Deep Learning & Mathematical Tools for 6G
FAU-KU Workshop

17 July 2025 at H16, Cauerstr. 7, Erlangen

Workshop Chairs

Ralf Müller, Speaker Elite Study Program ASC (Friedrich-Alexander-Universität Erlangen-Nürnberg)
Samson Lasaulce (Khalifa University)
Mérouane Debbah (Khalifa University)

Invited Speakers

Florian Euchner (University of Stuttgart)
Eduard Jorswieck (Technische Universität Braunschweig)
Abdel Lisser (Paris-Saclay University)
Slawomir Stanczak (Technische Universität Berlin)
Emiliano Traversi (ESSEC Paris)
Antonia Tulino (Università degli Studi di Napoli Federico II)
Benjamin Zaidel (Bar-Ilan University)
Abdellatif Zaidi (Huawei Paris)

Program

08:10	*Introduction* by **R. Müller**
08:15	*A Multi-Agent DRL Framework for Dynamic Control of Latency Critical Services* by **A. Tulino**
09:00	*Measurement Datasets for Machine Learning in Wireless Communications* by **F. Euchner**
09:45	*Distributed Statistical Learning: Architectures, Algorithms and Information and Communication Views* by **A. Zaidi**
10:30	**COFFEE**
11:00	*Sparse NOMA: An Information Theoretic Perspective* by B. **M. Zaidel**
11:45	**Panel** *Maths for Deep Learning or Deep Learning for Maths?* Invited participants: **M. Debbah, A. Zaidi, A. Lisser** and **E. Traversi**
12:30	**LUNCH**
14:00	*Future of Resource Allocation and Optimization for Wireless: Somewhere Between "fmincon" and LLM Prompting?* by **E. Jorswieck**
14:45	*Network as Sensor: Gaining Insight into Beamforming Design for ICAS in 6G* by **S. Stanczak**
15:30	*Neural Networks for Solving some Nonlinear Optimization Problems* by **A. Lisser**
16:15	**COFFEE**
16:45	Poster Session by ASC (Johanna Fröhlich, Marina Ritthaler, Levi Bohnacker, Paul Wawarek-López, Jan Claar)

FAU ASC Elitenetzwerk Bayern جامعة خليفة Khalifa University

Prof. Antonia M. Tulino [S'00, M'03, SM'05, F'13] received her Ph.D. degree in electrical engineering from Seconda Università degli Studi di Napoli, Italy, in 1999. She held research positions at Princeton University, at the Center for Wireless Communications, Oulu, Finland, and at Università degli Studi del Sannio, Benevento, Italy. From 2002 she has joined the Faculty of the Università degli Studi di Napoli "Federico 11," and in 2009 she joined Bell Labs. Since 2011, she has been a member of the Editorial Board of IEEE Transactions on Information Theory. She has received several paper awards, among the others the 2009 Stephen O. Rice Prize in the Field of Communications Theory for the best paper published in IEEE Transactions on Communications in 2008. She has been principal investigator of several research projects sponsored by the European Union and the Italian National Council, and was selected by the National Academy of Engineering for the Frontiers of Engineering program in 2013. Her research interests lie in the area of communication systems approached with the complementary tools provided by signal processing, information, theory and random matrix theory.

Florian Euchner (Member, IEEE) received the master's degree in electrical engineering and information technology from the University of Stuttgart, Germany, in 2021. Since then, he has been with the Institute of Telecommunications, University of Stuttgart. His research interests include channel charting and radio-based localization systems, raytracing for channel modeling, and practical synchronization aspects in distributed MIMO systems. As part of this work, he develops the channel sounder "DICHASUS" for data-driven massive MIMO research.

Prof. Benjamin M. Zaidel received the B.Sc. and M.Sc. degrees from Tel Aviv University, Israel, in 1990 and 1996, respectively, and the Ph.D. degree from the Technion - Israel Institute of Technology, Haifa, Israel, in 2006, all in electrical engineering. During 1990-1997, he worked with a communications research group responsible for conducting feasibility studies of communication systems, and in particular cellular systems and other mobile communications networks. During 2001-2007 and 2008-2012, he has been with the Government Research Laboratories in the capacity of a senior research engineer. During the years 2007-2008, he held a Postdoctoral position in the Department of Electronics and Telecommunications, Norwegian University of Science and Technology (NTNU), Trondheim, Norway. Since 2014 he is with the Faculty of Engineering at Bar-Ilan University, Ramat-Gan, Israel. His research interests include: Information-theoretic aspects of multiuser detection techniques; Multiple-input multiple-output channels; Cooperative processing in wireless networks; Application of random matrix theory and statistical physics tools to problems in communications and information theory.

