Keynote1: From Connected Cars to Smart Cities - On Wireless Communication Latency and Reliability

Abstract

In this keynote, we discuss the challenges and opportunities of the connected cars vision in relation to some of the most needed components in modern smart cities: improved road traffic safety combined with reduced travel times and emissions. Using selected application examples including the use of virtual traffic lights, intelligent intersection management, and platooning, we assess the needs on the underlying system components with a particular focus on inter-vehicle communication. With the standardization of the DSRC/WAVE protocol stack, the vehicular networking community converged to a common understanding of data dissemination schemes that already have high potentials for many applications. Yet, vehicular networks are way more dynamic than originally considered. Radio signal fading and shadowing effects need to be considered in the entire design process as well as the strong need for low-latency communication, fairness, and robustness. We bring all these aspects together outlining necessary ingredients for future connected cars applications.

Biography

Falko Dressler is a Full Professor for Computer Science and head of the Distributed Embedded Systems Group at the Dept. of Computer Science, University of Paderborn. Before moving to Paderborn, he was a Full Professor at the Institute of Computer Science, University of Innsbruck between 2011 and 2014, and an Assistant Professor at the Dept. of Computer Science, University of Erlangen. Dr. Dressler received his M.Sc. and Ph.D. degrees from the Dept. of Computer Science, University of Erlangen in 1998 and 2003, respectively. He is an editor for journals such as IEEE Trans. on Mobile Computing, Elsevier Ad Hoc Networks, Elsevier Computer Communications, and Elsevier Nano Communication Networks. He was guest editor of special issues on self-organization, autonomic networking, vehicular networks, and bio-inspired communication for IEEE Journal on Selected Areas in Communications (JSAC), Elsevier Ad Hoc Networks, and others. Dr. Dressler was General Chair of IEEE/ACM BIONETICS 2007, IEEE/IFIP WONS 2011, IEEE VNC 2014, and ACM MobiHoc 2016, TPC Co-Chair for IEEE INFOCOM, IEEE VNC, IEEE VTC, IEEE GLOBECOM, and ACM MSWiM, and Poster/Demo Chair for ACM MobiCom. He regularly serves in the program committee of leading IEEE and ACM conferences. Dr. Dressler authored the textbooks Self-Organization in Sensor and Actor Networks published by Wiley in 2007 and Vehicular Networking published by Cambridge University Press in 2014. Dr. Dressler has been an IEEE Distinguished Lecturer as well as an ACM Distinguished Speaker in the fields of inter-vehicular communication, self-organization, and bio-inspired and nano-networking. Dr. Dressler is a Senior Member of the IEEE (COMSOC, CS, VTS) as well as a Senior Member of ACM (SIGMOBILE). He is actively participating in the IETF
standardization. His research objectives include adaptive wireless networking, self-organization techniques, and embedded system design with applications in ad hoc and sensor networks, vehicular networks, industrial wireless networks, and nano-networking.

**U1: Routing for Wireless Networking, Mobility and Nomadicity**

Low Overhead Loop-Free Routing in Wireless Sensor Networks  
Henry-Joseph Audéoud and Michal Krol (Grenoble Informatics Laboratory, France); Martin Heusse (Grenoble Informatics Laboratory & Grenoble INP, France); Andrzej Duda (Grenoble Institute of Technology, France)

RPL-Based Routing Protocols For Multi-Sink Wireless Sensor Networks  
Muhammad Umer Farooq, Cormac J. Sreenan and Kenneth N Brown (University College Cork, Ireland); Thomas Kunz (Carleton University, Canada)

Augur: A Delay Aware Forwarding Protocol for Delay-Tolerant Networks  
Ahmad El Shoghri (The University of Queensland & Commonwealth Scientific Industrial and Research Organization, Australia); Branislav Kusy and Raja Jurdak (Commonwealth Scientific and Industrial Research Organisation (CSIRO) ICT Centre, Australia); Neil W Bergmann (University of Queensland, Australia)

Routing algorithm to fairly distribute the exposure to electromagnetic fields over wireless mesh networks  
Luis Diez and Julian Igareda (University of Cantabria, Spain); Vojîchta Iancu and Emil I Slusanschi (University Politehnica of Bucharest, Romania); Ramón Agüero (University of Cantabria, Spain)

