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Welcome Message from the General Chair and the General Co-Chairs

On behalf of the 2019 IEEE International Conference on Connected Vehicles and Expo (ICCVE) Organizing Committee, and the IEEE Instrumentation and Measurement Society, it is our great pleasure to welcome you to the 2019 ICCVE in Graz, Austria.

The city of Graz is a blend of old and new Austria. With one of the best-preserved historic town centre’s in Europe and four universities, it offers both a glimpse into the past, and a young, innovative cultural life. Graz enjoys a rich history yet is at the same time bursting with modern life. We hope that the attendees of the 2019 IEEE ICCVE will enjoy the conference and our vibrant city.

The 2019 IEEE ICCVE is the brand new application-driven flagship conference of the IEEE Instrumentation and Measurement Society and is the world’s premier conference in that field whose mission it is to bridge the automated vehicle gap: science and technology, consumer trust, homologation and liability. Experts, researchers, practitioners, and policymakers from all around the world will present the latest innovations and advances on Connected and Automated Vehicles (CAVs), share their experience and insights, forecast future trends and opportunities, and discuss the policy, economics and social implications.

2019 IEEE ICCVE is positioned to be a catalyst to promote interactions between industry and academia – a wide spectrum of academic research results will be presented while offering potential practical applications in current industrial technology and highlighting industry-driven developments. The conference will focus on all aspects related to research, development, and applications of vehicle connectivity and autonomy.

Papers are presented in four parallel tracks, each complemented by industry talks. We are very lucky to have five prominent keynote speakers: Mykel Kochenderfer from Stanford University will present on Building and Validating Safety Critical Decision Making Systems, Philip Koopman from Carnegie Mellon University on A Strategy for Evolving Self-Driving Car Safety Assurance, Steven E. Shladover from California PATH, UC Berkeley on Practical Challenges to the Implementation of Automated Driving Systems, Thomas Kuehbeck from BMW on the Importance of Standardization and Shared Code for Evaluating Automated Systems, and Sebastian Fischmeister from the University of Waterloo on The Convergence of Safety and Security in Connected Vehicles. We would like to extend our sincere thanks and gratitude to these individuals for their participation.

Day one will be dedicated to tutorials. Our Tutorial Chair Alexander Bergmann has arranged a comprehensive programme of five tutorial sessions which will be presented by eminent scientists.

Day four will feature our industry partners in an Industry Day organized by our Chair Serkan Arslan from Nvidia showcasing presentations from specialists from ASFINAG, AVL, MAGNA, Infineon, Nvidia, TTTech, and Bosch. These talks have been proposed and supported by ICCVE’s Industry Board.

It is also a great pleasure to host the 40-year anniversary of the foundation of the IEEE Austria Section. The current Section Chair and many former Chairs, IEEE Fellows and Section Members will facilitate a discussion about the history, present, and the future of this exciting endeavour.

Many people have worked tirelessly to ensure that the 2019 IEEE ICCVE a successful and enjoyable event. Our Technical Program Co-Chairs Anton Fuchs, Horst Bischof, Aldo Sorniotti, Antonella Ferrara and Reinhard Pfiegl have put together a very strong technical program. All submitted papers have been reviewed by independent and international reviewers according to the IEEE process. Immense thanks goes out to all the reviewers who
have spent valuable time to evaluate these papers and submit their reports in a timely manner and to our Scientific Advisory Board that ensured the scientific quality of contributions. This conference would not have been possible if the authors had not submitted papers so we would also like to thank each of them for choosing 2019 IEEE ICCVE and for their participation in the conference. We are similarly grateful to the IEEE Instrumentation and Measurement Society (financial sponsor), the IEEE Intelligent Transport Systems Society (technical sponsor), as well as the Austrian Federal Ministry of Traffic, Infrastructure, and Transport (BMVIT) for their strong support throughout the preparation phase of the 2019 IEEE ICCVE. And of course, we would like to thank in advance, all of our patrons and exhibitors; you all make the Conference and its Expo unique.

Last, but not the least, our thanks to the Local Arrangement Chair, Julia D’Orazio and all the Conference Catalysts staff, especially Laura LeBlanc, for managing the conference so efficiently and paying attention to every minute detail.

We hope you all will enjoy the conference and have an inspiring time in Graz!
ICCVE 2019 Organizing Committee

General Chair:
Daniel Watzenig, Graz University of Technology and Virtual Vehicle, Austria

General Co-Chair Europe:
Josef Affenzeller, AVL List, Austria

General Co-Chair Asia:
Yu Yuan, Senses Global Corporation, China

General Co-Chair Americas:
Wei-Bin Zhang, UC Berkeley, USA

Technical Program Chairs:
Anton Fuchs, Virtual Vehicle, Austria
Horst Bischof, Graz University of Technology, Austria
Aldo Somiotti, University of Surrey, UK
Antonella Ferrara, University of Pavia, Italy
Reinhard Pfiegl, IEEE Austria, Austria

Industry Chair:
Serkan Arslan, NVIDIA, Germany

Local Arrangement Chair:
Julia D'Orazio, Virtual Vehicle, Austria

Tutorial Chair:
Alexander Bergmann, Graz University of Technology, Austria

Conference Management:
Conference Catalysts, LLC, USA
Scientific Advisory Board

Wolfgang Boesch  
Graz University of Technology, Austria

Steven E. Shladover  
California PATH, UC Berkeley, USA

Yu Yuan  
Senses Global Corporation, China

Martin Törngren  
KTH, Sweden

Vincenzo Piuri  
University of Milano, Italy

Christoph Stiller  
Karlsruhe Institute of Technology, Germany

Mykel Kochenderfer  
Stanford University, USA

Alessandro Ferrero  
Politecnico di Milano, Italy

Werner Huber  
TH Ingolstadt, Germany

Adnan Tahirovic  
University of Sarajevo, Bosnia

Katie Driggs-Campbell  
University of Illinois, USA

Gereon Meyer  
VDI/VDE, Germany

Noshin Omar  
Vrije Universiteit Brussel (VUB), Belgium

Matthew Barth  
University of California-Riverside, USA

Jost Bernasch  
Virtual Vehicle, Austria

Chi-Hung Hwang  
Instrument Technology Research Center, NARLabs, Taiwan

Javier Gozalvez  
President, Uwicore and IEEE Vehicular Technology Society, Spain

Industry Board

Serkan Arslan  
Nvidia, Germany

Michael Paulweber  
AVL, Austria

Marcus Hennecke  
Infineon Technologies, Austria

Thomas Coughlin  
2018 IEEE President, IEEE-USA, USA

Michael Noest  
Austrian Association for Advanced Propulsion Systems (A3PS), Austria

Joachim Taiber  
International Transportation Innovation Center (ITIC), USA

Michael Andrews  
Andrews & Associates, IEEE Region 6, USA

Richard Bishop  
Bishop Consulting, USA

Tom Kuehbeck  
BMW, USA

Mario Rohracher  
GSV, Austria

Lee Stogner  
Steering Committee of the IEEE Entrepreneur Initiative, USA
ABSTRACT:

Building safety critical decision making systems is complicated due to the vast spectrum of possible scenarios that may be encountered. There are often many low-probability edge cases that are difficult for human engineers to anticipate and resolve before deployment. This talk will discuss an approach to designing robust systems that involves the mathematical framework of partially observable Markov decision processes (POMDPs). Instead of relying on human engineers to explicitly construct the decision making system, the approach involves specifying models of the dynamics, sensors, and objectives and using algorithms to optimize the decision strategy. Such an approach led to a new aircraft collision avoidance system that has been accepted for use worldwide, and it is the basis for ongoing work in automated driving. This talk will discuss how to validate the correct operation of these systems and outline the challenges in facilitating greater levels of automation into safety critical systems.

SPEAKER BIO:

Mykel Kochenderfer is a professor of Aeronautics and Astronautics at Stanford University. He is the director of the Stanford Intelligent Systems Laboratory (SISL), conducting research on advanced algorithms and analytical methods for the design of robust decision making systems, ranging from unmanned aircraft to driverless cars. He is also the director of the SAIL-Toyota Center for AI Research at Stanford and a co-director of the Center for AI Safety. He received a Ph.D. from the University of Edinburgh and B.S. and M.S. degrees in computer science from Stanford University. He is an author of the textbooks "Decision Making under Uncertainty: Theory and Application" and "Algorithms for Optimization", both from MIT Press.
ABSTRACT:

This presentation aims to provide a realistic assessment of the state of the art in Automated Driving Systems based on understanding the long-term historical trends in transportation and the technical challenges that remain to be solved. It begins with the long history of prior efforts to automate driving and then clarifies the descriptions of automated driving systems based on their levels of automation and connectivity and their operational design domains. The importance of vehicle-vehicle and vehicle-infrastructure connectivity in order to achieve transportation system improvements from automation is emphasized, based on results of simulations calibrated to full-scale vehicle test results. The formidable unsolved challenges in perception technology and system safety assurance are then discussed as part of the explanation for why it will take multiple decades of further development efforts before automated driving will be able to serve major fractions of surface transportation needs.

