Morning Keynote

Title: **Security by the Physical Layer: A Promising Direction for Next Generation Wireless Network Design**

Speaker: **Prof. Aylin Yener** (Pennsylvania State University, USA)

Abstract:

Physical layer security aims to provide secure communication guarantees built in to the network design at its foundation. The promise of absolute data confidentiality is particularly relevant in the context of wireless systems operating in an open broadcast medium. Having its roots in existence results in information theory and incubated in the information theory community for close to a decade, wireless physical layer security research has grown to be a vibrant area in communications, information theory, coding theory and signal processing for communications. The richness of the research questions and the resulting new insights makes physical layer security a promising direction for next generation wireless systems. The current research effort has thus started to look at solutions towards bridging the gap from the theoretical constructs to more practically relevant communication scenarios.

In this talk we will provide an overview of the advancements since 2005, and the resulting design insights. These include insights related to inducing judicious interference for confidentiality, i.e. cooperative jamming, structured signaling, multiantenna signaling strategies and merits of feedback. We will then overview some of the more recent advancements towards relaxing some of the idealized assumptions in earlier problem constructs, notably the channel state information in multiantenna channels with secrecy constraints, as well as research efforts towards getting close to practical system design. We will conclude with remaining challenges and open problems in the area.

Speaker's Bio:

Aylin Yener joined the faculty of The Pennsylvania State University, University Park, PA, in 2002, where she was an Assistant Professor, then Associate Professor, and is currently Professor of Electrical Engineering since 2010. During the academic year 2008-2009, she was a Visiting Associate Professor with the Department of Electrical Engineering, Stanford University, CA. Her research interests are in information theory, communication theory and network science, with recent emphasis on green communications and information security. She received the National Science Foundation CAREER award in 2003, the Penn State Engineering Alumni Association Outstanding Research Award in 2010, the Communication Theory Symposium best paper award at the IEEE International Conference on Communications in 2010, the Penn State Engineering Alumni Association Premier Research Award in 2014 and the IEEE Marconi Prize Paper Award in Wireless Communications in 2014.

Dr. Yener previously served as a technical program chair or co-chair for various conferences for the IEEE Communications Society, as an associate editor for the IEEE Transactions on Communications, as an associate editor and an editorial advisory board member for the IEEE Transactions on Wireless Communications. She served as the student committee chair for the IEEE Information Theory Society 2007-2011, and was the co-founder of the Annual School of Information Theory in North America co-organizing the school in 2008, 2009 and 2010. Dr. Yener currently serves on the board of governors of the IEEE Information Theory Society as its treasurer.

Afternoon Keynote

Title: **Practical Physical-Layer Security**

Speaker: **Prof. João Barros** (University of Porto, Portugal)

Abstract:

As the Internet evolves into an immense jungle of people, computers, mobile devices, sensors, vehicles and networked infrastructures, bringing forward unexpected technologies, applications, products and services, the proposed security sub-systems seem strangely "deja vu", relying on variations of established techniques such as hashing, symmetric encryption, public-key cryptography or access control policies. But is this really all that it takes to secure the internet of things, smart grids or intelligent transportation systems, to name just a few of the envisioned future internet environments? In this keynote, we shall address this question from the point of view of physical-layer security and its potential application in specific case studies such as vehicular networking, distributed sensing, and network coded systems. Our ultimate goal is to point at ways to ensure that such technologies can be well integrated in the protocol stacks of the (hopefully) secure internet of the future.

Speaker's Bio:

João Barros is an Associate Professor of Electrical and Computer Engineering at the University of Porto and Founding Director of the Institute for Telecommunications (IT) in Porto, Portugal. He was a Fulbright scholar at Cornell University and has been a Visiting Professor with the Massachusetts Institute of Technology (MIT) since 2008. He also teaches at the Porto Business School and co-founded two recent startups, Streambolico and Veniam, commercializing wireless video and vehicular communication technologies, respectively. Between 2009 and 2012, Dr. Barros served as National Director of the Carnegie Mellon Portugal Program. In recent years, João Barros has been Principal Investigator (PI) and Co-PI of numerous national, European and industry funded projects, co-authoring one book and 150+ research papers in the fields of networking, information theory and security, with a special focus on smart city technologies, network coding, physical-layer security, sensor networks, and intelligent transportation systems. Dr. Barros has received several awards, including the 2010 IEEE Communications Society Young Researcher Award for the Europe, Middle East and Africa region, the 2011 IEEE ComSoC and Information Theory Society Joint Paper Award, the 2012 BES National Innovation Award, and a state-wide best teaching award by the Bavarian State Ministry of Sciences, Research and the Arts. He received his undergraduate education in Electrical and Computer Engineering from the Universidade do Porto (UP), Portugal and Universitaet Karlsruhe, Germany, a performing arts degree in flute from the Music Conservatory of Porto, and the Ph.D. degree in Electrical Engineering and Information Technology from the Technische Universitaet Muenchen (TUM), Germany.