Caner Derici, PhD

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Technical Skills

Areas of Expertise:	Compilers & Programming Languages · Distributed Systems · Machine Learning
Languages:	Go · C/C++ · Python · Racket/Scheme · LLVM · Java · SQL · JavaScript
Cloud:	Kubernetes · AWS · GCE · Terraform · LXD · Docker
Productivity & Workflows:	Obsidian · Toggl · Todoist · Linux · Neovim · VSCode · Copilot · ChatGPT · Git · GH Actions
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 – 2015

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

Experience

Canonical USA

Remote, US

Software Engineer II (L4), Enterprise Cloud Engineering, Juju team *2021 – 2024*

- Developed and maintained Juju (see Projects below) as part of a 10-engineer team. Used Go, and Python.
- 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 efforts; mentored junior engineers, and improved hiring by creating a structured Juju-Bootcamp process that cut ramp-up from 6 months to 1 month for new engineers.

Indiana University

IN, US

Research Assistant, Course Instructor *2015 – 2021*

- Independently took an ambiguous, uncharted problem from zero to 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 Pycket below).
- Taught data structures & algorithms, compilers, virtual machines, and domain specific languages.

Asseco SEE Group

Software Engineer *2010-2012*

- International software company developing virtual payment platforms for e-commerce platforms. I developed and delivered 3 virtual point-of-sale projects in 1 year. Used Java, Apache Tomcat, Spring, Mercurial, Jira.

Selected Projects

Juju

A large scale, eventually consistent distributed orchestration system, used by ~200 companies globally for managing cloud workloads on any infrastructure (Kubernetes or otherwise) across various cloud providers (e.g., AWS, GCE), capable of handling 1000+-node workloads with 99.9% availability. See Canonical above for my contributions.

Pycket: A meta-tracing JIT compiler as full-scale self-hosting Racket

PhD thesis project. Developed and maintained Pycket for over five years, designing the compiler to bootstrap the entire Racket language on a meta-tracing JIT backend. Contributed to a new IR (linklets, see publications) for a more portable Racket. Built performance analysis tools and formalisms to improve meta-tracing efficiency. Implemented run-time optimizations, preemption for threads, full FFI for data structures, and primitives.

Rax: A full-stack Racket to x86_64 nanopass compiler

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.

FARS: Functional Automated Reasoning System

A hyper-resolution/refutation theorem prover, designed to prove expressions in first-order predicate logic with equality. Equational deduction is done with binary paramodulation, and forward and backward subsumption.

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). Full stack in Python and JS.

Last compiled on September 20, 2025

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

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