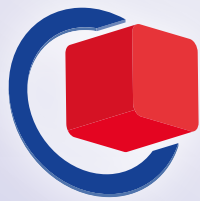


Nuremberg, Germany
9.–11.4.2024



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Exhibition&Conference

CONFERENCE PROGRAM

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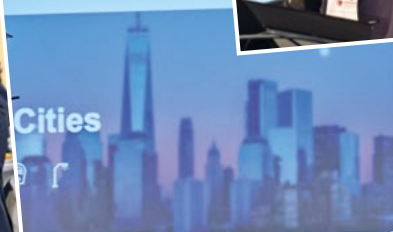
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EMBEDDED WORLD – A BUSTLING PLACE TO MEET

At embedded world, trade fairs and conferences complement each other perfectly. New technologies and ideas will be presented at the conference, and visitors can experience how current innovations are transformed into products at the trade fair.

In 2023 Daniel Cooley, CTO Silicon Labs, Prof. Ali Hessami, VEGA Systems and Prof. Dr. Albert Heuberger, Fraunhofer IIS were guest speakers.



The exchange of ideas and thoughts is a key part of the embedded world Conference. Discussions take place after the presentations, moderated by our Session Chairs, or during panel discussions in the exhibition halls.



WEKA's stand is as busy as a beehive: Developers, Partners and Executives meet and greet and are being interviewed.





Prof. Dr.-Ing. Axel Sikora
Chairman of embedded world Conference

embedded world Conference 2024 **connecting the embedded community**

Welcome to the 22nd edition of embedded world Exhibition & Conference held in Nuremberg during 9 - 11 April 2024! The unique combination of an exhibition for engineers and technical management and a world-leading conference at the intersection of applied research and industrial applications has proven extremely successful. embedded world is driven by technology as well as by applications with a strong focus on system and cross domain aspects.

This year's slogan "connecting the embedded community" recognizes three aspects of the event:

It is great to host a global event in Nuremberg that's experiencing a rapid increase in international speakers and visitors from all continents. This goes along with the growing international presence of the embedded world. We kicked off embedded world Exhibition & Conference China in Shanghai in June 2023 with a top class and very busy event; and we will start embedded world Exhibition & Conference North America in Austin (Texas) in October 2024.

embedded world 2024 will cover all aspects of the development and application of embedded systems, from fundamental technologies to development processes and special fields of applications. It is one of the central strengths of the event to be cross-sectoral and interdisciplinary. The conference provides a platform to bring together experts from different domains and application areas of embedded systems in order to promote a holistic system design perspective, to identify synergies and commonalities, and to strengthen the exchange of knowledge and experiences.

Connectivity, embedded systems of systems and the Internet of Things, connecting people and Things, and driving the embedded world to new levels – with regards to semiconductor technology, to algorithms, to signal processing. With regards to embedded systems, we are talking about connecting machines. With our embedded world event, we are connecting people and communities!

This 22nd edition of the embedded world delivers a thrilling program **structured along 8 tracks**. The program features a total of **213 hours** of knowledge delivery and exchange.

- **All 81 sessions** will not only include presentations, but also offer Q&A rounds between speakers and participants in each session.
- We will have **two first-class keynotes** from top notch industry and academic leaders, including

- On Tuesday, **Dr. Salil Raje**, Senior Vice President and General Manager, AMD, will talk about "Improving AI Efficiency from Edge to Cloud with Heterogeneous Computing".
- And Wednesday will see a keynote by **Fiona Treacy**, Managing Director Industrial Automation, Analog Devices on "How the Intelligent Edge may help enable the sustainable factory of the future"
- **18 half- or full day classes** will enable an in-depth knowledge transfer of current and relevant embedded systems topics.
- We will also feature **six plenary panel discussions** not only on hot technological topics such as embedded vision, but also on societal aspects such as "Sustainability and IoT", "Responsible AI", "EU Cyber Resilience Act", and "Supply Chain Challenges".

Let me also highlight the positive and fruitful collaboration with a range of communities, alliances, and interest groups. We organized and are running special sessions with alliances such as the Bluetooth SIG, edge AI and vision Alliance, Global Certification Forum (GCF), MIPI Alliance, MISRA, OpenHW Group, OSADL, PICMG or the RISC-V Foundation. This makes the embedded world truly a community of communities. We are grateful for this collaboration.

The steering board of embedded world 2024 wishes all participants stimulating discussions about new ideas and solutions enabling the community to more easily and efficiently cope with the immense challenges that lie ahead for our industry and society. We welcome you to gain great insights in a pulsating atmosphere.

It will be good to see all of you in a professional, personal and friendly atmosphere in Nuremberg!

Prof. Dr.-Ing. Axel Sikora
Chairman of embedded world Conference

Tuesday, 9 April

9:30-13:00	Class 3.1 Hands-On Zephyr Project Workshop Jonas Remmert, PHYTEC Messtechnik	Class 5.1 Ultra Low Power Hands-on Workshop Herman Roebbers, Capgemini Engineering	Class 6.1 Automating Model Based Systems Engineering with HarmonyMBE Andy Lapping, SodiusWillert	Class 6.2 Modern C++ Thread and Memory Models Dr. Carmelo Loiacono, Green Hills Software	Class 6.3 Testing Software of Embedded Systems Stephan Grünfelder	
14:00-17:30					Class 6.4 Embedded Rust Introduction Prof. Dr. Stefan Wehr, Hochschule Offenburg	Class 6.5 C++ and Modern C++ for Embedded Development Dr. Carmelo Loiacono, Green Hills Software

Wednesday, 10 April

9:30-13:00		Class 6.6 Practical SysML and MBSE: Basic Guidance for Engineers Dr. Michael Jastram, Formal Mind	Class 6.7 Requirement-based Iterative System Development Frank Stöckel, Philip Stolz, HOOD			Class 7.1 An Introduction to TinyML: Bringing Deep Learning to Ultra-low-power Microcontrollers Marcus Rüb, Hahn-Schickard-Gesellschaft für angewandte Forschung e.V.
14:00-17:30	Class 3.2 Introduction to RTOS Application Design Jacob Beningo, Embedded Group			Class 6.8 Testing Methods (not only) for Functional Safety Markus Franz, infoteam SET	Class 6.9 Embedded Rust Advanced Dion Dokter, Tweede golf	

Thursday, 11 April

9:30-13:00	Class 3.3 Introduction to Embedded Linux Using a Yocto Project SDK Robert Berger, Reliable Embedded Systems	Class 4.1 Functional Safety Standards Ingo Rolle, Hochschule Darmstadt		Class 5.2 EMC Compliant Industrial Electronic Design Dr. Heinz Zenkner, Würth Elektronik eiSos	Class 8.1 FPGA-Design Using C/C++ and High-Level Synthesis Prof. Dr. Frank Kesel, Hochschule Pforzheim	Classes: In the embedded world Classes, reputed experts speak on special topics for half a day or a full day. This format is aimed primarily at participants who want to familiarize themselves thoroughly and efficiently with a specific topic. Be sure to register now!
14:00-17:00			Class 4.2 Embedded Safety Architectures Alessandro Bastoni, STMicroelectronics			

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Tuesday, 9 April 2024, 10:00, Hall Sydney, Level 1

Conference Keynote**Improving AI Efficiency from Edge to Cloud with Heterogeneous Computing**

AI is transforming the fabric of everyday life. In healthcare, automotive, industrial, and consumer markets, AI has the potential to solve historically complex challenges. AI will drive silicon consumption for the foreseeable future, but it can consume a lot of power. Widespread adoption of Generative AI with large language models will intensify this demand.

