Implementing Hierarchical Scheduling to Support Multi-Mode System: **Rafia Inam, Mikael Sjödin and Reinder J. Bril**
Miniaturized wireless sensor node for earthquake monitoring applications: **Kevin I-Kai Wang, Zoran Salcic, Mathew R. Wilson and Karl M. Brook**
Automated Bio Cybernetic System - A Lab-on-Chip Case Study: **Kevin I-Kai Wang, Zoran Salcic, Johnny Yeh, Jin Akagi and Donald Wlodkowic**

Session 4: Networks II (Chair: Jean-Luc Scharbarg)
*A Performance Study of Audio Video Bridging in Aeronautic Ethernet Networks: **Emanuel Heidinger, Fabien Geyer, Stefan Schneele and Michael Paulitsch**
Implementing Hierarchical Scheduling on COTS Ethernet Switches Using a Master/Slave Approach: **Zahid Iqbal, Luis Almeida, Ricardo Marau, Moris Behnam and Thomas Nolte**
Design of Networked Control Systems (NCSs) on the basis of interplays between Quality of Control and Quality of Service: **Xuan Hung Nguyen and Guy Juanole**

Session 5: Embedded Systems Design
(Chair: Stefan Petters)
*On the Timing Analysis of the Dynamic Segment of FlexRay: **Unmesh D. Bordoloi, Bogdan Tanasa, Petru Eles and Zebo Peng**
Opportunistic Hierarchical Classification for Power Optimization in Wearable Movement Monitoring Systems: **Francesco Fraternali, Mahsan Rofouei, Nabil Alshurafa, Hassan Ghasemzadeh, Luca Benini and Majid Sarrafzadeh**
Inter-application Redundancy Elimination in Wireless Sensor Networks with Compiler-Assisted Scheduling: **Vikram Gupta, Eduardo Tovar, Karthik Lakshmanan and Ragunathan (Raj) Rajkumar**
On Voting Strategies for Loosely Synchronized Dependable Real-Time Systems: **Hüseyin Aysan, Radu Dobrin, Sasikumar Punnekkat and Iain Bate**

Session 6: Software Engineering and Control
(Chair: Eduardo Tovar)
*Efficient Implementation of AUTOSAR Components with Minimal Memory Usage: **Haibo Zeng and Marco Di Natale**
Introducing Database-Centric Support in AUTOSAR: **Andreas Hjertström, Dag Nyström and Mikael Sjödin**
Bandwidth Adaptation in Hierarchical Scheduling Using Fuzzy Controllers: **Nima Moghaddami Khalilzad, Moris Behnam, Giacomo Spampinato and Thomas Nolte**

Session 7: Stochastic Modeling (Chair: Guy Juanole)
Probabilistic Preemption Control using Frequency Scaling for Sporadic Real-time Tasks: **Abhilash Thekkilakattil, Radu Dobrin and Sasikumar Punnekkat**
Modeling Uncertainties in Safety-Critical Real-Time Systems: A Probabilistic Component-Based Analysis: **Dawood A. Khan, Luca Santinelli and Liliana Cucu-Grosjean**

Session 8: Multi-core (Chair: Wolfgang Karl)
*Embedded Systems: Many Cores - Many Problems: **Reinhard Wilhelm and Jan Reineke**
Optimized Software Mapping for Advanced Driver Assistance Systems: **Timo Schönwald, Alexander Viehl, Oliver Bringmann and Wolfgang Rosenstiel**
Response-Time Analysis for Non-Preemptive Scheduling in Multi-Core Systems with Shared Resources: **Mircea Negrean and Rolf Ernst**

