

Sebastian Nagel

Lead Software Engineer and Architect

I am a freelance software engineer that gets excited about functional programming languages, compilers and distributed systems, while needing to touch grass and rock on a regular basis.

Experience

2021 – current **Consultant / Lead Software Engineer**, *nCoding GmbH*, Liechtenstein

Working as individual contributor, architect, manager and consultant on projects in the blockchain research & development space, implementing novel scientific research using functional programming.

Notable clients: Input Output Global, Book.io, SundaeSwap Labs

- **Distributed ledger technology** implemented layer two technology for the Cardano blockchain. Starting from research papers, we prototyped, architected and realized a production-grade off-chain transaction processing system [cardano-scaling/hydra](#). This required intimate knowledge of the eUTxO ledger model, plutus smart contracts and the cardano-node.
- **Engineering management** built up, mentored and directly managed a team of 4 senior engineers, while also being responsible for the roadmap and engineering practices in two teams of 4 each.
- **Community interaction** written and video-based communication with stakeholders and users. Giving talks, managing expectations and demonstrating results [Cardano Summit 2022](#)
- **Property-based testing** of pure code and stateful systems, with model-based techniques and dynamic logic using hedgehog and Quickcheck in Haskell.
- **Formal methods** regularly formalized protocols in non-mechanized technical specification with occasional exposure to Agda and theorem provers.
- **Consulting** multiple projects in the Cardano ecosystem on how to build decentralized applications, optimize on-chain code and provide general research & development support.

2016 – 2020 **Senior Software Engineer**, *Franka Emika GmbH*, Munich - www.franka.de

2014 – 2016 **Software Engineer**, *KBee AG*, Munich

2013 – 2014 **Software Engineer**, *Kastanienbaum*, Munich

Being involved from the beginning in creating the robot programming environment at Franka Emika, KBee and Kastanienbaum, I covered topics like

- **Robot programming language design** created formal syntax and semantics, parsers, type checker and interpreter for a robot programming language mostly written in Haskell
- **Service oriented architectures** design and implementation of a ZeroMQ based Middleware layer, message description language, message code-generation, Haskell tools and C-library
- **REST API server** Haskell backends using Snap and Servant/WAI

Ruggell – Liechtenstein

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- **Web frontends** design and development of single-page applications in JavaScript ES6 and PureScript using React and Halogen
- **Hardware and systems programming** interface with hardware devices over Serial/UART or CAN using C++ and Haskell
- **Embedded Linux** maintaining the cross-toolchain build environment for an operating system
- **Release management and versioning** of the Panda research product, including legal aspects like open-source license compliance
- **Continuous integration and deployment** setting up and maintaining jobs using Jenkins, Docker containers for distribution and orchestration in multiple environments
- **Planning and coordinating** an open-source C++ library for low-level robot control and ROS interfaces, 4-5 people team in an agile Scrum process and a cloud platform with web application, integrating a robot system with over-the-air (OTA) updates and asset delivery, two teams of 5-6 developers each (Franka World).

Education

2011 – 2014 **MSc Robotics, Cognition and Intelligence, TU Munich**
Interdisciplinary course of computer science, mechanical and electrical engineering covering topics like Robotics, Control, Computer Vision and Machine Learning

2008 – 2011 **BSc Computer Science, FH Dornbirn**

Academic

🔗 **Master thesis** *A dynamic, distributed and service-oriented robot control architecture*

🔗 **ML project** *Segmenting and classifying GPS traces to identify types of transportation*

Skills

Using daily Emacs, Haskell, Nix, NixOS, Linux, L^AT_EX, Docker, Typescript
Used to GCP, AWS, Purescript, Rust, C, C++, Golang, Python, Java
Want to use more Rust, Agda

Side projects

garmin-otp-authenticator Garmin ConnectIQ Widget to generate HOTP/TOTP one time passwords, basically a SHA1 implementation in the MonkeyC language

🔗 [ch1bo/garmin-otp-authenticator](#)

ambicam Python scripts using OpenCV on a RaspberryPi with PiCamera to send illumination data to an “ambilight” setup 🔗 [ch1bo/ambicam](#)

Interests

Mountains Sport-, alpine- and ice-climbing, cross-country skiing and hiking the alps
Science Fiction Some authors I like are Daniel Suarez, Ernest Cline, Ramez Naam
Gaming CS, Apex, LoL, Rocket League back in the days, nowadays mostly single player

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