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
API, DB & Misc:	REST · gRPC · DQLite · MongoDB · PostgreSQL · Git · CI/CD · GH Actions · Jenkins

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Experience

Canonical USA — Remote, US

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

- Developed Juju as part of a 10-engineer team—an eventually consistent cloud-orchestrator handling 1000+-node workloads with 99.9% availability—used by ~200 companies globally. Stack: Go, 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—python-libjuju, Terraform Juju Provider —for three years; doubled active users and maintained a steady release cadence.
- Took part in roadmap planning, cross-team coordination; 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*

- 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 — *2012-2013*

- 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.

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 — 2011 – 2013

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

Selected Projects

Juju

A large scale distributed orchestration engine for managing cloud workloads on any infrastructure (Kubernetes or otherwise) across various cloud providers (e.g., AWS, GCE). Juju is written in Go, and has over a million lines of code. I was a core maintainer in a team of 14 engineers. See Canonical above for details of my contribution.

Terraform Juju Provider

A Terraform provider that enables integration with Juju while managing Terraform environments. I implemented new resources and features (e.g., manual provisioning on AWS), migrated the provider from the sdk2 to the provider framework (e.g., sample PR), and maintained release cadence of new versions. All in Go.

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.

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.

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