

2025 28th International Workshop on Smart Antennas (WSA 2025)

**Erlangen, Germany
16-18 September 2025**



**IEEE Catalog Number: CFP25822-POD
ISBN: 979-8-3503-9269-2**

**Copyright © 2025 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP25822-POD
ISBN (Print-On-Demand):	979-8-3503-9269-2
ISBN (Online):	979-8-3503-9268-5

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

Table of Contents

PREFACE

Welcome Note	III
Table of Contents	IV
Organizing Committee	VII
Technical Program Committee	VIII
Invited Speakers	XII
Author Index	XIII
1	ADVANCED MIMO & ARRAY PROCESSING
Compensating Beam Squint by Combining Phased Arrays with Time Delays in Digital Baseband	1
. <i>Torge Mewes, Wolfgang Rave, and Gerhard P. Fettweis</i>	
Estimation of Fluctuating Power Spectral Density Across a Sensor Array	7
. <i>Cornelius A. D. Pahalson, Stephan Weiss, Timothy Clarke, Julian Deeks, and Duncan Williams</i>	
On Optimal Movable Antennas in Integrated Sensing and Communications	13
. <i>Eduard Jorswieck, Xi Ding, and Ignacio Santamaria</i>	
Bayesian Learning for Pilot Decontamination in Cell-Free Massive MIMO	19
. <i>Christian Forsch, Zilu Zhao, Dirk Slock, and Laura Cottatellucci</i>	
On the Role of Channel Gain Weighting for Fairness in Cell-Free MIMO	26
. <i>Kaifeng Lu, Stefan Schwarz, and Markus Rupp</i>	
Challenges to Subcarrier MIMO Precoding and Equalisation with Smooth Phase Responses	32
. <i>Mohammed A. Bakhit, Faizan Ahmad Khattak, Sebastian J. Schlecht, Garrey Rice, and Stephan Weiss</i>	
Frequency-stable beamforming over wireless MIMO channels	39
. <i>Christoph F. Mecklenbräuker, Peter Gerstoft, Stefan Rotter, and Troels Pedersen</i>	
Gaussian PDF Divisions in Expectation Propagation	43
. <i>Zilu Zhao, Fangqing Xiao, and Dirk Slock</i>	
2	EXTREME MIMO: ENABLING LARGE-SCALE AND WIDEBAND MIMO COMMUNICATIONS
Grouped Device Detection and Channel Estimation in MTC Using Full Bayesian Approach	47
. <i>Reijo Leinonen, Hamza Djelouat, Markku Juntti, and Mikko Sillanpää</i>	
Rethinking Beam Squint Mitigation in XL-MIMO: The Impact of Practical TTD Constraints	53
. <i>Muhammad Qurratulain Khan, Mohammad Parvini, Torge Mewes, Philipp Schulz, and Gerhard P. Fettweis</i>	
Sparse Near-Field Channel Estimation for XL-MIMO via Adaptive Filtering	60
. <i>Vidya Bhasker Shukla, and Italo Atzeni</i>	
Key Enablers for Extreme MIMO Antennas and Receivers in Future 6G Frequency Bands	66
. <i>Padmanava Sen, Merve Tascioglu Yalcinkaya, and Sourya Prakash Rout</i>	
Beam Training-Based Hybrid Precoding for Multi-User Holographic MIMO	73
. <i>Kangda Zhi, and Giuseppe Caire</i>	
3	RECONFIGURABLE INTELLIGENT SURFACES
MMSE Channel Estimation for Passive RIS in MIMO Systems	78
. <i>Marc Bjelkanovic, Dominik Semmler, Michael Joham, and Wolfgang Utschick</i>	
STAR-RIS-aided RSMA for the URLLC multi-user MIMO Downlink	85
. <i>Mohammad Soleymani, Ignacio Santamaria, Eduard A Jorswieck, Robert Schober, and Lajos Hanzo</i>	
Evaluation of Near-field Fed RIS Illumination for Centimeter-Wave Gigantic MIMO Systems	91
. <i>Dennis Osterland, Felix-Christopher Lutz, Andreas Benzin, Wilhelm Keusgen, and Giuseppe Caire</i>	
Effects of Limited Pilot and Phase Sequences in RIS-Assisted MISO Systems	98
. <i>Sadaf Syed, Haihang Guo, Wolfgang Utschick, and Michael Joham</i>	
A Scalable Machine Learning Approach Enabled RIS Optimization with Implicit Channel Estimation	103
. <i>Bile Peng, Vahid Jamali, and Eduard Jorswieck</i>	

