COMITATO ELETTROTECNICO ITALIANO

IEC

ISO/IEC JTC 1/SC 43

ISO

Frontiers in Brain-Computer Interfaces Research

Technologies, Standards, and Societal Implications.

ISO/IEC JTC 1/SC 43

Date : 27 March 2026
Time: 9:00 – 12:15 CET
Presence: Hybrid
Location: Comitato Elettrotecnico Italiano,
Via Pietro Andrea Saccardo, 9
Online Registration: Webinar Registration Zoom

BRIEF OUTLINE

The Joint Symposium on Brain Computer Interfaces offers a concise overview of emerging BCI technologies—from wearable and high density EEG systems to advanced computational models—while highlighting their growing clinical relevance and the challenges of real world deployment. The program also addresses essential legal, ethical, and societal considerations, emphasizing the importance of standardization and global inclusivity, including initiatives such as the Arabic BCI terminology.

1. **Eng. Marco Nalin** will present Helmate, a next generation wireless and wearable EEG device designed for high quality signal acquisition outside laboratory settings. The talk covers usability, research grade protocols, ERP support, and applications in telemedicine and neurofeedback.
2. **Eng. Fabio Boi** will discuss how EEG based BCIs detect motor intent and support upper limb rehabilitation, summarizing current clinical evidence and outlining future perspectives for neuroplasticity driven recovery.
3. **Prof. Gianluca Di Flumeri** highlight emerging wearable EEG technologies and their real world passive BCI applications. He will emphasize market fragmentation, data reliability issues, and the urgent need for shared standards and validation frameworks.
4. **Prof. Mauro Ursino** will present neurocomputational models, EEG connectivity analysis, and deep learning approaches aimed at improving decoding performance and physiological interpretability of non invasive BCIs.
5. **Prof. Anna Maria Maddalena Bianchi** will explore multimodal brain mapping through the integration of EEG with fMRI, MEG, and fNIRS, with implications for diagnostics, adaptive neurorehabilitation, biomarker discovery, and precision medicine.
6. **Ph.D. Lawyer Maria Cristina** will examine the legal and ethical risks of BCI technologies, including neuroprivacy, cybersecurity, and self determination. Her contribution introduces a "legal & ethical compliance by design" methodology rooted in the EU regulatory landscape.
7. **Ph.D. Nibras Abo Alzahab** will present the BAYAN project, an initiative developing a standardized Arabic dictionary for BCI terminology. The project currently includes 324 carefully selected and classified technical terms across 10 thematic categories.
8. **Ph.D. Seong Min** will discuss research on digital biomarkers derived from biosignal analysis, in vitro diagnostic development, and the biological and physicochemical safety evaluation of medical devices relevant to BCI technologies.
9. **Eng. Dunja Duran** will address the use of BCIs in clinical environments, comparing low density and high density EEG systems. Her talk highlights challenges such as signal variability, patient fatigue, and reproducibility, as well as opportunities for diagnostic and rehabilitation workflows.

Prof. Pasquale Arpaia will serve as the Chair of the workshop, guiding the discussions, ensuring continuity across sessions, and fostering an effective dialogue between researchers, industry experts, and standardization stakeholders.

AGENDA

09:00-09:05	**Opening and introduction**
09:05-09:20	**Helmate and new frontiers of non-invasive BCI**
	Eng. Marco Nalin, ab medica SPA. (Italy)
09:20-09:35	**High-Density Neural Interfaces for next generation BCI**
	Eng. Fabio Boi, Corticale (Italy, Switzerland)
09:35-09:50	**Wearable EEG and Passive BCIs: From Emerging Opportunities to the Need for Standards**
	Prof. Gianluca Di Flumeri, Brainsigns srl (Italy)
09:50-10:05	**Emulating Cognitive Processes with Neural Networks and Neuroelectric Signals: Toward Better Non-Invasive BCI**
	Prof. Mauro Ursino, University of Bologna, Italy
10:05-10:20	**Electroencephalography in the Multimodal Era: From Neural Rhythms to Integrated Brain Mapping for Precision Medicine**
	Prof. Anna Maria Maddalena Bianchi, Politecnico di Milano (Italy)
10:20-10:45	Coffee break
10:45-11:00	**Legal and Ethical Compliance by design for BCI Technologies**
	Ph.D. Lawyer Maria Cristina Gaeta, Università Suor Orsola Benincasa, (Italy)
11:00-11:15	**BAYAN: Brain Arabic sYntax – Creation and standardization of an Arabic nomenclature for Brain-Computer Interfaces**
	Ph.D. Nibras Abo Alzahab, Marche Polytechnic University, (Italy)
11:15-11:30	**From Bio-signals to Healthcare Solutions: K-MEDI hub's Support for Device Development**
	Ph.D. Seong-Min Kim, Daegu-Gyeongbuk Medical Innovation Foundation (Republic of Korea)
11:30-11:45	**BCI in Healthcare: Limitations and Benefits in Clinical Applications**
	Eng. Dunja Duran, Foundation I.R.C.C.S. Carlo Besta Neurological Institute (Italy)
11:45-12:15	**Discussion Panel**
	Facilitator: Prof. Pasquale Arpaia

