar (venture-backed startup, [gitar.ai](#)), *Founding AI Coding Agent Engineer*** Apr 2024 – Present

- Launched [Gitar](#), the first coding agent [leveraging deep static analysis](#), driving a 700% spike in customer demand.
- Built [agent tools](#) which allow Gitar to perform static analyses and program transformations (symbol lookup, constant folding, dead code analysis, etc.), allowing for [precise, safe and efficient code changes](#).
- Designed a [synthetic data generation framework](#) for evaluating Gitar's agentic static analyses and program simplifications.
- Co-designed [cloud infrastructure](#) to support running Gitar in the cloud (similar to [Cursor's Background Agents](#)), prioritizing safety via [customer data isolation](#) and a [fine-grained permission system](#) to validate external API calls by the agent.
- Built Gitar's [GitHub pull request integration](#), which enables Gitar to act seamlessly on GitHub PRs to address comments and CI failures (similar to [Claude Code Action](#)).
- Worked directly with [enterprise customers](#), including multiple [Fortune 500s](#), to ensure Gitar integrates into their workflows across different Git hosting providers, CI/CD platforms, and monitoring solutions.

**Northeastern University, Programming Research Lab, *Dev Tools & AI Agents PhD*** Sep 2020 – Nov 2024

- Built [agentic package managers](#) (replacements for NPM and PIP) that can automatically apply patches based on runtime errors, avoid packages with security vulnerabilities, minimize code size, and more.
- Designed a [dependency resolution and optimization agent tool](#) that is called by the agentic package manager, enabling the LLM to focus on high-level reasoning and delegate the precise dependency solving.
- Mentored an undergraduate collaborator in building a distributed system to [scrape and archive every NPM package](#) (36M+, 20+ TB) as they are published in real-time. Used this dataset to [empirically analyze developer pain points](#) and [evaluate agentic package managers](#).
- Developed a novel methodology (MultiPL-E) to [automatically translate](#) the HumanEval and MBPP benchmarks, enabling [multilingual evaluation](#) of LLMs. MultiPL-E now supports 31 different evaluation languages, and is used actively on the [Big Code Models Leaderboard](#) on HuggingFace.

**Draper Laboratory, *Security and Safety Research Scientist*** Feb 2023 – May 2023

- Funded by a [DARPA](#) defensive [cybersecurity](#) research program ([AMP](#)), enhanced the safety of live-patching binary code by developing [formal methods](#) to automatically [verify correctness of binary security patches](#).

**Uber, Programming Systems Group, *Dev Tools Research Scientist*** May 2020 – Dec 2020

- Repaired over 75% of flaky tests across Uber by designing [dynamic analysis](#)-based tooling informed by [natural language processing](#) and [clustering](#) of crash logs. Evaluated with [large-scale experiments](#) on all tests across Uber.

**University of Massachusetts Amherst, *Compilers & Cloud Infrastructure MS*** Sep 2018 – May 2020

- Pioneered the study of [formal semantics for serverless computing](#) (FaaS), laying a [theoretical and empirical foundation](#) for cloud providers to develop new FaaS abstractions, such as [Microsoft Azure's Durable Functions](#).
- Reduced code size by 23% and sped up programs by 15% for multithreaded [WebAssembly](#) by extending a [JIT compiler](#) (Wasmtime) with stack capture and resume instructions at the virtual machine level.

**Apple Inc., macOS Frameworks Team, *Intern*** Jun 2016 – Aug 2016

- Created a [new user-interface feature](#) simplifying tab navigation in the native macOS UI framework (UIKit), and perfected reliability of it across first-party and third-party apps so it could ship in [macOS High Sierra](#).
- Presented the feature before a distinguished panel, including Apple's Senior Vice President Craig Federighi, earning recognition as one of the [top 10 intern projects](#) from a pool of hundreds of competitors.

## EDUCATION

**Northeastern University, PhD in Computer Science** Sep 2020 – Nov 2024

*Focused on [Dev Tools & AI Agents](#), GPA: 4.00, Advised by Drs. Arjun Guha and Jonathan Bell*

**University of Massachusetts Amherst, MS in Computer Science** Sep 2018 – May 2020

*Focused on [Compilers & Cloud Infrastructure](#), GPA: 3.87, Advised by Drs. Arjun Guha and Yuriy Brun*

**University of California Davis, BS in Computer Science and Mathematics** Sep 2014 – Jun 2018

*Double Major in [Computer Science & Engineering and Mathematics](#), GPA: 3.94*

**PhD Dissertation 2024** *Improving Dependency Management via Formal Semantics*. **Donald Pinckney**. [\[PDF\]](#). Keywords: LLMs, Agents, Empirical Methods, Evaluations.

**ICSE 2023 (Acceptance rate: 15%)** *Flexible and Optimal Dependency Management via Max-SMT*. **Donald Pinckney**, Federico Cassano, Arjun Guha, Jonathan Bell, Massimiliano Culpò, Todd Gamblin. [\[paper\]](#) [\[talk\]](#) [\[github\]](#) [\[install\]](#). Keywords: Program Analysis, Empirical Methods, Theoretical Frameworks.

**MSR 2023** *A Large Scale Analysis of Semantic Versioning in NPM*. **Donald Pinckney**, Federico Cassano, Arjun Guha, Jonathan Bell. [\[paper\]](#). Keywords: Empirical Methods, Data Collection, Data Analysis.

**ESEC/FSE 2023 Demo Track** *npm-follower: A Complete Dataset Tracking the NPM Ecosystem*. **Donald Pinckney**, Federico Cassano, Arjun Guha, Jonathan Bell. [\[paper\]](#) [\[talk\]](#) [\[dataset\]](#) [\[github\]](#). Keywords: Data Collection, Data Analysis.

**TSE 2023** *MultiPL-E: A Scalable and Polyglot Approach to Benchmarking Neural Code Generation*. **Donald Pinckney**, Federico Cassano, John Gouwar, Daniel Nguyen, Sydney Nguyen, Luna Phipps-Costin, Ming-Ho Yee, Yangtian Zi, Carolyn Jane Anderson, Molly Q Feldman, Arjun Guha, Michael Greenberg, Abhinav Jangda. [\[paper\]](#) [\[talk\]](#) [\[github\]](#) [\[website\]](#). Keywords: LLMs, Empirical Methods, Model Benchmarking, Data Generation.

**DLS 2020** *Wasm/k: Delimited Continuations for WebAssembly*. **Donald Pinckney**, Yuriy Brun, Arjun Guha. [\[paper\]](#) [\[talk\]](#) [\[github\]](#) [\[website\]](#). Keywords: Compilers, Program Analysis, Empirical Methods, Performance Benchmarking.

**OOPSLA 2019 (Acceptance rate: 15%), Distinguished Paper Award** *Formal Foundations of Serverless Computing*. Abhinav Jangda, **Donald Pinckney**, Yuriy Brun, Arjun Guha. [\[paper\]](#) [\[talk\]](#) [\[website\]](#). Keywords: Cloud Infrastructure, Empirical Methods, Theoretical Frameworks, Performance Benchmarking.