

Pawel Wodnicki, MS

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Software Senior Engineer / Embedded Architect / Software Manager

SUMMARY OF QUALIFICATIONS

Accomplished Senior Software Engineer, Embedded Architect and Software Development Manager with extensive experience managing all facets of the software development lifecycle. Experienced in all aspects of software and algorithm development, project management, hardware design and development, and research and development. Adept at using entrepreneurial skills in hardware and architecture development and applications. Skilled at leading technical teams in the completion of high-profile projects and complex scientific applications delivering high ROI technology.

Core competencies include:

Software Development | Product Development | Open Source | Security | Containerization | Cloud Technology
Linux | IoT | Compiler Technology | Programming Languages | Computer Architecture | RTOS | Code Generation
FPGA High-Level Synthesis | Embedded Systems Debugging and Verification | Industrial Automation IEC 61499
Computer Vision | 2D and 3D Image Processing | AI| Deep Learning | Robotics | CNC | 3D Printing | Hypertext

EDUCATION

AGH UNIVERSITY OF SCIENCE AND TECHNOLOGY | **MS in Electronics and Electrical Engineering**

PROFESSIONAL EXPERIENCE

Sabanto Inc. | Itasca, IL

2022 November – Present

Senior Embedded Engineer

Researched and developed comprehensive cybersecurity plan for the embedded part of the Sabanto's product line.

Designed and developed secure provisioning process of Ubuntu 20.04 on Raspberry Pi CM4 for Sabanto Automy Kit. Secure provisioning process is based on Raspberry Pi CM4 secure boot and integration with Infineon OPTIGA M secure chip.

Developed custom embedded Linux distribution using Buildroot for secure boot of Raspberry Pi CM4. Developed integration of Infineon OPTIGA M Linux packages.

Researched and developed prototype in record time of CAN Bus bridge based on NXP i.MXRT1060 MCU for Sabanto Autonomy Kit.

Debug and resolved performance issues with Robotic Operating System ROS.
Developed low level debugging and monitoring of I2C bus operations.

Tech stack AWS cloud, AWS IoT, Remote IoT, DataDog, Github, ROS, PKI, Sectigo.

Liquid Controls | Lake Bluff, IL

2020 August – 2022 October

Systems Software Engineer

Proposed software (Linux+Zephyr RTOS) and hardware (iMX8) architecture for Universal Register next generation of cloud connected electronic registers. New architecture is based on connectivity

centric principle with gRPC and TCP/IP at the core seamlessly connecting Linux based HMI and RTOS based MCU.

Executed study that showed feasibility of unifying existing systems and application software to run on new software and hardware architectures. This task involved prototyping new hardware and porting application software to it.

Contributed to the new platform hardware design by helping with key components selection and by specifying system behavior. Reviewed hardware design and proposed many schematic and layout changes.

Based on the proposed architecture developed embedded Linux platform using connectivity centric approach utilizing gRPC and TCP/IP running over all available communication interfaces including: serial, Bluetooth, WiFi, Ethernet and cellular connection. To accomplish this task I have developed container based Digital Twin for new platform. Because of the delays prototype hardware could not be procured on time.

Developed Docker images to for a multiplatform (Windows and Linux) CI/CD build system.

Established and managed SonarQube for code quality improvement and security assessment of the current code base.

Developed SSH based infrastructure for secure IoT project including secure TCP port forwarding to the home server, dockerized device management using Apache Guacamole, VNC based remote control, support for Nimbelink Skywire embedded cellular modem.

Proposed and investigated feasibility of developing custom MCU using ARM DesignStart.

Liquid Controls | Lake Bluff, IL

2018 September – 2020 August

Systems Software Engineer - Consultant

Tasked with productizing embedded Linux OS for new product line of LCR.iQ™ Electronic Registers.

- Delivered customized Debian based OS distribution for NXP i.MX6 CPUs shipping to customers worldwide. Responsible for Linux custom kernel configuration, patching (Wi-Fi and Bluetooth stacks), building and debugging. Configuring and building custom uBoot boot loader. Debian OS Image configuration including networking NetworkManager, system services using SystemD. OS hardening utilizing Center for Internet Security CIS Debian Linux Benchmark guidelines.
- Designed and developed C based Wireless API and Python daemon supporting custom networking protocol over wireless interfaces. including WiFi in Station and Direct Mode (P2P) utilizing wpa_supplicant and Bluetooth RFCOMM utilizing BlueZ stack. Later I was given responsibility to fully qualify third party developed Android based SDK for custom LCP protocol. Work involved continued SDK development using Android Studio and supporting customers developing Android applications for integration with LCR.iQ™ Electronic Registers.
- Proposed network centric software architecture for future Liquid Controls / IDEX products. Focus on IoT connectivity and protocols (MQTT) for integration with emerging mobile fueling solutions.
- Ported in house bare metal STM32CubeX application to Zephyr OS.

