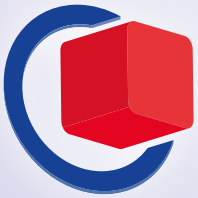
Nuremberg, Germany

9.–11.4.2024



embeddedworld

Exhibition&Conference

CONFERENCE PROGRAM

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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.

Fotos: NürnbergMesse/Heiko Stahl

embeddedworld
Exhibition&Conference

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 "AI on the Edge: Unlocking the Potential of AI Applications".
- 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 "
- **16 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 6.2** **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, Tamme Dittrich, 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		
14:00-17:00			**Class 4.2** **Embedded Safety Architectures** Alessandro Bastoni, STMicroelectronics				

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!

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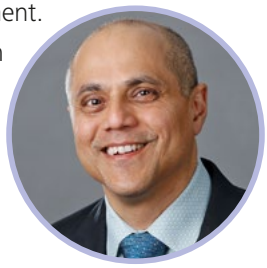
Tuesday, 9 April 2024, 10:00, NCC Ost, Room TOKIO

Conference Keynote

AI on the Edge: Unlocking the Potential of AI Applications

The world is on the edge of something big. It's artificial intelligence, and it's transforming everyday life. In healthcare, AI is driving helping doctors make more accurate diagnoses. In automotive, AI is powering driver-assist and enhancing safety in cars. In the industrial space, AI is used in robotics and vision systems. And for embedded systems, AI is changing how chips are designed, tested, and debugged.

As exciting as these innovations are, humans are only just beginning to explore what's possible with AI. To unlock its full potential and make it pervasive, an adaptive and heterogeneous approach is a must: one that combines CPUs, GPUs, and programmable logic with open software, distributing workloads from cloud to edge and endpoints. The solutions also need to be adaptable, providing the ability to update or reconfigure AI hardware with the latest models – even years after deployment.



Most discrete devices today are not optimized for power efficiency. But since 2020, improvements in processor efficiency, and AI Engines on adaptive SoCs are helping to deliver power savings for AI. During this keynote presentation, attendees will learn about:

- The growing compute and power requirements needed to drive AI
- Techniques to drive power-efficient AI with heterogeneous computing solutions
- How to achieve compute efficiency through 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, NCC Ost, Room ISTANBUL

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

Bluetooth® · edge ai + vision ALLIANCE · GCF Test Certify Connect · mipi alliance · OPENHW GROUP PROVEN PROCESSOR IP · OSADL Open Source Automation Development Lab eG · PICMG® · MISRA

	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 **Identity Management**	Session 2.10 **WiFi**			Session 4.7 **Security Architectures & Technologes 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 & Technologes 2**	
DAY 3: afternoon	Session 1.9 **Platforms 2**	Session 2.12 **Wireless 2**		Session 3.8 **Updates**	Session 4.9 **Open Source**	

Conference Fees

Fees Classes	Full Price
1 Half-Day Class Ticket	EUR 495.00
2 Half-Day Classes Ticket	EUR 990.00
3 Half-Day Classes Ticket	EUR 1295.00
4 Half-Day Classes Ticket	EUR 1490.00
5 Half-Day Classes Ticket	EUR 1795.00
6 Half-Day Classes Ticket	EUR 1990.00

Fees Sessions	Full Price
Sessions 1 Day Ticket	EUR 695.00
Sessions 2 Day Ticket	EUR 845.00
Sessions 3 Day Ticket	EUR 990.00