Dr Abdellatif Zaidi received the B.S. degree from the École Nationale Supérieure de Techniques Avancées, ENSTA ParisTech, Paris, France, in 2002 and the M.Sc. and Ph.D. degrees from the Ecole Nationale Superieure des Télécommunications, TELECOM ParisTech, Paris, in 2002 and 2005, respectively, all in electrical engineering. From December 2002 to December 2005, he was with the Department of Communications and Electronics, TELECOM ParisTech and the Signals and Systems Laboratory, CNRS/Supélec, France, pursuing his Ph. D. degree. From May 2006 to September 2010, he was a Research Assistant with the École Polytechnique de Louvain, Université Catholique de Louvain, Belgium. In the Fall of 2007 and Spring of 2008, he was a "Research Visitor" with the University of Notre Dame, Notre Dame, IN, USA. He is currently an Associate Professor with the Université Paris-Est Marne-la-Vallee, France, where he is also a member of the Laboratoire d'Informatique Gaspard-Monge (LIGM). His research interests cover a broad range of topics from network information theory and signal processing for communication. Of particular interest are the problems of multiterminal information theory, Shannon theory, relaying and cooperation, network coding, physical-layer security, source coding, and interference mitigation in multiuser channels. Dr. Zaidi serves as an Editor for the EURASIP Journal on Wireless Communications and Networking.

Prof. Emiliano Traversi is an Associate Professor in the Department of Information Systems, Decision Sciences, and Statistics at ESSEC. Professor Emiliano Traversi holds a PhD in Operations Research from the University of Bologna. Before joining ESSEC, he was a tenured professor at LIRMM, University of Montpellier, in France. His research areas include mathematical optimization, decomposition methods, machine learning, and autonomous systems.

Prof. Eduard A. Jorswieck (IEEE Fellow) was born in 1975 in Berlin, Germany. He is managing director of the Institute of Communications Technology and the head of the Chair for Communications Systems and Full Professor at TU Braunschweig, Brunswick, Germany. From 2008 until 2019, he was the head of the Chair of Communications Theory and Full Professor at TU Dresden, Germany. Eduard's main research interests are in the broad area of communications, signal processing, applied information theory, and communication theory. He has published more than 190 journal papers, 18 book chapters, 1 book, 4 monographs, and some 300 conference papers on these topics. Since 2017, he has been serving as Editor-in-Chief of the EURASIP Journal on Wireless Communications and Networking. Currently, he serves Editor for IEEE Transactions on Information Theory. He was on the Editorial Boards of IEEE Signal Processing Letters, IEEE Transactions on Signal Processing, IEEE Transactions on Wireless Communications, IEEE Transactions on Information Forensics and Security, and IEEE Transactions on Communications. In 2006, he was co-recipient of the IEEE Signal Processing Society Best Paper Award. He and his colleagues were also recipients of the Best Paper and Best Student Paper Awards at the IEEE CAMSAP 2011, IEEE WCSP 2012, IEEE SPAWC 2012, IEEE ICUFN 2018, PETS 2019, and ISWCS 2019.

Slawomir Stanczak is Professor of Network Information Theory at the Technical University of Berlin and Head of the Wireless Communications and Networks Department at the Fraunhofer Heinrich Hertz Institute (HHI). Prof. Stanczak is co-author of two books and more than 200 peer-reviewed journal articles and conference papers in the field of information theory, wireless communications, signal processing, and machine learning. Prof. Stanczak received research grants from the German Research Foundation and the Best Paper Award from the German Society for Telecommunications in 2014. He was an associate editor of the IEEE Transactions on Signal Processing from 2012 to 2015 and chair of the ITU-T Focus Group on Machine Learning for Future Networks including 5G from 2017 to 2020. Since 2020 Prof. Stanczak is chairman of the 5G Berlin association and since 2021 he is coordinator of the projects 6G-RIC (Research & Innovation Cluster) and CampusOS. He is also the project coordinator of xG-Incubator since November 2023, which is part of StartUpConnect.

Professor Abdel Lisser is an applied mathematician with a long experience in stochastic optimization, convex optimization, stochastic games, Markov decision process and neurodynamic optimization. He holds a Ph.D. in Optimization from University Paris Dauphine and the Habilitation thesis from University Sorbonne Villetaneuse, where he specialized in convex optimization and stochastic optimization and their applications in telecommunications, energy planning problems under uncertainty as well as autonomous vehicles. His research focuses on probabilistic constraint modeling, robust and distributionally robust optimization, and neurodynamic optimization. He has authored more than 100 peer-reviewed publications in leading journals and has served as principal investigator or co-investigator on several national and international research projects. He is internationally recognized for his contributions to the theory and application of chance constrained optimization and currently leads methodological work on integrating probabilistic constraints into neurodynamic optimization frameworks.