Speaker Introduction and Report Abstract

Eng. Marco Nalin

Marco Nalin is a Program Manager in the R&I department of ab medica s.p.a., the Italy's leading company in the production and distribution of effective and efficient health solutions, as well as a reference point in the field of minimally invasive medical technologies, surgical robotics, digital health, and for technological innovation in healthcare. He leads and coordinates projects in the fields of eHealth, neural engineering, and wearable medical devices. He holds an M.Sc. in Electronic Engineering from the University of Padua. He has over twenty years of experience in e-health, biomedical technologies, and research-driven product development. From 2004 to 2012 he contributed to the design of advanced eService for health at San Raffaele Hospital in Milan. From 2013 to 2020 he served as Program Manager at Telbios, overseeing several large European Commission–funded initiatives focused on remote patient monitoring, prevention, and AI- driven health services. Since joining ab medica in 2020, his work focuses on wireless EEG systems, next- generation BCI-enabled solutions, and the industrialization of medical-grade wearable technologies for both clinical and home environments. He is author of more than 50 peer-reviewed publications on topics such as neural engineering, rehab technologies, and cognitive robotics.

Helmate and new frontiers of non-invasive BCI

This presentation introduces Helmate, a next-generation wireless and wearable EEG device designed to make high-quality neurophysiological monitoring accessible outside traditional laboratory environments. The talk will outline the engineering principles behind its design. Three main pillars will be explored:
1) usability and signal quality, as the session will demonstrate the device's electrode configurations, acquisition parameters, and examples of real EEG signals; 2) research-grade protocols and synchronizations (e.g., supporting ERP paradigms; 3) telemedicine applications (including Neurofeedback and BCI Applications), as the mobile app will be showcased as a flexible platform for remote EEG monitoring, home-based rehabilitation, and stimuli-driven protocols. Helmate paves the way for a new generation of portable EEG systems supporting research, healthcare innovation, and widespread adoption of BCI technologies, ensuring translational research to clinics thanks to its CE certification as medical device.

Speaker Introduction and Report Abstract

Eng. Fabio Boi

Fabio Boi received his M.Sc. degree in Robotics Engineering from the University of Genoa in 2012 and earned his Ph.D. in 2016 at the Italian Institute of Technology (IIT), where he studied bidirectional brain–machine interfaces for closed-loop motor control and intracortical artificial sensory feedback. He was part of the team that originally designed the SiNAPS neural probes, playing a key role in developing and validating the technology in both bench and in-vivo settings, and actively collaborating with international research institutions including Harvard Medical School, HHMI Janelia, LMU, and Newcastle University. Since 2021, he has been the Co-founder and CTO of Corticale SRL, where he oversees production processes, operational activities, and engagement with neurotechnology companies and research groups adopting the SiNAPS technology.

BCI for Neurorehabilitation: the State of the Art

Corticale's proprietary SiNAPS technology enables the development of implantable intracortical neural probes with high spatiotemporal resolution. Thanks to integrated CMOS technology, it allows for minimally invasive implants with thousands of microelectrodes and a reduced number of interconnections, capable of interfacing stably and durably with entire neuronal populations at cellular scale. Building on this unique technology, Corticale is developing a next-generation BCI capable of sampling several thousand neurons from specific brain areas, exponentially increasing decoding performance and delivering clinical benefits to millions of patients who will have access to these medical devices.

