

Einladung des Instituts für Kommunikationsnetze und Satellitenkommunikation:
Gastvortrag des Herrn Kumar Vijay MISHRA, PhD,
United States Army Research Laboratory (ARL), Adelphi

Titel: Signal Processing for Joint Radar-Communications

Wann: Montag, 27.05.2024 um 13:30 Uhr

Wo: Seminarraum HF01092, 4400 IKS, Inffeldgasse 12/1. OG, 8010 Graz

Abstract:

Recent interest in joint radar-communications (JRC) has led to the design of novel signal processing techniques to recover information from an overlaid radar-communications signal as well as transmit a common signal for both systems. In this talk, we consider a broad definition of JRC, which covers sensing with cooperation from downlinks, collaborative communications, and sensing with interference. Toward fully realizing the coexistence of the two systems, optimization of resources for both new/futuristic sensing and wireless communications modalities is crucial. These synergistic approaches that exploit the interplay between state sensing and communications are both driving factors and opportunities for many current signal processing and information-theoretic techniques. In addition, a large body of prior works considers colocated JRC systems while distributed systems remain relatively unexamined. Building on the existing approaches, this talk highlights emerging scenarios in collaborative and distributed JRC, particularly at mm-Wave and THz frequencies, highly dynamic vehicular/automotive environments that would benefit from information exchange between the two systems. We also describe an interesting application of precipitation estimates using communications satellite terminals aided by weather radars. Toward the end of the talk, we focus on highlighting emerging JRC scenarios that include reconfigurable intelligent surfaces.

Biography:

Kumar Vijay Mishra (S'08-M'15-SM'18) obtained a Ph.D. in electrical engineering and an M.S. in mathematics from The University of Iowa in 2015, and an M.S. in electrical engineering from Colorado State University in 2012, while working on NASA's Global Precipitation Mission Ground Validation (GPM-GV) weather radars. He is currently Senior Fellow at the United States Army Research Laboratory (ARL), Adelphi; Technical Adviser to Singapore-based automotive radar start-up Hertzwell and Boston-based imaging radar startup Aura Intelligent Systems; and honorary Research Fellow at SnT - Interdisciplinary Centre for Security, Reliability and Trust, University of Luxembourg. His research on radar signal processing and joint radar-communications has won several awards and fellowships. He is the Chair (2023-2026) of the International Union of Radio Science (URSI) Commission C. He is the lead co-editor of three books on radar: Signal Processing for Joint Radar-Communications (Wiley-IEEE Press), Next-Generation Cognitive Radar Systems (IET Press Radar, Electromagnetics & Signal Processing Technologies Series), and Advances in Weather Radar Volumes 1, 2 & 3 (IET Press Radar, Electromagnetics & Signal Processing Technologies Series). His research interests include radar systems, signal processing, remote sensing, and electromagnetics.