Session 9: Modeling and Verification
(Chair: Jian-Jia Chen)
*Model-Driven Virtual Prototyping for Real-Time Simulation of Distributed Embedded Systems: **J. Zimmermann, S. Stattelmann, A. Viehl, O. Bringmann and W. Rosenstiel**
A Formal Support for Homogeneous Simulation of Heterogeneous Embedded Systems: **Luigi Di Guglielmo, Franco Fummi, Graziano Pravadelli, Francesco Stefanni and Sara Vinco**
Integrating PSL Properties into SystemC Transactional Modeling - Application to the Verification of a Modem SoC: **Laurence Pierre, Luca Ferro, Zeineb Bel Hadj Amor, Philippe Bourgon and Jérôme Quévremont**
An LLVM-based Hybrid Binary Translation System: **Bor-Yeh Shen, Jyun-Yan You, Wuu Yang and Wei-Chung Hsu**

Session 10: Safety and Error Checking
(Chair: Muhammad Shafique)
Enhancing Security in CAN Systems using a Star Coupling Router: **Roland Kammerer, Bernhard Frömel and Armin Wasicek**
System configuration check against security policies in industrial networks: **Manuel Cheminod, Luca Durante and Adriano Valenzano**
Fine-Grained Timing and Control Flow Error Checking for Hard Real-Time Task Execution: **Julian Wolf, Bernhard Fechner, Sascha Uhrig and Theo Ungerer**

7th IEEE International Symposium on Industrial Embedded Systems (SIES'12)

IEEE KIT Karlsruhe Institute of Technology

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June 20 – June 22, 2012
Karlsruhe, Germany

Advance Program

Keynote Speakers

Speaker 1: Jörg Henkel (KIT, Germany)

"Dependable Software for Undependable Hardware"

Chair: Samarjit Chakraborty

Abstract: As technology scales to 22nm and beyond, reliability becomes a serious concern of densely integrated on-chip systems. Aging effects like electro-migration, NBTI (Negative Bias Temperature Instability), TDDB (Time Dependent Dielectric Breakdown) and other effects alter the electric characteristics of circuits and lead finally to transient and/or permanent faults. High temperature often accelerates these effects and can be seen as a trigger for many known aging effects. But not only aging effects, also various kinds of particle strikes jeopardize reliability as CMOS technology scales to deep nano-scale. In fact, particle strikes may lead to transient bit-flips. All these effects are already observed today and will worsen with each upcoming technology node. So far, mostly physical-level and device-level techniques have been applied to control these negative effects that represent a major hurdle for further technology scaling. However, also architectural-level techniques have been successfully applied. Going even a step further up, we propose to include the whole software stack all the way up to the applications software to control these negative effects. We will show means in form of a few basic software transformations that can contribute to increase reliability in deep nano-scale systems. We emphasize the potential of cross-layer approaches and contribute to the paradigm "Reliable Software for Unreliable Hardware: Embedded Code Generation aiming at Reliability"

Speaker 2: René Graf (Siemens AG, Germany)

"Embedded systems in automation - Commodities and challenges"

Chair: Thomas Nolte

Abstract: Automation is just one application field of embedded systems, but surely one of the most heterogeneous ones. Automation systems can be found in very different places like traffic control, home and building automation, but also in industrial scenarios like production of cars or petrochemical plants. The first part of the keynote will take the audience on a journey through this variety. Both real time requirements and applications of these domains will be presented.

Furthermore, common trends like multicore processors enter the field of automation systems as well, but the consequences of using multicore processors in hard real time devices are not understood completely so far. The second part of the keynote will present a real life example of loosing performance by using two cores instead of one. The most important conclusion is that hardware and software have implicit dependencies, which have to be considered in the very early system design phase.

	Wednesday June 20		Thursday June 21		Friday June 22
08:15	Registration	08:15	Registration	08:15	Registration
09:00	Opening	09:00	Keynote René Graf	09:00	Session 7 Stochastic Modeling
09:15	Keynote Jörg Henkel				
10:15	Coffee	10:00	Coffee	10:00	Coffee
10:45	Session 1 Networks I	10:30	Session 4 Networks II	10:30	Session 8 Multi-core
12:15	Lunch	12:00	Lunch	12:00	Lunch
13:30	Session 2 Scheduling	13:30	Session 5 Embedded Systems Design	13:30	Session 9 Modeling and Verification
15:30	Coffee	15:30	Coffee	15:30	Coffee
16:00	Session 3 – Work-in-Progress (WIP) Papers	16:00	Session 6 Software Engineering and Control	16:00	Session 10 Safety and Error Checking
		17:30			
17:30	Reception with Poster Session			17:30 17:45	Closing
19:00		18:15	Bus leaves for Marxzell		
		19:00	Banquet (Bus returns from Marxzell at 22:00)		
		22:00			