Speaker Introduction and Report Abstract

Prof. Gianluca Di Flumeri

Prof. Gianluca Di Flumeri is a researcher and neuroscientist at Sapienza University of Rome, working at the intersection of neuroscience, human factors, and intelligent technologies. His research focuses on the measurement and modeling of human cognitive and emotional states through neurophysiological signals, with particular emphasis on brain–computer interfaces (BCIs), neuroergonomics, and applied neuroscience in real-world environments. He has extensive experience in the development and validation of multimodal neurophysiological monitoring systems integrating EEG, eye-tracking, and autonomic signals to assess human performance, workload, attention, and trust in complex human–machine interaction scenarios. His work supports the design of human-centered adaptive systems in safety-critical domains, including intelligent transportation, automated driving, and advanced human–machine interaction. Through long-standing collaboration with BrainSigns and his involvement in the European project MINDTOOTH, Prof. Di Flumeri has gained hands-on experience with wearable EEG technologies, directly addressing the technical, methodological, and operational challenges associated with deploying neurotechnology outside controlled laboratory environments. This activity has strengthened his focus on robustness, usability, data reliability, and real-world applicability of BCI systems. With more than ten years of research experience in applied neurotechnology, he has developed a comprehensive understanding of both the innovation opportunities enabled by BCIs and the practical constraints imposed by real-world applications. His work increasingly engages with the need for shared methodologies, interoperability, and validation procedures, contributing to discussions on standardization and highlighting existing gaps in regulatory and technical frameworks for emerging neurotechnologies.

Wearable EEG and Passive BCIs: From Emerging Opportunities to the Need for Standards

Recent advances in wearable EEG technologies are accelerating the transition of brain–computer interfaces (BCIs) from laboratory settings to everyday environments. Portable and user-friendly systems are enabling passive BCI applications for monitoring cognitive and affective states in real-world contexts, with growing societal relevance in safety, mobility, and human–technology interaction. However, rapid market expansion has led to significant heterogeneity in device design, signal reliability, validation practices, and claimed capabilities. Drawing also on the development experience along the Fast-Track-to-Innovation European project MINDTOOTH (with the consequent commercialization of the Mindtooth Touch EEG wearable system), this talk highlights how different innovation pathways, scientifically-driven versus market-driven, contribute to current fragmentation within the neurotechnology landscape. While wearable EEG opens unprecedented opportunities, the lack of shared benchmarks and validation frameworks remains a major barrier to trust and scalability. The presentation discusses key technical and methodological gaps and emphasizes the role of standardization in enabling robust, interoperable, and responsible deployment of passive BCI technologies.

Speaker Introduction and Report Abstract

Prof. Mauro Ursino

Mauro Ursino is a Full Professor at the Department of Electrical, Electronic, and Information Engineering, University of Bologna, Italy. He has been an associate editor and member of the editorial board of several international journals and been responsible for several research grants on physiological modeling. His research activity is mainly focused on mathematical modeling of complex physiological systems. He has been working on cardiovascular regulatory mechanisms and cerebral autoregulation for many years. At present, his research interests are mainly focused on computational neuroscience via biologically inspired neural networks. In this field, he is working on the modeling of multisensory integration in the brain, on the neural substrate of semantic memory, on alterations of basal ganglia and levodopa pharmacokinetics in Parkinson's disease, and the role of brain oscillations in cognition. Recently, he has also been working on the estimation of brain connectivity from EEG data in healthy and pathological conditions (autism spectrum disorders, Schizophrenia, fear conditioning).

Emulating Cognitive Processes with Neural Networks and Neuroelectric Signals: Toward Better Non-Invasive BCI

Non-invasive brain–computer interfaces (BCIs) rely heavily on decoding scalp EEG signals, whose dynamics emerge from complex neural mechanisms and interactions among task-specific brain regions. A deeper, mechanistic understanding of how cognition shapes EEG activity—across domains such as motor imagery, attention, memory, and disease-related alterations—can therefore improve both interpretability and robustness of BCI decoding. This lecture presents advanced approaches that connect brain function to measurable neuroelectric signatures, organized into three complementary domains. First, neurocomputational models of oscillatory neural populations are used to reproduce physiological rhythms and to elucidate functional roles of prominent bands, including alpha modulation during attentional processing and beta dynamics during motor imagery. Second, functional connectivity and graph-theoretical networks are derived from scalp EEG combined with source reconstruction, with emphasis on how network alterations characterize pathological conditions (e.g., autism spectrum traits, schizotypia, epilepsy). Third, deep neural networks are discussed as powerful tools for decoding motor-related information and classifying movements. Taken together, these examples motivate a unified framework in which mechanistic modeling, network neuroscience, and data-driven learning jointly inform next-generation non-invasive BCIs— enhancing decoding performance while improving physiological interpretability.

