TU Darmstadt | FB18 | KOM | Rundeturmstr. 10 | 64283 Darmstadt

TECHNISCHE UNIVERSITÄT DARMSTADT

Dear KOM-enthusiasts,

the year 2021 at our Multimedia Communications Lab was all about **transitions**. And for once, not only in research. Strange? You can find out how by reading our traditional review of the year, we hope you enjoy it!

Prof. Dr.-Ing. Ralf Steinmetz

Multimedia Communications Lab (KOM)

Department of
Electrical Engineering and Information Technology
Department of Computer Science
(Adjunct Professor)

Rundeturmstr. 10
64283 Darmstadt
Germany

Tel. +49 6151 16 - 29101
Tel. +49 6151 16 - 29100 (secretary)
Fax +49 6151 16 - 29109

Ralf.Steinmetz@KOM.tu-darmstadt.de
www.kom.tu-darmstadt.de
www.multimedia-communications.net

Björn Scheuermann joined the TU Darmstadt

At the beginning of the semester, we cleared out the Rundeturmstr. and redistributed our offices. Space was needed, as: To my and everyone's delight Björn Scheuermann has accepted his appointment to TU Darmstadt in order to establish his chair on communication networks as an early reappointment to my professorship. We will use the transition time of a few years as a dual leadership to strengthen especially communication networks in Darmstadt and, thus, Björn Scheuermann's goals here.

Most recently, Björn Scheuermann held the chair of Computer Engineering at HU Berlin. Since October he has been teaching and researching at TU Darmstadt, especially on the topics of network protocol design, security & privacy and hardware. He has also brought some of his Research Associates working towards their PhD with him from Berlin.

Research Activities focus on 5G, 6G, Resilience and Transitions

Based on the existing expertise we have launched forward-looking research activities at KOM in the areas of 5G, 6G, transitions and resilience. One of them focuses on the future demands of the Deutsche Bahn. The goal is to replace the somehow outdated GSM-R technology with a railway-owned 5G campus network. Making use of 5G we focus on research of how transitions between different networks and communication technologies allow to ensure to a high degree the safety and reliability of future railroad systems. This requires, among other things, identifying and mitigating interfering signals.

Together with Deutsche Telekom we conceive and drive experiments in order to understand how and to which degree telecommunications can be improved using new algorithms as part of the latest 5G and SDN technology. The improvement of some key features of the most advanced 5G technology has been the subject of our collaboration with Siemens. While 5G is still the focus of many activities, we already have started working towards 6G; this happens mainly as part of a larger collaborative effort within the Open6GHub project financed by the federal government. As a very advanced experimental environment, we have acquired a fully functional O-RAN radio network to be installed at various locations on our campus.

Meanwhile, Jannis Weil made it through the tough application phase at Software Campus and will be leading a research project on the application and enhancement of machine learning in networking. Further new AI approaches

Date
in January 2022

Our signatures
RSt/CW/GS

will make networks more resilient and secure in order to protect critical infrastructure; this is the scope within our federal funded AI-NET project. Moreover, in the prominent LOEWE emergenCITY center we investigate how to better be prepared in case of disasters and how to keep the critical infrastructure functioning afterwards. The past year has shown that flooding can well be a huge threat - also in Germany.

MAKI continues to elaborate on Transitions and Key Issues of the Future Internet

Dean of ETiT Abdelhak Zoubir (left), TU President Tanja Brühl, MAKI Chairman and Coordinator Ralf Steinmetz and Dean of Computer Science Department Felix Wolf (right) at the kick-off event of the third funding period of MAKI.

I am pleased to announce that the third and final four-year period of the Collaborative Research Center MAKI - "Multi-Mechanism Adaptation for the Future Internet" has been approved. Before conceiving and writing the proposal, the co-applicants and President Tanja Brühl asked me to take over the lead for the application process and, if successful, to continue as spokesperson/head of MAKI at the TU.

The kick-off event for the new funding period took place in mid-November with almost 80 guests, just before the Delta wave rose. In her personal greeting, the President of the TU Darmstadt, Tanja Brühl, made clear how relevant our research on this topic is. The Corona pandemic, she said, shows that communication systems are essential for society and must be adapted quickly in the face of new challenges with increased reliability and good quality. In digital form, MAKI has managed to hold most of the meetings scheduled during the year despite the pandemic. Thanks to Zoom, high-profile speakers being at research institutions located all over the world were our guests. Talks of experts working at companies such as Netflix, Siemens or HERE took place at the Industry Colloquium.

Publications in Renowned Journals

Outstanding research is something we continued to do in 2021. This is shown by the numerous awards we received. The papers on decentralized channel access for cooperative driving by Daniel Bischoff and on high-performance network test systems by Ralf Kundel were published in the well-known journals IEEE Access and IEEE Communications Magazine. At the prestigious 14th IEEE International Symposium on Embedded Multicore/Many-core Systems-on-Chip, Ralf Kundel and the co-authors received the Best Paper Award.

Traditionally, KOM alumni chose the best final theses of a year. 2021 Melanie Holloway and Dieter Schuller selected the bachelor thesis of Sebastian Fenn, who analyzed javelin throws using sensors. Marvin Härdtlein's work on hybrid network switches was honored as the best master's thesis.

An Anniversary

There was an anniversary of a special kind to celebrate. In hybrid format, Dr.-Ing. Polona Caserman, Dr.-Ing. Manisha Luthra and Dr.rer.nat. Sounak Kar completed their PhDs as "my" doctorates PhDs #99, #100 and #101. New at our lab and/or at MAKI are Pegah Golchin, Pratyush Agnihotri, Ahmad Khalil, Lisa Wernet and Christine Wachter. The latter is in charge of science communication. Others left: Sonja Bergsträßer to the German Research Foundation DFG, Thomas Lenz to SWR, Rhaban Hark to the ABB Research Center and Patrick Lieser to the espresso machine manufacturer ECM.

An entire research area has also grown out of the lab. In 13 years, we have successfully established courses on Serious Games for students, promoted the topic to the general public, supervised over 180 theses and completed nine doctorates. Last year, the federal funded projects KITE and SB4BB were added, following WTT and the LOEWE research cluster IDG. Since the beginning of the year, all these activities comprise the core activities of the Serious Games group at the etit faculty under the leadership of Stefan Göbel. We wish you much success!

There was also a transition at httc e.V. We founded the Hessian Telemedia Technology Competence Center in 1998 under my leadership in order to conduct application-oriented research in the field of multimedia technology. In view of the envisaged closer cooperation with the h_da and the expansion with regard to transfer and consulting, Vice President Arnd Steinmetz has taken over the chairmanship of the board at the end of 2021.

Sharing these reflections with you I hope your personal transition into the new year went well. I wish you a happy and rewarding and hopefully pandemic-reduced 2022!

Ralf Steinmetz