SPEAKER BIO:

Dr. Steven Shladover has been researching road vehicle automation systems for 45 years, beginning with his masters and doctoral theses at M.I.T. He was the Program Manager, Mobility at the California PATH Program of the Institute of Transportation Studies of the University of California at Berkeley until his retirement in November 2017. He led PATH’s pioneering research on automated highway systems, including its participation in the National Automated Highway Systems Consortium from 1994-98, and has continued research on fully and partially automated vehicle systems since then. This work has included a definition of operating concepts, modeling of automated system operations and benefits, and design, development and testing of full-scale prototype vehicle systems. His target applications have included cooperative adaptive cruise control, automated truck platoons, automated buses and fully-automated vehicles in an automated highway system.

Dr. Shladover joined the PATH Program in 1989, after eleven years at Systems Control, Inc. and Systems Control Technology, Inc., where he led the company’s efforts in transportation systems engineering and computer-aided control engineering software products. He chaired the Transportation Research Board Committee on Intelligent Transportation Systems from 2004-2010 and currently chairs the TRB Committee on Vehicle-Highway Automation. Dr. Shladover leads the U.S. delegation to ISO/TC204/WG14, which is developing international standards for “vehicle-roadway warning and control systems"
ABSTRACT:

Assuring the safety of fully self-driving vehicles will require a dramatic increase in scope compared to previous automotive safety standards because there will no longer be a human driver to take ultimate responsibility for vehicle safety. Moreover, the use of nondeterministic algorithms and inductive learning techniques requires an assurance approach that goes beyond the classic “V” model. This talk will present a technology-neutral goal-based safety argumentation approach to establishing and evolving self-driving car safety. Salient features include: treating uncertainty as a first class citizen, permitting credit for data feedback paths in evolving safety, and enabling integration of evidence generated by diverse existing safety standards. Rather than mandating specific use of technology, the approach includes recommendations of best practices, anti-patterns that should be avoided, and topics that must be addressed to provide credible argumentation in support of safety.

SPEAKER BIO:

Prof. Philip Koopman is a faculty member at the Carnegie Mellon University ECE department, with additional affiliations with the Institute for Software Research and the Robotics Institute. He leads research on safe and secure embedded systems and teaches cost-effective embedded system design techniques.

He has over 20 years of experience with autonomous vehicle safety, dating back to the CMU Navlab team and the Automated Highway Systems (AHS) program. His most recent projects include using stress testing and run time monitoring to ensure safety for a variety of vehicle and robotic applications for the research, industry, and defense sectors. He has additional experience with automotive and industrial functional safety, including testifying as an expert in vehicle safety class action litigation and consulting to NHTSA.

He is co-founder of Edge Case Research, which provides tools and services for autonomous vehicle testing and safety validation. His pre-university career includes experience as a US Navy submarine officer, embedded CPU designer at Harris Semiconductor, and embedded system architect at United Technologies. He is a Senior Member of IEEE, a Senior Member of ACM, and a member of SAE. He is also the 2018 winner of the IEEE Carl Barus Award for Outstanding Service in the Public Interest for his work on automotive software safety. http://www.ece.cmu.edu/~koopman
ICCVE 2019 Keynote Speakers

Thomas Kuehbeck
BMW Technology Office

Importance of Standardization and Shared Code for Evaluating Automated Systems

ABSTRACT:

The indefinite number of scenarios a highly automated vehicle faces during its lifespan is infeasible to be covered or predicted. To derive these scenarios into requirements and respectively aligned tests is complicated; system robustness covering all scenarios within this traffic space is equally complicated. Simulation allows engineers to extract edge case scenarios in virtual environments running complete vehicles tests, enlarging the covered scenario test space. In this talk I will discuss the errors occurring when extracting scenarios out of collected test vehicle measurements, and subsequently re-simulating newer versions of the software stack under test. The detailed errors for scenario extraction, re-simulation, and its assessment reveal the problems for scenario-based risk assessment using different test domains. Furthermore, the error chain for these processes shows the need not only for standardization, but also for sharing code - due to errors originating within the different mathematical principles being used. For an industry overarching goal of evaluating automated systems, standardized code is inevitable, allowing companies to share scenarios and give an overall safety assessment for future traffic analysis.

SPEAKER BIO:

Thomas Kuehbeck received the Diploma Degree (Dipl-Inf FH) from the University for applied sciences Regensburg in 2010, the Bachelor of Honors in computing science from Staffordshire University (UK), in 2010 and PhD in computing science from Staffordshire University in 2018. Between 2010 and 2013 he worked on active vehicle safety topics contributing to his PhD. Since 2013 Dr. Thomas Kuehbeck is working on topics regarding highly automated driving functions covering all fields from vehicle design and set-up, software architecture to evaluation of highly automated driving systems. Since 2017 he is with the BMW Technology Office in Mountain View, Sillicon Valley integrating the country specific requirements into the software stack.
ABSTRACT:

For decades, safety was a dominating topic driving technology development regarding the dependability of cyberphysical systems. Safety of a system ensures that in the case of faults, the system is still highly unlikely to cause harm to users, capital infrastructure, or the environment. With the advent of connectivity, security is now becoming an equally important topic as connectivity enables scalable attacks. Unfortunately, the complexity of today's systems prevents engineers from gaining a deep understanding of systems, and consequently new approaches for safety and security are necessary. This talk presents this challenge in the context of connected automotive systems. The lecture discusses automation and autonomy of automotive systems, safety vs. security for connected vehicles, and in general shows the need for merging safety and security research for further advances in electronics, software, and systems of next-generation automated/autonomous systems.

SPEAKER BIO:

Sebastian Fischmeister is an Associate Professor in the Department of Electrical and Computer Engineering at the University of Waterloo, and Executive Director of the Waterloo Centre for Automotive Research (WatCAR), which facilitates research for 130 faculty members working on automotive research. Sebastian has more than 15 years of experience in R&D of safety-critical real-time embedded systems and delivered innovation to real-time communication, embedded software, timing analysis, instrumentation and debugging technology, as well as safety and security monitoring.

Prof. Fischmeister performs systems research at the intersection of software technology, distributed systems, and formal methods. He has published more than 90 peer-reviewed conference presentations and 30 journal articles, and has built demonstrators with his team and colleagues, including the reference demo for the ASTM F29.21 standard, an SFOC-licensed UAV, the APMA Connected Vehicle Technology Demonstrator, the Renesas Autonomous Vehicle Demonstrator (showcased at CES in Las Vegas in both 2017 and 2018), and the DENSO Driving AI Demonstrator (CES 2018). His work has received several research and industry awards.

Sebastian is a licensed Canadian Professional Engineer, active in the Standards Council of Canada, and an Association for Computing Machinery Distinguished Speaker.
Aspects of Automotive Radar
Helmut Schreiber (Graz University of Technology)

Due to its properties radar is an important part of the sensor environment of modern cars. This tutorial will give an overview of the function of automotive radar. This includes some theory about detection and estimation of target parameters, the principle of operation, hardware components (like the antenna) and signal processing. Due to the increasing number of cars equipped with radar interference between the sensors is already becoming an important topic. The tutorial will be concluded by a look into the possible future of automotive radar.

Optical Time-of-Flight Sensors for Autonomous Driving
Marcus Hennecke (Infineon Technologies, Austria)

Optical time of flight sensors is considered essential for autonomous driving at level 3 and above since they provide high-resolution 3D representations of the environment by measuring the time it takes for light to travel to the surrounding objects and back. As such, they are often called LiDAR, an acronym for Light Detection And Ranging. The tutorial will cover the most prevalent methods for measuring the time of flight as well as the individual components such as lasers, receivers, and scanners that make up LiDAR sensors and will point out the specific challenges of the various design choices. Format: Lecture with demonstrators Similar tutorial held at the Eurosensors School 2018.