- Developed comprehensive test and verification of the uBoot bootloader, Linux Kernel and OS Image utilizing Linux Test Project and NXP production tests.
- Developed CMake based build system and greatly enhanced existing Makefile based build system.
- Mentored team members in all aspects of Linux development.
- Resolved critical application data loss issue experienced by the customers in the field. Work involved debugging shutdown of multi-thread custom application which identified issues with signal handling in multi-thread environment and developing proper solution.
- Developed Docker based build system for CI/CD.
- Worked on source code based migration from in house Perforce P4 repositories to cloud based Bitbucket Git repositories.

32bitmicro | Brookfield, WI

2005 - Present

President

Developed cloud-based SDLC (software life-cycle development solutions) for the IoT and embedded markets. Develop LLVM based tools and embedded firmware targeting ARM-based 32-bit micro-controllers. Contributed to the development of LLVM - a leading open source compiler infrastructure. Utilized talents to provide LLVM consulting services and serve as a Release Manager for the LLVM 3.2 release. Maintain the standalone new libnano embedded C library from Linaro GCC ARM embedded. Investigate the total usage of LLVM on the Android platform.

Key Achievements:

- Conceptualized and implemented an embedded compiler and development environment for 32-bit micro-controllers.
- Improved functionality by eliminating and correcting bugs within the software.
- Created mobile software, Android custom applications, and the Hybrid App Cordova.
- Ported the HBBR basic compiler to an Android platform using Android NDK and JNI.

S&C | Chicago, IL

2016 - 2018

Manager Real-Time Embedded Software

Utilized talents to deliver technical architecture and development framework to implement a next gen control platform. Spearheaded security architecture specifications, analysis, design, implementation and testing, and related documentation for a new Linux-based software platform. Established a test driven development (TDD) approach for software development processes. Formulated project schedules and timelines while managing the team progress against the schedule. Collaborated with stakeholders to establish roadblocks, objectives, and requirements. Led two development teams and performed human resources related tasks. Mentored team members while supporting personal career development goals. Implemented and sustained innovation and product development processes.

Key Achievements:

- Developed architecture for S&C next generation of the embedded platform.
- Championed the development of an MCU to PCIe and DSP bridge with custom peripherals and ADC processing.
- Devised a DevOps-based build system for custom S&C software and Yocto-based Linux distribution.
- Ensured project deadlines and performance objectives were met by recruiting top talent.

- Ported open source Chromium Embedded Controller (EC) to MS SmartFusion2 FPGA with the Cortex-M3 MCU subsystem.
- Integrated ARM Mbed TLS and PKI security with FreeRTOS running on Kinetis based IoT product.
- Targeted custom boards from prototype while bringing the boards to pre-release revision status.
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NORDCO | Oak Creek, WI

2014 - 2016

Lead Controls Engineer

Oversaw a controls group with a \$1M annual budget, four software developers, two electrical engineers, one contractor, outsourced work and remote developers. Integrated third-party custom software for tamping solutions. Designed CANOpen-based controls for electrical actuators for a RoadReady Tamper machine reference systems. Devised a CAN bus-based custom protocol for a computer-based controls system. Established a software development life-cycle process for automated builds and TRAC-based issue tracking.

Key Achievements:

Spearheaded the development of real-time controls, machine delivery, and startups for new Spiker machines.

Developed machine real-time controls, a user interface, and electrical for the RoadReady RST1000 Tamper and RBR1000 Regulator machines.

Boosted productivity by 100% by establishing a controls lab and controls emulation.

Minimized programming errors by creating emulation software for the controls system and debugging procedures using Linux-based emulation for the C++-based STW RTOS and controls.

Created real-time software controls for hydrostatic propulsion for three lines of machines in various modes.

Resolved quality issues with the first two pre-production machines.

PREVIOUS WORK HISTORY:

SYNOPSYS INC. | Morrisville, NC | **Software Engineer Group Leader**

AVANT! CORPORATION | Morrisville, NC | **Software Engineer Systems Group**

JUKI CORPORATION | Morrisville, NC | **Technical Manager**

ZEVATECH | Morrisville, NC | **Lead Developer**

UNIVERSITY OF NORTH CAROLINA | Chapel Hill, NC | **Application Analyst Programmer I / Electronics Technician IV**

RESEARCH & PUBLICATIONS

Fluorescence Lifetime Imaging Microscopy

P. Wodnicki; Applied Fluorescence in Chemistry, Biology, and Medicine; p. 491-507; 1999

Recent Developments in Monitoring Calcium & Protein Interactions in Cells Using Fluorescence Lifetime Microscopy

P. Wodnicki; Journal of Fluorescence; p. 85-91; Vol. 7; Iss. 1; 1997

Automated Image Microscopy

P. Wodnicki; Fluorescence Imaging Spectroscopy and Microscopy; p. 31-54; 1996

Time-Resolved Fluorescence Lifetime Imaging Microscopy Using a Picosecond Pulsed Tunable Dye Laser System