**T1: Network Performance Evaluation and Optimization**

An Optimal MIMO Mode Selection Method for D2D Transmission in Cellular Networks  
Armin Morattab (École de Technologie Supérieure, Canada); Zbigniew Dziong (École de technologie supérieure, University of Quebec, Canada); Kazem Sohraby (South Dakota School of Mines and Technology, USA); MD. Habul Islam (Southern Alberta Institute of Technology, Canada)

Performance Analysis of Energy Detection over Mixture Gamma based Fading Channels with Diversity Reception  
Omar Alhussein (Simon Fraser University, Canada); Ahmed Al Hammadi (Khalifa University, UAE); Paschalís C. Sofotasíos (Tampere University of Technology & Aristotle University of Thessaloniki, Finland); Sami Muhaïdat (Khalifa University, UAE); Jie Liang (Simon Fraser University, Canada); Mahmoud Al-Qutayri (Khalifa University, UAE); George K. Karagiannidis (Aristotle University of Thessaloniki, Greece)

Effective Capacity in Multiple Access Channels with Arbitrary Inputs  
Marwan Hammouda, Sami Akin and Jürgen Peissig (Leibniz Universität Hannover, Germany)

Outage Probability Analysis of Dual-hop Full-Duplex Decode-and-Forward Relaying over Generalized Multipath Fading Conditions  
Mulugeta K. Fikadu (Tampere University of Technology, Finland); Paschalís C. Sofotasíos (Tampere University of Technology & Aristotle University of Thessaloniki, Finland); Mikko Valkama (Tampere University of Technology, Finland); Sami Muhaïdat (Khalifa University, UAE); Qimei Cui (Beijing University of Posts and Telecommunications, P.R. China); George K. Karagiannidis (Aristotle University of Thessaloniki, Greece)
T7: mmWave and Massive MIMO for 5G Communications

A comparative Analysis of mmWave vs LTE technology for 5G Moving Networks
Antonio Mastrosimone and Daniela Panno (University of Catania, Italy)

Performance of Distributed Compressive Sensing Channel Feedback in Multi-User Massive MIMO
Khaled Hassan (German University in Cairo (GUC), Egypt); Martin Kurras
(Fraunhofer Heinrich Hertz Institute & Fraunhofer, Germany); Lars Thiele
(Fraunhofer Heinrich Hertz Institute, Germany)

Sum-rate Maximizing in Downlink Massive MIMO Systems with Circuit Power Consumption
Rami Hamdi (École de Technologie Supérieure (ÉTS) & Université du Québec à Montréal (UQÀM), Canada); Wessam Ajib (Université du Québec à Montréal, Canada)

R2: Optimizations for Multimedia Applications

Mobile Video Streaming with Video Quality and Streaming Performance Guarantees
King Ching Wu, Yan Liu and Jack Y. B. Lee (The Chinese University of Hong Kong, Hong Kong)

Large-scale Intrusion Detection with Low-cost Multi-camera wireless image sensors
CongDuc Pham (University of Pau, France)

Ranging Explosion Events Using Smartphones
Srinivas Chakravarthi Thandu (Missouri University of Science and Technology, USA); Sriman Chellappan (University of South Florida, USA); Zhaozheng Yin
(Missouri University of Science and Technology, USA)

RADE: Resource-aware Distributed Browser-to-browser 3D Graphics Delivery in the Web
Timo Koskela, Arto Heikkinen, Erkki Harjula, Mikko Levanto and Mika Ylianttila
(University of Oulu, Finland)

T2: New Schemes for 5G Communications

Physical-Layer Security for Multi-Antenna Wiretap Channel in the Wideband Regime
Mustafa El-halabi (American University of Science & Technology, Lebanon); Roger Achkar
(American University of Science and Technology, Lebanon)

KLT-Based PAPR Reduction Technique for LTE-Advanced Uplink with Carrier Aggregation
Abdel-karim Ajami (American University of Beirut (AUB), Lebanon); Hassan A. Artail
(American University of Beirut, Lebanon)

