

## Electronics for Automotive



O. Pyper  
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### Biography

Dr. Oliver Pyper holds a Diploma in chemistry and a PhD in natural science. After his studies at the Technical University of Berlin, he joined Infineon Technologies Dresden in 2000. Until 2005 he was responsible for a module of the DRAM-technology and managing several projects for optimising current technologies and fast ramp of new technologies. In 2005 he changed to production, managing several projects to improve the manufacturing landscape. Since 2007 he is also responsible for managing innovation projects within R&D- and pilotline-projects.

### ENMOVER



R. Petersohn  
Member of Academic Staff  
Dresden Institute of Automobile Engineering, Chair of Vehicle Mechatronics, Dresden,  
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### Abstract

The Chair of Automotive Mechatronics at the Institute of Automotive Technology Dresden - IAD, at the Dresden University of Technology combines the interdisciplinary engineering expertise in the automotive sector. The chair is dedicated to research in the disciplines of energy and information management, energy storage technologies and battery systems, electrical / electronic architecture, diagnosis, driver assistance systems and vehicle networking and telemetry. The algorithms, concepts, methods developed at the department are modeled and simulated using standard simulation software as well as implemented in real hardware and deployed in vehicles and tested under road conditions.

In this presentation, the content of the showcase project "ENMOVER - Energy and Mobility in Interaction" is presented. In addition to the development and testing of multiple usage scenarios, also their influence on the traction battery and therefore to the cost efficiency of the vehicle will be discussed. In addition data acquisition and the link to the public transport are discussed, which are processed in other showcase projects at the department.

### Biography

Ronny Petersohn graduated in Mechatronics at Dresden University of Technology. In 2012 he joined the IAM GmbH (part of the TU Dresden AG) in Dresden as a member of the academic staff. His activity was the study of electrochemical storage for mobile use in vehicles. In this position he worked among other things with the modeling and simulation of electrochemical storage systems. Since 2014 he is member of the academic staff at the Institute of Automotive Technology Dresden. In his field of activity he continues the research of electrochemical storage systems with extension to electro mobility and the associated charging infrastructure.



## Energy Efficient Communication and Localization in Urban Traffic Environments using WSN-based Devices



O. Michler  
Professor  
TU Dresden / Institute of Traffic Telematics, Chair of Transport Systems Information  
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### Abstract

The Chair of Transport Systems Information Technology is part of Institute for Traffic Telematics at the Faculty of Transportation and Traffic Sciences "Friedrich List" of Technische Universität Dresden (TU Dresden). It deals with information technology as a basis for telematics services in transportation applications. Scopes of the chair are acquisition, transmission and processing of traffic information as well as positioning of traffic participants.

The constantly growing amounts of vehicles in urban areas lead to a more saturated condition at signalized intersections. Microscopic traffic flow optimization offer a probate solution to reducing queue length and travel time, thus increasing overall traffic flow. Gathering sufficient input data for the optimization process is dependent on available hardware and the investigated mode of transport. In the presentation we suggest the usage of inexpensive and energy efficient wireless sensor networks (WSN). This technology is applicable to a broad variety of modes of transport in urban traffic environments. The WSN-nodes are capable of transmitting traffic telematics information as well as achieving a distance measurement between two equally equipped nodes. We present testing data that shows the performance of the positioning using the proposed hardware while still maintaining a communication link and transmitting data from the traffic light system to the vehicle. In our tests we are able to achieve a lane selective tracking of a vehicles approach of a signalized intersection without sensor data fusion or even excessive post processing of the gathered distance measurements, thus proving the general applicability of our approach. This work is part of the project Cool Energy Car Communication (CECC) within the Leading-Edge Cluster "Cool Silicon", which is sponsored by the German Federal Ministry of Education and Research (BMBF).

### Biography

Since 2008 Professor Michler holds the chair for Transport Systems Information Technology which is part of the Institute for Traffic Telematics at the Technische Universität Dresden

He studied Electrical Engineering at Technische Universität Dresden, where he graduated in 1993. After having received his diploma he continued research work there at the Faculty about sensitivity and robustness analysis of systems. In 1999 he received his PhD in this topic. In 1997 he started working with Video-Audio-Design GmbH, Dresden, as project manager in the areas of digital broadcasting, sensor systems with data fusion in mobile transport vehicles. In 2000 Prof. Michler joined the Fraunhofer Institute for Transportation and Infrastructure Systems in Dresden to continue his research work about telematics services in transportation applications, integrated acquisition, transmission and processing of traffic information. In 2005 he was made a professor at the Dresden University of Applied Sciences in signal processing and electronic measurement techniques. In 2010 Prof. Michler began building up a joint research group between Technical University Dresden and the Fraunhofer Institute for Transportation and Infrastructure Systems Dresden, dedicated to applied research about localization methods, energy efficiency of sensors and data transmission with optimal usage of bandwidth.

## Automotive MEMS Sensors - Overview & future Trends



T. Kramer  
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Robert Bosch GmbH, Reutlingen, Germany

### Abstract

Bosch Automotive Electronics (AE) - headquartered in Reutlingen, Germany - is the largest manufacturer of micromechanical products and one of the largest automotive semiconductor manufacturers in Europe. Bosch has been at the forefront of MEMS (microelectromechanical systems) technology since the very beginning. Since the start of production in 1995, the company has manufactured well in excess of five billion MEMS sensors. Bosch supplies sensors for applications in the consumer electronics and automotive industries.