Speaker Introduction and Report Abstract

Prof. Anna Maria Maddalena Bianchi

Anna M. Bianchi is scientific coordinator of the Medical Informatics Lab at DEIB and is co- founder and member of the management committee of two inter-departmental Labs at Politecnico: the BrainLab@Polimi and PHEEL. She is founder of the Joint Research Platform between IRCCS Fondazione Policlinico di Milano where she coordinates the Biocomputation, Analytics, Systems Biology, Signals and Imaging Lab. Anna M. Bianchi had responsibility and cohordination positions in International (EU projects PSYCHE, LINK, PICKFIBER) and National funded research projects (PNRR MUSA; FRRB E-PARKNET); she is Senior Member of the IEEE Engineering in Medicine and Biology Society and since 2012 she is Fellow EAMBES (European Alliance for Medical and Biological Engineering and Science). In 2011 she was awarded with the Martin Black Prize for the best article published in Physiological Measurement during 2010; Dr. Bianchi serves as a scientific expert in the EMBS Technical Committee on Neuroegineering and Technical Committee on Cardiopulmonary Systems. She served as Associate Editor of the IEEE.

Electroencephalography in the Multimodal Era: From Neural

Electroencephalography (EEG) is evolving from a classical electrophysiological technique into a central pillar of multimodal brain science. With millisecond temporal resolution, EEG captures the dynamic language of neural oscillations underlying perception, cognition, and behavior. Today, its integration with neuroimaging modalities such as functional magnetic resonance imaging (fMRI), magnetoencephalography (MEG), and functional Near Infrared spectroscopy (fNIRS) is reshaping our capacity to map the brain across complementary spatial and temporal scales. These synergistic approaches enable more precise localization of neural networks while preserving real-time dynamics, advancing systems neuroscience and biomarker discovery. Clinically, multimodal EEG frameworks are fostering earlier diagnosis, individualized treatment planning, and adaptive neurorehabilitation strategies. Coupled with machine learning, wearable technologies, and brain–computer interfaces, EEG is poised to support closed-loop interventions and precision medicine. This visionary convergence positions EEG not merely as a recording tool, but as an integrative platform for decoding, monitoring, and therapeutically modulating human brain function.

Speaker Introduction and Report Abstract

Ph.D. Lawyer Maria Cristina Gaeta

Maria Cristina Gaeta is an Appointed Lecturer in Private Law and ICT Law, at Suor Orsola Benincasa University of Naples (Italy), as well as the Scientific Secretary of the Research Centre in European Private Law (ReCEPL) at the same University. Since 2024 she serves on Technical Committee 324 on BCI of the Italian Electrotechnical Committee (CEI). Since 2016, Dr Gaeta has been a member of the Interdepartmental Research Centre Scienza Nuova and the Napolitan section of the Academy of European Private Lawyers. From 2020 she joined the High Observatory on European Policies (AOPE) and since 2021 is a member of the Interdepartmental Research Centre for Bioethics (CIRB) at the of Federico II University. She is key staff and Senior Advisor for the Jean Monnet Centre of Excellence ReCEPL4STAI (2026–2028) and has held teaching and leadership roles in multiple Jean Monnet projects (NextGEUOrder, EUGREENEXT, PROTECH, EURA). She participates in several research projects, including CREA3, TAtoDPR, REFERENCES, LadiBank and PRILeD. Her research focuses on regulation of robotics and artificial intelligence, particularly on BCI, smart and green transport, sustainable AI. She authored a monograph on autonomous vehicle regulation and numerous articles in Italian and English on European technology law, and AI law. Dr. Gaeta coordinates the Referee and Editorial Board of the European Journal of Privacy Law & Technologies (EJPLT) and serves on editorial boards of different scientific Journals. She is an active conference speaker and won multiple prizes and scholarships, including EURA Young Scholar Prize (2022) and Law & Tech ECLT Prize (2021). She was visiting professor at Salamanca University (2024), Heidelberg University (2022), RifaS (2020), IALS and Queen Mary University (2017–2020). She is an active conference speaker and won of multiple prizes and scholarships, including EURA Young Scholar Prize (2022), best paper IEEE MetroXRAINE (2022), and Law & Tech ECLT Prize (2021). She holds a PhD in Private Law (Federico II University, 2018) and is a civil lawyer (since 2018).