Spatial Interference Management with Hierarchical Precoding in Ultra-Dense Heterogeneous Networks
Martin Kurras and Mohamed Shehata (Fraunhofer Heinrich Hertz Institute, Germany); Khaled Hassan (German University in Cairo (GUC), Egypt); Lars Thiele (Fraunhofer Heinrich Hertz Institute, Germany)

Effective Secrecy-SINR Analysis of Time Reversal-Employed Systems over Correlated Multi-path Channel
Ha-Vu Tran (University of Québec, Canada); Hung Tran (ETS, Canada); Georges Kaddoum (ETS Engineering School, University of Québec, Canada); Dung Tran and Dac-Binh Ha (Duy Tan University, Vietnam)

U2: MAC for Wireless Networking, Mobility and Nomadicity
On Modeling Single-cell IEEE 802.11 Ad-Hoc Network with Power Saving Mode
Wei Zhang, Yuhan Zhou, Mahima Suresh and Radu Stoleru (Texas A&M University, USA)

Performance Evaluation of MIMO-based MAC/PHY cross-layer design in multi-hop ad hoc networks
Abderrezak Rachedi (University Paris-Est Marne-la-Vallée, France); Hakim Badis (Institut Gaspard-Monge, France)

Direction Aware Cluster-Based multi channel MAC Protocol for Vehicular Ad Hoc Networks
Aboobeker sidhik Koyamparambil mammu (University Of Deusto, Spain); Unai Hernández-Jayo and Nekane Sainz (University of Deusto, Spain)

Buffer Management in Wireless Full-Duplex Systems
Nader Bouacida (King Abdullah University of Science and Technology, Tunisia); Ahmad Showail and Basem Shihada (KAUST, Saudi Arabia)

R1: Performance evaluation and resource allocation

Mobile-to-Mobile Opportunistic Task Splitting and Offloading
Gerardo Calice (Sapienza University of Rome, Italy); Abderrahmen Mtibaa (Texas A&M University, USA); Roberto Beraldi ("Sapienza" Università di Roma, Italy); Hussein Alnuweiri (Texas A&M University, Qatar)

Increasing the Efficiency of Code Offloading through Remote-side Caching
Florian Berg, Frank Dürr and Kurt Rothermel (University of Stuttgart, Germany)

Comparison of in-App Ads Traffic in Different Ad Networks
Riwa Mouawi, Imad H Elhajj, Ali Chehab and Ayman Kayssi (American University of Beirut, Lebanon)

What Matters is an Application: on the Excessive I/Os in Smartphones
Myungsik Kim (Hanyang University, Korea); Seongjin Lee (Hanyang univ, Korea); Youjip Won (Hanyang University, Korea)

Leveraging CDR datasets for Context-Rich Performance Modeling of Large-Scale Mobile Pub/Sub Systems
Georgios Bouloukakis (Inria, France); Rachit Agarwal (Inria Rocquencourt, France); Niko laos Georgantas (INRIA, France); Animesh Pathak (Inria Paris-Rocquencourt, France); Valerie Issarny (INRIA, France)

T3: Antennas and Channel Propagation

Hexagonal Dielectric Loaded Nantenna for Optical ITU-T C-Band Communication
Waleed Tariq Sethi, Hamsakutty Vettikalladi and Habib Fathallah (King Saud University, Saudi Arabia); Mohamed Himdi (Université de Rennes 1, France)

Single-Band PIFA MIMO Antenna System Design for Future 5G Wireless Communication Applications
Osama Haraz (Assiut University, Egypt); Muhammad Ashraf (College of Engineering, King Saud University, Saudi Arabia); Saleh A Alshebeili (King Saud University, Saudi Arabia)

Enhanced Gain Compact Size Switched Beam Conformal Antipodal Tapered Slot Antenna System for 5G MIMO Wireless Communication
Muhammad Ashraf (College of Engineering, King Saud University, Saudi Arabia); Osama Haraz (Assiut University, Egypt); Saleh A Alshebeili (King Saud University, Saudi Arabia)
Cluster-based Mobile-to-Mobile Channel Characterization for Realistic Modelling of Multipath-Components