Most discrete devices today are not optimized for power efficiency. Since 2020, AMD has achieved a 6.8X improvement in processor efficiency, and the AI Engines on its adaptive SoCs help deliver power savings for compute-intensive applications. During this keynote, attendees will learn about:



- Growing compute and power requirements needed to drive AI
- Techniques to drive power-efficient AI with heterogeneous compute
- How to achieve workload optimization with adaptive computing

Dr. Salil Raje

As the leader of AMD's Adaptive and Embedded Computing Group (AECG), Salil Raje is responsible for all aspects of strategy, business management, engineering, and sales for FPGAs, adaptive SoCs, embedded processors, and core markets. Raje joined AMD in 2022 from Xilinx, as part of the largest acquisition in semiconductor history. Raje holds a Bachelor of Technology in Electrical Engineering from the Indian Institute of Technology, Madras, and Master of Science and Doctorate degrees in Computer Science from Northwestern University. He holds eight patents in electronic design tools, ASIC, and FPGA designs, and has written more than 15 industry-recognized research papers.

Wednesday, 10 April 2024, 10:00, Hall Sydney, Level 1

Conference Keynote**How the Intelligent Edge May Help Enable the Sustainable Factory of the Future**

Factory operations are being transformed thanks to data, with next-generation operational insight enabling dynamic production flows and hyper-agile, energy-efficient manufacturing. This session explores how digitizing, connecting, and interpreting data from the factory floor in real-time unlocks the power of the Intelligent Edge. Fiona Treacy will explain how to implement modular system design, demonstrate the impact of localized decision-making, and showcase the benefits of ubiquitous sensing, all in the context of increasing intelligence at the edge.

These innovations are central to the future of industrial system design and will be vital in creating energy-efficient production environments for a more sustainable future.

Fiona Treacy

is Managing Director within the Industrial Automation Business Unit at Analog Devices, where she leads an Isolation & Safety Systems business unit, along with a business strategy team focused on accelerating customer development. Previously Fiona held roles in engineering, applications, marketing and business management within the Factory Automation and Process Control, Industrial Connectivity, Precision Converters, and Instrumentation business units. Fiona has a B.Sc. in applied physics and electronics and an M.B.A. from the University of Limerick.



Community Partners

edge ai + vision
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Open Source Automation Development Lab eG



	1. Internet of Things	2. Connectivity Solutions		3. Embedded OS	4. Safety & Security	5. Board Level
DAY 1: morning	Session 1.1 Innovations	Session 2.1 Single Pair Ethernet	Session 2.4 Matter	Session 3.1 Basics	Session 4.1 Standards	
DAY 1: afternoon	Session 1.2 Development	Session 2.2 CAN	Session 2.5 Application Layer Protocols	Session 3.2 Linux	Session 4.2 CRA	
	Session 1.3 Platforms 1	Session 2.3 Performance	Session 2.6 TSN	Session 3.3 Yocto	Session 4.3 Software BOM	
DAY 2: morning	Session 1.4 Software	Session 2.7 Bluetooth Applications		Session 3.4 RTOS	Session 4.4 Architectures & Technology 1	
DAY 2: afternoon	Session 1.5 Computing	Session 2.8 Bluetooth Innovations		Session 3.5 Virtualization	Session 4.5 Architectures & Technology 2	
	Session 1.6 Smart Home	Session 2.9 Bluetooth Localization		Session 3.6 Container	Session 4.6 Verification	
DAY 3: morning	Session 1.7 Smart Home	Session 2.10 WiFi			Session 4.7 Security Architectures & Technologies 1	Session 5.10 Automotive Design
	Session 1.8 SIM-based Identity Management	Session 2.11 Wireless 1		Session 3.7 Open Source	Session 4.8 Security Architectures & Technologies 2	
DAY 3: afternoon	Session 1.9 Platforms 2	Session 2.11 Wireless 2		Session 3.8 Updates	Session 4.9 Open Source	

Conference Fees

Fees Classes	Early Rate	Full Price
1 Half-Day Class Ticket	EUR 395.00	EUR 495.00
2 Half-Day Classes Ticket	EUR 790.00	EUR 990.00
3 Half-Day Classes Ticket	EUR 995.00	EUR 1295.00
4 Half-Day Classes Ticket	EUR 1195.00	EUR 1490.00
5 Half-Day Classes Ticket	EUR 1490.00	EUR 1795.00
6 Half-Day Classes Ticket	EUR 1695.00	EUR 1990.00

Contact: Ms. Alexandra Feuerstein
Phone: +49 (0) 89 / 255 56-1372
Email: AFeuerstein@weka-fachmedien.de
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Richard-Reitzner-Allee 2
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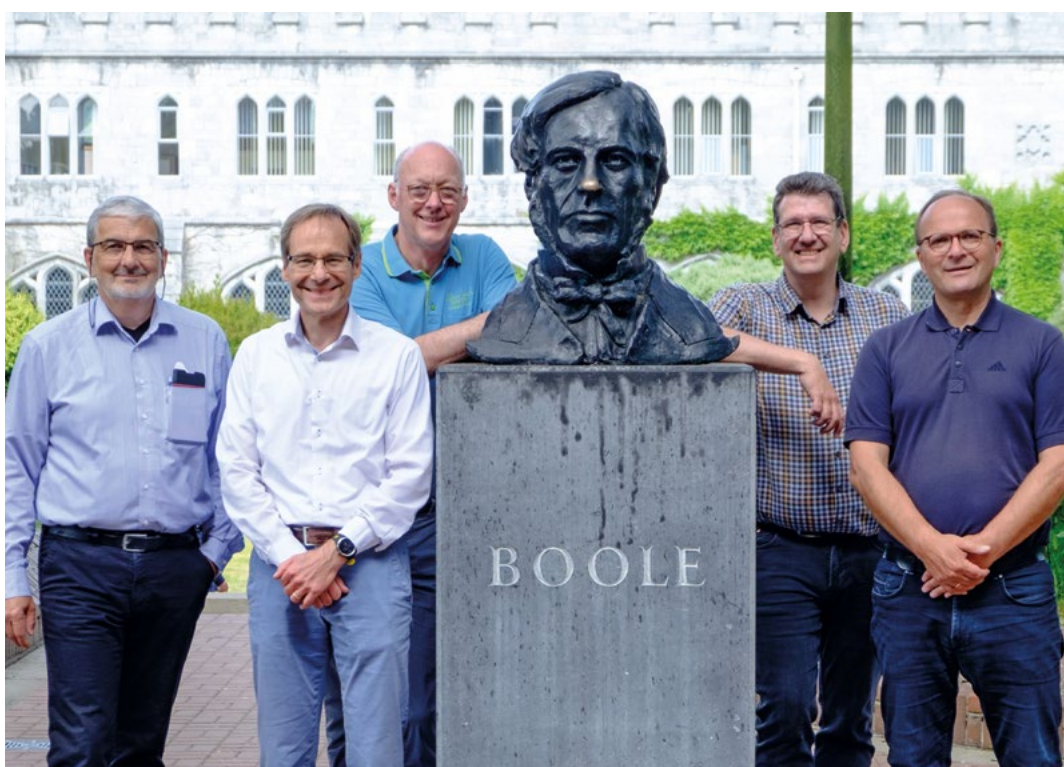
Fees Sessions	Early Rate	Full Price
Sessions 1 Day Ticket	EUR 495.00	EUR 695.00
Sessions 2 Day Ticket	EUR 645.00	EUR 845.00
Sessions 3 Day Ticket	EUR 790.00	EUR 990.00

All fees excluded 19% VAT

Terms and Conditions:

- The attendance fee includes participation on the booked conference days, proceedings, refreshments, and free admission to the embedded world 2024 Exhibition.
- You will receive a confirmation of your conference registration along with your invoice.
- Cancellations received in writing before or on 19 March 2024 will be subject to a service charge of EUR 50 for one-day registrations and EUR 100 for several-days registrations. For all cancellations received after 19 March 2024 the full conference fee remains payable. Substitutions within the same company are welcome at any time.
- The organizers reserve the right to make changes in the program and/or speakers or to cancel sessions/classes if conditions beyond its control prevail. Please check www.embedded-world.eu for the latest conference information.
- Students are granted a 50% reduction, student ID required. Please register online.
- Exhibitors will receive a discount of 30%. Please use the code: EWC24EXH
- For registrations of five persons and more from one company, please contact our conference department for special rates.
- On-site-registration: Please register in advance. For on-site-registration a surcharge of EUR 70 per attendee will apply.