Physical-realistic camera simulations: how real do simulations have to be?
Alexander Braun (University of Applied Sciences, Germany)

Simulating reality has fast become a mandatory component in the development and validation of sensor systems for ADAS and AD. This workshop focuses on (optical) cameras systems and how to make a simulation for these cameras 'look like real'. It provides an overview of the different simulation tools currently on the market. We further examine the use-cases (HiL / SiL) in detail and show the role simulation plays in both the development and validation of sensor systems. Invalidation, another focus lies on specifications and tolerance calculation. We discuss how realistic current simulations tools are, present a novel approach to lens modeling, and critically reflect on the influence the 'real-ness' (or rather lack thereof) of the simulated optical effects. Content overview: Introduction: Every camera is unique! Basics and Definitions Photo-realistic is not enough! Simulation stages: Optics, Sensor, ISP, Detection Algorithm How realistic do simulations have to be?
Securing Connected and Autonomous Vehicles via Trust Management
Farhan Ahmad (University of Derby, United Kingdom, Great Britain)
Asma Adnane (Loughborough University, UK)
Fatih Kurugollu (University of Derby, United Kingdom, Great Britain)

The revolution of connected and autonomous vehicles (CAVs) have attracted a massive response from both research and industrial community due to their significant potential to improve the overall transportation in terms of road safety and providing infotainment to the vehicular users. This innovative technology is commonly known as Vehicular Ad-hoc NETworks (VANET) where smart and connected vehicles exchange information with each other in real-time, which as a result, expands the vision of the drivers to take right decisions in time-critical situations. Therefore, only accurate, authentic and trusted information must be allowed to disseminate among vehicles in the network. The attackers along with their malicious content must be identified in order to secure VANET. Trust management is proposed as a security measure in VANET where vehicles can directly communicate with each other to identify attackers and their content, thus disseminating only trusted information in the network. However, due to the high mobility of the vehicles in VANET, calculating and evaluating trust in such a short duration is extremely challenging. This tutorial will break into three major sections. The first section of the tutorial will introduce various trust management techniques in VANET. The second section of the tutorial will discuss our novel trust evaluation framework which has the capability to evaluate different trust models in an efficient manner. Specifically, we will provide details on the architecture of the framework and its feasibility study where we implemented and evaluated three different trust models in different contexts of VANET. Finally, the last section will identify various challenges and future research directions in this domain. This tutorial can be instrumental to car manufacturers and researchers to design and implement new trust models in VANET.

IEEE P2020 Automotive Image Quality
Alexander Braun (University of Applied Sciences, Germany)

The next generation of cars will be multi-sensor, multi-modal, multi-camera, AI platforms. The key driver for this dramatic evolution in our vehicles is to increase safety. While cameras are crucial for a vehicle to sense and perceive its surroundings, to date there had not been a consistent approach in the automotive industry to measure image quality. Existing standards are not covering the needs of automotive imaging:
- IEEE-SA P1858 Camera Phone Image Quality (CPIQ) working group
- EMVA1288
- ISO12233

Automotive imaging imposes unique challenges due to its varied and distinct landscape of different setups (fisheye, multi-camera, HDR, temperature range, …), which are not adequately addressed in the existing standards. Therefore, the IEEE-SA P2020 working group has set the goal of defining the relevant metrics and KPIs for automotive image quality, enabling customers and suppliers to efficiently define, measure and communicate image quality of their systems. This tutorial presents the working group, both in terms of the structure of the group as well as the content and the proposed new metrics and KPIs.
ICCVE 2019 Exhibitors

[Logos for SCOTT, TRUST, ARTEMIS, A3PS, IEEE, AUSTRIAN STANDARDS, COSMOS, and ECSEL JU Lighthouse Initiatives]
ICCVE 2019 Social Events

TUTORIAL RECEPTION
Time: Monday, November 4th from 6:30 – 8:00 PM
Location: Messe Congress Graz Betriebsgesellschaft m.b.h.

WELCOME RECEPTION
Time: Tuesday, November 5th from 6:00 – 7:30 PM
Location: Messe Congress Graz Betriebsgesellschaft m.b.h.

The Welcome Reception for ICCVE 2019 will take place on Tuesday, November 5th at the Messe Congress Graz Betriebsgesellschaft m.b.h. All attendees that are registered for the full conference are welcome to attend the tutorial and the reception.

BANQUET DINNER
Time: Wednesday, November 6th at 6:30 PM
Location: Schlossberg (Floating Above the City)

Gravity barely allows to float. But sometimes in life you come to a place where the law of gravity is out of force. A place that gives us enjoyable ease and puts us in an unforgettable state of suspension. A place where we can unwind our soul informally.
# PROGRAM SCHEDULE – Tutorials – Monday, November 4, 2019

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<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Room 12</th>
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<tbody>
<tr>
<td>12:00 PM – 6:00 PM</td>
<td>Registration</td>
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<tr>
<td>1:00 PM – 2:00 PM</td>
<td>Aspects of Automotive Radar</td>
<td>Helmut Schreiber</td>
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<td>2:00 PM – 3:00 PM</td>
<td>Optical Time-of-Flight Sensors for Autonomous Driving</td>
<td>Marcus Hennecke</td>
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<td>3:00 PM – 3:30 PM</td>
<td>Coffee Break</td>
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<td>3:30 PM – 4:30 PM</td>
<td>Physical-realistic camera simulations: how real do simulations have to be?</td>
<td>Alexander Braun</td>
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<td>4:30 PM – 5:30 PM</td>
<td>Securing Connected and Autonomous Vehicles via Trust Management</td>
<td>Farhan Ahmad</td>
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<td>Fatih Kurugollu</td>
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<td>5:30 PM – 6:30 PM</td>
<td>IEEE P2020 Automotive Image Quality</td>
<td>Alexander Braun</td>
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<td>6:30 PM – 8:00 PM</td>
<td>Tutorial Reception</td>
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*Registration, Breaks & Receptions will take place in the Foyer*
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<tr>
<th>Time</th>
<th>Room 12</th>
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<tr>
<td>8:00 AM – 6:00 PM</td>
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<td>8:15 AM – 8:30 AM</td>
<td><strong>Opening Ceremony</strong></td>
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<td>Room: Galerie</td>
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<td>8:30 AM – 9:15 AM</td>
<td><strong>Keynote Speaker:</strong> A Strategy for Evolving Self-Driving Car Safety Assurance Philip Koopman Room: Galerie</td>
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<td>9:15 AM – 9:45 AM</td>
<td>Coffee Break</td>
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<td>9:45 AM – 11:45 AM</td>
<td>Advanced Systems for Smart, Green and Integrated Multi-Actuated Ground Vehicles</td>
<td>Vehicular Cloud Computing</td>
<td>Vehicle Control</td>
<td>Sensor Simulation and Stimulation</td>
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<td>11:45 AM – 1:15 PM</td>
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<tr>
<td>1:15 PM – 2:00 PM</td>
<td><strong>Keynote Speaker:</strong> Practical Challenges to the Implementation of Automated Driving Systems Steven E. Shladover Room: Galerie</td>
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<td>2:00 PM – 2:30 PM</td>
<td>Coffee Break</td>
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<td>4:30 PM – 6:00 PM</td>
<td>IEEE Austria 40th Anniversary Celebration Room: Galerie</td>
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<td>6:00 PM – 7:30 PM</td>
<td>Welcome Reception</td>
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Registration, Breaks, Lunches & Receptions will take place in the Foyer
**PROGRAM SCHEDULE – Wednesday, November 6, 2019**

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<td>Registration</td>
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</table>
| 8:30 AM – 9:15 AM | **Keynote Speaker:** Building and Validating Safety Critical Decision Making Systems  
Mykel Kochenderfer  
Room: Galerie |                                              |                                              |                                              |
| 9:15 AM – 9:45 AM | Coffee Break                    |                                              |                                              |                                              |
| 9:45 AM – 11:45 AM | Computational and Artificial Intelligence  
Hybrid Simulation and Empirical Testing  
Policy, Economics, and Social Implications  
Safety Assurance and Cybersecurity |                                              |                                              |                                              |
| 11:45 AM – 1:15 PM | Lunch                          |                                              |                                              |                                              |
| 1:15 PM – 2:00 PM | **Keynote Speaker:** The Convergence of Safety and Security in Connected Vehicles  
Sebastian Fischmeister  
Room: Galerie |                                              |                                              |                                              |
| 2:00 PM – 2:30 PM | Coffee Break                    |                                              |                                              |                                              |
| 2:30 PM – 4:30 PM | Cooperative Intelligent Transport Systems  
Advanced Data-Driven Approaches and Modelling  
Multi-vehicle Cooperation, Connected Vehicles, Platooning - Part 2  
Virtual Homologation and System Assessment |                                              |                                              |                                              |
| 6:30 PM – 9:30 PM | Banquet Dinner                  |                                              |                                              |                                              |