Session Assignments

Session 1: Networks I (Chair: Moris Behnam)

*Formal Worst-Case Timing Analysis of Ethernet Topologies with Strict-Priority and AVB Switching: **Jonas Diemer, Daniel Thiele and Rolf Ernst**

Worst-case delay analysis on a real-time heterogeneous network: **Xiaoting Li, Jean-Luc Scharbarg and Christian Fraboul**

Response-Time Analysis of the FlexRay Dynamic Segment under Consideration of Slot-Multiplexing: **Moritz Neukirchner, Mircea Negrean, Rolf Ernst and Torsten T. Bone**

Session 2: Scheduling (Chair: Rolf Ernst)

Certification-cognizant scheduling of tasks with pessimistic frequency specification: **Sanjoy Baruah**

Global schedulability analysis of a synchronization protocol based on replenishment-bounded overrun for compositional real-time systems: **Sjoerd Cranen and Reinder J. Bril**

Online Intra-Task Device Scheduling for Hard Real-Time Systems: **Muhammad Ali Awan and Stefan M. Petters**

An Improved Preemption Delay Upper Bound for Floating Non-preemptive Region: **José Manuel Marinho, Vincent Nélis, Stefan M. Petters and Isabelle Puaut**

Session 3: Work-In-Progress (WIP) (Chair: David Maci and Lars Bauer)

Scalable Virtual Prototyping of Distributed Embedded Control in a Modern Elevator System: **Alberto Ferrari, Marco Carloni, Alessandro Mignogna, Francesco Menichelli, David Ginsberg, Eelco Scholte and Dang Nguyen**

Towards Runtime Adaptation in Real-time, Networked Embedded Systems: **Christian Prehofer and Marc Zeller**

Design by Uncertainty: Towards the Use of Measurement Uncertainty in Real-Time Systems: **Peter Ulbrich, Florian Franzmann, Fabian Scheler and Wolfgang Schröder-Preikschat**

LISPARC: Using an Architecture Description Language Approach for Modelling an Adaptive Processor Microarchitecture: **Carsten Tradowsky, Florian Thoma, Michael Hübner and Jürgen Becker**

Non-generic floating-point software support for embedded media processing: **Claude-Pierre Jeannerod, Jingyan Jourdan-Lu and Christophe Monat**

AUTOSAR OS on a Message-Passing Multicore Processor: **Florian Kluge, Mike Gerdes and Theo Ungerer**

Response Time Analysis for Mixed Messages in CAN Supporting Transmission Abort Requests: **Saad Mubeen, Jukka Mäki-Turja and Mikael Sjödin**

Combining Instruction Set Simulation and WCET Analysis for Embedded Software Performance Estimation: **Stefan Stattelmann, Sebastian Ottlik, Alexander Viehl, Oliver Bringmann and Wolfgang Rosenstiel**

Shared Memory Protection for Spatial Separation in Multicore Architectures: **Anton Hattendorf, Andreas Raabe and Alois Knoll**

Designing Embedded Systems with MARTE: A PIM to PSM Converter: **Roberto de Medeiros, Marcilyanne M. Gois, Drausio L. Rossi and Vanderlei Bonato**

Performance Evaluation of Chirp Spread Spectrum Ranging for Indoor Embedded Navigation Systems: **Paolo Pivato, Stefano Dalpez and David Macii**

A Predicate-Aware Modulo Scheduling for Improving Resource Efficiency of Coarse Grained Reconfigurable Architectures: **Jhin-Bin Jiang, Kuen-Cheng Chiang and Jean Jyh-Jiun Shann**

Towards Resource Sharing under Multiprocessor Semi-Partitioned Scheduling: **Sara Afshar, Farhang Nemati and Thomas Nolte**