Hardware Engineering	6. Systems & Software Engineering		7. Embedded Vision & Edge Ai		8. System-on-Chip (SoC) Design
Session 5.1 PICMG 1	Session 6.1 Development & Processes		Session 7.1 Technologies 1	Session 7.4 Object Detection	
Session 5.2 PICMG 2	Session 6.2 Software Development 1		Session 7.2 Technologies 2	Session 7.5 Case Studies 1	
Session 5.3 Sensor Technologies	Session 6.3 Software Development 2		Session 7.3 Standards	Session 7.6 Case Studies 2	
Session 5.4 MIPI I3C	Session 6.4 MISRA & Static Code Analysis 1	Session 6.7 MBSE	Session 7.7 Pipelines		Session 8.1 Architectures
Session 5.5 MIPI	Session 6.5 MISRA & Static Code Analysis 2	Session 6.8 Advanced Code Qualification	Session 7.8 Large Models 1		Session 8.2 FPGA Design
Session 5.6 Power, EMC	Session 6.6 MISRA & Static Code Analysis 3	Session 6.9 Performance Engineering	Session 7.9 Large Models 2		Session 8.3 Automotive
Session 5.7 Memory	Session 6.10 Testing 1	Session 6.13 C/C++	Session 7.10 Testing & Monitoring		Session 8.4 RISC-V 1
Session 5.8 Wireless	Session 6.11 Testing 2	Session 6.14 Rust	Session 7.11 Optimization 1		Session 8.5 RISC-V 2
Session 5.9 RF Design & Radar	Session 6.12 Debugging	Session 6.15 Development Productivity	Session 7.12 Optimization 2		Session 8.6 Accelerators




STEERING BOARD

(from left to right):

Dr. Bernd Hense,
 Prof. Dr. Dirk Pesch,
 Joachim Kroll,
 Prof. Dr. Peter Fromm,
 Prof. Dr. Axel Sikora

The steering board is the strategic think tank behind the embedded world Conference. Currently five senior engineers with excellent scientific and business records, with open minds and lots of ideas, shape the future direction of the embedded world Conference.


The photo was taken at University College Cork, the home of George Boole, who lived too early to be member of our steering board.

	1. Internet of Things	2. Connectivity Solutions		3. Embedded OS
10:00-10:15	Opening & Welcome Remarks Prof. Dr. Axel Sikora, Offenburg University			
10:15-10:45	Conference Keynote: Improving AI Efficiency from Edge to Cloud with Heterogeneous Computing Dr. Salil Raje, Advanced Micro Devices (AMD)			
	1.1: Innovations 	2.1: Single Pair Ethernet	2.4: Matter	3.1: Basics
11:00-11:30	Andes RISC-V Processors Firing on All Cylinders Dr. Hong Men Su, Andes Technology	Revolutionizing Industrial IoT: Enabling Real-time Secure Connectivity to the Edge with Single-Pair Ethernet and Zephyr OS Jason Murphy, Analog Devices	Security Pitfalls in Matter Device Implementation Melissa Loos, SCHUTZWERK	RTOS Performance Characterization on the STM32L475 IoT Discovery Board Jacob Beningo, Beningo Embedded Group
11:30-12:00	Enabling Sustainability Through Innovation Dr. Laurens Polgar, NXP Semiconductors	Simplified Development of Wire Connected Applications using 10BASE-T1S Single Pair Ethernet Jonathan Harper, onsemi	A Bridge to the Future – How Matter Brings Compatibility with Zigbee Networks Charlie Ice, NXP Semiconductors	Immutable Image-Based Operating Systems; What, How and Why Drew Moseley, Toradex
12:00-12:30	GCF Certification Process for IoT Devices. Maximizing Interoperability with Cellular Networks Carlos Pedraz Rodriguez, Global Certification Forum	Link Robustness of 10BASE-T1L Kilian Brunner, ZHAW Institute of Embedded Systems	Explaining the Matter Bridge Architecture and How to Simplify and Automate Multi-Protocol Software Development for Smart Home Gateways Julien Tiron, Silicon Labs	C++OS: An Standards Based RTOS for Small Embedded Systems Detlef Vollmann, vollmann engineering
12:30-12:45	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A
	Lunch Break			
	1.2: Development	2.2: CAN	2.5: Application Layer Protocols	3.2: Linux
13:45-14:15	Implementing Web User Interface on Embedded Devices Sergey Lyubka, Cesanta	Standardized Cybersecurity in CAN-Based Systems Thilo Schumann, CAN in Automation (CiA)	IT/OT Data Convergence: A Comparative Analysis of MQTT, OPC UA and DDS for Industrie 4.0 Use Cases Dr. Gerardo Pardo-Castellote, Real-Time Innovations (RTI)	Power Management on Linux: From the Hardware to the Kernel and Userspace Interfaces Sergio Prado, Embedded Labworks
14:15-14:45	Integrating A/B Testing and Feature Toggles in IoT Applications Deployed at Edge Alina Dima, AWS	Improved Network Start-up for Dynamically Changing Embedded CAN Systems Prof. Dr. Reiner Zitzmann, CAN in Automation (CiA)	TCP/IP for Real-Time Embedded Systems: The Good, the Bad and the Ugly Prof. Dr. Endric Schubert, Missing Link Electronics	Never Prevent an Operating System from Complaining! Dr. Carsten Emde, Open Source Automation Development Lab (OSADL)
14:45-15:15	Accelerating Factory 4.0 – Tools and Techniques for Server Development Prof. Douglas Sandy, PICMG	Collaborative Design of Security Measures for CAN and CANopen Systems Olaf Pfeiffer, Embedded Systems Academy	OPC UA Pub/Sub over TSN for Motion Control Application Melvin Francis Stephen, BE.services	The Unknown Reason Why Embedded Code Should Avoid GPLv3 Raul Muñoz, Foundries.io
15:15-15:30	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A
	Coffee Break			
	1.3: Platforms 1	2.3: Performance	2.6: TSN	3.3: Yocto
16:00-16:30	IoT Platform For Water Management and Actuation in Smart Buildings Using LoRaWAN Manuel Caballero, Nimbus Centre	Continuous CAN Bus Subsystem Latency Evaluation and Stress Testing on GNU/Linux-Based Systems Pavel Pisa, Czech Technical University in Prague	Abstracting Time-Sensitive Networking Configuration Complexity to Accelerate IT/OT Convergence Christopher Main, TenAsys Corporation	The Cyber Security Act: Navigating Its Impact on Yocto-Based Products Pierre Gal, Witekio
16:30-17:00	Amazon Sidewalk Performance Analysis Lucie Labadie, Silicon Labs	Benchmarking Embedded Platforms for EtherCAT Industrial Control Pekka Varis, Texas Instruments	When Software Meets Hardware: Hardware Characteristics in TSN Configuration Lionel Havet, RealTime-at-Work	FOSS License Compliance for Yocto with the OSSelot Curation Database Caren Kresse, Open Source Automation Development Lab (OSADL) eG
17:00-17:30	A Multi-Protocol IO-Link Gateway Solution for Edge IoT Michael Hannah, Texas Instruments	Solve Design Challenges for High Performance Isolated 1080p HDMI and USB High Speed Connectivity Dr. Riccardo Privitera, Analog Devices	Design Method for Converged Real-time Networks Integrating TSN-based and Legacy Systems Hannes Grabmann, ISW Institut für Steuerungstechnik der Werkzeugmaschinen und Fertigungseinrichtungen Universität Stuttgart	Yocto is Hard to Maintain! How Can You be Sure to Always Run the Latest Yocto Layers? Vanessa Maegima, foundries.io
17:30-17:45	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A