Jochen Martin-Creuzburg and Jörg Fischer (Fraunhofer Institute for Integrated Circuits IIS, Germany); Robert Koch (Fraunhofer IIS, Germany); Markus Landmann (Fraunhofer Institute for Integrated Circuits IIS, Germany); Reiner S. Thomä (Ilmenau University of Technology, Germany)

U6: Future Wireless Networking, Mobility and Nomadicity

Mobility as a First Class Function

Ditchaphong Phoomikiattisak and Saleem N Bhatti (University of St Andrews, United Kingdom)

Planning the Communication Infrastructure for Vehicular Networks Without Tracking Vehicles

Cristiano M. Silva (Universidade Federal de São João Del-Rei, Brazil); João Sarubbi (Centro Federal de Educação Tecnológica de Minas Gerais - CEFETMG, Brazil); Wagner Meira, Jr. (Universidade Federal de Minas Gerais, Brazil)

Taming the Densification Challenge in Next Generation Wireless LANs: An Investigation into the Use of Dynamic Sensitivity Control

Parag Kulkarni (Toshiba Research Europe Ltd., United Kingdom); Fengming Cao (Toshiba Europe Research Telecommunication Lab, United Kingdom)

Exploiting Social Information For Dynamic Tuning in Cluster Based WiFi Localization

Abderrahmen Mtibaa (Texas A&M University, USA); Khaled A. Harras (Carnegie Mellon University, USA); Mohamed Abdellatif (Carnegie Mellon University, Qatar)

An Efficient Elastic Distributed SDN Controller for Follow-Me Cloud

Abdelkader Aissioui (University of Versailles St Quentin en Yvelines, France); Adlen Ksentini (University of Rennes 1 / IRISA Lab, France); Abdelhak (Mourad) Gueroui (University of Versailles, France)

Keynote2: Towards 5G - on operators perspective

Abstract

Fixed line broadband and 4th generation mobile network have had a transformational impact on today's world. There is a growing consensus on the needs for future wireless services which embody significant technical and economic challenges. The 5th generation of mobile technology will need to support broadband, IoT and tactile internet services. This talk explores some of BT's research activities which aim to address these challenges and highlights how 5G is driving convergence of fixed, Mobile and computing infrastructure.

Biography

Paul Crane is Head of Practice in BT's Research and Innovation group. Paul leads applied research activities in Mobile, Wireless and Sustainability. The objective of this work is the development and delivery of technical solutions for next generation services. His current research activities are focused on the application of emerging mobile technologies to meeting the needs of consumer and business customers. Paul is a telecommunications engineer, with over 20 years in the industry. He has undertaken a variety of from strategic technology roles with BT in the UK, USA and Europe. Paul has a personal interest in the development of voice, multimedia communications and mobile technology.
T4: Modulation and Coding

Iterative receiver cancellation of nonlinear power amplifier distortion in FBMC/OQAM system

Bouhadda Hanen (Innov’Com Sup’Com, Tunisia); Rafik Zayani (Innov’COM Lab, Sup’Com, Tunisia); Hmaied Shaiek (CNAM, France); Daniel Roviras (Cnam, France); Ridha R. Bouallegue, B. (Ecole Supérieure des Communications de Tunis, Tunisia)

An Implementation of a Fountain Code-Based MIMO-OFDM Receiver for Real-Time Wireless Video Streaming

Yi-Pin Lu, Wei Lan, Yi-Feng Cheng and Tzi-Dar Chiueh (National Taiwan University, Taiwan)

Analytic Symbol Error Rate Evaluation of M–PSK Based Regenerative Cooperative Networks Over Generalized Fading Channels

Mulugeta K Fikadu (Tampere University of Technology, Finland); Paschalis C. Sofotasios (Tampere University of Technology & Aristotle University of Thessaloniki, Finland); Mikko Valkama (Tampere University of Technology, Finland); Qimei Cui (Beijing University of Posts and Telecommunications, P.R. China); Sami Muhaidat (Khalifa University, UAE); George K. Karagiannidis (Aristotle University of Thessaloniki, Greece)

