Wednesday, December 16, 10:30 - 10:50

C1: Coffee

Wednesday, December 16, 10:50 - 12:30

S0: Simulation and Performance Evaluation

Chair: Jérôme Härri (EURECOM, France)
S0.1 10:50 Luxembourg SUMO Traffic (LuST) Scenario: 24 Hours of Mobility for Vehicular Networking Research 1
   Lara Codeca and Raphael Frank (University of Luxembourg, Luxembourg); Thomas Engel (University of Luxembourg, Luxembourg)

S0.2 11:15 Performance of Multi-Carrier Waveforms in Vehicle-to-Vehicle Communications 9
   Jamal Bazzi, Katsutoshi Kusume and Petra Weitkemper (DOCOMO Euro-Labs, Germany); Keisuke Saito, Anass Benjebbour and Yoshihisa Kishiyama (NTT DOCOMO, INC., Japan)

S0.3 11:40 On the Level of Detail of Synthetic Highway Traffic Necessary to Vehicular Networking Studies 17
   Marco Gramaglia (Universidad Carlos III de Madrid and IMDEA Networks Institute, Spain); Marco Fiore (National Research Council of Italy, Italy)

S0.4 12:05 LTE Link Level Performance Evaluation Using Stochastic Channel Models for V2X Communication 25
   Andreas Möller and Thomas Kürner (Technische Universität Braunschweig, Germany)

Wednesday, December 16, 12:30 - 13:30

L1: Lunch

Wednesday, December 16, 13:30 - 14:00

I1: Invited Talk

Vehicle as a New Social Infrastructure
Dr. Yuji Inoue, Toyota InfoTechnology Center, Japan

Yuji Inoue received the B.E., M.E. and Ph. D degrees from Kyushu University, Fukuoka, Japan, in 1971, 1973 and 1986, respectively, and was made an Honorary Professor of the Mongolian University of Science and Technology in 1999.

He joined NTT Laboratories in 1973 and served there for 34 years. While he was in NTT, he was active in ITU-T standardization on ISDN (Integrated Services Digital Network), SDH (Synchronous Digital Hierarchy) and TNA (Transport Network Architecture) during 1982 - 1992. After new business development in NTT Data, he was a board member of NTT in 5 years as CTO and the head of NTT
group's R&D with 6000 researchers and engineers.

He moved to The Telecommunication Technology Committee, TTC in 2007 as the President and CEO, then to Toyota Info technology Center Co. Ltd, as the Chairman of the Board. He is a fellow of IEICE and IEEE and is currently President Elect of IEICE. He wrote and edited many technical books.

**Wednesday, December 16, 14:00 - 15:30**

**S1: Networking**

Chair: Sandra Céspedes (Universidad de Chile, Chile)

**S1.1 14:00 Improving QoS on High-Speed Vehicle by Multipath Transmission Based on Practical Experiment**

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Ping Dong (Beijing Jiaotong University, P.R. China); Xiaojiang Du (Temple University, USA); Tao Zheng and Hongke Zhang (Beijing Jiaotong University, P.R. China)

**S1.2 14:15 Select Thy Neighbors: Low Complexity Link Selection for High Precision Cooperative Vehicular Localization**

36

Minh Gia Hoang (CEA-Leti Minatec & EURECOM, France); Benoit Denis (CEA-Leti Minatec, France); Jérôme Härri and Dirk Slock (EURECOM, France)

**S1.3 14:40 Providing Fairness Between Multiple Flows in Vehicular Networks**

44

Wantanee Viriyasitavat (Mahidol University, Thailand); Fan Bai (General Motors, USA); Ozan Tonguz (Carnegie Mellon University, USA)

**S1.4 15:05 Temporal Connectivity of Vehicular Networks: The Power of Store-Carry-and-Forward**

52

Christian Glacet and Marco Fiore (National Research Council of Italy, Italy); Marco Gramaglia (Universidad Carlos III de Madrid and IMDEA Networks Institute, Spain)