P. Wodnicki; Review of Scientific Instruments; p. 3722-3731; Vol. 67; Is. 10; 1996

Fluorescence Lifetime Imaging in Cell Biology

P. Wodnicki; Optical Diagnostics of Living Cells and Biofluids; p. 88; 1996

High-Speed Fluorescence Microscopy: Lifetime Imaging in the Biomedical Sciences

P. Wodnicki; Microscopy and Microanalysis; p. 13-23; Is. 1; 1995

Fluorescence Lifetime Imaging Microscopy and Its Applications

P. Wodnicki; Time-Resolved Laser Spectroscopy in Biochemistry IV; p. 64; 1994

CAT-CW3: A Coursework Framework for Engineer Education

CAT-CW2: Authoring System for Tutoring in Engineering Sciences

Pawel Wodnicki

- Indian Creek, IL, US

Contact Information

- 3t4-6wo-htn@mail.dice.com
- 2622445849

Summary

Seasoned, research-oriented Software Engineer with 20+ years of progressive experience covering all aspects of the software development life cycle (SDLC) in the electronics, software, hardware, rail and academic industries. Leverages expertise in software and algorithm development, project management, research and development (R&D) and hardware driving design, development, implementation and support. Utilizes entrepreneurial skills to excel in application, hardware and architecture development, with a specialization in compiler technology targeting embedded applications. Leads technical teams in high-profile projects, including EDA, R&D and complex scientific applications that deliver high ROI technology. Contributes value added input in open source projects LLVM, Raspberry Pi, Zephyr Project and RISC-V.

Work History

Total Work Experience: 27 years

- **President HBBR Basic And**
Jan 01, 2005
- **Software Engineer Group Leader SYNOPSYS INC**
Jan 01, 2002
- **Software Engineer Systems Group AVANT! CORPORATION**
Jan 01, 2000

- **Technical Manager JUKI CORPORATION U.S. R&D CENTER**
Jan 01, 1998
- **Lead Developer ZEVATECH**
Jan 01, 1996

Education

- **Masters** | AGH University of Science and Technology

Skills

- **software** - 26 years
- **embedded systems** - 23 years
- **iot** - 23 years
- **leadership** - 22 years
- **cloud** - 21 years
- **consulting** - 21 years
- **open source** - 21 years
- **infrastructure** - 20 years
- **sdic** - 20 years
- **android** - 19 years
- **apache cordova** - 19 years
- **compiler** - 19 years
- **embedded c** - 19 years
- **firmware** - 19 years
- **gcc** - 19 years
- **jni** - 19 years
- **llvm** - 19 years
- **mobile applications** - 19 years
- **president** - 19 years
- **release management** - 19 years
- **agile methodologies**
- **algorithm design**
- **antlr**
- **architectures**
- **arm architecture**
- **arm cortex m3**
- **arm cortex-m3**
- **assembly arm**

- bare metal
- boost
- c++
- cmake
- code generation
- compilers
- continuous delivery
- cross platform development
- cross-platform development
- cyber security
- debugging
- docker
- eclipse
- eda
- elf
- entrepreneurship
- fluorescence lifetime imaging
- fluorescence-lifetime imaging
- gdsii
- image processing
- linkers
- linux
- linux kernel
- low level programming
- microcontrollers
- milkyway database
- opencv
- os x
- parsing
- pcb design
- perl
- pki
- prolog
- public key cryptography
- python
- real time operating systems
- secsgem
- smt pick and place
- software design
- software development
- software development life cycle
- software engineering
- software project management
- start ups
- start-ups

- **stl**
- **test driven development**
- **turbo pascal**
- **verilog**
- **vhdl**
- **visual studio**
- **windows**
- **xml**
- **automated testing** - 15 years
- **creativity** - 15 years
- **embedded linux** - 15 years
- **embedded software** - 15 years
- **arm** - 10 years
- **automation** - 10 years
- **design review** - 5 years
- **device drivers** - 5 years
- **continuous integration** - 2 years
- **android development** - 1 years
- **bluetooth**
- **c**
- **agile** - 2 years
- **cryptography** - 2 years
- **devops** - 2 years
- **bitbucket**
- **distributed computing** - 4 years

Work Preferences

- Likely to Switch: True
- Willing to Relocate: False
- Travel Preference: 25%
- Preferred Location:
 - Milwaukee, WI, US
 - Chicago, IL, US
- Work Authorization:
 - US
- Work Documents:
 - Green Card Holder
- Security Clearance: False
- Third Party: False
- Employment Type:
 - Full-time

- Contract - Independent
- Contract - W2
- Contract to Hire - Independent
- Contract to Hire - W2

Profile Sources

- linkedin: <https://www.linkedin.com/in/pawel-wodnicki-88a1a11a>
- github: <https://github.com/32bitmicro>
- Dice: <https://www.dice.com/employer/talent/profile/2b81fd5567ee05ff58e93ebf8948603d>