*Registration, Breaks & Lunches will take place in the Foyer*
# PROGRAM SCHEDULE – Thursday, November 7, 2019

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<tr>
<th>Time</th>
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<tr>
<td>8:00 AM – 5:30 PM</td>
<td>Galerie</td>
<td>Registration</td>
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</tbody>
</table>
| 8:30 AM – 9:15 AM  | Galerie                | **Keynote Speaker:** *Importance of Standardization and Shared Code for Evaluating Automated Systems*  
Thomas Kuehbeck   |
| 9:15 AM – 9:45 AM  | Galerie                | AVL Presentation                                                        |
| 9:45 AM – 10:15 AM | Galerie                | Coffee Break                                                            |
| 10:15 AM – 11:00 AM| Galerie                | Panel Discussion                                                        |
| 11:00 AM – 12:00 PM| Galerie                | Industry Talks                                                          |
| 12:00 PM – 1:15 PM | Galerie                | Lunch                                                                   |
| 1:15 PM – 2:15 PM  | Room 11               | **Special Session:** Next Generation Electrified and Automated Vehicles |
| 2:15 PM – 3:15 PM  | Room 12               | **Special Session:** Legal and Insurance Aspects                        |
| 3:15 PM – 4:15 PM  | Room 11               | Artificial Intelligence and Data Science                                |
| 3:15 PM – 4:15 PM  | Room 12               | Special Session:** Platooning                                           |
| 3:15 PM – 4:15 PM  | Galerie                | Wireless Vehicle Communication                                           |
| 3:15 PM – 4:15 PM  | Room 12               | Special Session:** Scenario-based safety validation of Automated Driving for 'all' situations |
| 4:15 PM – 5:15 PM  | Room 11               | Implications of CAVs                                                    |
| 4:15 PM – 5:15 PM  | Galerie                | Efficiency and Flexibility in Development                               |
| 4:15 PM – 5:15 PM  | Room 12               | Special Session:** Trust Vehicle                                        |
| 5:15 PM – 5:30 PM  | Galerie                | Closing Ceremony                                                        |

Registration, Breaks & Lunches will take place in the Foyer
### Technical Schedule: Tuesday, November 5

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Room</th>
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<tbody>
<tr>
<td>8:00 - 18:00</td>
<td><strong>Registration</strong></td>
<td><strong>Foyer</strong></td>
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<tr>
<td>8:30 - 9:15</td>
<td><strong>Keynote Speaker</strong></td>
<td><strong>Galerie</strong></td>
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<td>9:15 - 9:45</td>
<td><strong>Coffee Break</strong></td>
<td><strong>Foyer</strong></td>
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<tr>
<td>9:45 - 11:45</td>
<td><strong>1A: Advanced Systems for Smart, Green and Integrated Multi-Actuated Ground Vehicles</strong></td>
<td><strong>12</strong></td>
</tr>
</tbody>
</table>

**Multi-actuated ground vehicle tyre force estimation through a coupled 1D simulation-estimation framework**
Marco Viehweger (KU Leuven & Flanders Make DMMS-M @ KU Leuven, Belgium)
Sebastiaan van Aalst (Flanders Make DecisionS, Belgium)
Frank Naets (KU Leuven &amp; Flanders Make DMMS-M @ KU Leuven, Belgium)
Wim Desmet (KU Leuven &amp; Flanders Make DMMS-M @ KU Leuven, Belgium)

**An Approach for Combined Vertical Vehicle Model and Road Profile Identification from Heterogeneous Fleet Data**
Frank Naets (KU Leuven & DMMS lab of Flanders Make, Belgium)
Jeroen Geysen (KU Leuven, Belgium)
Wim Desmet (University of Leuven, Belgium)

**On Driver-Vehicle-Environment Integration for Multi-Actuated Ground Vehicles Safety Advancement**
Andrei Aksjonov (Skoda Auto a. s., Czech Republic)
Halil Beglerovic (AVL List GmbH, Austria)
Michael Hartmann (University of Technology Graz & Virtual Vehicle Research Center, Austria)
Shriram Jugade (Université de Technologie de Compiègne, France)
Cyrano Vaseur (Flanders Make, Belgium)

**Sliding Mode Methods in Electric Vehicle Stability Control**
Timur Agliullin (KNRTU–KAI, Germany)
Vincenzo Ricciardi and Valentin Ivanov (Technische Universität Ilmenau, Germany)
Dzmitry Savitski (Arrival Germany GmbH, Germany)
Salim Kaddari (Technische Universität Ilmenau, Germany)
Klaus Augsburg (TU Ilmenau, Germany)

**A Path Tracking Approach for Autonomous Driving on Slippery Surfaces**
Enrico Regolin (University of Pavia, Italy)
Marco Vanzulli (University of Pavia, Italy)
Massimo Zambelli (University of Pavia, Italy)
Antonella Ferrara (University of Pavia, Italy)
9:45 - 11:45
**1B: Vehicular Cloud Computing**

*Room: 11*

### Cloud-Based Vehicle Ride-Height Control
Konstantin Riedl (Technical University of Munich, Germany)  
Thomas Einmüller (AUDI AG, Germany)  
Andreas Noll (AUDI AG, Germany)  
Andreas Allgayer (AUDI AG, Germany)  
David Reitze (AUDI AG, Germany)  
Markus Lienkamp (Technical University of Munich, Germany)

### A Data-based Approach to Predict the Response Time of Cloud-based Vehicle Functions
Farzaneh Milani (Robert Bosch GmbH, Germany)  
Mike Foell (Robert Bosch GmbH, Germany)  
Christian Beidl (Technical University of Darmstadt, Germany)

### Towards Privacy in Geographic Message Dissemination for Connected Vehicles
Stefan Ruehrup (ASFINAG, Austria)  
Stephan Krenn (AIT, Austria)

### Preliminary Considerations for a Cooperative Intelligent Transport System Cybersecurity Reference Architecture
Christoph Schmittner (AIT Austrian Institute of Technology GmbH, Austria)  
Martin Latzenhofer (AIT Austrian Institute of Technology GmbH, Austria)

9:45 - 11:45
**1C: Vehicle Control**

*Room: 10*

### A Software Architecture for the Dynamic Path Planning of an Autonomous Racecar at the Limits of Handling
Johannes Betz (Technical University of Munich & Chair of Automotive Technology, Germany)  
Alexander Wischnewski (Technical University of Munich, Germany)  
Alexander Heilmeyer (Technical University of Munich, Germany)  
Felix Nobis (Technical University of Munich, Germany)  
Leonhard Hermansdorfer (Technical University of Munich, Germany)  
Tim Stahl, Thomas Herrmann (Technical University of Munich, Germany)  
Markus Lienkamp (Technical University of Munich, Germany)

### Improvement of Lane Keeping Assistance ADAS Function utilizing a Kalman Filter Prediction of Delayed Position States
Selim Solmaz (Virtual Vehicle Research Center, Austria)  
Georg Nestlinger (Virtual Vehicle Research Center, Austria)  
Georg Stettinger (VIRTUAL VEHICLE Research Center, Austria)

### A Model-Free Algorithm to Safely Approach the Handling Limit of an Autonomous Racecar
Alexander Wischnewski (Technical University of Munich, Germany)  
Johannes Betz (Technical University of Munich & Chair of Automotive Technology, Germany)  
Boris Lohmann (Technische Universität München, Germany)
### A Novel Tuning Approach of the $H\infty$ Filter for Longitudinal Tracking of Automated Vehicles
Jasmina Zubača (Graz University of Technology, Austria)
Michael Stolz (Institute of Automation and Control Technical University Graz & Virtual Vehicle Research Center, Austria)
Daniel Watzenig (Graz University of Technology & Virtual Vehicle Research Center, Austria)

### Path following controller for autonomous vehicles
Ádám Domina (Budapest University of Technology and Economics, Hungary)

