Caner Derici, PhD

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Technical Skills

Areas of Expertise:	Compilers & Programming Languages · Distributed Systems · Machine Learning
Languages:	C++ · Go · Python · Racket/Scheme · LLVM · Java · SQL · JavaScript
Cloud:	Kubernetes · AWS · GCE · Terraform · LXD · Docker
Workflows & Productivity:	Linux · Neovim · tmux · VSCode · Copilot · Git · GH Actions · Obsidian · Toggl · Todoist
API, DB & Misc:	REST · gRPC · OpenAPI · FastAPI · DQLite · MongoDB · PostgreSQL · CI/CD · Jenkins

Education

Ph.D., Indiana University, Bloomington, Computer Science, Compilers & Programming Languages 2015 – 2025
Dissertation: Self-Hosting Functional Programming Languages on Meta-Tracing JIT Compilers

M.Sc., Boğaziçi University, Computer Science, Machine Learning & Natural Language Processing 2012 – 2014

B.Sc., Bilgi University, Computer Science 2005 – 2010

Experience

Canonical USA — Remote, US

SWE II (L4 - IC3) · Distributed orchestration at scale *2021 – 2024*

- Developed and maintained Juju, an eventually consistent distributed orchestration system used by ~200 companies globally, capable of handling 1000+-node workloads with 99.9% availability on any infrastructure (Kubernetes or otherwise) across various cloud providers (e.g., AWS, GCE). All in Go.
- Improved reliability and fault tolerance by implementing edge machine services on relational DQLite back-end, migrating from NoSQL MongoDB (e.g., sample PR).
- Owned client libraries for three years–python-libjuju, Terraform Juju Provider; doubled active users and maintained a steady release cadence.
- Took part in roadmap planning, coordinated cross-team work; mentored junior engineers, and improved hiring by creating a structured bootcamp process that cut down onboarding new engineers from 6 months to 1 month.

Indiana University — IN, US

Research Assistant, Course Instructor *2015 – 2021*

- Independently took an ambiguous, uncharted compiler problem to a working product; built the first-ever tracing JIT compiler that is a full-scale runtime for a self-hosting, production-grade language. Conducted a full performance investigation and designed new optimization algorithms (see PhD dissertation).
- Taught data structures & algorithms, compilers, virtual machines, and domain specific languages.

Asseco SEE Group

Software Engineer *2010-2012*

- International software company developing virtual payment systems for e-commerce platforms. I developed and delivered 3 virtual point-of-sale projects in 2 years. Used Java, Apache Tomcat, Spring, Mercurial, Jira.

Selected Projects

Pycket: A tracing JIT compiler for full-scale Racket
Developed and maintained for over five years. Designed the compiler to self-host a language on a meta-tracing JIT backend. Contributed designing a new IR (see publications). Built performance analysis tools, run-time optimizations, and formalisms to improve performance. Implemented code-gen for full FFI layer, and engines with meta-continuations for preemption for green threads. In Python, C, and Racket.

Rax: A full-stack nanopass compiler from Racket to x86_64
Implemented all the passes (e.g., closure conversion, register allocation, code-gen, etc.), along with garbage collection. Developed optimizations, such as inlining, loop-invariant code motion, and proper tail-calls. In Racket, and C.

FARS: Functional Automated Reasoning System
A resolution/refutation theorem prover, for expressions in first-order predicate logic with equality. Used binary paramodulation, and forward and backward subsumption for equational deduction. In Racket.

HazirCevap (Witty): A closed domain question answering system for high school students
Government funded large scale question answering system. M.Sc. thesis on NLP. Led the R&D team (3 faculties, 4 grad students). Developed a Hidden Markov Random Field model for question analysis, and relevance metrics for information retrieval and response generation (see publications). In Python, and JavaScript.

Selected Publications

- Flatt M., Derici C. Dybvig R. K., Keep A. et. al. "Rebuilding racket on chez scheme (experience report)", ICFP'19
- Derici C. et. al. "A closed-domain question answering framework using reliable resources to assist students" Natural Language Engineering'18
- Derici C. et. al. "Question analysis for a closed domain question answering system", CICLING'15
- Derici C. et. al. "Rule-based focus extraction in Turkish question answering systems", SIU'14
- Başar R. E., Derici C., and Şenol Ç. "World With Web: A compiler from world applications to JavaScript". Technical Report, Scheme and Functional Programming Workshop'09

Awards & Scholarships

- Scholarship and award for a project on teaching natural languages to hearing impaired, 2014.
- Full Scholarship for PhD, 2015-2020
- Full Scholarship for MSc, 2012
- Full Scholarship for BSc, 2005-2010