Niklas Hauser

Embedded Software Engineer

Status: M.Sc. Computer Science (2023) — Aachen, Germany
Fields: Embedded Software & Tooling, Data Science & Code Generation, Prototyping & Evaluation — www.salkinium.com
Techs: C/C++20, Python3, SCons/Make/CMake, OpenOCD, OpenSCAD, KiCAD, ARM Cortex-M — github.com/salkinium
Activities: Automating Things, Open Source Maintenance, Tooling, Debugging, Documenting — niklas@salkinium.com

Summary

I am specialized in the area of deeply embedded software and hardware with most of my experience in researching and developing initial concepts into evaluated prototypes to produce solid foundations for new solutions. During my 2+ years at Arm, I worked in a small, highly specialized team with expert knowledge on all Cortex-M architectures and their software ecosystem. As tech lead, I assisted the digitization of the ELVA railway lab by designing and manufacturing custom hardware and writing specialized firmware for it, as well as teaching and supervising team members. As project lead, I created large parts of the open-source modm embedded library, modm-device database, and lbuild code generator and actively maintain it with quarterly releases.

Experience

Embedded Specialist – Institute of Transport Science: ELVA Railway Lab — 2014–15, 2018 – 2021

Tech lead for creating custom hardware and software to control thousands of IO via CAN with Qt5 and modm, as well as a modular 1:32 scale railway signaling system. Used OpenSCAD/SolidPython, SolveSpace, KiCAD, X3D, SVG, STM32 and manufactured hundreds of PCBs via JLCPCB and 3D models via MJF and SLA printers with manual SMT assembly and quality control, including teaching and supervision of student assistants.

Programmer and Organizer – Roboterclub Aachen e.V. — 2010 – 2020

Architecture and tooling design, programming autonomous robots, teaching new members, and organizing events.

Embedded Software Engineer – ARM Ltd. Cambridge: IoTBU — Sept. 2015 – Dec. 2017

mbedOS 3: design and implementation of a new HAL and testing harness — until Feb. 2016
uVisor security layer: design, implementation, and evaluation on ARMv7-M and ARMv8-M — until Aug. 2017
GCC compiler team: macOS Homebrew support and packaging — until Dec. 2017

Student Assistant – Media Computing Group — 2012 – 2015

Design, manufacture, and testing of a 60×7m display with 20k LEDs hung on the CS building façade.

Education

M.Sc. Computer Science – RWTH Aachen University: 120 ECTS, good grade — 2018 – 2023

Major: Communication and distributed systems and internet protocols — 21 ECTS
Application subject: Railway safety engineering and transport economics — 18 ECTS
Thesis: Data Extraction from Technical Documentation for Generating Embedded Software — best grade

B.Sc. Computer Science – RWTH Aachen University: 180 ECTS, satisfactory grade — 2010 – 2015

Thesis: Temperature Dependency of Bit Error Distributions in Wireless Sensor Networks — best grade

Open Source Projects

modm: C++20 embedded library generator – Project lead and co-maintainer — 2011 – present

Creation of AVR and Cortex-M startup code, linkerscripts, many HAL and device drivers, build, debugging, and documentation systems, lbuild modularization, CI setup, integration of external projects: FreeRTOS, CMSIS, FatFS, ETL, LVGL, TinyUSB, CrashCatcher. Maintenance and guidance for hundreds of PRs and quarterly releases.

modm-devices: hardware data for thousands of µCs – Creator and maintainer — 2013 – present

lbuild: modular code generator in Python3 – Co-author and maintainer — 2018 – present