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>9:45 - 11:45</td>
<td><strong>1D: Sensor Simulation and Stimulation</strong></td>
<td>Galerie</td>
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<tr>
<td></td>
<td><strong>Camera Vignetting Model and its Effects on Deep Neural Networks for Object Detection</strong></td>
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<td></td>
<td>Kmeid Saad (Kempten University of Applied Sciences, Germany)</td>
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<td>Stefan Alexander Schneider (Hochschule Kempten, Germany)</td>
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<td><strong>Open-Source CiThruS Simulation Environment for Real-Time 360-Degree Traffic Imaging</strong></td>
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<td>Teo Niemirepo (Tampere University, Finland)</td>
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<td>Juuso Toivonen (Tampere University, Finland)</td>
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<td>Marko Viitanen (Tampere University, Finland)</td>
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<td>Jarno Vanne (Tampere University, Finland)</td>
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<td></td>
<td><strong>3D LiDAR Extrinsic Calibration Method using Ground Plane Model Estimation</strong></td>
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<td>Mohammad Ali Zaiter (Université du Littoral Côte d’Opale, France)</td>
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<td>Régis Lherbier (Univ Littoral Côte d’Opale, France)</td>
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<td>Oussama Bazzi (Lebanese University, Lebanon)</td>
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<td>Ghaleb Faour (CNRS Lebanon, Lebanon)</td>
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<td>Jean-Charles Noyer (Université du Littoral Côte d’Opale, France)</td>
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<td></td>
<td><strong>Object-based sensor model for virtual testing of ADAS/AD functions</strong></td>
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<td></td>
<td>Stefan Muckenhuber (VIRTUAL VEHICLE Research Center, Austria)</td>
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<td>Hannes Holzer (VIRTUAL VEHICLE Research Center, Austria)</td>
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<td>Jonas Ruebsam (AVL List GmbH, Austria)</td>
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<td>Georg Stettinger (VIRTUAL VEHICLE Research Center, Austria)</td>
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<td>11:45 - 13:15</td>
<td><strong>Lunch</strong></td>
<td>Foyer</td>
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<td>13:15 - 14:00</td>
<td><strong>Keynote Speaker</strong></td>
<td>Galerie</td>
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<tr>
<td>14:00 - 14:30</td>
<td><strong>Coffee Break</strong></td>
<td>Foyer</td>
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</tbody>
</table>
Fault-tolerant environmental perception architecture for robust automated driving
Stephanie Grubmueller (Virtual Vehicle Research Center, Austria)
Georg Stettinger (VIRTUAL VEHICLE Research Center, Austria)
Miguel Angel Sotelo (University of Alcala, Spain)
Daniel Watzenig (Graz University of Technology & Virtual Vehicle Research Center, Austria)

ISO 26262 ASIL-Oriented Hardware Design Framework for Safety-Critical Automotive Systems
Kuen-Long Lu (National Taipei University, Taiwan)
Yung-Yuan Chen (National Taipei University, Taiwan)

Architectural Safety Perspectives & Considerations Regarding the AI-based AV Domain Controller
Terry L Fruehling (Encore Semi Inc. & Journal of Connected and Automated Vehicles, USA)
Abel Hailemichael (NC A&T State University, USA)
Corey Graves (North Carolina A&T State University, USA)
Eric Nutt (Mandli Communications Inc., USA)
Robert Fischer (GTiMA, USA)
Jonathan Riehl (University of Wisconsin, USA)
Arash Khabbaz Saberi (Eindhoven University of Technology, The Netherlands)

Decentralized Dynamic Platooning Architecture with V2V Communication Tested in Omnet++
Tobias Renzler (Graz University of Technology, Austria)
Michael Stolz (Institute of Automation and Control Technical University Graz & Virtual Vehicle Research Center, Austria)
Daniel Watzenig (Graz University of Technology & Virtual Vehicle Research Center, Austria)

Effect of Packet Loss on a Connected Heavy Vehicle Collision Avoidance Algorithm
Venkata Ramani Shreya Yellapantula (Indian Institute of Technology Madras (IITM), India)
Devika K b (Post Doctoral Fellow, India & IIT Madras, unknown)
Shankar Subramanian (Indian Institute of Technology Madras, India)

Signal Green Time Estimation Method for Connected Vehicle-to-Infrastructure Applications
Jijo Mathew, Howell Li and Darcy Bullock (Purdue University, USA)

TRUDI: Testing Environment for Vehicular Applications Running with Devices in the Loop
Michele Menarini (CNR-IEIIT, Italy)
Giammarco Cecchini (CNR - IEIIT, Italy)
Alessandro Bazzi (CNR, Italy)
Barbara M Masini (CNR - IEIIT & University of Bologna, Italy)
Alberto Zanella (Istituto di Elettronica e di Ingegneria dell'Inform. e delle Telecomunicazioni, Italy)

Improving Autonomous Vehicle Communication Technology Based on Interference Analysis for Wireless Networks
Jamal Raiyn (Al Qasemi Academic College, Israel)
Cooperative Trajectory Planning for Autonomous Driving Using Nonlinear Model Predictive Control
Icaro Viana (Cranfield University, United Kingdom (Great Britain))
Husain Kanchwala (Cranfield University, United Kingdom (Great Britain))
Nabil Aouf (City, University of London, United Kingdom (Great Britain))

Lane Based Platoon Control of Homogeneous Platoons
Halid Mahama (Beijing University of Technology, P.R. China)
Husain Kanchwala (Warwick Manufacturing Group, University of Warwick)

14:30 - 16:30
2C: Wireless Communication and Vehicular Networking
Room: 10

Validation of virtual test environment for C2X communication under radio jamming conditions
Michal Tarkowski (Gdansk University of Technology, Poland)
Mateusz Rzymowski (Gdansk University of Technology & WiComm Center of Excellence, Poland)
Lukasz Kulas (Gdansk University of Technology, Faculty of Electronics, Telecommunications and Informatics, Poland)
Krzysztof Nyka (Gdansk University of Technology, Poland)
Marcin Borawski (Gdansk University of Technology, Poland)
Przemyslaw Kwapisiewicz (Gdansk University of Technology, Poland)
Wojciech Piechowski (Gdansk University of Technology, Poland)
Gerald Temme (German Aerospace Center, Germany)
Saifullah Khan (German Aerospace Center, Germany)
Danny Behnecke (German Aerospace Center, Germany)
Mohamed Mahmod (German Aerospace Center, Germany)

Over-the-air emulation of a two-path model for automotive LTE system performance testing
Philipp Berlt (Technische Universität Ilmenau, Germany)
Christian Bornkessel (Technische Universität Ilmenau, Germany)
Matthias Hein (Ilmenau University of Technology, Germany)

Evaluating Automotive Antennas for Cellular Radio Communications
Nils Dreyer (TU Braunschweig, Germany)
Thomas Kürner (Technische Universität Braunschweig, Germany)
Gerald Arter (Vienna University of Technology, Austria)
Matthias Hein (Ilmenau University of Technology, Germany)
Frank Backwinkel (Volkswagen AG, Germany)

On the Reliability of VANET Safety Applications for Bicycles
Mohammad Baqer (University of Idaho, USA)
Axel Krings (University of Idaho, USA)

LTE-V2X Mode 4: Increasing Robustness and DCC Compatibility with Reservation Splitting
Philip Wendland (Technische Universität Ilmenau, Germany)
Guenter Schaefer (Technische Universität Ilmenau, Germany)
Reiner S. Thomä (Ilmenau University of Technology, Germany)
Infrastructure data fusion for validating and future enhancing autonomous vehicles' perception on Austrian motorways
Jacqueline Erhart (ASFINAG, Austria)
Bernd Datler (ASFINAG, Austria)
Manfred Harrer (ASFINAG Maut Service GmbH, Austria)
Peter Hrassnig (ASFINAG Maut Service GmbH, Austria)
Siegfried Seebacher (ASFINAG Maut Service GmbH, Austria)
Arnold Praesent (Tieto Austria GmbH, Austria)
Martin Andreas Ullrich (Tieto Austria GmbH, Austria)
Christian Schwarzl (Virtual Vehicle Research Center, Austria)
Gerhard Greiner (ALP Lab GmbH, Austria)

Harmonizing Heterogeneous Diagnostic Data of a Vehicle Fleet for Data-Driven Analytics
Sidney Koerper (University of Tübingen, Embedded Systems & Porsche AG, Germany)
Roland Herberth (Karlsruhe Institute of Technology & Porsche AG, Germany)
Oliver Bringmann (University of Tuebingen, Embedded Systems / FZI, Germany)
Frank Gauterin (Karlsruhe Institute of Technology, Germany)

Proposal for Identification Scheme of Driver and Impostor based on Acceleration Data
Yuki Mori (Aichi Institute Of Technology, Japan)
Ryota Ono (Aichi Institute Of Technology, Japan)
Takaya Mitani (NAGOYA University, Japan)
Katsuhiro Naito (Aichi Institute of Technology, Japan)
Takaya Yamazato (Nagoya University, Japan)