	Integration of RIS in QuaDRiGa: Near-Field Adaptability and Exemplary Application	109
	. . . . . <i>Eman Elbeiti, Sven Haesloop, Ehsan Tohidi, and Slawomir Stanczak</i>	
	Low-Complexity CSI-Free Reconfigurable Intelligent Surface Phase Shift Design	116
	. . . . . <i>Yifei Wu, Mehmet Emin Arslan, Niels Neumann, Wolfgang Gerstacker, and Robert Schober</i>	
	LC-RIS Loss-Trade-Off Analysis in Wireless Communications	123
	. . . . . <i>Mohamadreza Delbari, Bowu Wang, Robin Neuder, Alejandro Jiménez-Sáez, and Vahid Jamali</i>	
4	AI FOR WIRELESS COMMUNICATIONS	
	No Pilots, No Problem: A Generative Model for Position-based Downlink Precoding	127
	. . . . . <i>Franz Weißer, Amar Kasibovic, Benedikt Böck, and Wolfgang Utschick</i>	
	Digital Post-Distortion Architectures for Nonlinear Power Amplifiers: Volterra and Kernel Methods	133
	. . . . . <i>Daniel Schüufele, Jochen Fink, Renato L. G. Cavalcante, and Slawomir Stanczak</i>	
	Enhancements in Score-based Channel Estimation for Real-Time Wireless Systems	140
	. . . . . <i>Florian Strasser, Marion Bäro, and Wolfgang Utschick</i>	
5	ADVANCED ANTENNA DESIGN	
	D-Band Dielectric Lens Antenna: Emulated Linear Array Superposition Measurements for Performance Analysis	147
	. . . . . <i>Vitor Almeida, Ramez Askar, Woo Cheol Choi, Michael Peter, Jaehoon Chung, and Wilhelm Keusgen</i>	
	Evaluation of a WR6.5 Rotary Joint with two 3D-printed TE ₀₁ Mode Transducers	153
	. . . . . <i>Mathis Schmieder, Sven Wittig, Steffen Sigwart, Michael Peter, and Wilhelm Keusgen</i>	
6	CHANNEL MODELING & PROPAGATION	
	Real-Time Sounding in ISAC networks: Design and Implementation of a Multi-Node Testbed with Synchronized Airborne and Ground-Based Sensors)	157
	. . . . . <i>Julia Beuster, Carsten Andrich, Sebastian Giehl, Marc Miranda, Lorenz Mohr, Dieter Novotny, Tom Kaufmann, Christian Schneider, and Reiner S. Thomä</i>	
	Agile Sub-Terahertz to Terahertz Broadband Time-Domain Photonic Channel Sounder	164
	. . . . . <i>Ramez Askar, Garrit Schwanke, Milan Deumer, Alper Schultze, Nico Vieweg, Thomas Puppe, Sebastian Müller, Albrecht Neudecker, Oliver Stiewe, Robert Kohlhaas, Shahram Keyvaninia, Robert Elschner, Colja Schubert, Ronald Freund, Michael Peter, Taro Eichler, and Wilhelm Keusgen</i>	
	Enhancing Situational Awareness in ISAC Networks via Drone Swarms: A Real-World Channel Sounding Data Set	170
	. . . . . <i>Julia Beuster, Carsten Andrich, Sebastian Giehl, Marc Miranda, Lorenz Mohr, Dieter Novotny, Tom Kaufmann, Christian Schneider, and Reiner S. Thomä</i>	
	Design and Validation of a Time Domain Correlation based Channel Sounder up to 500 GHz	174
	. . . . . <i>Alper Schultze, Anton Valentin Dilg, Sven Wittig, Mathis Schmieder, Ramez Askar, Michael Peter, and Wilhelm Keusgen</i>	
	On Level Crossings and Fade Durations in von Mises-Fisher Scattering Channels	178
	. . . . . <i>Kenan Turbic, and Slawomir Stanczak</i>	
	Integrated Sensing and Communication based on Road Side Units for Intersection Monitoring	183
	. . . . . <i>Jonas Bönsch, Philipp Reitz, Julian Motzelt, Norman Franchi, and Maximilian Lübke</i>	
	Dynamic Channel Characterization for Vehicular ISAC in Intersection Scenarios at 77 GHz	189
	. . . . . <i>Guojin Zhang, Norman Franchi, and Maximilian Lübke</i>	
7	NON-TERRESTRIAL NETWORKS	
	SmartUT: Receive Beamforming for Spectral Coexistence of NGSO Satellite Systems	195
	. . . . . <i>Almoatssimbillah Saifaldawla, Eva Lagunas, Flor Ortiz, Abuzar Babikir Mohammad Adam, and Symeon Chatzinotas</i>	
	OpenNTN: An Open-Source Framework for Non-Terrestrial Network Channel Simulations	201
	. . . . . <i>Tim Düe, Mohammad Amin VakiliFard, Carsten Bockelmann, Dirk Wübben, and Armin Dekorsy</i>	
	Multi-UAV-Enabled Cognitive Radio Networks: Joint UAV Deployment and Resource Allocation Design	208
	. . . . . <i>Paul Zheng, Boyao Li, Xiaopeng Yuan, Yulin Hu, and Anke Schmeink</i>	
	Handover Management in 5G Non-Terrestrial Networks: Simulations and Testbeds	214
	. . . . . <i>Sahana Raghunandan, Moustafa Roshdi, Sara Begaj, Thomas Heyn, and Christian Rohde</i>	
	Spatial Correlation of Rain Attenuation in Space-to-Earth Links	221
	. . . . . <i>Stephan P. Winter, Abhipshito Bhattacharya, Thomas Delamotte, and Andreas Knopp</i>	
	Achievable Rates of Phased Array-Fed Reflector Satellite Antenna Systems	228
	. . . . . <i>Xavier Artiga, Miguel Ángel Vazquez, Ana Pérez-Neira, and Joan Muñoz Sanchis</i>	