**Wednesday, December 16, 15:30 - 16:10**

**C2: Coffee**

**Wednesday, December 16, 16:10 - 17:30**

**S2: Channel Modeling and Exploitation**

Chair: Haris Kremo (Toyota InfoTechnology Center, Japan)

**S2.1 16:10 Cluster-based Transmit Power Control in Heterogeneous Vehicular Networks**

60

Agon Memedi (University of Paderborn, Germany); Florian Hagenauer (Paderborn University, Germany); Falko Dressler and Christoph Sommer (University of Paderborn, Germany)

**S2.2 16:25 Cooperation and Network Coding Based MAC Protocol for VANETs**

64

Saifullah Khan (Carl von Ossietzky University, Oldenburg, Germany); Muhammad Alam (Instituto de Telecomunicacões, Portugal); Nils Henning Müllner (Universität Oldenburg, Germany); Martin Fränzle (OFFIS Institute for Computer Science and University of Oldenburg, Germany)
Thursday, December 17

Thursday, December 17, 09:00 - 09:30

12: Invited Talk

V2X Communication Technology: Current and Future Trends
Prof. Kenya Sato, Doshisha University, Japan

Kenya Sato is a professor of Doshisha University, Kyoto, Japan, where he has been since 2004. He also currently leads the Mobility Research Center of the university, and serves as a designated professor of Nagoya University. He received the BE and ME degree from Osaka University, and also received the Ph.D. degree from Nara Institute of Science and Technology. During 1991-1994 Dr. Sato was a visiting researcher at Computer Science Department, Stanford University, and he was a chief technologies of Automotive Multimedia Interface Collaboration in Michigan, U.S. in 2001-2003. His research interests include network architecture, distributed systems, and ITS. Professor Sato is a member of Japan Delegation to ISO ITS technical committee, and a member of Advance Safety Vehicle study committee in Japan.

Thursday, December 17, 09:30 - 10:30

S3: Visible Light Communication

Chair: Marco Fiore (National Research Council of Italy, Italy)

S3.1 09:30 Dual Channel Visible Light Communications for Enhanced Vehicular Connectivity 84
Bugra Turan and Seyhan Ucar (Koc University, Turkey); Sinem Coleri Ergen (Koc University & University of California Berkeley, Turkey); Oznur Ozkasap (Koc University, Turkey)

S3.2 09:45 Characterizing Link Asymmetry in Vehicle-to-Vehicle Visible Light Communications 88
Hua-Yen Tseng, Yu-Lin Wei, Ai-Ling Chen, Hao-Ping Wu, Hsuan Hsu and Hsin-Mu Tsai (National Taiwan University, Taiwan)

S3.3 10:10 Improving Reliability of Platooning Control Messages Using Radio and Visible Light Hybrid Communication 96
Susumu Ishihara (Shizuoka University, Japan); R. Vince Rabsatt (University of California Los Angeles, USA); Mario Gerla (University of California at Los Angeles, USA)
Thursday, December 17, 10:30 - 10:50

C3: Coffee

Thursday, December 17, 10:50 - 12:30

S4: Applications

Chair: Michele Segata (University of Innsbruck & University of Trento, Italy)

S4.1 10:50 Modeling IVC-based Energy Savings of Electric Vehicles 104
    Rüdiger Berndt (Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany); Sebastian Schellenberg (University of Erlangen-Nuremberg, Germany); David Eckhoff and Reinhard German (University of Erlangen, Germany)

S4.2 11:05 A Tree-Based Authentication Scheme for a Cloud Toll/traffic RFID System 108
    Amerah Alabrah (King Saud University, Saudi Arabia); Mostafa Bassiouni (University of Central Florida, USA)

S4.3 11:20 Platoon-based Cyclists Cooperative System 112
    Sandra Céspedes (Universidad de Chile, Chile); Juan Salamanca (Icesi University, Colombia); Alexis Yañez (Universidad de Chile, Chile); Carlos Rivera and Juan Sacanamboy (Icesi University, Colombia)