Evaluation of an indoor localization system for a mobile robot
Victor Juan Expósito Jiménez (Virtual Vehicle Research Center, Austria)
Helmut Martin (Virtual Vehicle Research Center, Austria)
Christian Schwarzl (Virtual Vehicle Research Center, Austria)

Accuracy Evaluation of Camera-based Vehicle Localization
Kai Cordes (VISCODA GmbH, Germany)
Norman Nolte (VISCODA GmbH, Germany)
Nikolaus Meine (VISCODA GmbH, Germany)
Hellward Broszio (VISCODA GmbH, Germany)
## Technical Schedule: Wednesday, November 6

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<th>Event</th>
<th>Speaker(s)</th>
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<td>Registration</td>
<td>Room: Foyer</td>
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<tr>
<td>8:30 - 9:15</td>
<td>Keynote Speaker</td>
<td>Mykel Kochenderfer</td>
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<td>Room: Galerie</td>
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<td>9:15 - 9:45</td>
<td>Coffee Break</td>
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<td>Room: Foyer</td>
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<td>9:45 - 11:45</td>
<td>3A: Computational and Artificial Intelligence</td>
<td>Classification of Streetsigns Using Gaussian Process Latent Variable Models, Deep Grid Fusion of Feature-Level Sensor Data with Convolutional Neural Networks, Spatial Positioning Token (SPToken) for Smart Mobility, GAN-based Method for Labeled Image Augmentation in Autonomous Driving, A Deep Learning Approach for Location Independent Throughput Prediction</td>
</tr>
</tbody>
</table>

### Classification of Streetsigns Using Gaussian Process Latent Variable Models
Wilfried Wöber, MSc (University of Natural Resources and Life Sciences and UAS Technikum Wien, Austria)
Mohamed Aburaia (UAS Technikum Wien, Austria)
Cristina Olaverri-Monreal (Johannes Kepler University, Austria)

### Deep Grid Fusion of Feature-Level Sensor Data with Convolutional Neural Networks
Gabor Balazs (Technical University of Munich, Germany)
Walter Stechele (Technical University of Munich, Germany)

### Spatial Positioning Token (SPToken) for Smart Mobility
Roman Overko (University College Dublin, Ireland)
Rodrigo H. Ordonez-Hurtado (IBM Research & Ireland, Ireland)
Sergiy Zhuk (IBM Research, Ireland)
Pietro Ferraro (University College Dublin, Ireland)
Andrew Cullen (University College Dublin, Ireland)
Robert Shorten (University College Dublin, Ireland)

### GAN-based Method for Labeled Image Augmentation in Autonomous Driving
Wenbo Yu (ISUZU Technical Center of America, USA)
Yong Sun (ISUZU Technical Center of America, USA)
Ruilin Zhou (ISUZU Technical Center of America, USA)
Xingjian Liu (ISUZU Technical Center of America, USA)

### A Deep Learning Approach for Location Independent Throughput Prediction
Josef Schmid (Ostbayerische Technische Hochschule Amberg-Weiden, Germany)
Mathias Schneider (Ostbayerische Technische Hochschule Amberg-Weiden, Germany)
Alfred Höß (OTH Amberg-Weiden, Germany)
Björn W Schuller (Imperial College London & University of Augsburg, United Kingdom (Great Britain))
9:45 - 11:45
3B: Hybrid Simulation and Empirical Testing
Room: 11

Proof of concept for Scenario-in-the-Loop (SciL) testing for autonomous vehicle technology
Mátyás Szalai (Budapest University of Technology and Economics, Hungary)
Zsolt Szalay (Budapest University of Technology and Economics, Hungary)
Balint Toth (Automotive Proving Ground Zala Ltd., Hungary)
Tamás Tettamanti (Budapest University of Technology and Economics, Hungary)
Viktor Tihanyi (Budapest University of Technology and Economics, Hungary)

Empirical Testing of Automotive Cyber-Physical Systems with Credible Software-in-the-Loop Environments
Indrasen Raghupatruni (Robert Bosch GmbH, Germany)
Thomas Goeppel (Robert Bosch GmbH, Germany)
Julien Bou (Robert Bosch GmbH, Germany)
Thomas Huber (Robert Bosch GmbH, Germany)
Muhammed Atak (Robert Bosch GmbH, Germany)

A Novel Testbench for Development, Calibration and Functional Testing of ADAS/AD Functions
Selim Solmaz (Virtual Vehicle Research Center, Austria)
Franz R. Holzinger (Virtual Vehicle Research Center, Austria)

DigiCAV project: Exploring a Test-Driven Approach in the Development of Connected and Autonomous Vehicles
Ioannis Kyriakopoulos (HORIBA MIRA Limited, United Kingdom (Great Britain))

9:45 - 11:45
3C: Policy, Economics, and Social Implications
Room: 10

Modeling Charging of Electric Vehicles in Smart Cities: Charles Square Use Case
Michal Lom (Czech Technical University in Prague, Czech Republic)
Ondrej Pribyl (CVU, Czech Republic)

Investigating the Potential Transportation Impacts of Connected and Autonomous Vehicles
Fatemeh Elham Asadi (University of Cambridge & Horiba-Mira Ltd., United Kingdom (Great Britain))
Ammar Anwar (University of Cambridge, United Kingdom (Great Britain))
John Miles (University of Cambridge, United Kingdom (Great Britain))

Quantitative Assessment of Pavement and Scooter Suspension on Ride Quality
Steven Zehr (Purdue University, USA)
Jijo Mathew (Purdue University, USA)
Darcy Bullock (Purdue University, USA)
European Innovation for Next Generation Electrified Vehicles and Components
Eric Armengaud (AVL List GmbH, Austria)
Omar Hegazy (Vrije Universiteit Brussel, Belgium)
Bernhard Brandstaetter (Virtual Vehicle Competence Center, Austria)
Valentin Ivanov (Technische Universität Ilmenau, Germany)
Reinhard Tatschl (AVL List GmbH, Austria)
Michele De Gennaro (AIT, Austria)
Aldo Sorniotti (University of Surrey, United Kingdom (Great Britain))
Joeri Van Mierlo (Vrije Universiteit Brussel, Belgium)
Christof Schernus (FEV Europe, Austria)

Applications and Trends in Connected Vehicles: Debates and Conclusions
Abhijit Vasili (University of South Florida, USA)
Wilfrido Moreno (University of South Florida, USA)

9:45 - 11:45
3D: Safety Assurance and Cybersecurity
Room: Galerie

Improve cybersecurity of C-ITS Road Side Infrastructure Installations: the SerIoT - Secure and Safe IoT approach
Bernhard Monschiebl (Austriatech, Austria)
Alexander Froetscher (Austriatech, Austria)
Erol Gelenbe (Imperial College London, United Kingdom (Great Britain))
Anastasios Drosou (Centre for Research & Technology Hellas - Information Technologies Institute, Greece)
Martin J Reed (University of Essex, United Kingdom (Great Britain))
Mays F AL-Naday (University of Essex, United Kingdom (Great Britain))

Evaluation Framework for Network Intrusion Detection Systems for In-Vehicle CAN
Guillaume Dupont (Technical University of Eindhoven, The Netherlands)
Jerry den Hartog (Technical University of Eindhoven, The Netherlands)
Sandro Etalle (Technical University of Eindhoven, The Netherlands)
Alexios Lekidis (Eindhoven University of Technology & ForeScout Technologies, The Netherlands)

Safety & Security in the Context of Autonomous Driving
Manuel Koschuch (FH Campus Wien - University of Applied Sciences Vienna, Austria)
Walter Sebron (FH Campus Wien - University of Applied Sciences Vienna, Austria)
Zsolt Szalay (Budapest University of Technology and Economics, Hungary)
Árpád Török (Budapest University of Technology and Economics, Hungary)
Hans Tschürtz (FH Campus Wien - University of Applied Sciences Vienna, Austria)
István Wahl (Knorr-Bremse Fékrendszerek Kft., Austria)

Identification of performance limitations of sensing technologies for automated driving
Helmut Martin (Virtual Vehicle Research Center, Austria)
Bernhard Winkler (Virtual Vehicle Research Center, Austria)
Stephanie Grubmueller (Virtual Vehicle Research Center, Austria)
Daniel Watzenig (Graz University of Technology & Virtual Vehicle Research Center, Austria)