4. Safety & Security	5. Board Level Hardware Engineering	6. Systems & Software Engineering	7. Embedded Vision & Edge AI	
Opening & Welcome Remarks Prof. Dr. Axel Sikora, Offenburg University				
Conference Keynote: Improving AI Efficiency from Edge to Cloud with Heterogeneous Computing Dr. Salil Raje, Advanced Micro Devices (AMD)				
4.1: Standards	5.1: PICMG 1 	6.1: Development & Processes	7.1: Technologies 1	7.4: Object Detection 
Future Challenges of Certifying Multicore DO-178C Avionics in Line with A(M)C 20-193 Objectives Dr. Guillem Bernat, Rapita Systems	COM Express – COM-HPC: Decision Time for Small Form Factor Modules Irene Hahner, Kontron	Requirements Engineering is Needed – But Which One to Take for a Healthy Future? Andreas Krefß, HOOD	Secure AI Inference for Embedded Vision Platforms Dr. Abdel Younes, Synaptics	Empowering AI & Embedded Vision: Enhancing Object Detection in Extreme Low-Light Environments Sami Pietilä, Visidon Oy
Safety Critical Open Standards for Accelerated Heterogeneous Computing Leonidas Kosmidis, Khronos Group	High Performance in a Mini Form Factor: COM-HPC Mini – The Game Changer Christian Eder, congatec	Open Source Software and Lifecycle Standards – Yes: It Can Be Done! Frédéric Desbiens, The Eclipse Foundation; Andrew Banks, LDRA	Designing Genlocked Video Systems with Deterministic Low Latency on FPGAs Dr. Alex Lopich, Intel	How to Train an Object Detection Model for Visual Inspection with Synthetic Data Jenny Plunkett, Edge Impulse
Update on Maintenance of IEC 61508-3 for Safety Software Michael Kindermann, Pepperl+Fuchs	COM-HPC in Modern System Design Christian Engels, Avnet Embedded	CORE SPICE: Streamlining Process Improvement & Assessment In An Era of Accelerated Development Roman Mildner, United Mentors	Memristive Technologies for Embedded AI Computing Prof. Dietmar Fey, Friedrich-Alexander University Erlangen-Nürnberg(FAU)	Object Detection in Images Using RNN Dmitri Lvov, Synaptics
Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A
Lunch Break				
4.2: CRA	5.2: PICMG 2 	6.2: Software Development 1	7.2: Technologies 2	7.5: Case Studies 1
Experiences Based on the Finnish Cybersecurity Label: Uncovering Insights from Vulnerabilities to Testing Methods Juho Vesanen, Finnish Transport and Communications Agency	Open Standards Serving Science – The Case at European Spallation Source Dr. Timo Korhonen, European Spallation Source ERIC	A Meta Modeling Approach for Highly Interconnected Software Defined Vehicles Friedrich Wattenberg, Dr. Ing. h.c. F. Porsche	Hardware-Aware Joint Optimization of Model Architecture and Quantization Karthikeyan Shanmuga Vadivel, Synaptics	Combining Synthetic Data Generation and Sensor Modeling to Develop Embedded Vision Solutions – A Practical Case Study Dr. Joana Duarte, 7 Sensing Software
The Practical Impact of NIS2, CRA and AI Act on IIoT and IoT Mirko Ross, asvin	Liberating High-Performance Edge AI on Open Standards Hardware Aksel Saltuklar, Elma Electronic	Automotive Software Defined Vehicle – Continously & Traceable From SysML System Specifications To AUTOSAR SW Architecture And Code Thorsten Gerke, DASSAULT SYSTEMES	Performance Examination of Symbolic Aggregate Approximation in IoT Applications Suzana Veljanovska, Zurich Univerity of Applied Sciences (ZHAW)	Application Case Study for AI/ML: Enabling Voice Control on Battery-Powered Smart Appliances Using a Cloud-Free Embedded ML Solution Javier Elenes, Silicon Labs
Solution Strategy for PSIRT in the ICS Environment Andreas Harner, DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE	A Signal Integrity Case Study in PICMG COM-HPC Mini Modules Matthew Burns, Samtec	What is Coming Next With Software Defined Vehicles? An Examination Of The Trends Predicted Over The Coming Years Brendan Morris, Siemens Digital Industries Software	Rapid Prototyping and Deployment of Real-Time Multi-Object Tracking Solutions on Edge Devices Dr. Immanuel Bayer, Palaimon	Computer Vision Based Electric Vehicle Charging Occupancy Detection Sandeep Mistry, ARM
Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A
Coffee Break				
4.3: Software BOM	5.3: Sensor Technologies	6.3: Software Development 2	7.3: Standards	7.6: Case Studies 2
Using and Supporting Software Bill of Materials Regulation Mark Hermeling, CodeSecure	Small Sensors, Big Solutions: Enhancing Climate, Air Quality, and Well-being Dr. Stefan Finkbeiner, Bosch Sensortec	Software-defined Vehicles: Safe And Secure Ethernet For Zonal ECUs Dr. Ahmed Majeed Khan, Siemens Digital Industries Software	How Can Connectivity Innovations Transform Machine Vision Applications in the Industrial Market? Yaki Sfadya, Valens Semiconductor	Fitting AI Solutions on Connected Platforms in Real-world Industrial Applications Dirk van den Heuvel, Topic Embedded Systems
Understanding SBOMs and Complying with New Cybersecurity Requirements Leonardo Held, Toradex	Ankle Joint Orthosis with Textile-based Incorrect Weight-bearing Sensor Kay Ullrich, imbut	Establishing a Secure Software Development Platform In The Age of Software-Defined Vehicles Dr. Dennis Kengo Oka, Synopsys	Open Standards Powering the Future of Embedded Compute and Vision Applications Neil Trevett, Khronos Group	How mmWave Radar MMIC's Assist Sensor Designs which Increase Robots Productivity and Operators' Safety Greg Peake, Matthieu Chevrier, Texas Instruments
Software Bill of Materials Christian Seipel, DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE	Implementation of a Haptic Robot Gripper using Strain – Sensors and Artificial Intelligence (AI) Algorithms Markus Kuderer, Hahn-Schickard-Gesellschaft für angewandte Forschung	Trust Anchor Mesh: Common Trusted Area Based on Decentralized Trust Topology Vladislav Rummyantsev, ZF Group	How Edge-based GenAI Models are the Future of Computer Vision Applications Dr. Chen Su, NVIDIA	Wireless Sensing – How to Develop Motion Detection Applications Based on Embedded ML on the Edge Tamas Daranyi, Silicon Labs
Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A

Want more? See page 4 for additional classes!

