

**08. – 11. Dezember 2019, Dagstuhl-Seminar 19502**

## **Future Automotive HW/SW Platform Design**

### **Draft Program**

#### **Monday: Predictability of HW/SW systems**

##### **09h00-10h15 Introduction**

- 45' Introduction (by organizers and then 1 min per participant)
- 30' Dirk Ziegenbein (Robert Bosch GmbH - Renningen, DE)  
Breaking Automotive Traditions - Trends & Challenges

##### **10h45-12h15 Dependability**

- 15' Albrecht Mayer (Infineon Technologies - München, DE)  
Sorry software, hardware matters for dependability
- 15' Alessandra Nardi (Cadence - San Jose, US)  
Design-For-Safety For Automotive IC Design: Challenges And Opportunities
- 15' Mark Lawford (McMaster University - Hamilton, CA)  
Domain Controllers, Autonomous Driving and Functional Safety, oh my!
- 15' Thidapat Chantem (Virginia Polytechnic Institute - Arlington, US)  
Predictable and Reliable Automated Transportation Systems
- 30' Discussion

##### **14h00-15h30 Timing Predictability**

- 15' Alessandro Biondi (Sant'Anna School of Advanced Studies - Pisa, IT)  
Predictable Heterogeneous Computing for Next-generation Cyber-Physical Systems
- 15' Chung-Wei Lin (National Taiwan University - Taipei, TW)  
Formal Verification on Finite-State Machines with Weakly-Hard Fault Models
- 15' Zhu Qi (Northwestern University - Evanston, US)  
Leveraging Weakly-hard Constraints in Design and Adaptation
- 15' Ignacio Sanudo Olmedo (University of Modena, IT)  
Paving the way towards predictable performance in multi-heterogeneous SoC, industrial problems and directions
- 30' Discussion

##### **16h00-17h00 Timing Predictability (cont'd)**

- 15' Masaki Gondo (eSOL - Tokyo, JP)  
Aggregation and integration of next-generation vehicle computing & OS technologies
- 15' Rolf Ernst (TU Braunschweig, DE)  
Predictable Low-latency Data Services for Critical Applications – Challenges & Concepts
- 15' Maximilian Odendahl (Silexica - Köln, DE)  
Performance testing platform for ROS- & Adaptive Autosar-based Autonomous Systems
- 15' Discussion

##### **17h00-18h00 3 Breakout Sessions**

- 60' ML in CPS, Modularization of Control Systems, Weakly-Hard Real-Time Models

## Tuesday: Safe Integration of Heterogeneous Software Applications

### 09h00-09h15 Recap

15' Report from Breakout Sessions

### 09h15-10h15 Automotive Software Architecture

- 15' Philipp Obergfell (BMW AG - München, DE)  
Centralized automotive software and system architectures
- 15' Philipp Mundhenk (Autonomous Intelling Driving - München, DE)  
Safe and Secure Software Platforms for Autonomous Driving
- ~~15' Sebastian Steinhorst (TU München, DE)  
Software Decentralization in Automotive System Architectures~~
- 30' Discussion

### 10h45-12h15 Automotive Networks / Mobility & Society

- 15' Wilfried Steiner (TTTech Computertechnik - Wien, AT)  
The Role of Synchronized Time for Safe Integration of Heterogeneous Software Applications
- 15' Lulu Chan (NXP Semiconductors - Eindhoven, NL)  
Mixed Criticality Communication in Future In-Vehicle Architectures
- 15' Baik Hoh, Seyhan Ucar (Toyota Motors North America - Mountain View, US)  
Automotive Edge Computing Use-cases Inspired by Societal Problems
- 15' Sophie Quinton (INRIA - Grenoble, FR)  
Automotive System Design: Challenges of the Anthropocene
- 30' Discussion

### 14h00-15h00 2 Breakout Sessions

60' HW/SW Architecture Exchange, Cars and Climate Change

### 15h30-17h00 Automotive CPS

- 15' Sabine Glesner (TU Berlin, DE)  
Security and Correctness in the Face of Self-Adaptive Learning Automotive Systems
- 15' Bart Besselink (University of Groningen, NL)  
Towards a contract theory for physical systems
- 15' Jyotirmoy Deshmukh (USC - Los Angeles, US)  
Logic meets Autonomy
- 15' Peter Gorm Larsen (Aarhus University, DK)  
Possibilities using FMI-based Co-simulation for the Validation of Cyber-Physical Systems
- 30' Discussion

### 17h00-18h00 3 Breakout Sessions

60' ML in CPS (cont'd), SW Lifecycle, How to model HW and SW dependencies?

## **Wednesday: Programmability and Optimization of Emerging Heterogeneous Platforms**

### **09h00-10h45 Programmability**

- 15' Jerónimo Castrillón-Mazo (TU Dresden, DE)  
The role of programming abstractions in automotive software
- 15' Eduardo Quinones (Barcelona Supercomputing Center, ES)  
Parallel programming models for critical real-time embedded systems
- 15' Roland Leißa (Universität des Saarlandes, DE)  
AnyDSL: A Partial Evaluation Framework for Programming High-Performance Heterogeneous Systems
- 15' Lukas Sommer (TH Darmstadt, DE)  
DAPHNE - An automotive benchmark suite for parallel programming models on embedded heterogeneous platforms
- 45' Discussion

### **11h15-12h15 2 Breakout Sessions**

- 60' Programming Model(s) vs. Execution Model(s), Uncertainty (Handling) in CPS

### **13h30-14h30 Closing**

- 60' Report of Breakout Sessions, feedback, next steps