Bernhard Schuster



Staff Software Engineer with 15+ years of experience delivering cross-domain solutions in distributed and embedded systems, from design to production, ranging from safety to security and consumer electronics. Expert in performance optimization and debugging, rustacean by heart, polyglot anyways. Proven track record from embedded firmware in the field to deployed large scale backend infrastructure. Driven to solve complex, high-stakes problems and mentor teams to grow beyond themselves.

Distributed Systems Engineering • Engineering Management • Technical Leadership • Software Architecture Mentoring • Code Review • Hiring • Security Audits • Performance Engineering • Systems Programming Platform Engineering • Applied Cryptography • Embedded Systems • Monte-Carlo-Simulation • GPU Kernels OpenCL / CUDA • Erasure Coding • Observability • Rust • C / C++ • Python • gRPC, capńṕroto • Linux

Professional Experience

Freelance Staff+ Software Engingeer *konifay* Jul 2022 – present

- Simulation (2026) - assessed and improved modelling accuracy
- Interim Head of Engineering (2022, 2025) - align the teams around product-market fit and shipping
- Applied cryptography implementation (2025) - improve performance using SIMD extensions for finite fields
- Managing security audit findings (2025) - triaged and resolved 200+ high and medium findings
- Startup scaling and quest for product-market fit (2022)

Staff Software Engineer *Miden* Jun 2025 – May 2026

- Cross-domain solutions for sparse merkle trees, virtual machine extensions for FFI, database query optimizations, gRPC code generation, telemetry unification via topic validating proc-macros
- Performance optimization across the stack, specifically large smt forest backed by rocksdb

Engineering Manager & Technical Lead *Gensyn AI* Jul 2022 – Jan 2025

- Set technical direction including ML compiler stack; defined requirments for provable, reproducible, and decentralized training - shipped initial injectable cuda library with reproducible kernels for torch
- Mentored engineers; resolved conflicts via conversation and prioritization - grew team size from 3 to 25
- Design and implement a streaming, distributed, erasure-coding-based storage layer for 100s of GBs from 0 to 1

Polkadot Engineering Team Lead *Parity Technologies* Oct 2021 – Jun 2022

- Architecture and implementation of significant pieces of the Polkadot Node
- Led a 4-person team under pressure - deployed polkadot successfully
- Erasure-decoding performance improvement - from $O(n^3)$ to $O(n \log n)$

Rust Core Developer *Parity Technologies* Feb 2020 – Sep 2021

- Rust systems development: backend, distributed systems, performance profiling, observability, code quality

Embedded Software Engineer & Architect *BMW AG* Oct 2018 – Jan 2020

- Firmware architecture and implementation in C/C++
- Taylored cryptographic primitives library with hardware acceleration on given hardware - enabled hardware independent testing
- Transpiler and code generation pipeline from custom declarations to C++11 for zero-copy inter-chip communication in Rust for secure lock/unlock - shipped with 50k+ vehicles

Lead Embedded Software *LocumiLabs GmbH* Aug 2017 – Sep 2018

- Firmware architecture, OTA updater implementation, asynchronous state machines, peripheral drivers, and implementation in C++
- Backend test tooling, utilizing a custom DSL in Rust
- Communication protocol definition and implementation in Rust and embedded C++ - reduced protocol failures by 100%

Senior Software Engineer *E.S.R. Labs AG* Mar 2015 – Jul 2017

- Automatic emergency call systems for well-known car brands in C++, GOST ERA GLONASS - certified and shipped with 100k+ cars
- Integration of machine learning frameworks in embedded applications (NVIDIA Drive PX 2, OpenCL, CUDA)

Master's Thesis *Airbus Defence & Space / Astrium* Aug 2014 – Feb 2015

- Subject: *'GNSS processing techniques tailored to the land user environment'*
- Algorithm design and verification focused on statistical error bound estimation under constraints

Student Assistant *Research Center of Informatics (Forschungszentrum Informatik / FZI)* Apr 2013 – Mar 2014

- Design and implementation of an embedded Linux REST service bridging from DBus in C

Internship *Excito Electronics AB, Malmö, Sweden* Oct 2012 – Mar 2013

- Consumer Electronics Control (CEC) implementation as a Linux kernel module and C library for Android

Student Assistant *Institute for Measure and Control* Aug 2009 – May 2012

- Design and impl. of an eval tool for intersection topologies C++/Qt
- Porting a multi-camera calibration algorithm from MATLAB to C++

EDUCATION

GRADES IN PARENTHESES, **1.0** IS BEST ACHIEVABLE

Udacity Nanodegree - Term 1/3: Autonomous Driving	Oct 2016 – Feb 2017
Coursera: Machine Learning by Stanford University(online verification)	Jul 2016 – Sep 2016
Master's Thesis: *'GNSS processing techniques tailored to the land user environment'* (*1.0*)	Aug 2014 – Feb 2015
Master's Electronics and Information Theory at KIT (Karlsruhe Institute of Technology) (*1.4*)	Oct 2012 – Feb 2015
Complementary course: Swedish 3 / B2.1, Folkuniversitetet Malmö	Jan 2013 – Mar 2013
Bachelor's Electronics and Information Theory at KIT (*2.4*)	Oct 2008 – Sep 2012
Bachelor's Thesis: *'A comparison of different feature detectors for fully automatic multi-camera calibration'* (1.3)	Apr 2011 – Oct 2011
Complementary course: Business English (1.0)	Mar 2011 – Jul 2011
Abitur at Gymnasium Roth (2.3)	Sep 1999 – Jul 2008

LANGUAGES

German	Native
English	Fluent
Swedish	Limited working proficiency

PORTFOLIO & OPEN SOURCE PROJECTS

Maintainer	sccache distributed compile cache with cloud storage
Creator	cargo-spellcheck spellchecking for doc comments in Rust source and cmark files
Rust Munich Meetup	Former organizer and steward, scaled from 100 to over 1000 people, gave many talks, now a passive member

TALKS & PUBLICATIONS

regularly	Blog: `https://konifay.io/blog`
2019	Talk: Rust Munich meetup *iterators and fast iterators*
2019	Talk: Rust Munich meetup *cross compiling - speedbumps included*
2018	Talk: Rust Munich meetup *procedural macros - derive*
2012	Paper: *'Automatic camera and range sensor calibration using a single shot'* A. Geiger, F. Moosmann, Ö. Car, B. Schuster; ICRA Pg. 3936-3943