Adrian Winterstein

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Adrian Winterstein is an experienced developer and architect with a special focus on device development (embedded systems) using modern C++. He has already worked on over 15 successful projects, including the firmware development for a smoke detector, an IIoT railway switch sensor and an adaptation module for a patient monitor. In addition to software development, he also has extensive knowledge in the areas of testing and DevOps. He particularly enjoys contributing his skills to interdisciplinary, international teams, where he can leverage his expertise to drive innovation and efficiency.

Skills

Programming	C++, Python, C, Rust
Libraries	Qt, Boost, STM32Cube, Protobuf
Microcontroller	Arm Cortex, Arduino
Operating Systems	FreeRTOS, Linux, Zephyr
Testing	Test Automation, Pytest, Google Test, Cpputest
Documentation	Arc42, C4 Model, UML, Doxygen, Markdown, Polarion, LaTeX
Build Systems	CMake, Yocto, Make
Processes	Agile Development, Scrum, V-model, Test-driven-development
DevOps	Continuous Integration, Ansible, Azure DevOps, TeamCity, Jenkins, Docker
Code Analysis	Clang Tidy, SonarQube, PC-Lint, Cppcheck
Tools	Git, Bash, Visual Studio Code, QtCreator, Atlassian Toolsuite (Jira, Confluence, Bitbucket)

Professional Experience

Software Architect & Developer — since Jun 2023
Self-employed

- Independent project work focussing on embedded software architecture and software development with C++
- Consulting in the areas of continuous integration (CI) & testing as well as interdisciplinary collaboration

Lead Embedded Software Architect — Jan 2020 – May 2023
Zühlke Engineering GmbH

- Technical lead of remote device developments
- Architecture consulting and requirements management
- Implementation focus on C++ (bare-metal / RTOS), continuous integration (CI) & testing as well as firmware updates

Expert Software Engineer — Jan 2018 – Dec 2020
Zühlke Engineering GmbH

- Responsibility for the software architecture and quality of an IIoT device development (C++, FreeRTOS, Arm Cortex)
- Assumption of leadership tasks for 5 software developers

Software Engineer — Nov 2014 – Dec 2017
Zühlke Engineering GmbH

- Software development and consulting for embedded systems with a focus on C++ and real-time operating systems (FreeRTOS)
- Gradual assumption of responsibility for project success and direct customer communication

Research Assistant — Jun 2013 – Jul 2014
German Cancer Research Center

- Research in the field of computer-assisted interventions
- Development and evaluation of an ultrasound-based assistance system for the minimally invasive implantation of markers

Research Assistant — Jan 2010 – Dec 2014
Center for Advanced Security Research Darmstadt

- Research in the fields of IT security and image processing
- Development of algorithms for the automatic detection of ears on 3D images

Education

M.Sc. in Computer Science — Mar 2012 – Apr 2014

Darmstadt University of Applied Sciences

- Master's thesis: Development of a System For Navigated Implantation of Radiation Therapy Markers

B.Sc. in Computer Science — Sept 2009 – Feb 2012

Darmstadt University of Applied Sciences

- Bachelor's thesis: Development of an Algorithm for the Detection of Ears on 3D Profile Images

Certifications

- iSAQB - Certified Professional for Software Architecture (CPSA-F)
- ISTQB - Certified Tester (CTFL)
- IREB - Certified Professional for Requirements Engineering (CPRE FL)

Projects

Optical Beam Smoke Detector — Aug 2022 – Oct 2024

- Responsible for the firmware architecture and the integration into the overall system
- Technical leadership for 3 firmware developers
- Support of test system development (HIL) with the Pytest framework in Python
- Implementation of, among other things smoke level calculation, firmware update and persistence layer
- Design and implementation of the build system with CMake and continuous integration in the CI/CD tool TeamCity
- Automation of reproducible build and test environments with Ansible and Docker
- Skills: Architecture, Tech Lead, C++, Firmware, CI / CD, Arm Cortex, FreeRTOS, CMake, Python, Firmware Update, TeamCity, Protobuf, Polarion, Cpputest, Pytest, Ansible, Docker, Gitlab

Sensor Connection Module for a Patient Monitor — Nov 2021 – Jul 2022

- Responsible for the device firmware in an interdisciplinary, agile team
- Clarification of the software requirements
- Tracing the requirements through to architecture, implementation and tests with Polarion
- Definition and documentation of the software architecture (incl. the interfaces to the electronics)
- Software development of parts of the firmware for the module
- Skills: Architecture, Tech Lead, C++, Firmware, CI / CD, Arm Cortex, FreeRTOS, CMake, Python, Firmware Update, Azure DevOps, Polarion, Google Test, Pytest, Qt, Ansible, Scrum, Git