S4.4 11:45 Differential Pressure for V2V Vertical Clearance 119
    Matthew Hu (Stanford University, USA); Roger Melen and Gaurav Bansal (Toyota InfoTechnology Center, USA)

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L2: Lunch

Thursday, December 17, 13:30 - 14:50

S5: Safety

Chair: Sinem Coleri Ergen (Koc University & University of California Berkeley, Turkey)

S5.1 13:30 Speed-Dependent Autonomous Beamwidth Variation for VANET Safety Applications 127
    Shota Soeno and Shinya Sugiura (Tokyo University of Agriculture and Technology, Japan)

S5.2 13:45 Crosslayer Beaconing Design Toward Guaranteed Cooperative Awareness with Contending Traffic 131
    Hoa-Hung Nguyen and Han-You Jeong (Pusan National University, Korea)

S5.3 14:00 Jerk Beaconing: A Dynamic Approach to Platooning 135
    Michele Segata (University of Innsbruck, Austria and University of Trento, Italy); Falko Dressler (University of Paderborn, Germany); Renato Lo Cigno (University of Trento, Italy)
S5.4 14:25 Implementation and Analysis of Traffic Safety Protocols Based on ETSI Standard 143
Muhammad Alam (Instituto de Telecomunicações, Portugal); Bruno Fernandes, Luis Emanuel Moutinho Silva and Muhammad Awais Khan (Instituto de Telecomunicações, Portugal); Joaquim Ferreira (University of Aveiro, Portugal)

Thursday, December 17, 14:50 - 15:30

M1: Two Minute Madness

Chairs: Jonathan Petit (Security Innovation, USA), Takayuki Nishio (Kyoto University, Japan)

M1.1 14:50 Poster: cOSMetic - Towards Reliable OSM to SUMO Network Conversion 151
Christian Bewermeyer (University of Erlangen-Nuremberg, Germany); Rüdiger Berndt (Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany); Sebastian Schellenberg (University of Erlangen-Nuremberg, Germany); Reinhard German and David Eckhoff (University of Erlangen, Germany)

M1.2 14:52 Poster: Wearable Warning System for Improving Cyclists Safety in the Scope of Cooperative Systems 153
Unai Hernández-Jayo, Jagoba Perez and Idoia de la Iglesia (University of Deusto, Spain)

M1.3 14:54 Poster: Anti-jamming Automatic Gain Control and Packet Detection for Vehicular Receiver 155
Shao-Ying Yeh (National Chiao Tung University, Taiwan); Jian Ya Chu (NCTU, Taiwan); Terng-Yin Hsu (National Chiao Tung University, Taiwan)

M1.4 14:56 Poster: Location-Based Distributed Channel Assignment for Communications Among Autonomous Vehicles 157
Daichi Ishikawa, Koya Sato and Takeo Fujii (The University of Electro-Communications, Japan); Matthias S Wilhelm, Haris Kremo and Onur Altintas (Toyota InfoTechnology Center, Japan)

M1.5 14:58 Poster: Comparison of the Correlation of Measured and Simulated Vehicle-to-Vehicle Shadow Fading 159
Jörg Fischer and Jochen Martin-Creuzburg (Fraunhofer Institute for Integrated Circuits IIS, Germany); Robert Koch, Gerd Kilian and Albert Heuberger (Fraunhofer IIS, Germany)

M1.6 15:00 Poster: CQI-Aware Digital Beamforming in V2X Radio Modem 161
Jian Ya Chu and Terngyin Hsu (NCTU, Taiwan); Shao-Ying Yeh (National Chiao Tung University, Taiwan)

M1.7 15:02 Poster: Greedy Data Dissemination Algorithm for Infrastructure-to-Vehicle Services 163
Inshick Kim (LG Electronics, Korea); Ryangsoo Kim and Hyuk Lim (Gwangju Institute of Science and Technology, Korea); Kyung-Joon Park (DGIST, Korea)