All fees excluded 19% VAT

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Exhibition Ticket Included

REGISTER ONLINE:
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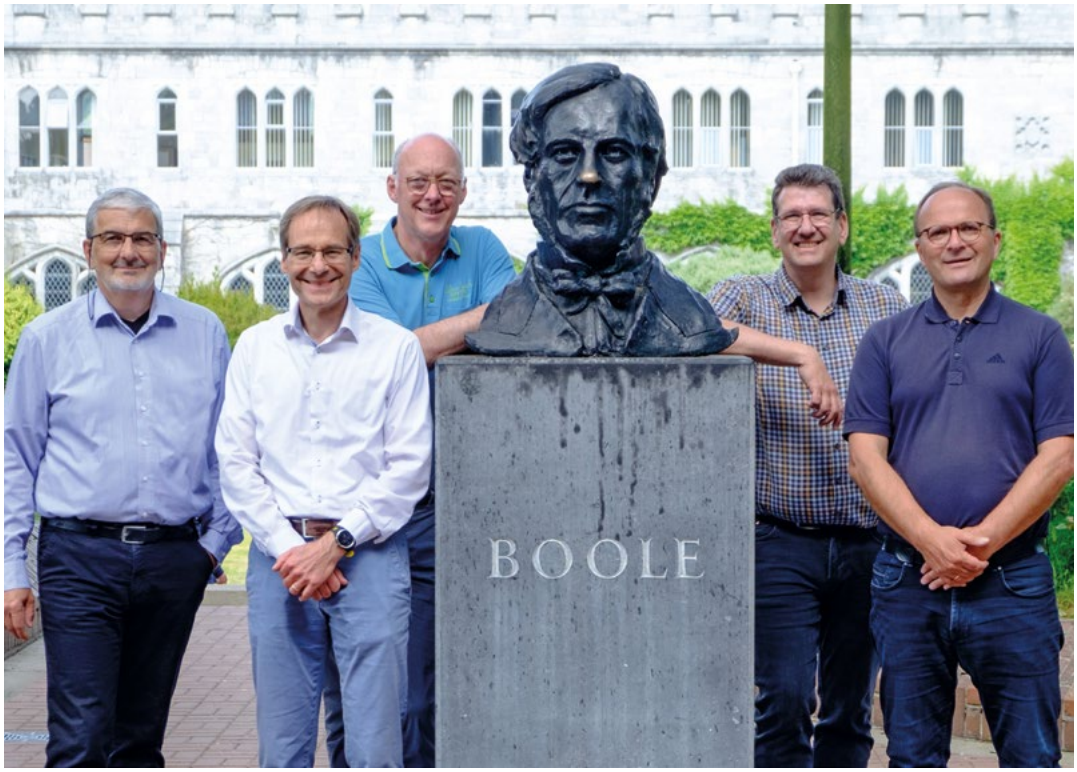
Terms and Conditions:

1. The attendance fee includes participation on the booked conference days, proceedings, refreshments, and free admission to the embedded world 2024 Exhibition.
2. You will receive a confirmation of your conference registration along with your invoice.
3. 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.
4. 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.
5. Students are granted a 50% reduction, student ID required. Please register online.
6. Exhibitors will receive a discount of 30%. Please use the code: EWC24EXH
7. For registrations of five persons and more from one company, please contact our conference department for special rates.
8. 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 **Model Based Systems Engineering**	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: AI on the Edge: Unlocking the Potential of AI Applications** Dr. Salil Raje, Advanced Micro Devices (AMD)			
	1.1: Innovations GCF	**2.1: Single Pair Ethernet**	**2.4: Matter**	**3.1: Basics**
11:00-11:30	**Simplifying Smart Product Development with thin-edge.io: A Game Changer for Embedded Engineers** Philip Hooker, Software AG	**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** Heiko Ehret, 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** Arndt Schuebel, 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** 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** Julien Bernet, 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** Nilabh Anand, 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	**How to Keep Yocto Project Layers Always Actual** 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: AI on the Edge: Unlocking the Potential of AI Applications
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
Performing TARA Analysis Out Of Context (ISO 21434 And Software Components) Stephen Ridley, WITTENSTEIN high integrity 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 Kreß, 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 Dr. Erik Tomusk, Codeplay Software	**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, Thomas Ziller, 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 Juhani Eronen, 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	Low Power Analog Feature Extraction for Industrie4.0 Edge-AI Markus Kuderer, Hahn-Schickard	**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
Software Bill of Materials Aleg Vilinski, Festo	**Small Sensors, Big Solutions: Enhancing Climate, Air Quality, and Well-being** Dr. Stefan Finkbeiner, Bosch Sensortec	**Software-defined Vehicles: Ethernet Embedded Software 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
Using and Supporting Software Bill of Materials Regulation Mark Hermeling, CodeSecure	**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
Understanding SBOMs and Complying with New Cybersecurity Requirements Leonardo Held, Toradex	**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 Rumyantsev, 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	**Using Bluetooth Periodic Advertising with Response Feature to Control Wireless Battery Management Systems** Victor Zhodzishsky, Infineon Technologies	**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** Hendrik Cordier, 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** Ute Philipp, 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** Prof. Dr. Achim Brucker, University of Exeter
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 the 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	**Distance Estimation Advantages Using Bluetooth Channel Sounding** 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** Denis Zebrowski, 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: Model Based Systems Engineering**	**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 Multiple Accelerated Neural Networks 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 Lars Häring, 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 Mark Hoopes, Satheesh Chellappan, Lattice Semiconductor	**Branch Aware Static Analysis To Improve Developer Workflows** Mark Hermeling, CodeSecure	**Data Coupling, Control Coupling, And Cohesion – Demystified!** Mark Richardson, 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 Ali Osman Ors, NXP Semiconductors	**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** Dr. Marc Thomas, 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** Surya Piplani, STMicroelectronics
Vertical Circuit Architectures for Next Generation Low Power Embedded Designs Ankur Bal, STMicroelectronics	**Bringing Existing Code into MISRA Compliance: Challenges and Solutions** Prof. Dr. Roberto Bagnara, University of Parma; Stefano Stabellini, AMD	**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 Krahl, 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

Want more? See page 4 for additional classes!

	1. Internet of Things	2. Connectivity Solutions	4. Safety & Security 3. Embedded OS	5. Board Level Hardware 4. Safety & Security
	1.7: Identity Management	**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 YeTEE? 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, BitifEye Digital Test Solutions; Eyran 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 GCF	**2.11: Wireless 1**	**3.7: Open Source** OSADL	**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	**An Evaluation of Preempt_rt on RISC-V mr** Tobias Schaffner, Siemens	**Strengthening Embedded Security in Late-Stage Development: Preparing for a Secure Production Phase** Tim Woodruff, IAR
12:15-12:45	**Unlocking the Potential of SIM, eSIM & Integrated SIM Technology for IoT Device Security** Bertrand Moussel, Trusted Connectivity Alliance	**Driving Into the Future: How C-V2X Expands the Capabilities of Cloud-Native Vehicles** Andrei Kholodnyi, Wind River	**Using the OSS Review Toolkit for Yocto Project Compliance** Sebastian Schuberth, Double Open	**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** Alexander Mildner, Intel Corporation	**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	**Demystifying IoT Security: Demonstrating Best Practice on Arm Corstone Cortex-M Platforms with FreeRTOS** 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, Florian Netter, 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 Josef Holzmayr, Mender.io	**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** Federico Serafini, BUGSENG	**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** Rafael Taubinger, 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, Synopsys
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** Charles Macfarlane, 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** Martino Dazzi, 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** Joakim Lönnberg, 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** Manuel Fedou, 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

Want more? See page 4 for additional classes!

DAY 1

09.04.2024, 9:30 – 13:00

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, 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, 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, Syncronization in ARM, PowerPC and x86 will be discussed.

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 taylor it to the needs of the integrity requirements of the product under test.

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, 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 contructors (Big three vs Big five).

DAY 2

10.04.2024, 14:00 – 17:30

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.

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.

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.

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.

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.

10.04.2024, 14:00 – 17:30
Class 6.9 Embedded Rust Advanced
Dion Dokter, Tamme Dittrich, 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.

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.

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.

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 ito link all sections.

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.

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