Towards Responsibility-Sensitive Safety of Automated Vehicles with Reachable Set Analysis
Piotr F. Orzechowski (FZI Research Center for Information Technology & Karlsruhe Institute of Technology, Germany)
Kun Li (Karlsruhe Institute of Technology (KIT), Germany)
Martin Lauer (Karlsruhe Institute of Technology (KIT), Germany)
11:45 - 13:15
Lunch
Room: Foyer

13:15 - 14:00
Keynote Speaker
Sebastian Fischmeister
Room: Galerie

14:00 - 14:30
Coffee Break
Room: Foyer

14:30 - 16:30
4A: Cooperative Intelligent Transport Systems
Room: 12

Urban Intersection Management with Connected Infrastructure Objects and Autonomous Vehicles
Sergey Chuprov (ITMO University, Russia)
Ilya Viksnin (ITMO University, Russia)
Iuliia Kim (ITMO University, Russia)

Interference Tests of ITS-G5 Vehicle-to-Vehicle Communication Networks with Virtual Drive Tests
Berk Altinel (Technische Universitât Ilmenau, Germany)
Matthias Hein (Ilmenau University of Technology, Germany)

Implications of user and system optimum based traffic control considering autonomous fleets
Qiong Lu (Budapest University of Technology and Economics, Hungary)
Tamâs Tettamanti (Budapest University of Technology and Economics, Hungary)
Dániel Hörcher (Imperial College, United Kingdom (Great Britain))

Analysis of Data Collected by the 700 MHz Band Intelligent Transport Systems for Reducing Ambulance Transportation Time
Takuya Mitani (NAGOYA University, Japan)
Takaya Yamazato (Nagoya University, Japan)
Katsuhiro Naito (Aichi Institute of Technology, Japan)
Yuki Mori (Aichi Institute Of Technology, Japan)

Intersection Crossing in Mixed Traffic Flow Environment leveraging V2X Information
Angelo Coppola (University of Naples Federico II, Italy)
Gennaro Nicola Bifulco (University of Naples Federico II, Italy)
Stefania Santini ("Federico II", Italy)
Bianca Caiazzo (University of Naples Federico II, Italy)
14:30 - 16:30
**4B: Advanced Data-Driven Approaches and Modelling**
*Room: 11*

Yet Another Driving Simulator OpenROUTS3D: The Driving Simulator for Teleoperated Driving
Stefan Neumeier (Technische Hochschule Ingolstadt & Technische Universität München, Germany)
Michael Höpp (Technische Hochschule Ingolstadt, Germany)
Christian Facchi (Technische Hochschule Ingolstadt, Germany)

Hybrid trajectory planning approach for roundabout merging scenarios
Carlos E Hidalgo (University of the Basque Country & Tecnalia Resarch & Innovation, Spain)
Ray Lattarulo (Tecnalia Research and Innovation, Spain)
Joshue Perez (Tecnalia, Spain)
Estibaliz Asua (University of the Basque Country UPV/EHU, Spain)

A longitudinal driver model for long horizon speed prediction in powertrain applications
Florian Morlock (University of Stuttgart & Institute for System Dynamics, Germany)
Oliver Sawodny (University of Stuttgart, Germany)

Stochastic Model Predictive Control for Scheduling Charging of Electric Vehicle Fleets with Market Power
Arec Jamgochian (Stanford University, USA)
Mykel J Kochenderfer (Stanford University, USA)

Heterogeneity of Microscopic Congested Traffic Data Based on Drone Measurements
Yildirim Dülgar (Daimler AG, Germany)

14:30 - 16:30
**4C: Multi-vehicle Cooperation, Connected Vehicles, Platooning - Part 2**
*Room: 10*

Control of Mixed Platoons Consist of Automated and Manual Vehicles
Omer Orki (Ben-Gurion University, Israel)
Shai Arogeti (Ben-Gurion University, Israel)

Laboratory Emulator Using Connected Scaled Cars to Study Traffic Waves
Sharon Hornstein (General Motors, Israel)
Klaus Trangbaek (General Motors, Israel)

Network Load Adaptation for Collective Perception in V2X Communications
Quentin Delooz (Technische Hochschule Ingolstadt & Halmstad University, Germany)
Andreas Festag (Technische Hochschule Ingolstadt & Fraunhofer Institute for Transportation and Infrastructure Systems IVI, Germany)

A Fault-Tolerant Controller Manager for Platooning Simulation
Shahriar Hasan (Mälardalen University, Sweden)
Muhammed Abdullah Al Ahad (Mälardalen University, Sweden)
Irfan Slijivo (Mälardalen University, Sweden)
Ali Balador (Mälardalen University & RISE SICS Västerås, Sweden)
Svetlana Girs (Mälardalen University, Sweden)
Elena Lisova (Malardalen University, Sweden)
COPADRIVe - A Realistic Simulation Framework for Cooperative Autonomous Driving Applications
Ricardo Severino (Polytechnic Institute of Porto, School of Engineering, Portugal)
Enio Prates Vasconcelos Filho (Instituto Superior do Porto & Cister Research Centre, Portugal)
Bruno Vieira (CISTER/ISEP Research Centre, Portugal)
Anis Koubaa (Prince Sultan University, unknown)
Eduardo Tovar (The Polytechnic Institute of Porto, Portugal)

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<thead>
<tr>
<th>Time</th>
<th>Session Description</th>
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<tbody>
<tr>
<td>14:30 - 16:30</td>
<td>4D: Virtual Homologation and System Assessment</td>
<td>Galerie</td>
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</tbody>
</table>

Online validity monitor for vehicle dynamics models
Stephan Rhode (Robert Bosch GmbH, Germany)
Johannes von Keler (Robert Bosch GmbH, Germany)

Optimizing coverage of simulated driving scenarios for the autonomous vehicle
Marc Nabhan (Renault & Paris-Sud University-INRIA, France)
Marc Schoenauer (INRIA, France)
Yves Tourbier (Renault, France)
Hiba Hage (Renault, France)

Development of a Scenario Simulation Platform to Support Autonomous Driving Verification
Christoph Pilz (Technical University Graz & VIRTUAL VEHICLE Research Center, Austria)
Gerald Steinbauer (Graz University of Technology, Austria)
Markus Schratter (Virtual Vehicle Research Center, Austria)
Daniel Watzenig (Graz University of Technology & Virtual Vehicle Research Center, Austria)

Comparing two systematic approaches for testing automated driving functions
Hermann Felbinger (AVL List GmbH, Austria)
Florian Steffen Klück (Technische Universität Graz, Austria)
Yihao Li (Technische Universität Graz, Austria)
Mihai Nica (AVL List GmbH, Austria)
Jianbo Tao (AVL List GmbH, Austria)
Franz Wotawa (Graz University of Technology, Austria)
Martin Zimmermann (Technische Universität Graz, Austria)

Methods for Improving the Accuracy of the Virtual Assessment of Autonomous Driving
Dominik M Notz (BMW Group, USA)
Martin Sigl (BMW AG, Germany)
Thomas Kuehbeck (BMW AG, Germany)
Sebastian Wagner (TU München, Germany)
Korbinian Groh (BMW Group, Germany)
Christoph Schütz (BMW AG, Germany)
Daniel Watzenig (Graz University of Technology & Virtual Vehicle Research Center, Austria)

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<th>Time</th>
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<tr>
<td>18:30 - 21:30</td>
<td>Banquet Dinner</td>
<td>Schlossberg</td>
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## Technical Schedule: Thursday, November 7