Legal and Ethical Compliance by design for BCI Technologies

The research examines the legal and ethical implications of brain-computer interfaces as a crucial aspect of the design and development of BCI technologies. As a matter of fact, Brain-computer interfaces (BCIs) are among the most promising technologies of the digital age, but they can pose multiple legal and ethical risks that must be analysed and, where possible, prevented: while BCIs offer transformative benefits in several domains, they introduce significant risks for human beings, first of all on privacy (neuroprivacy), cybersecurity, and individual autodetermination. In this light, the research explores the legal and ethical complexities of BCI, emphasising the necessity of a ‘Legal & ethical compliance by design’. Starting from the evolution of the European regulatory landscape applicable to neurotechnologies, the research presents a multidisciplinary methodology designed to measure the impact of BCI devices on fundamental rights, ensuring that legal rules and ethical principles are integrated into the technological architecture from the initial design phase. This research is carried out in collaboration with Prof.Lawier Lucilla Gatt (Suor Orsola Benincasa University of NAples – Italy full Professor of Private Law, European Technologies Law and Family Law since 2006 at Suor Orsola Benincasa University of Naples (Italy), as well as Director of the Research Centre in European Private Law - ReCEPL) and Prof. Fiorella Battaglia (Founding Director of the Laboratory for Ethics in the Wild at the Digital Humanities Centre, University of Salento (Italy).

Speaker Introduction and Report Abstract

Ph.D. Nibras Abo Alzahab

Ph.D. Nibras Abo Alzahab s a researcher at the Polytechnic University of Marche (UNIVPM) and a founding member of the Syrian Research and Publication Society (SRPS). His work is distinguished by a highly multidisciplinary approach that combines engineering, neuroscience, and linguistics, with a deep commitment to promoting, translating, and standardizing cutting-edge scientific research for the Arabic-speaking world.

BAYAN: Brain Arabic sYntax -Creation and standardization of an Arabic nomeclaturebfor Brain-Computer Interfaces

This presentation, delivered on behalf of the Syrian Research and Publication Society (SRPS), illustrates the vision and current progress of the BAYAN project (Brain Arabic sYntax: an Annotated Nomenclature).

BAYAN is an ongoing initiative aimed at developing a specialized dictionary for translating the science and terminology of Brain-Computer Interfaces (BCI). The primary objective is to fill a linguistic and technical gap by standardizing the translation of this complex terminology into Arabic for researchers, students, and professionals.

To ensure the highest scientific and linguistic rigor, the project relies on the collaboration of a highly multidisciplinary team composed of engineers, researchers, neuroscientists, physicians, and linguists. To date, the research group has already carefully selected and translated a list of 324 technical terms, methodically classifying them into 10 main thematic groups.

Speaker Introduction and Report Abstract

Ph.D. Seong-Min Kim

Ph.D. Seong-Min Kim is a researcher at the Daegu-Gyeongbuk Medical Innovation Foundation (K-MEDI hub), Republic of Korea, with a multidisciplinary background spanning biotechnology and medical engineering. She received her Ph.D. in Medical Biotechnology, focusing on the function and properties of lipoproteins in metabolic diseases. During her postdoctoral training, she expanded her expertise into neuroscience, contributing to the development of brain–machine interface (BMI) systems and the efficacy evaluation of therapeutic candidates for Alzheimer's disease. At K-MEDI hub, Dr. Kim is engaged in developing in vitro diagnostic (IVD) devices through the discovery of biomarkers in body fluids and conducting digital biomarker research based on biosignal analysis. She also specializes in the biological safety and physicochemical evaluation of medical devices to ensure their clinical reliability. Recently, she has been actively contributing to international standardization to support the advancement and global harmonization of the healthcare industry.

From Bio-signals to Healthcare Solutions: K-MEDI hub's Support for Device Development

The Medical Device Development Center at K-MEDI hub, a public institution under the Ministry of Health an d Welfare of Korea, provides comprehensive support for the commercialization of IT-based healthcare techn ologies. In this session, we present specific healthcare device use cases—such as wearable EEG systems and neuro-rehabilitation tools—that have been successfully developed through K-MEDI hub's technical assistanc e programs. The presentation demonstrates how our support facilitates the entire transition from raw bio-si gnal processing and digital biomarker discovery to final clinical performance validation.