Digital Beacon for Traffic Diversions — Mar 2021 – Feb 2022

- Coaching of the software lead
- Conception and development of the test environment
- Firmware development with a focus on the area of positioning and application logic
- Skills: Architecture, C++, Firmware, CI / CD, Arm Cortex, FreeRTOS, Firmware Update, MQTT, CMake, Python, Pytest, AWS IoT Core, Azure DevOps, Git

Next Generation of Coffee Machines — Jul 2020 – Apr 2021

- Definition of the software architecture for the two main components of the device
- training of an architect at the customer's Romanian site
- Support of the local team in design, testing and regarding the development process
- Skills: Architecture, C99, C++, Firmware, Arm Cortex, Python, Gitlab, Visual Studio, Git

Development of the Test Stand Software for a Motor Control Unit — Jun 2020 – Jul 2020

- Development of the GUI component for the test system with PyQt
- Enabling colleagues to continue this development
- Skills: Qt, Python, PyQt, Git

IoT Edge Device for Campervans — Apr 2020 – Jun 2020

- Consultancy on firmware and system architecture for the edge device
- Support during the system alpha phase
- Skills: Architecture, C++, Firmware, Arm Cortex, CAN, MQTT, Azure, Git

Security Platform — Nov 2019 – May 2020
- Clarification of requirements and concepts of the security platform for a fixed price offer for the remaining development activities
- Finalisation of the Yocto recipes including the integration of software updates
- Skills: Architecture, C++, Linux, Yocto, i.MX8, Scrum, Git

IoT Device for the Acquisition of Sensor Data — Nov 2017 – Dec 2020
- As the software lead responsible for the software architecture and quality
- Leading the international cooperation with colleagues from a Serbian location
- Skills: Architecture, Tech Lead, C++, Firmware, CI / CD, Arm Cortex, FreeRTOS, CMake, Python, Firmware Update, Jenkins, Google Test, Pytest, Ansible, Eclipse, Scrum, Git

Household Appliance for Hot Drinks Preparation — Jul 2017 – Jan 2018
- Temporary support by firmware development in Scrum team
- Focus on controlling the preparation process and error handling
- Skills: C++, Firmware, Arm Cortex, FreeRTOS, CMake, Google Test, XText, Eclipse, Scrum, Git

Architecture Review of a Control Software for Industrial 3D Printers — May 2017 – Jul 2017
- Carrying out the architecture review of the Qt application
- Preparation of the results and development of concrete suggestions for improvement
- Skills: Architecture, C++, Qt, QML, qmake, cppcheck, Visual Studio

Software Platform for Laboratory Analysis Devices — Jun 2016 – May 2017
- Co-development of the software platform
- Focus on integration with the build system and guidance of junior colleagues
- Training of client employees regarding C++ programming and software design
- Skills: C++, Python, ZeroMQ, Boost, Protobuf, Google Test, Linux, Qt Creator, Asciidoctor

Prototype “Pump & Heater” for a Coffee Machine — Apr 2016 – May 2016
- Implementation of the firmware for controlling the prototype
- Skills: C++, Arduino, Firmware, Prototyping, Git

Test Stand for an Oven — Nov 2015 – May 2016
- Replacing manual tests with test automation
- Design and implementation of the SIL test system
- Implementation of the software for the HIL test system
- Skills: C++, Boost, NI TestStand, Google Test, Jenkins, Qt Creator

Proof of Concept for a System for Tracking Transported Goods — Jul 2015 – Sept 2015
- Focus on energy efficiency of the battery-powered system
- Firmware development based on a hardware platform created by the customer
- Clarification of requirements and guidance for junior colleagues
- Skills: C99, Firmware, Bluetooth Low-Energy, Arm Cortex, FreeRTOS, Eclipse, Git

Diagnostic Tool for High-end Converters for Railroad Applications — Feb 2015 – May 2015
- Implementation of additional functionalities within the existing Qt/QML application
- Consultancy for the customer on software design (separation of presentation and business logic)
- Skills: Qt, QML, C++, Android, CI / CD, Jenkins, Qt Creator, Git

Control System for Innovative Chillers — May 2014 – Dec 2015
- Co-development of the firmware middleware for the device control
- Focus on implementation and tests for the communication interfaces such as RS232, Modbus and Ethernet for connecting the actuators and sensors within the system
- Skills: C++, Firmware, Arm Cortex, FreeRTOS, Google Test, CI / CD, Jenkins, Rake, Asciidoctor, IAR Embedded Workbench, Visual Studio

Navigated Implantation of Radiation Therapy Markers — Jul 2013 – Jul 2014
- Analysis of the workflow with the domain experts
- Implementation of the navigation application
- Evaluation by means of a phantom study in collaboration with medical staff
- Publication of the research results
- Skills: C++, Qt, ITK, VTK, Ultrasound, Electromagnetic Tracking

Detection of Ears on 3D Profile Images **Aug 2011 – Apr 2012**

- Design & implementation of the detection algorithm in MATLAB
- Scientific evaluation of the results
- Skills: MATLAB, Image Processing