The presentation will show this wide range of MEMS Sensors for automotive applications focusing on the necessary technologies developed within the last 20 years. These sensors measure pressure, acceleration, rotary motion and mass flow. With consumer electronics entering the vehicle the automotive demand for faster development processes, advanced designs and technologies is rising. However, automotive quality and reliability still need to be assured to fulfill consumer's expectations on vehicle safety and lifetime. In the second part of the presentation this topic will be covered, showing applications arising from consumer applications like combo inertial sensors or air quality measurements. Finally an outlook on further potential applications will be given.

### Biography

Dr. Torsten Kramer graduated in Physics at University of Heidelberg and received his PhD in microsystem technology from University of Freiburg. In 2003 he joined the Robert Bosch GmbH in Reutlingen as a development engineer of Si-based sensor chips for mass flow- and pressure sensors. Between 2009 and 2011 he worked at Bosch Sensortec as a senior project manager for triaxial accelerometers for consumer applications. Rejoining Robert Bosch GmbH in Reutlingen in 2011 as a teamleader he is responsible for wafer process development of membrane sensors for automotive and consumer applications. Since 2014 he is appointed senior expert 'technology membrane sensors'.

## Automotive Megatrends, Challenges and Solutions - an OEM Perspective



U. Abelein  
Quality Manager, Semiconductor Quality & Analysis  
Audi AG, Ingolstadt, Germany

### Abstract

The field of automotive electronics went through an impressive change over the last 20 years. Starting from a purely mechanical system with some electric parts a modern vehicle turned into one of the most complex mobile electronic devices used today in our modern society. Electronics made cars safer, greener, more comfortable and easier to handle. Most innovations we have seen in vehicles over the last decade were either directly or indirectly enabled by electronics.

This development lead to completely new challenges for the automobile industry. Electronics knowledge became a core competence for a car maker and semiconductors have a essential influence on overall quality targets. Treating innovation and quality as a unity is therefore absolutely necessary for the use of state-of-the-art technologies in automotive applications.

The megatrends of the upcoming decade will even intensify these effects further. Car-to-X solutions, advanced driver assistance systems or e-mobility are just some examples of upcoming functions based on a highly integrated electronic systems. The realization of such complex systems under automotive conditions makes it necessary to move the unity of innovation and quality to the next level.

This talk will give an overview of the challenges and chances of modern automotive electronics. It will highlight the general boundary conditions of the automobile industry with respect to electronics and their consequences for semiconductor development, qualification and manufacturing. Furthermore some new approaches to deal with current and future tasks in the field of high quality automotive electronics will be sketched.

### Biography

Ulrich Abelein is responsible for semiconductor quality and failure analysis within the AUDI AG. His responsibilities include the Audi semiconductor failure analysis lab and the strategic development of the fields of qualification and quality strategies for automotive semiconductors as well. He studied microelectronics and economics at the Technial University of Munich and the University of Hagen respectively.

2003 he joined the group of Prof. Eisele at the University of the Federal Armed Forces in Neubiberg/Munich. There he worked in the in the field of novel device concepts on silicon and process technology development. In 2008 he took over his current position at the AUDI AG.

## Future requirements on semiconductors as enablers for automotive innovation



T. Gutheit  
Sen. Dir. Technology Innovation  
Infineon Technologies AG, ATV TI, Neubiberg, Germany

### Abstract

Infineon Technologies AG is a world leader in semiconductors. Infineon offers products and system solutions addressing three central challenges to modern society: energy efficiency, mobility, and security. Microelectronics is the key enabling technology for major breakthrough innovations in the automotive arena which we will see on the road in the next 3..10 years. With its broad portfolio of automotive semiconductors ranging from sensors, MOSFET switches, protected switches, ICs and modules for conventional and electrical drivetrain and microcontrollers Infineon is well prepared to shape the future of automotive electronics together with our customers and partners. The complexity on system level is driven up in several dimensions at the same time as data capture and processing, highly reliable power electronic, high levels of security and functional safety. The presentation will selectively cover some of the emerging applications in automotive as autonomous driving, advanced driver assistance systems and networked cars. We will provide an insight into new requirements which the semiconductor industry is facing here and into the approaches Infineon is taking to tackle these challenges.

### Biography

Dr. Tim Gutheit is Senior Director of Technology & Innovation of Infineon's Automotive Division. In this function he is responsible for the innovation and predevelopment strategy of that division , which includes roadmaps for technology and development methodologies, the global development center footprint and competence development of the R&D staff.

From 2008 to 2011 he was leading the development group for Automotive Power Semiconductor Platforms in which wafer and package technologies and design kits for automotive power ICs were set up.

From 2005 to 2008 Tim Gutheit headed Infineon's productline for high integration IC for use in automotive powertrain and safety applications.

Tim Gutheit started his career 1992 at Daimler Benz central research lab, working on materials for high temperature electronics before moving on to Siemens Semiconductor (later Infineon Technologies) where he held numerous positions in R&D and Operations.

He holds a diploma and Ph.D in physics of the Technical University in Munich, Germany, and is inventor of 12 patents.