8	INTEGRATED SENSING & COMMUNICATIONS	
	Target Detection for ISAC with TDD Transmission	234
	. . . . . <i>Marcus Henninger, Lucas Giroto, Stephan Saur, Artjom Grudnitsky, Thorsten Wild, and Silvio Mandelli</i>	
	Optimal Azimuth Sampling and Interpolation for Bistatic ISAC Setups (<i>Best Paper Award</i>)	241
	. . . . . <i>Alexander Felix, Silvio Mandelli, Marcus Henninger, and Stephan ten Brink</i>	
	Benchmarking CFAR and CNN-based Peak Detection Algorithms in ISAC under Hardware Impairments	247
	. . . . . <i>Paolo Tosi, Steffen Schieler, Marcus Henninger, Sebastian Semper, and Silvio Mandelli</i>	
	Sensing-Aided Beamforming: The Impact of Distributed Sensing Network Geometry	254
	. . . . . <i>Zhixiang Zhao, Sebastian Semper, Christian Schneider, and Reiner S. Thomä</i>	
	How to Enhance the ISAC Security in Cell-Free Networks?	261
	. . . . . <i>Zonghan Wang, Jiajun He, Zahra Mobini, Hien Ngo, and Michail Matthaiou</i>	
	Evaluating the Performance of UE-Side Bistatic Sensing using PRS on a Highway Entry Scenario	267
	. . . . . <i>Jan-Steffen Grönweg, Soheil Gherekhloo, Maximilian Lübke, and Norman Franchi</i>	
	Code-Orthogonal PMCW MIMO ISAC System: Digital Beamforming for Pilot and Data Separation	273
	. . . . . <i>Yanpeng Su, Norman Franchi, and Maximilian Lübke</i>	
	Comparative Analysis of rootMUSIC, MVDR, and TTD Angle Estimation Under Phase Impairments	279
	. . . . . <i>Carl R. Collmann, Ahmad Nimr, and Gerhard P. Fettweis</i>	
	Data Compression for Ultra-Precise Wireless Synchronization	284
	. . . . . <i>Sebastian Klob, Siying Pan, Marcelo Michael, Joerg Robert, and Thomas Maul</i>	
9	FURTHER RELATED TOPICS	
	Binary MOCZ with Soft Decoding	288
	. . . . . <i>Maurice Ott, and Stephan F. Pfletschinger</i>	
	Optimization of Preprocessing for Integer-Forcing Source Coding	295
	. . . . . <i>Rebekka Schulz, and Robert F.H. Fischer</i>	
	CSI Obfuscation: Single-Antenna Transmitters Can Not Hide from Adversarial Multi-Antenna Radio Localization Systems)	302
	. . . . . <i>Phillip Stephan, Florian Euchner, and Stephan ten Brink</i>	
	Doppler Resistant Enhancement for Energy Efficient Device-to-Satellite LoRa Communications	308
	. . . . . <i>Guido Dietl, Sebastian Oehme, and Philip Bergmann</i>	
	CKM-Assisted Physical-Layer Security for Resilience Against Unknown Eavesdropping Location	314
	. . . . . <i>Ladan Khalooupour, Matthias Hollick, and Vahid Jamali</i>	