Furthermore, we address the critical IT requirements for BCI technologies to enter the healthcare market, e mphasizing verification strategies for neural data cybersecurity, AI-driven signal processing reliability, and en d-user usability. By outlining these systematic approaches, this presentation demonstrates the role of public infrastructure in bridging the gap between innovative bio-signal research and the reliable commercialization of next-generation healthcare devices.

Speaker Introduction and Report Abstract

Eng. Dunja Duran

Dunja Duran holds a Master's degree in Biomedical Engineering from Politecnico di Milano. Since 2012, she has been working at Fondazione IRCCS Istituto Neurologico Carlo Besta as a researcher and technician responsible for MEG system maintenance, data acquisition, and advanced signal analysis. Her expertise extends to both non-invasive and invasive neurophysiological data analysis, including high-density EEG (HD-EEG), stereo-EEG (SEEG), and multimodal integration with neuroimaging data to support clinical diagnostics and research investigations. Her main research interests include epilepsy, neurological disorders, surgical mapping and language processing. Over the years, she has established several collaborations with clinical and research institutions, enabling her active involvement in software and toolbox development, multimodal patient screening and evaluation. These experiences have provided a deeper understanding of the challenges encountered in clinical settings, as well as the difficulties in designing and validating reliable tools suitable for use outside controlled clinical environments.

BCI in Healthcare: Limitations and Benefits in Clinical Applications

Brain–computer interface (BCI) technology has progressed rapidly thanks to advances in computational methods and neuroscience. The development of low-density EEG systems and wearable sensors has expanded BCI use beyond laboratory settings. In clinical contexts, however, further validation studies in patient populations are essential. Research is often constrained by small sample sizes due to strict inclusion criteria, making signal quality and variability control crucial. Pathological network alterations, individual anatomical and functional differences, as well as compliance, fatigue, and dropout, can affect statistical robustness and reproducibility. In contrast, standardized protocols in controlled environments with high-density systems and specialized professionals enable the extraction of reliable clinical biomarkers. Integrating wearable devices into diagnostic assessments may clarify the informational limits of low-density sensors while defining the data quality standards needed to ensure diagnostic relevance and support rehabilitation. The presentation will highlight the potential of current BCI technology in the clinical environment, describe limitations regarding the high vs low sensor devices and exploring future opportunities.

Speaker Introduction and Report Abstract

Prof. Pasquale Arpaia

Pasquale Arpaia took M.Sc. and Ph.D. degrees in Electrical Engineering at the University of Naples Federico II, where he is a full professor of Measurements.

He is Director of the Interdepartmental Center for Research on Health Management and Innovation (CIRMIS), Head of the Laboratory of Instrumentation and Measurement for Particle Accelerators (IMPALab), the Augmented Reality Laboratory for Health Monitoring (ARHeMlab), the Human-machine Interfaces for Measurements in Living Environments (HIMaLivE) Joint Research Laboratory with CNR STIIMA, the Advanced Instrumentation Laboratory for superconductor testing, the Unina Hi-Tech Academic FabLab, and past chairman of the University Federico II Internship Project. He has also been a Team Leader at the European Organization for Nuclear Research (CERN) for 15 years, a professor at the University of Sannio, and an associate at the CNR Institutes of Engines and Biomedical Engineering, and now of the CNR STIIMA Institute and the INFN Section in Naples. He is founding member of CT 324 of CEI for Brain Computer Interface standardization.

He is Associate Editor of the Institute of Physics Journal of Instrumentation, MDPI Instruments and previously of the Elsevier Journal Computer Standards & Interfaces, and the IEEE Transactions on Electronics Packaging and Manufacturing. He was editor at Momentum Press of the book collection "Emerging Technologies in Measurements, Instrumentation, and Sensors." In recent years, he has been scientific manager of more than 30 competitive research projects in collaboration with industry, with related international patents and licenses, and has founded 4 academic spin-off companies. He has served as a scientific evaluator in several international research committees. He is general chair of XR Salento, IEEE IWIS and IEEE MetroXRAINE. He is an annual plenary speaker at several international scientific conferences.

He has published 6 books, and about 480 scientific papers (Scopus) in journals (7 in the last 7 years in Nature Group) and proceedings of national and international conferences. His PhD students were awarded in 2006, 2010 and 2020 at IEEE I2MTC, as well as in 2016 and 2012, 2018 at IMEKO TC-10 and World conferences, respectively. In 2024, he was awarded by the SIN-Merck Grant on Digital Innovation in Neurology and his book on Brain Computer Interfaces as best STEM book of the year by Francis and Taylor.