	1. Internet of Things	2. Connectivity Solutions	3. Embedded OS	4. Safety & Security
10:00-10:15	Opening & Welcome Remarks Prof. Dr. Axel Sikora, Offenburg University			
10:15-10:45	Conference Keynote: How the Intelligent Edge May Help Enable the Sustainable Factory of the Future Fiona Treacy, Analog Devices			
	1.4: Software	2.7: Bluetooth Applications 	3.4: RTOS	4.4: Architectures & Technology 1
11:00-11:30	Simplify the Integration of Software Components in Modern Microcontroller Systems Joseph Yiu, ARM	Repurposing BLE Radio Inside a Smart Meter to Enable Concurrent Thread Mesh Networking and Robust Multi-WAN Connectivity Indar Singhal, Mohit Arora, STMicroelectronics	The State of Open Source Real-Time Operating Systems Frédéric Desbiens, Eclipse Foundation	WCET and Qualified Critical Applications: Robust Partitioning Alone is Not Enough Steve DiCamillo, LDRA
11:30-12:00	Dynamically Shared Processing in Multi-Controller Embedded Systems for Optimal Use of Power and Processing Load Madhur Agarwal, Kamaldeep Bansal, STMicroelectronics	Auracast Broadcast Audio: Best Practices for Developing Transmitters, Receivers, and Broadcast Assistants for Public Locations Maruel Alfredo Zain, Qualcomm	Zephyr Project: Result of Applying Open Source Project Best Practices Kate Stewart, The Linux Foundation	SoC-FPGA architecture for Functional Safety According to ISO 13849-1 Cat. 3 PL d SIL2 Alex Huntley, Intel
12:00-12:30	Using Software to Reduce Complexity in Modern Embedded Systems Dr. Rob Oshana, Analog Devices	Low-power, Secure Applications for Automotive and Healthcare with the Emerging Bluetooth Technology Tomas Motos, Texas Instruments	Zephyr Device Drivers: Walkthrough and Examples Mohammed Billoo, MAB Labs Embedded Solutions	Systematic Protection with a Third Privilege level in RISC-V Itai Yarom, MIPS
12:30-12:45	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A
Lunch Break				
	1.5: Computing	2.8: Bluetooth Innovations 	3.5: Virtualization	4.5: Architectures & Technology 2
13:45-14:15	FPGA Implementation of a 5G Industrial Internet of Things Platform for Industry 4.0 Automation and Edge AI Applications Dr. Hossam Fattah, Karl Wachswender, Lattice Semiconductor	Redefining Bluetooth Low Energy Testing to Cover Latest Bluetooth Innovations Joerg Koeppe, Rohde & Schwarz	A Comparative Study of Interrupts Management Methods on Embedded Virtualized Systems Dr. Carmelo Loiacono, Green Hills Software	AutoCHERI – Ensuring Memory Safety in Critical Applications Rob Potter, Beam Connectivity Andrew Banks, LDRA
14:15-14:45	Enhancing Signal Processing Through Transparent AI in an Embedded Sensor System Oliver Völckers, BeST Berliner Sensortechnik	Elevating Network Excellence: The Impact of New Bluetooth Mesh Standard Mikko Savolainen, Silicon Labs	An Open Source Reference RISC-V Virtualization Platform – CPU, SoC, and Beyond Dr. Sandro Pinto, Universidade do Minho	A Software Architecture For Mixed-Criticality Airborne Embedded Systems Dr. Daniel Kliem, Airbus Operations
14:45-15:15	Analog Computing in-Memristive Devices Dr. Vikas Rana, FZ Juelich	Exploring the Bluetooth LE PAwR Feature in Large-Scale Network Testing Petteri Paatsila, Silicon Labs	Running NuttX with VirtIO on QEMU + Hypervisors Masayuki Ishikawa, Sony Corporation	Principles of High Assurance Security Engineering Andre Schmitz, Green Hills Software
15:15-15:30	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A
Coffee Break				
	1.6: Smart Home	2.9: Bluetooth Localization 	3.6: Container	4.6: Verification
16:00-16:30	Matter Protocol Unwrapped: Unleashing the Potential of Smart Homes – A One-Year Retrospective Channa Samynathan, Amazon Web Services	Bluetooth Distance Estimation Advantages Using HADM Parker Dorris, Silicon Labs	Energy Savings in Distributed Embedded Systems by using Containerization and Orchestration Peter Heusinger, Fraunhofer IIS	Proven in Use vs. SIL by Design Matthias Spranz, Hitex
16:30-17:00	Home, Sustainable, Secure, Smart, and Sweet Home Lifeng Geng, ARM; Mona Xiong, Tuya Smart	Bluetooth Low Energy Angle of Arrival Location Solution – Tags, Receiver, Antenna, Firmware, Application Software Jonathan Harper, onsemi	Containers for Cost-Optimized MCUs and MPUs: A Game-Changer for Embedded Systems Maulin Patel, NXP Semiconductors	Trusted Data, Emerging as Critical for Trusted AI, ML & Digital Twins Eric Sivertson, Lattice Semiconductor
17:00-17:30	Matter: Technology and Adoption From A User's Perspective Matt Maupin, Silicon Labs	High-Accuracy Low-Power Secure Ranging using Bluetooth Channel Sounding Tomas Motos, Texas Instruments	Use of Docker Containers in Embedded Systems Raul Muñoz, Foundries.io	Fault Analysis Methodology for ISO-26262 Certification of Complex Programmable SoCs Dr. Yanran Chen, AMD
17:30-17:45	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A

5. Board Level Hardware Engineering	6. Systems & Software Engineering		7. Embedded Vision & Edge Ai	8. System-on-Chip (SoC) Design
Opening & Welcome Remarks Prof. Dr. Axel Sikora, Offenburg University				
Conference Keynote: How the Intelligent Edge May Help Enable the Sustainable Factory of the Future Fiona Treacy, Analog Devices				
5.4: MIPI I3C 	6.4: MISRA & Static Code Analysis 1 	6.7: MBSE	7.7: Pipelines 	8.1: Architectures
MIPI I3C, The Next-Generation Utility and Control Bus Supporting Time-Critical Applications Michele Scarlatella, MIPI Alliance	MISRA – What's New And What's Happening? Andrew Banks, LDRA	The HarmonyMBE Method for Efficient Model-based Systems Engineering Andy Lapping, Sodius Willert	High-performance Image Signal Processing and Camera Sensor Pipeline Design on FPGAs Dr. Alex Lopich, Intel	If You Snooze You Lose: How Microcontrollers with Programmable Logic Simplify Functional Safety Odd Jostein Svendsli, Microchip Technology
Demystifying I3C Protocol Martin Cavallo, Binho	C Threads and Atomics – The Concurrency Rules Of MISRA C:2023 Dr. Daniel Kästner, AbsInt Angewandte Informatik	Bridging MBSE To MBD With Requirements In The Loop Simulation David Eduardo Diaz Ascencio, Arshita Paliwal, Dassault Systemes	Heterogeneous AI-enabled Systems using Hardware Accelerated Vision Pipelines on Embedded Processors Reese Grimsley, Texas Instruments	The Importance of Balancing Energy Efficiency and Performance when Creating Future Microcontrollers. The Path Towards Sustainability. Bogdan Holmanu, STMicroelectronics
Demonstrating the Benefits of I3C Through Real World Implementations Ashish Makthal, Max Prasad, Microchip Technology	Impact of Undecidable MISRA Guidelines on Static Analysis Tools Dr. Daniel Simon, Qt Group	Using Model-Based Design And Virtual ECUs For Software Verification On Next Generation Heterogeneous Multi-core Architectures Kevin Brand, Synopsys	Cross-Framework Deep Learning Workflow for Reliable Autonomous Systems in Robotics and Automated Driving Applications Marco Roggero, The Mathworks	Why Integrated All-in-one Chipsets are a Must to Succeed in IoT Dima Feldman, Sony Semiconductor Israel
Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A
Lunch Break				
5.5: MIPI 	6.5: MISRA & Static Code Analysis 2 	6.8: Advanced Code Qualification	7.8: Large Models 1 	8.2: FPGA Design
Challenges and Solution Supporting HiRes 13+ MP Camera Sensors within MIPI D-PHY Domain Satheesh Chellappan, Lattice Semiconductor	Branch Aware Static Analysis To Improve Developer Workflows Mark Hermeling, CodeSecure	Data Coupling, Control Coupling, And Cohesion – Demystified! Mark Pitchford, LDRA	Implementing Transformer Neural Networks for Visual Perception on Embedded Devices Shang-Hung Lin, Verisilicon	FPGA Design and Implementation of a High-Performance Avionics Certifiable CNN Accelerator Dr. Niels Haandbæk, Daedalean
A MIPI DSI/CSI-2/D-PHY Deep Dive Jonathan Phillippe, NXP Semiconductors (Entity Member)	MISRA C++23: A Survival Guide Loïc Joly, SonarSource	Satisfying Timing Requirements For Safety-Critical Real-Time Software Dr. Daniel Kästner, AbsInt Angewandte Informatik	Distilling Large Computer Vision Models for Constrained Systems Prof. Zain Asgar, Stanford University	FPGA-based Material Testing Machine Controller Rafayel Ghasabyan, TACTUN
MIPI CSI-2 – Enabling Machine Vision in Industrial Applications Ariel Lasry, Qualcomm, speaking on behalf of MIPI Alliance	Static Sentiment Analysis: Intelligently Finding Hotspots In Intent Alex Celeste, Perforce Software	Code Quality Assurance In The Age of AI Assistance: Ensuring Compliance and Security David Källberg, IAR	Advancing Smart Vision in the Large Model Era Catherine Wang, Chloe Ma, ARM	FPGA Based High Speed Recording – Do's and Don't's of Building a 400GBit/s Data Recorder Andreas Schuler, David Epping, Missing Link Electronics
Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A
Coffee Break				
5.6: Power, EMC	6.6: MISRA & Static Code Analysis 3 	6.9: Performance Engineering	7.9: Large Models 2	8.3: Automotive
Are Modern MCUs Immune to Interference Problems? An Empirical-driven Reality Check Daniel Oliveira, University of Minho	Automatic Verification of (Un) Intended Data and Control Flows in Embedded Software Dr. Martin Becker, The MathWorks	Power And Energy Dissipation Aware Compiler Optimizations Gerard Vink, TASKING	GPU-Accelerated LLM on an Embedded Device Dr. Marcus Edel, Collabora	Data-oriented Processor Evaluation for Specialized Microcontrollers for Electric Vehicles Jaskaran Singh, Dr. Prateek Sikka, STMicroelectronics
Vertical Circuit Architectures for Next Generation Low Power Embedded Designs Ankur Bal, STMicroelectronics	Bringing Existing Code into MISRA Compliance: Challenges and Solutions Federico Serafini, Simone Ballarin, BUGSENG	Parallel Programming For High-performance Real-time Embedded Systems Dr. Sara Royuela, Barcelona Supercomputing Center	Unlocking Next-Gen Multimodality in Autonomous Robots Through Advanced Large Language Models Chloe Ma, ARM; Ian Zhang, Thundersoft	Architecture Exploration and De-risk Strategy for Complex Automotive SoCs Surya Piplani, Dr. Prateek Sikka, STMicroelectronics
Industrial EMC Challenges: Strategies for Success James Scanlon, Analog Devices	An Industrial Case Study on Formal Verification of Embedded C-Code Using Open-Source Tools Markus Krah, Munich University of Applied Sciences	Programmability Of Next-generation Heterogeneous Computing Architectures Dr. Asif Ali Khan, TU Dresden	How Transformers are Changing the Nature of Deep Learning Models Tom Michiels, Synopsys	Processor Architecture and Software Evolution to Accelerate Software-defined Vehicle Implementation Steve McAslan, NXP Semiconductors
Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A

