

**Speaker:**

Stefano Buzzi

Professor, Università di Cassino e del Lazio Meridionale, Italy

Title:

Scalable user-centric and target-centric cell-free massive MIMO OFDM-ISAC systems

Abstract:

Cell-free distributed MIMO architectures are poised to become a cornerstone of future 6G wireless networks. In an ISAC-enabled cell-free system, multiple small access points, each with limited hardware and few antennas, are strategically deployed to provide seamless connectivity and perceptive services. These access points are linked via fronthaul connections to one or more central processing units for coordination.

Unlike traditional setups with independent base stations equipped with large massive MIMO arrays, cell-free distributed MIMO offers substantial advantages in energy efficiency, performance fairness, and macro-diversity enhancement. However, this shift introduces challenges in, e.g., system complexity, scalability, access point-user association, and synchronization among access points.

This talk will delve into the integration of sensing in communication-oriented cell-free distributed MIMO systems using OFDM waveforms. Specifically, the talk will focus on scalable solutions for integrated sensing/tracking and communication for the case in which multiple targets are present in the considered area, and the issue of 3D velocity estimation in multi-static settings will be also discussed. Finally, emerging research opportunities in this rapidly evolving field will be discussed to wrap-up the talk.

Bio:

Stefano Buzzi received the M.Sc. degree (summa cum laude) in electronic engineering and the Ph.D. degree in electrical and computer engineering from the University of Naples “Federico II” in 1994 and 1999, respectively. He had short-term research appointments at Princeton University, Princeton, NJ, USA, in 1999, 2000, 2001, and 2006. He joined the University of Cassino and Southern Lazio, Italy, in 2000, where he was an Assistant Professor and has been an Associate Professor since 2002 and a Full Professor since 2018. Since 2022, He is also affiliated on a part-time basis with Politecnico di Milano, Italy.

He was the General Coordinator of the EU-Funded Innovative Training Network Project METAWIRELESS (2020-2025), on the application of metasurfaces to wireless communications, and is currently the General Coordinator of the EU-Funded Doctoral Network ISLANDS (2024-2028), on integrated sensing and communications for the vehicular environment. He has coauthored about 200 technical peer-reviewed journals and conference papers, and, among these, the highly cited paper “What will 5G be?,” IEEE JOURNAL ON SELECTED AREAS IN COMMUNICATIONS, in June 2014.

Stefano Buzzi is a Fellow of the IEEE, a Fellow of the International Academy of Artificial Intelligence Sciences (AAIS), and was the recipient of the 2025 IEEE Signal Processing Society Best Paper Award for the the work "Foundations of MIMO Radar Detection Aided by Reconfigurable Intelligent Surfaces," IEEE TSP, 2022.

His current research interests include communications and signal processing, with an emphasis on wireless communications and 6G systems. He serves regularly as a TPC

member for several international conferences. He is a former Associate Editor of IEEE SIGNAL PROCESSING LETTERS and IEEE COMMUNICATIONS LETTERS and has been the Guest Editor of five IEEE JOURNAL ON SELECTED AREAS IN COMMUNICATIONS special issues. From 2014 to 2020, he was an Editor of IEEE TRANSACTIONS ON WIRELESS COMMUNICATIONS. Currently, he is an Associate Editor of IEEE TRANSACTIONS ON COMMUNICATIONS.