ABOUT COST INTERACT

Radio communications have become one of the pillars on which our Society relies for performing many daily tasks. Indeed, they have not only changed the way we interact with each other, but, in the next future, they will have an even broader purview, enabling new interactions that will make industries more efficient, lives more convenient, transportation safer and contribute to better well-being.

The Intelligence-Enabling Radio Communications for Seamless Inclusive Interactions (INTERACT) vision is to go beyond the capabilities of the 5G vision and to make the radio network itself intelligent, meaning aware, adaptive and parsimonious. Radio network intelligence is required to enhance the human experience of both human-to-human and human-to-machine communications and make it seamless, with the perception of no intermediary. In a long-term vision, wireless networks will not only become intelligent, but they will constitute the nervous system to foster intelligence in other systems, such as transportation, factories and cities.

This COST action started in October 2021 and ends in October 2025.

The action organizes three meetings per years, training schools, workshops and provides grants for Short-Term Scientific Missions (STSMs).

HTTP://INTERACTCA20120.ORG

This COST Action aims at contributing to this societal transformation, by developing the next generation of radio communication networks, 6G. Challenges include:

i.*To perform* ***fundamental research*** *in the fields of antennas and propagation, signal processing and localization, network architectures and protocols, to design intelligent-enabling radio communications;*

ii.*To exploit* ***Machine Learning*** *tools for the implementation of many aspects of this network intelligence;*

iii.*To collect sufficient evidence of real-world data and making them available to the research community by building the* ***INTERACT datasets***.

INTERESTED TO JOIN AND PARTICIPATE? BECOME A MEMBER THROUGH HTTP://E-SERVICES.COST.EU/ !

WWW.COST.EU

Funded by the European Union

cost
EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

Laurent Clavier *IMT Nord Europe, France*	**Chair**	**Science Communication Coordinator**	**Margot Deruyck** *Ghent University – IMEC, Belgium*
Chiara Buratti *Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT), Italy*	**Vice-chair**	**Training Coordinator**	**Luis M. Correia** *Instituto Superior Técnico – University of Lisboa, Portugal*
Chiara Buratti *Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT), Italy*	**Grant Holder Scientific Representative**	**Grant Awarding Coordinator**	**Carles Antón-Haro** *CTTC, Spain*
		Young Researchers Representative	**Agnieszka Czapiewska** *Gdánsk University of Technology, Poland*

THE ACTIVITIES OF INTERACT ARE ORGANIZED ACCORDING TO THREE TYPES OF WORKING GROUPS: DISCIPLINARY WORKING GROUPS (WGS), VERTICAL TRACKS (VTS), AND HORIZONAL ACTIVITIES (HA). TECHNICAL DOCUMENT DISCUSSIONS ARE ORGANIZED IN SUCCESSIVE/PARALLEL SESSIONS ON THIS INITIAL BASIS.

WG1 – **Radio channels**: increases the theoretical and experimental understanding and modelling of radio channels in any type of environment. High mobility, wide frequency ranges from sub-GHz to THz, dense networks and massive antenna systems are seen as key challenges. Special attention will be paid to collecting data and sharing them to create large training sets for (ML) models.
Chairs: Vittorio Degli Esposti (UNIBO, Italy) & Mate Boban (HUAWEI, Germany)

SWG – mmWave and THz sounding: concentrates the expertise on radio channel measurements and analysis. Novel experimental set-ups, verification of channels sounders, radio channel measurements in different environments/applications are some of the key aspects. The chain to be covered ranges from the validation of the measurement equipment to the analysis of the results.
Chairs: Diego Dupleich (TUIL, Germany) & Wei Fan (AAU, Denmark)

SWG – Reconfigurable Intelligent Surfaces (RIS): develops electromagnetically consistent analytical, numerical and experimental models for RIS and RIS-aided radio channels, so as to unveil the fundamental and achievable performance limits of RIS in future wireless network deployments in various communication environments, indoor and outdoor, and frequency bands ranging from sub-6 GHz to THz.
Chairs: Marco Di Renzo (CNRS & CentralSupélec, France) & Joonas Kokkoniemi (UOULU, Finland)