M1.8 15:04 Poster: Design of a Mutual Exchange Communication System for an In-Vehicle Network 165
Seung Hyeon Park and Ji Hyun Yang (Kookmin University, Korea)
M1.9 15:06 Poster: Development of ICA Algorithm for V2X Communications by Using PreScan 167
Min Baek, Hwan Lee, HyoJin Choi and Kyunbyoung Ko (Korea National University of Transportation, Korea)

M1.10 15:08 Demo: Human-Interactive Hardware-In-the-Loop Simulator for Cooperative Intelligent Transportation Systems and Services 169
Seokil Song, Taein Jeon, Eunjin Kim, Jinsu Kim, Dojin Choi, Yeona Kim, HyoJin Choi, Kyunbyoung Ko and Cheol Mun (Korea National University of Transportation, Korea)

M1.11 15:10 Demo: Implementation of IEEE 802.11p Transceiver Using USRP-RIO by LabVIEW Communications 171
YooHo Shin and Gilwon Seo (Korea National University of Transportaion, Korea); Sang Woo Woo (Korea National University Of Transportation, Korea); Kyunbyoung Ko and Cheol Mun (Korea National University of Transportation, Korea)

M1.12 15:12 Demo: Development of an Integrated Cooperative Collision Warning System Based on Established Standards 173
Jisoo Yu, Yeona Kim and Cheol Mun (Korea National University of Transportation, Korea)

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C4: Coffee, Posters, and Demos

Thursday, December 17, 16:50 - 18:30

S6: Traffic Management

Chair: Stefan Dietzel (Humboldt-Universität zu Berlin, Germany)

S6.1 16:50 Traffic Optimization on Islands 175
Daniel Cagara and Björn Scheuermann (Humboldt University of Berlin, Germany); Ana Bazzan (Federal do Rio Grande do Sul, Brazil)

S6.2 17:15 Assisting Solution of Traffic Congestion At Sags Using Inter-Vehicle Communication with Heterogeneous Wireless Systems 183
Hiroaki Morino, Takashi Inafune and Takuya Watanabe (Shibaura Institute of Technology, Japan)

S6.3 17:40 Effective Variables for Urban Traffic Incident Detection 190
Chaiyaphum Siripanpornchana and Sooksan Panichpapiboon (King Mongkut's Institute of Technology Ladkrabang, Thailand); Pimwadee Chaovalit (National Electronics and Computer Technology Center, Thailand)

S6.4 18:05 An Adaptive and VANETs-based Next Road Re-routing System for Unexpected Urban Traffic Congestion Avoidance 196
Shen Wang (Lero, RINCE, School of Electronic Engineering, Dublin City University, Ireland); Soufiene Djahel (Manchester Metropolitan University, United Kingdom); Jennifer McManis (Dublin City University, Ireland)
Thursday, December 17, 19:00 - 20:00

B1: Banquet

Friday, December 18

Friday, December 18, 09:30 - 10:30

K2: Panel

The Future of Vehicular Networks: In-vehicle, V2V, and V2I
Organizer: Dr. Jim Lansford, Qualcomm

Panelists:
Chisato Endo, Senior manager, Vehicle OEM sales group, Freescale Japan
Yukimasa Nagai, Assistant Manager/Senior Strategist, Mitsubishi Electric

Friday, December 18, 10:30 - 10:50

C5: Coffee

Friday, December 18, 10:50 - 12:30

S7: Content Dissemination and Relays

Chair: Susumu Ishihara (Shizuoka University, Japan)
S7.1 10:50 Adaptation of Topology-Based Routing Protocols for Data Gathering Applications in VANETs 204
   Diego Pacheco-Paramo and Luigi Iannone (Telecom ParisTech, France); Daniel Kofman (Telecom ParisTech, France); Aline Carneiro Viana (INRIA, France); Gregory Mermoud (Cisco, USA); Jean-Phillippe Vasseur (Cisco Systems, USA)