	1. Internet of Things	2. Connectivity Solutions	4. Safety & Security 3. Embedded OS	5. Board Level Hardware 4. Safety & Security
	1.7: Smart Home	2.10: WiFi	4.7: Security Architectures & Technologies 1	5.10: Automotive Design
09:30-10:00	How New Electronic Shelf Label (ESL) Standards are Improving Retail Experience and Efficiencies Art Miller, Qualcomm Technologies	Low Power with High throughput – Comparing WiFi VirtualZero Technology Against Bluetooth Low Energy for IoT Applications David Lara, Renesas Electronics America	Are We There Yet? A Critical Perspective and Future Directions for Trusted Execution Environments Dr. Sandro Pinto, Universidade do Minho	MIPI A-PHY Camera Ingestion for Automotive x86 Architectures Frederik John, Dr. Stephanie Friederich, Intel Deutschland
10:00-10:30	Get Ready to Reimagine the Future of IoT: How Self-Sovereign Identities Will Soon Impact IoT Ecosystems Markus Soppa, Filancore	Elevating Healthcare Connectivity: Wi-Fi 6 and Wi-Fi 7 Innovations Pelle Svensson, u-blox	Insecure Passwords? MFA Methods for Embedded Systems as Problem Solvers! Jürgen Fitschen, SSV Software Systems	Connecting the Automotive Future: A Harsh Environment for Moving Bits Dr. Julien Henaut, BitfEye Digital Test Solutions; Eyrann Lida, Valens Semiconductor
10:30-11:00	Lifecycle Management of IoT Devices Via Digital Identities Management and Distributed Ledgers Solutions Konstantinos Loupos, INLECOM INNOVATION	Overview of Wi-Fi Intelligent Energy Management for the Internet of Things (IoT) Yoav Ben Yehezkel, Texas Instruments	Don't Sign Your Firmware Updates. No, Really. Jon Oster, Toradex	MIPI A-PHY v2.0 Automotive SerDes Interface – Supporting Software-defined Vehicles and Next-generation Centralized Automotive E/E Architectures Edo Cohen, Valens Semiconductor, speaking on behalf of MIPI Alliance
11:00-11:15	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A
	Coffee Break			
	1.8: SIM-based Identity Management 	2.11: Wireless 1	3.7: Open Source 	4.8: Security Architectures & Technologies 2
11:45-12:15	The Shift of Control Though the New SGP.32 Standard: What Does this Mean for Businesses and the IoT? Paul Bullock, Wireless Logic	Battery Powered IoT Mesh Network using IEEE 802.15.4e (TSCH) Marcel Graber, Steinel Solutions	Using the OSS Review Toolkit for Yocto Project Compliance Sebastian Schuberth,	Strengthening Embedded Security in Late-Stage Development: Preparing for a Secure Production Phase David Källberg, IAR
12:15-12:45	Unlocking the Potential of SIM, eSIM & Integrated SIM Technology for IoT Device Security Bertrand Moussel, Trusted Connectivity Alliance	5G NR Evolution on V2X Technologies and the Importance for Connected Mobility Thomas Jaeger, DEKRA SE	An Evaluation of Preempt_rt on RISC-V mr Tobias Schaffner, Siemens	CROSSCON: Interoperable IoT Security Stack for Embedded Connected Devices Dr. Tiago Gomes, Universidade do Minho
12:45-13:15	eSIM IoT Devices – Boost Flexibility While Ensuring Interoperability with GSMA's Latest eSIM Specification Dr. Marcus Dormanns, COMPRION	5G TSN: Intelligent Edge Device Architecture for Optimum End-to-end KPI Weifeng Voon, Intel Microelectronics	Practical Implementation of Penetration Testing as a Community-based Service Alexander Bähr, Open Source Automation Development Lab (OSADL)	GateMate FPGA Bitstream Encryption and Copy Protection Patrick Urban, Cologne Chip
13:15-13:30	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A
	Lunch Break			
	1.9: Platforms 2	2.12: Wireless 2	3.8: Updates	4.9: Open Source
14:30-15:00	Hard Real Time Security Policies Using Berkeley Packet Filter Prof. Hans Dermot Doran, Zürich University of Applied Sciences	SDR-Based Demonstration System to Study Distributed Cooperative Communication in Practical MANETs Mus'ab Yüksel, Darmstadt University of Applied Sciences	Secure Firmware Updates Over-The-Air Using BLE for IoT Devices Tanuj Lokpal, Indar Singhal, STMicroelectronics	An introduction to SELinux for Embedded Linux Developers Sergio Prado, Embedded Labworks
15:00-15:30	Architecture and Performance of Integrated High-speed and Versatile Embedded Networking Ulrich Langenbach, Missing Link Electronics	Centralizing Radar Processing with High-Speed Connectivity Edo Cohen, Valens Semiconductor	Unlocking IoT Security: A Deep Dive Into FreeRTOS Featured IoT Integrations David Henry, Sam Taylor, ARM	Security Beyond Secure Boot: Enabling Secure Full System Updates on Embedded Devices Jorge Ramirez-Ortiz, Foundries.io
15:30-16:00	AI and Accelerated Real Time Computing Solutions for Automotive Jens Stapelfeldt, Advanced Micro Devices (AMD)	Wireless Communication Through Hermetic Metal Boundaries Dr. Eduardo Valdes Cambero, Prof. Dr. Marcel Meli, Applied Science University of Winterthur	1001 Firmware Update Strategies Pierre Gal, The Embedded Kit	Linux-Powered Open-Source Automotive Software: Navigating Quality, Safety and Maintenance Prof. Dr. Joachim Schlosser, Elektrobit Automotive
16:00-16:15	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A

