



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

ADVANCED COMMUNICATION AND NETWORKING TECHNOLOGIES

Theoretical analysis and performance evaluation of wireless and wired communication systems, network and service design engineering.

Expertise at the University of Bologna covers all aspects of communications and networking, from physical issues, to system design and network architectures.

The research activities cover a wide range of issues: Information theoretic aspects of wireless communications; Indoor and outdoor wireless localization including Ultra wide Band (UWB); Low power optical systems with cavity lasers (VCSEL); Optical system for radio-astronomy applications; Multi-static Radar; Error Correcting Codes; Network protocols design and implementation; Network engineering and performance evaluation; Beyond 5G and 6G Communications; Quantum Communications; Large Intelligent Surfaces; Communications and Technologies.

Besides theoretical research the main focus to date is on the incoming 5G, encompassing all aspects of this emerging technology, in particular: Standardization and regulatory aspects for next generation mobile wireless systems; Cognitive Radio Advanced physical layer techniques (synchronisation, estimation, detection, ...); Radio over Fiber distribution systems; MIMO and Multiple Antenna Systems; Wireless sensor networks and IoT communications; Non-Terrestrial Networks; UAV based communications; Software Defined Networking (SDN) control plane; Network Function Virtualization (NFV); Orchestration architectures for advanced 5G services.

HIGHLIGHTS

European partnerships

The University of Bologna is member of the [5G Infrastructure Association](#) (5G IA), partner of the new Smart Networks and Services (SNS) Joint Undertaking. Moreover the University of Bologna is full member of ETSI and partner of the 3rd Generation Partnership Project (3GPP).

European funded projects

H2020 [5-Alive-5G](#) 5G: A Leadership Vision for Europe (2014-2015)

H2020 [EURO 5G](#): Euro-5G (2015-2017)

H2020 [To-Euro-5G](#): Supporting the European 5G Initiative (2017-2019)

H2020 [EuroCPS](#) European Network of competencies and platforms for Enabling SME from any sector building Innovative CPS products to sustain demand for European manufacturing (2015-2018)

The University of Bologna is the project coordinator of H2020 [Dynasat](#) - Dynamic Spectrum Sharing and Bandwidth-Efficient Techniques for High-Throughput MIMO Satellite Systems (2020-2022).

The University of Bologna awarded a Pre-Commercial Procurement contract [PPDR4Europe](#) - Toward Broadband Emergency Operations: the Broadway Project coordinated by Leonardo