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<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>8:00 - 17:30</td>
<td>Registration</td>
<td>Room: Foyer</td>
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<tr>
<td>8:30 - 9:15</td>
<td><strong>Keynote Speaker</strong>&lt;br&gt;Thomas Kuehbeck</td>
<td>Room: Galerie</td>
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<tr>
<td>9:15 - 9:45</td>
<td><strong>AVL Presentation</strong>&lt;br&gt;A Scenario-Based Approach for Verification, Validation and Homologation of Highly Automated Vehicles&lt;br&gt;Roland Lang (Program Manager ADAS/AD Business Development, AVL, Austria)</td>
<td>Room: Galerie</td>
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<tr>
<td>9:45 - 10:15</td>
<td><strong>Coffee Break</strong></td>
<td>Room: Foyer</td>
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<td>10:15 - 11:00</td>
<td><strong>Panel Discussion</strong>&lt;br&gt;Federal Minister A. Reichhardt (bmvit)&lt;br&gt;G. List (AVL)&lt;br&gt;S. Rohringer (Infineon)&lt;br&gt;C. Zengerer (ACstyria)&lt;br&gt;B. Datler (ASFINAG)&lt;br&gt;S. Arslan (NVIDIA)&lt;br&gt;G. Krachler (Magna)</td>
<td>Room: Galerie</td>
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| 11:00 - 12:00 | **5A: Industry Talks**<br>Artificial Intelligence: The Key to the Future of Automated Mobility and Transportation<br>Serkan Arslan (Nvidia Europe, Germany)  
Holistic Analysis of Automated Driving Functions using New Data Sources<br>Gerhard Krachler (Magna Steyr Fahrzeugtechnik AG&Co KG, Austria)  
Bosch is seamlessly connecting mobility<br>Javier Ealo (Robert BOSCH, Austria)  
Design Paradigms for Safe Autonomous Systems<br>Wilfried Steiner (TTTech) | Room: Galerie |
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<th>Time</th>
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<tr>
<td>12:00 - 13:15</td>
<td><strong>Lunch</strong></td>
<td>Foyer</td>
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<td>13:15 - 14:15</td>
<td><strong>Special Session: Next Generation Electrified and Automated Vehicles</strong></td>
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<td><strong>EVC1000</strong></td>
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<td>Eric Armengaud (AVL)</td>
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<td><strong>VISION-xEV</strong></td>
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<td>Reinhard Tatschl (AVL)</td>
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<td><strong>SYS2WHEEL</strong></td>
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<td>Alois Steiner (Virtual Vehicle)</td>
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<td><strong>FITGEN</strong></td>
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<td>Michele De Gennaro (AIT)</td>
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<td><strong>XIL4EV</strong></td>
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<td>Valentin Ivanov (TU Ilmenau)</td>
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<td>13:15 - 14:15</td>
<td><strong>Special Session: Legal and Insurance Aspects</strong></td>
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<td><strong>Safety, Security &amp; Liability - From Humans to Computers?</strong></td>
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<td>Andreas Eustacchio (EUSTACCHIO Rechtsanwälte – Attorneys at Law)</td>
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<td><strong>How to insure autopilots</strong></td>
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<td>Dieter Pscheidl (Vienna Insurance Group AG, Austria)</td>
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<td><strong>How Safe is Safe Enough From a Legal Perspective</strong></td>
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<td>Marleen Roubik (BMVIT - Austrian Ministry for Transport, Innovation and Technology)</td>
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<td><strong>Legislating Autonomous Vehicles against the Backdrop of Adversarial Machine Learning Findings</strong></td>
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<td>Steven Van Uytsel (Kyushu University, Japan)</td>
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<tr>
<td>14:15 - 15:15</td>
<td><strong>5A: Artificial Intelligence and Data Science</strong></td>
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<td><strong>Data science meets connected vehicles: Potentials, pitfalls, and application examples</strong></td>
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<td>Alexander Stocker (Virtual Vehicle Research Center, Austria)</td>
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<td>Christian Kaiser (Virtual Vehicle Research Center, Austria)</td>
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The inD Dataset: A Drone Dataset of Naturalistic Road User Trajectories from Intersections
Julian Bock (RWTH Aachen University, Institute for Automotive Engineering, Germany)
Robert Krajewski (RWTH Aachen University, Institute for Automotive Engineering, Germany)
Lennart Vater (RWTH Aachen University, Institute for Automotive Engineering, Germany)
Tobias Moers (fka GmbH, Germany)
Lutz Eckstein (RWTH Aachen University, Institute for Automotive Engineering, Germany)

Challenges for AI in autonomous vehicles with vulnerable road users
Michael Hartmann (University of Technology Graz & Virtual Vehicle Research Center, Austria)
Daniel Watzenig (Graz University of Technology & Virtual Vehicle Research Center, Austria)

14:15 - 15:15
Special Session: Platooning
Room: 12

CCAD impact on road operators' core business (results from CEDR automation study MANTRA on CCAD including freight automation)
Walter Aigner (HiTec)

Getting ready for infrastructure supported automated driving
Bernd Datler (ASFINAG, Austria)

Scientific evidence from the German field trial on SAE L1 truck platooning project EDDI
Christian Haas (Hochschule Fresenius)

Infrastructure-based truck platoon management with C-ITS
Thomas Novak (Swarco)

Time-Synchronized Wireless Sensor Network for Precision Truck-Platooning Measurements
Peter Sammer (Virtual Vehicle)

15:15 - 16:15
5B: Wireless Vehicle Communication
Room: 11

Efficient 802.11 mode conversion for V2X communication
Zeungil Kim (150, Hyundaiyeonguso-ro & HYUNDAI MOTOR Company, Korea)

Over-the-air testing of automated and connected cars in virtual environment
Matthias Hein (Ilmenau University of Technology, Germany)

Visible light communication and sensing - essential enablers for automated mobility
Andreas Weiss (Industriestrasse 6 & Joanneum Research, Austria)

Modelling V2V message generation rates in a highway environment
Aashik Chandramohan (University of Twente, The Netherlands)
15:15 - 16:15
Special Session: Scenario-based safety validation of Automated Driving for 'all' situations
Room: 12

Scenario-based validation of automated driving functions
Andrea Leitner (Instrumentation and Test Systems & AVL LIST GMBH, Austria)

Scenario-based safety validation of Automated Driving for 'all' situations
Sytze Kalisvaart (TNO, The Netherlands)

HEADSTART Project: scenario based validation in Proving grounds
Álvaro Arrúe (Applus IDIADA, Spain)

Validation of autonomous vehicles using scenario-based massive simulation
Gwen van Vugt (Siemens, The Netherlands)
Alexandru Forrai (Siemens, The Netherlands)

16:15 - 17:15
6A: Implications of CAVs
Room: 11

Unlock the Intelligent Automation System: A new Era of Autonomous Vehicles
Saba Al-Rubaye (Cranfield University, United Kingdom (Great Britain))

Challenge mass production - going scale
Alexander Braun (University of Applied Sciences Düsseldorf, Germany)

Analysis and Initial Observations on Varying Penetration Rates of Automated Vehicles in Mixed Traffic Flow utilizing SUMO
Mohamed Berrazouane (Virtual Vehicle Research Center, Austria)
Kailin Tong (Virtual Vehicle Research Center, Austria)
Selim Solmaz (Virtual Vehicle Research Center, Austria)
Martijn Kiers (FH Joanneum Gesellschaft mbH, Austria)
Jacqueline Erhart (ASFINAG, Austria)

Challenges of Large-Scale Sensor Data Processing for Autonomous Driving
Jan Wiegelmann (Autovia GmbH, Germany)

16:15 – 17:15
6B: Efficiency and Flexibility in Development
Room: Galerie

Clock Synchronization in Context of the Distributed Co-Simulation Protocol
Martin Krammer (VIRTUAL VEHICLE Research Center, Austria)
Philipp Ferner (VIRTUAL VEHICLE Research Center, Austria)
Daniel Watzenig (Graz University of Technology & Virtual Vehicle Research Center, Austria)
Research on Autonomous Driving based on a Highly Flexible Prototype Vehicle
Helmut Brunner (Graz University of Technology, Austria)
Xuelei Zhi (Tongji University, P.R. China)
Matthias Mietschnig (Graz University of Technology, Austria)
Stephen Jones (AVL List GmbH, Austria)
Su Zhou (Tongji University, P.R. China)
Gerald Steinbauer (Graz University of Technology, Austria)
Mario Hirz (Graz University of Technology, Austria)

Towards accelerated development and repeatable testing of CAVs
Ioannis Kyriakopoulos (HORIBA MIRA Limited, United Kingdom (Great Britain))

16:15 – 17:15
Special Session: Trust Vehicle
Room: 12

Getting the Measures Right: Performance and Acceptance of Level 3 Autonomous Vehicles
Ahu Ece Hartavi Karci

The users’ perspective on autonomous driving
Micaela Troglia

HMI Development for a Level 3 Automated Bus
Kimmo Kauvo

Development of on-demand low speed shared mobility services for new urbanism environments
Joachim Taiber (Clemson University, USA)

Heavy Commercial Truck Autonomous Trailer Reverse Parking in Confined Areas
Ersun Sözen

A Hands-On Approach on Front Lidar Positioning with Respect to VRU Scenario
Elias Meral (Volvo Cars)
Daniel Åhlund (Volvo Cars)
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4. to reject bribery in all its forms

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6. to maintain and improve our technical competence and to undertake technological tasks for others only if qualified by training or experience, or after full disclosure of pertinent limitations

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