S7.2 11:15 PYRAMID: Informed Content Reconciliation for Vehicular Peer-to-Peer Systems 212
   Bo Yu and Fan Bai (General Motors, USA)

S7.3 11:40 Performance Analysis of CSMA/CA Packet Relay Assisted V2V Communication with Sectorized Relay Station 220
   Le Tien Trien and Yasushi Yamao (The University of Electro-Communications, Japan)

S7.4 12:05 Vehicular Massive Multiway Relay Networks Applying Graph-Based Random Access 227
   Ardimas Andi Purwita and Khoirul Anwar (Japan Advanced Institute of Science and Technology, Japan)
Friday, December 18, 12:30 - 13:30

L3: Lunch

Friday, December 18, 13:30 - 15:30

S8: In-Vehicle Communication

Chair: Giovanni Pau (UPMC Sorbonne Universités & UCLA, France)
S8.1 13:30 Physical Layer Performance Analysis of a Wireless Data Transmission Approach for Automotive Lithium-Ion Batteries 235  
Damian Alonso, Oliver Opalko and Klaus M. Dostert (Karlsruhe Institute of Technology (KIT), Germany)

S8.2 13:55 Physical Layer and Multi-carrier Analysis for Power Line Communication Networks in Li-ion Batteries for Electric and Hybrid Vehicles 243  
Oliver Opalko, Bernd Simon, Damian Alonso and Klaus M. Dostert (Karlsruhe Institute of Technology (KIT), Germany)

S8.3 14:20 Formal Worst-Case Timing Analysis of Ethernet TSN's Time-Aware and Peristaltic Shapers 251  
Daniel Thiele (Technische Universitaet Braunschweig, Germany); Rolf Ernst (Technical University of Braunschweig, Germany); Jonas Diemer (Symtavision GmbH, Germany)

S8.4 14:45 Improving In-Vehicle Network Architectures Using Automated Partitioning Algorithms 259  
Nasser Nowdehi (Chalmers University of Technology & Volvo Car Corporation, Sweden); Pierre Kleberger and Tomas Olovsson (Chalmers University of Technology, Sweden)

S8.5 15:10 Prototyping of the Physical and MAC Layers of a Wireless Battery Management System 267  
Damian Alonso, Christoph Winkler, Oliver Opalko and Klaus M. Dostert (Karlsruhe Institute of Technology (KIT), Germany)

Friday, December 18, 15:30 - 16:10

C6: Coffee

Friday, December 18, 16:10 - 17:30

S9: Security and Privacy

Chair: David Eckhoff (University of Erlangen, Germany)
S9.1 16:10 Wireless Channel-Based Message Authentication 271
Ala'a Al-Momani (Ulm University, Germany); Frank Kargl (Ulm University, Germany & University of Twente, The Netherlands, Germany); Christian Waldschmidt, Steffen Moser and Frank Slomka (Ulm University, Germany)

S9.2 16:25 Scaling VANET Security Through Cooperative Message Verification 275
Hongyu Jin and Panagiotis Papadimitratos (KTH, Sweden)

S9.3 16:40 Decentralized Enforcement of k-Anonymity for Location Privacy Using Secret Sharing 279
David Foerster and Hans Loehr (Robert Bosch GmbH, Germany); Frank Kargl (Ulm University, Germany & University of Twente, The Netherlands, Germany)

S9.4 17:05 Context-adaptive Detection of Insider Attacks in VANET Information Dissemination 287 Schemes
Stefan Dietzel (Humboldt-Universität zu Berlin, Germany); Rens van der Heijden (Ulm University, Germany); Jonathan Petit (Security Innovation, USA); Frank Kargl (Ulm University, Germany & University of Twente, The Netherlands, Germany)

Friday, December 18, 17:30 - 18:00

C: Closing