Space Time Block Coded Cooperative Spatial Modulation

Hasan Kartlak (Istanbul University & Akdeniz University, Turkey); Niyazi Odabasioglu and Aydin Akan (Istanbul University, Turkey)

R3: Scheduling and coordinating wireless mobile devices

Programmable Orchestration of Time-Synchronized Events Across Decentralized Android Ensembles

Edmund Lam (Carnegie Mellon University & Qatar Campus, Qatar); Iliano Cervesato (Carnegie Mellon University - Qatar Campus, Qatar); Ali Elgazar (Carnegie Mellon University, Qatar)

Deploying a Pool of Long-Range Wireless Image Sensor with Shared Activity Time

CongDuc Pham (University of Pau, France)

Heterogeneous Scheduling in Wireless Networks Machine to Machine case study

Konstantinos Lizos (University of Oslo, Norway)

An Unobtrusive Interaction Interface for Multiple Co-located Mobile Devices

Seung Eun Chung and Injong Rhee (North Carolina State University, USA)

U4: Wireless Sensor Networking, Mobility and Nomadicity

Remote Inference Energy Model for Internet of Things Devices

Vilen Looga, Zhonghong Ou and Yang Deng (Aalto University, Finland); Antti Ylä-Jääski (Helsinki University of Technology, Finland)

Optimized Trajectories of Multi-Robot Deploying Wireless Sensor Nodes

Ines Khoufi (Inria, France); Mohamed Hadded (TELECOM SudParis, France); Pascale Minet (INRIA, France); Anis Laouiti (TELECOM SudParis, France)

Tracking and Monitoring Horses in the Wild using Wireless Sensor Networks

Ion Emilian Radoi (The University of Edinburgh, United Kingdom); Janek Mann and DK Arvind (University of Edinburgh, United Kingdom)

Green Smartphone GPUs: Optimizing Energy Consumption using GPUFreq Scaling Governors
Enas Ahmad and Basem Shihada (KAUST, Saudi Arabia)

R4: Security, privacy and authentication in mobile applications

Secure and Privacy-Preserving AMI-Utility Communications via LTE-A Networks
Zaher Haddad (Alaqsa University & Cairo University, Palestine); Mohamed M E A Mahmoud (Tennessee Tech University, USA); Sanaa Taha and Imane A. Saroit (Cairo University, Egypt)

ProbeTags: Privacy-Preserving Proximity Detection Using Wi-Fi Management Frames
Marco Maier (Ludwig-Maximilians-Universität München, Germany); Lorenz Schauer and Florian Dorfmeister (LMU Munich, Germany)

Jamming Detection on 802.11p under Multi-channel Operation in Vehicular Networks
Huong Nguyen-Minh (University of Avignon, France); Abderrahim Benslimane (University of Avignon & LIA/CERI, France); Abderrezak Rachedi (University Paris-East Marne-la-Vallée, France)

Gesture-Based Soft Authentication
Alan Ferrari, Daniele Puccinelli and Silvia Giordano (University of Applied Sciences and Arts of Southern Switzerland (SUPSI), Switzerland)

T5: Radio Resource Management

Joint Scheduling and Power Control in Multi-Cell Networks for Inter-Cell Interference Coordination
Bilal Maaz (University of Versailles, France); Kinda Khawam (Université de Versailles, France); Samer Lahoud (IRISA, University of Rennes 1, France); Steven Martin (Paris-Sud University, France); Jad Nasreddine (Rafik Hariri University, Lebanon); Samir Tohme (University of Versailles, France)

On the Analysis of Channel-Aware Schedulers in OFDMA-Based Networks using FFR
Jan García-Morales, Guillem Femenias and Felip Riera-Palou (University of the Balearic Islands, Spain)

Joint Multi-user Resource Scheduling and Computation Offloading in Small Cell Networks
Wael Labidi (CEA-List, France); Mireille Sarkiss and Mohamed Kamoun (CEA LIST, France)

Wait-to-Pick-As-Available (W2PAA): a New MAC Protocol for Uplink Multi-Users Transmissions in WLAN
Btissam Er-rahmadi (University Rennes 1 & Orange Labs, France); Adlen Ksentini (University of Rennes 1 / IRISA Lab, France); Djamil-Eddine Meddour (Orange Labs, France)