Engineering	6. Systems & Software Engineering		7. Embedded Vision & Edge Ai	8. System-on-Chip (SoC) Design
5.7: Memory	6.10: Testing 1	6.13: C/C++	7.10: Testing & Monitoring	8.4: RISC-V 1
Trust is Good, But Application-Specific DRAM Testing is Better! Prof. Dr. Peter Pöchmüller, Neumonda	Test Driven Development for Microcontrollers Daniel Penning, embeff	C-rusted: A Formally Verifiable Flavor of C For The Development of Safe and Secure Systems Prof. Dr. Roberto Bagnara, University of Parma	Qualification of AI/ML Systems and Interfacing Devices Mark Pitchford, LDRA	GAP9: A RISC-V Based NN/DSP Application Processor Enabling Next Generation of Audio Features in Hearable and Wearable Products Martin Croome, GreenWaves Technologies
Predictable Real-time Data Management Over Persistent Storage Media Steve Graves, McObject; Thom Denholm, Tuxera	The Future Of Industrial Protocol Certification Testing: CI/CD Pipelines, Cloud-Based, Automated And Orchestrated Omar Lone, ZHAW Institute of Embedded Systems	Elevating Embedded Systems Development with C++17 Useful Features Anders Lundgren, IAR	Monitoring and Refining AI-enabled Fleets at Scale Natalie Serrino, Gimlet Labs	A Novel Trusted Execution Environment for Next-Generation RISC-V MCUs Dr. Sandro Pinto, Universidade do Minho; Matjaz Breskvar, Beyond Semiconductor
Smart Memory Partitioning Enhances System Performance Ilan Sever, Weebit Nano	Boosting Embedded System Development: A Case for Rapid Testing Rainer Poisel, Stefan Riegler, honeytreeLabs	Maximizing Efficiency: Writing Power-Efficient Code for Embedded Systems Niklas Källman, IAR	Simulation and Virtual Testing of Embedded AI Object Detection Systems Lando Petersen, Fraunhofer FOKUS	Next Generation RISC-V Functional Coverage; Auto Generation and Scenario Coverage Jon Taylor, Imperas Software
Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A
Coffee Break				
5.8: Wireless	6.11: Testing 2	6.14: Rust	7.11: Optimization 1 	8.5: RISC-V 2 
Understanding and Solving the Wireless Connectivity Problem on Difficult Platforms Dr. Gareth Conway, AntennaWare	How to Reach 100% Code Coverage in Integration Tests of Embedded Systems – A Systematic Approach Dr. Alexander Weiss, Accemic Technologies	Rust for Embedded Developers: The Peripheral Access Crate Jacob Beningo, Beningo Embedded Group	Machine Learning Model Optimization Techniques for Efficient Computer Vision on the Edge Ali Osman Ors, NXP Semiconductors	Customized RISC-V In a Simple Game Console Zdeněk Přikryl, Codasip
Wireless Charging of Compact Devices with NFC Charging Technology Qi Zhu, Infineon Technologies	Using the Hyper Coverage To Detect Hidden Or Poorly Tested Code Michael Wittner, Razorcat Development	Hot Topic: DIY Induction Heater with Embedded Rust Dion Dokter, Tweede golf	Leveraging SYCL for Edge Vision Processing with Efficient Heterogeneous Accelerator Programming Rod Burns, Codeplay	Unlocking Extensible RISC-V Cores Using the Core-V Extension Interface (CV-X-IF) Dr. Christian Herber, NXP Semiconductors
Energy Autonomous Wireless Remote Control Prof. Dr. Marcel Meli, Joel Waldner, University of Applied Sciences, ZHAW-InES	Comparing Formal Verification and Hardware Checks For Achieving Memory Safety Prof. Dr. Achim D. Brucker, University of Exeter	Reducing Complexity, Increasing Safety: Rust for Multicore Automotive Applications Mario Cupelli, HighTec EDV-Systeme	Efficient Edge AI: Quantization Strategies for Running Computer Vision Models at Their Best Dr. Bram Verhoef, Axelera AI	VM-Based OP-TEE Systems on RISC-V David Cerdeira, OSYX
Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A
Lunch Break				
5.9: RF Design & Radar	6.12: Debugging	6.15: Development Productivity	7.12: Optimization 2	8.6: Accelerators
Implementing Design Requirements For Devices Using RF Transceiver Modules Miroslav Dlouhy, STMicroelectronics	Data Acquisition Methods For Debugging Complex Embedded Software Dr. Max Kolesnikov, MKS Technology	How CMSIS Accelerates Productivity Reinhard Keil, ARM Germany	Efficient Mapping of Neural Networks on FPGA with Generated HDL Code Thierry Delafontaine, ZHAW Zurich University of Applied Sciences	In-Memory to Approximate Computing Prof. Dr. Nima TaheriNejad, Uni Heidelberg
Research: New Single-layer Metal Core PCB Design Could Revolutionize Smart Lighting with Lower Production Costs and Better RF Characteristics Marton Komancsik, Silicon Labs	Improving The Automotive Development Process With AUTOSAR Run Time Interface ARTI Rudi Dienstbeck, Lauterbach	Boosting Developer Productivity: Creating Future Proof Extensions Beyond VS Code Rafael Taubinger, IAR	Deliver Highly Performant and Efficient Machine Learning on MCU by Leveraging Arm Helium Technology and Reference Design Platform Ming Chun Su, Laurent Le Faucheur, Arm	Architecture-Compiler Co-Optimization of Computing-in-Memory Edge-AI Accelerators Dr. Jan Moritz Joseph, RWTH Aachen University
Integration of 60 GHz Radar with Raspberry Pi Using Modular Design Paul Perlwitz, TU Berlin	Reducing The Microcontroller Pin Count By Utilizing it's I3C Interface For Debugging Ingo Rohloff, Lauterbach	Advance Controller Development with a Pragmatic Digital Approach Daniel Fonte, Speedgoat	Uniform Benchmarking of ARM-base SOCs Executing Machine Learning Models Pekka Varis, Texas Instruments	Design of Domain Specific Accelerators with High-Level Synthesis Prof. Russell Klein, Siemens EDA
Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A

09.04.2024, 9:30 – 13:00**DAY 1****Class 3.1 Hands-On Zephyr Project Workshop**

Jonas Remmert, PHYTEC Messtechnik

After providing foundational knowledge of Zephyr, this workshop will show interactively how to set up a development environment and configure an out-of-tree example with Zephyr. In addition, it will cover topics like board abstractions, RTOS features and higher layer software subsystems such as the Sensor API, BLE stack and the networking stack. With hands-on practice on a board that participants can take with them afterwards. Workshop is tailored for beginners to intermediate users.

09.04.2024, 14:00 – 17:30**Class 6.4 Embedded Rust Introduction**

Prof. Dr. Stefan Wehr, Hochschule Offenburg

Rust's main goals are performance, correctness, safety and productivity. While still ~70 % of all severe vulnerabilities are caused by memory bugs, Rust offers 100 % memory safety (no segfaults or buffer overflows) and is 100 % safe against data races. Participants gain some practical experience with fundamental Rust features (basic types, ownership, borrowing, vectors, strings, enums, pattern matching, error handling, traits) and the Rust toolchain.