WG2 – Signal processing and localization: designs novel physical layer technologies by combining the data information from statistical learning with the theoretical knowledge of the transmitted signal structure. Encoders for short block lengths, channel estimation schemes, beamforming and (massive) MIMO processing in sub-6-GHz and mmWave bands will be considered. The WG aims also at designing new positioning and localization techniques.
Chairs: Ana Garcia Armada (UC3M, Spain) & Alister Burr (UOY, United Kingdom)

SWG - Integrated Sensing and Communication (ISAC): combines channel modelling and physical layer signal processing expertises to develop transceivers and information retrieve approaches that simultaneously sense and communicate.
Chairs: Yang Miao (Unviversity of Twente, Netherlands) & Carsten Smeenk (IIS Fraunhofer, Germany)

WG3 – Network architectures and protocols: proposes new networking paradigms to perform human-to-thing communication, suppressing the perception of any intermediary. This fluid communication will require a network database for different use cases, dynamic infrastructure management and adequate distribution of the computing load between different network components.
Chairs: Hamed Hamadi (UOY, United Kingdom) & Konstantin Mikhaylov (UOULU, Finland)

VT1 – Health and Well-Being: addresses communications around or inside the human body, including energy absorption by human tissues, communication reliability , nano-networks, data access, privacy and security.
Chairs: Kamran Sayrafian (NIST, United States), Slawomir Ambroziak (PG, Poland)

SWG – EMF (Exposure to Electromagnetic Fields): contributes to the standardization of evaluation methodologies and measurement analysis for the assessment of human exposure to EMF, for existing and novel mobile communication systems. The implications of exposure limits on the development of new communication systems and on the establishment of exclusion zones will be addressed.
Chairs: Conchi Garcia-Pardo (UPV, Spain) & Wout Joseph (Ghent University - IMEC, Belgium)

VT2 – Transportation: emphasizes the scientific challenges related to autonomous vehicles, high mobility, requesting precise knowledge of the radio channel and its time evolution. New physical layers and communication protocols will be designed.
Chairs: Thomas Blazek (SAL, Austria) & Adrian Kliks (PUT, Poland)

VT3 – Industrial automation: focuses on the Industry 4.0 context which leads to very strict requirements in terms of reliability and latency, calling for the design of novel transmission techniques, considering the use of mmWave and THz bands, and the need for channel state information in harsh environments.
Chairs: Golsa Ghiaasi (SAL, Austria) & Raheeb Muzaffar (SAL, Austria)

VT4 – Smart buildings and cities: emphasizes both very high-rate communications and/or ultra-dense networks. Essential issues to be considered are channel state information acquisition, massive MIMO, ultra-energy efficiency, adaptability, and scalability.
Chairs: Periklis Chatzimisios (IHU, Greece) & Fernando José Velez (UBI, Portugal)

HA1 – Datasets: addresses INTERACT dataset(s) setup and maintenance. The expected large number of participants and the open collaborative environment provides INTERACT with a unique opportunity to feed these datasets. HA1 will be responsible for creating a favorable environment to share measurements, simulation scenarios and models inside and outside the Action.
Chair: Marco Skocaj (UNIBO, Italy)

HA2 – Dissemination: is devoted to the organization of workshops and special sessions, the creation and maintenance of the website, and social media. HA2 is responsible for presenting the Action to external entities and issuing newsletters and leaflets.
Chairs: Margot Deruyck (Ghent University – IMEC, Belgium) & Adrian Kliks (PUT, Poland)

HA3 – Training: is devoted to the organization of tutorials in conferences, scientific training schools, and STSMs.
Chairs: Luis M. Correia (ULISBOA, Portugal) & Krzysztof Cichoń (PUT, Poland)