U5: Cellular Wireless Networking, Mobility and Nomadicity

Cross-layer approach enabling communication of high number of devices in 5G mobile networks
Jan Plachy and Zdenek Becvar (Czech Technical University in Prague, Czech Republic); Emilio Calvanese Strinati (CEA-LETI, France)

On Efficient Power Allocation Modeling in Virtualized Uplink 3GPP-LTE Systems
Mohamed Hussein (University of Western, Canada); Abdallah Moubayed and Serguei Primak (University of Western Ontario, Canada); Abdallah Shami (The University of Western Ontario, Canada)
General-Purpose Multi-Objective Vertical Hand-off Mechanism Exploiting Network Dynamics

**Novia Nurain** (Bangladesh University of Engineering and Technology, Bangladesh); **Taslima Akter** (Bangladesh University of Engineering and Technology (BUET), Bangladesh); **Hafsa Zannat** (Bangladesh University of Engineering & Technology (BUET), Bangladesh); **Monira Akter** and **A. B. M. Alim Al Islam** (Bangladesh University of Engineering and Technology, Bangladesh); **Md. Humayun Kabir** (University of Victoria, Canada)

Using GSPNs for Performance Analysis of a New Admission Control Strategy with Retrials and Guard Channels

**Nawel Gharbi** (University of Sciences and Technology USTHB, Algeria)

**T6: Channel Estimation and Equalization**

DFE for AF-PNC over Frequency-Selective Multipath Channels

**Alaa Ahmed** (Newcastle University, School of Electrical and Electronic Engineering, United Kingdom); **Charalampos C. Tsimenidis** and **Jeffrey A. Neasham** (Newcastle University, United Kingdom); **Bayan S Sharif** (Khalifa University, UAE)

Sparse NLMS Adaptive Algorithms for Multipath Wireless Channel Estimation

**Abdullah Al-Shabili**, **Bilal Taha**, **Hadeel Elayan**, **Fatimah Al-Ogaili** and **Leen AlHalabi** (Khalifa University, UAE); **Luis Weruaga** (Khalifa University of Science, Technology & Research, UAE); **Shihab Jimaa** (Khalifa University, UAE)

Leveraging the 11-LS Criterion for OFDM Sparse Wireless Channel Estimation

**Fatimah Al-Ogaili**, **Hadeel Elayan**, **Leen AlHalabi**, **Abdullah Al-Shabili** and **Bilal Taha** (Khalifa University, UAE); **Luis Weruaga** (Khalifa University of Science, Technology & Research, UAE); **Shihab Jimaa** (Khalifa University, UAE)

**U3: Security and Privacy for Wireless Networking, Mobility and Nomadicity**

An Efficient Pairwise Key Establishment Scheme for Ad-hoc Mobile Clouds

**Subhajit Mandal**, **Chen Yang**, **Ala Altaweel** and **Radu Stoleru** (Texas A&M University, USA)

Secret Key Generation from Static Channels with Untrusted Relays

**Rene Guillaume** (University of Duisburg-Essen & Robert Bosch GmbH, Germany); **Stephan Ludwig** and **Andreas Mueller** (Robert Bosch GmbH, Germany); **Andreas Czyliwk** (Universität Duisburg-Essen, Germany)

A Two Level Privacy Preserving Pseudonymous Authentication Protocol for VANET

**Ubaidullah Rajput** (Hanyang University, Erica Campus, South Korea, Korea); **Fizza Alvi**, **Engr.** (Hanyang University, South Korea, Korea); **Hasoo Eun** (Hanyang University, Korea); **Rasheed Hussain** (Innopolis University & Information Security and Privacy Lab, Russia); **Heekuck Oh** (Hanyang University, Korea)

Real-World Evaluation of an Anonymous Authenticated Key Agreement Protocol for Vehicular Ad-Hoc Networks

**Carsten Büttner** (Adam Opel AG and Technische Universität Darmstadt, Germany); **Friederike Bartels** (Adam Opel AG, Germany); **Sorin A. Huss** (Technische Universität Darmstadt, Germany)

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