09.04.2024, 09:30 – 17:30**Class 5.1 Ultra Low Power Hands-on Workshop**

Herman Roebbers, Capgemini Engineering

This workshop gives a broad and systematic overview of the overwhelming possibilities for ultra low power design. More experienced people can also benefit from this course because of the overview and the many hints and tips. Various hardware blocks are discussed from the perspective of their possibility to consume less power: MCUs, memory/processor/I-O, sensors & interfacing, radio, energy sources, regulators.

09.04.2024, 14:00 – 17:30**Class 6.5 C++ and Modern C++ for Embedded Development**

Dr. Carmelo Loiacono, Green Hills Software

In this class, we will discuss the use of C++ and modern C++ for embedded development, focusing on its benefits and challenges. In addition to best practices, we talk about: Static assert, Binary literals and digits separators, nullptr, Strong typed enumerator, Auto type, Range Based for loop, Algorithms, Unary Predicate/Operator, Functor/ Inner Functor, Adaptors, Lambdas, Constexp versus const, Copy and move constructors (Big three vs Big five).

09.04.2024, 9:30 – 13:00**Class 6.1 Automating Model Based Systems Engineering with HarmonyMBE**

Andy Lapping, SodiusWillert

Hands-on workshop with the latest version of the HarmonyMBE workflow. HarmonyMBE drastically reduces the time it takes to build consistent systems engineering models by providing powerful automations. You will gain an introduction to HarmonyMBE by building your own systems engineering model, from textual requirements through functional analysis and onto an architectural design.

**09.04.2024, 9:30 – 13:00****Class 6.2 Modern C++ Thread and Memory Models**

Dr. Carmelo Loiacono, Green Hills Software

We will discuss the main embedded operating system architectures and analyze their operation and main features, highlighting advantages and disadvantages with real use case examples. We will also cover scheduling and multi-threading techniques by highlighting the features of modern C++ when used with embedded operating systems. Modern C++ Memory model, Synchronization and protection, Synchronization in ARM, PowerPC and x86 will be discussed.

10.04.2024, 14:00 – 17:30**DAY 2****Class 3.2 Introduction to RTOS Application Design**

Jacob Beningo, Embedded Group

We will explore how to design RTOS-based applications. We will start with a review of RTOS fundamentals. Reviewing concepts like threads, semaphores, mutexes, and message queues. We'll explore the different types of scheduling that an RTOS offers before then diving into how to design an RTOS application. Attendees will learn how to take a top-down approach and create a scalable software architecture that is not dependent on the RTOS, but can effectively leverage it.

09.04.2024, 09:30 – 17:30**Class 6.3 Testing Software of Embedded Systems**

Stephan Grünfelder

After a presentation of testing techniques that apply to all sorts of software-based systems, participants will learn which technique to apply in which stage of the software development process. We then learn about techniques that are only needed in high integrity or real-time embedded systems. Such testing is usually very expensive. We will discuss how to optimize the test process and how to tailor it to the needs of the integrity requirements of the product under test.

10.04.2024, 9:30 – 13:00**Class 6.6 Practical SysML and MBSE: Basic Guidance for Engineers**

Dr. Michael Jastram, Formal Mind

This class guides engineers in transitioning from traditional to Model-Based Systems Engineering (MBSE) with SysML, addressing modern product complexity. Key elements covered include Systems Engineering, Agile development, and the historical evolution of modeling. The role of tools in MBSE is explored, with discussions on dominating ones and repurposing existing tools.

At www.embedded-world.eu/program you will find more detailed information about the content of the classes and recommended prior knowledge for participation.


DAY 3
11.04.2024, 09:30 – 17:00
Class 3.3 Introduction to Embedded Linux Using a Yocto Project SDK

Robert Berger, Reliable Embedded Systems

This one-day training class uses hands-on exercises combined with instruction to illustrate some basic concepts of Embedded Linux. Hands-on sessions are performed on the host with a Yocto Project SDK and on some target hardware. The class provides the necessary practical experience to go ahead and configure/build an Embedded Linux system with mainline components.

10.04.2024, 9:30 – 13:00
Class 6.7 Requirement-based Iterative System Development

Frank Stöckel, Philip Stolz, HOOD

This class provides proven approaches for successful requirements-based iterative system development in a complex context. We will work on a specific system from idea to implementation. The aim is to describe the handling of requirements, concepts and tests iteratively/incrementally in the context of an entire system development process. We also consider documentation and legal or industry specific requirements. The class covers systems consisting of SW and HW.

11.04.2024, 9:30 – 13:00
Class 4.1 Functional Safety Standards

Ingo Rolle, Hochschule Darmstadt

Get an introduction into the concept of Functional safety by working through an example in which IEC 61508, the basic safety standard, is applied. In the second part, IEC 61511, ISO 26262, ISO 13849 and their differences are discussed. We compare e.g. functional safety lifecycles, different approaches to risk analysis, how the requirements are defined (SIL, ASIL, PL), and whether said standards require certain technical solution.

10.04.2024, 14:00 – 17:30
Class 6.8 Testing Methods (not only) for Functional Safety

Markus Franz, infoteam SET

With the growing performance of embedded controllers, software takes over more and more highly complex tasks, which need to be qualified according to standards like IEC61508 or ISO26262. This class gives an introductory but thorough overview of testing concepts, methods and processes. Special focus is given to automated testing in functional safety software projects.

11.04.2024, 14:00 – 17:00
Class 4.2 Embedded Safety Architectures

Alessandro Bastoni, STMicroelectronics

Participants will not only get an introduction of basic concepts about safety compliant designs based on microcontrollers, but also to understand the cross relationship between all individual aspects of safety compliance. We will discuss architecture selection, safety artifacts availability/use, safety mechanisms definition, application software development, safety case & safety concept and a rolling example to link all sections.

10.04.2024, 9:30 – 13:00
Class 7.1 An Introduction to TinyML: Bringing Deep Learning to Ultra-low-power Microcontrollers

Marcus Rüb, Hahn-Schickard-Gesellschaft für angewandte Forschung e.V.

A practical guide how to get started with TinyML with a hands-on example. Specifically, the audience will learn to bring down the memory demand of neural network inference. The tutorial will introduce TinyML compression methods (quantization and pruning) and frameworks such as Tensor Flow Lite for Micro.

11.04.2024, 09:30 – 13:00
Class 5.2 EMC Compliant Industrial Electronic Design

Dr. Heinz Zenkner, Würth Elektronik eiSos

The interface electronics and cable connections play a crucial role in managing electromagnetic interference, necessitating EMC filter concepts that address both transient interference and emissions above 1 GHz. Using examples like WiFi, USB 3.1, and GB-Ethernet interfaces, details like layout design, signal integrity, mismatch, and signal propagation are discussed. The discussion extends to IC parameters per data sheets, guiding suitable filter circuit designs.

10.04.2024, 14:00 – 17:30
Class 6.9 Embedded Rust Advanced

Dion Dokter, Tweede golf

After explanation of how the embedded Rust ecosystem works and how PACs and HALs work, we'll let the participants program their first embedded Rust application where they need to read the ID register of an accelerometer. We'll bring the hardware for them to use, though they cannot keep it. Next we'll cover how device drivers work and how the embedded-HAL crate helps us to write platform independent code. The participants then create their own little driver.

11.04.2024, 09:30 – 17:00
Class 8.1 FPGA-Design Using C/C++ and High-Level Synthesis

Prof. Dr. Frank Kesel, Hochschule Pforzheim

This hands-on workshop will give an introduction in the design of IP cores for Xilinx FPGAs using the Vivado HLS tool. After an overview of the design flow with Vivado HLS it will be shown how the synthesis result can be interpreted in order to derive measures for optimizations. The influence of data types will be shown and how different interfaces can be easily implemented by using directives. Finally it will be shown how the RTL hardware architecture can be optimized.