CONFERENCE PROGRAM

2025 IEEE INTERNATIONAL CONFERENCE ON

METROLOGY FOR EXTENDED REALITY, ARTIFICIAL INTELLIGENCE AND NEURAL ENGINEERING

ANCONA, ITALY OCTOBER 22-24, 2025

IEEE METROXRAINE ANCONA2025

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Welcome Message from the General Chairs and Technical Program Chairs

On behalf of the Organizing Committee, we wish to welcome you to the 2025 IEEE International Conference on Metrology for eXtended Reality, Artificial Intelligence, and Neural Engineering (IEEE MetroXRAINE 2025). MetroXRAINE 2025 promotes synergies among experts in emerging technologies that highly influence frontier applications: eXtended Reality, Brain-Computer Interface, and Artificial Intelligence, with special attention to measurement and its quality on the field (applied metrology).

As the boundaries between Extended Reality, Artificial Intelligence, and Neural Engineering continue to blur, this edition of the Conference further highlights the transversal nature of these technologies. Their influence reaches far beyond the laboratory, shaping the way we teach, learn, and interact with the world. Reflecting this, the program features several parallel events dedicated to exploring their impact on education, ethical frameworks, and the development of global standards. Together, at this conference, we aim to explore how Industry and Health 5.0 can be developed and deployed in ways that are not only innovative but also aligned with our shared values for a more sustainable future.

The organization of this fourth edition of the Conference is coordinated by the Università Politecnica delle Marche, the University of Naples Federico II, the University of Salento, the Politecnico di Milano, and the National Research Council of Italy – STIIMA.

The IEEE MetroXRAINE 2025 Technical Program consists of more than 140 oral presentations, and more than 100 poster presentations scheduled over the three days. Oral presentations are organized in six Plenary Sessions (three scientific Keynote speeches and three Tutorials from companies), and 24 Parallel Sessions. These were derived from Thematic Sessions, and they aim to create a focus on specific topics, where researchers can share knowledge, familiarize themselves, exchange ideas, and build cooperation. Among them, a Workshop entitled “Shaping the Future of Interaction: Integrating AI, Human Factors, and Immersive Technologies in HCI” was also established because of the outstanding number of contributions submitted and accepted in the inherent track. Thematic Sessions also led to Poster Presentations, which are organized in three main sessions over the days. They involve an “Industry poster session” too, with financed projects as part of the *ID4MetroXRAI* special event, as well as a Youth Forum, which is part of the *Youth Program*. Overall, seven Special Events are hosted:

- *ID4MetroXrAi* on Industry 5.0;
- *AIRevEdu* on AI-driven education, skills, and collaborative training;
- *NxGenBCI* on advancing non-invasive brain-computer interfaces,
- *Data Ethics and Quality in the AI Era* on building fair and trustworthy AI through quality data, metrology, and responsible regulation;

- *DHEAL-COM4MetroXRAI* is a dissemination event showcasing the results achieved within the DHEAL-COM project. It focuses on advancing digital solutions for community care, presenting real-world applications that enhance patient monitoring and management in local healthcare settings;
- *PsychoBit* on digital psychology
- *Youth Program*.

In addition, three Panel Sessions, three Demo Sessions, and interactive Company Exhibitions are hosted within the Conference.

The extended abstracts received were submitted to a peer-review process. Relevance, quality, significance, and novelty of scientific contribution were the main attributes for acceptance and publication in the Proceedings. The Proceedings are published in the IEEEXplore Digital Library. We would like to thank all the reviewers who actively contributed to the selection and quality improvement of the presented works.

Extended versions of presented papers can be submitted to the Special Issues of the Journals:

- IOPscience - Journal of Neural Engineering;
- MDPI - Instruments;
- Intelligenza Artificiale.

MetroXRAINE 2025 is honored to have well-claimed experts in metrology, eXtended Reality, Artificial Intelligence, and Neural Engineering as Plenary Keynote Speakers:

- Prof. Olfa Kanoun, from the Chemnitz University of Technology, Germany, will present “Redefining Human-Machine Interaction: Intelligent Camera-Free Wearable Gesture Recognition at the Edge” on October 22;
- Ms. Yuntao Yu, from ISO/IEC JTC 1 China Mirror Committee, will give a talk on “Development and Standardization of BCI” on October 23;
- Dr. Federico Mattei, IBM Quantum Ambassador in IBM Research, will present “Quantum Computing and its Synergies with AI” on October 24.

In addition to the keynote presentations, MetroXRAINE 2025 will also feature specialized tutorials:

- Dr. Christoph Guger, CEO of g.tec medical engineering GmbH, with the tutorial “Brain-computer interfaces for neurorehabilitation, communication, brain assessment and brain mapping” on October 22;
- Dr. Claudio Colangeli, from Siemens Industry Software, Leuven, Belgium, with the tutorial “XR as part of the everyday in engineering” on October 23;
- Prof. Enzo Pasquale Scilingo from the University of Pisa, Italy, will present “Abel: Towards Artificial Empathy – A Social Robot for Natural Interactions” on October 24.

We are grateful to all Keynote Speakers and Tutorial presenters for joining the Conference.

To recognize the most outstanding paper presented at the annual *2025 IEEE International Conference on Metrology for eXtended Reality, Artificial Intelligence, and Neural Engineering*, the Best Conference Paper Award, sponsored by Micron, will be assigned. The Best Graphical Abstract Award, sponsored by the IEEE Professional Communication Italy Chapter, and the Best Demo Award, also sponsored by Micron, will likewise be assigned. Additional recognition sponsored by Revelop includes the Best Contribution by a Young Researcher Award and the Young Contest Award. The Best Poster Award will acknowledge the most outstanding paper presented during the Poster Session. Moreover, the Best Paper on Service Innovation Award, sponsored by the International Society of Service Innovation Professionals (ISSIP), will recognize excellence in this specific research area.

Finally, beginning with this edition, a Career Award will be conferred upon a researcher who has distinguished themselves not only for the originality of their scientific work and fundamental contributions to Science, but also for their active commitment to scientific dissemination and the social dimensions of research. This year, the award will be presented to Giuseppe Trautteur, an Italian physicist, *for his long and prolific career, where he has combined theoretical rigor, interdisciplinary insight, and philosophical depth, leaving a lasting mark on the development of computer science and the broader dialogue between science and thought.*

We sincerely thank all the sponsors and the patrons who made this event possible.

October 2025

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IEEE MetroXRAINE 2025 Keynote Speakers

Plenary Session - Wednesday October 22 - H 11:40

Redefining Human-Machine Interaction: Intelligent Camera-Free Wearable Gesture Recognition at the Edge

Olfa **Kanoun**

Chemnitz University of Technology, Germany

ABSTRACT

In an increasingly interconnected world, intuitive and seamless human–machine interaction is essential. Gesture recognition plays a pivotal role in various fields, including healthcare, rehabilitation, robotics, and assistive technologies. Wearable sensing systems are of particular interest as they offer enhanced privacy, robustness and practical applicability in real-world settings by enabling camera-free gesture recognition methods.

These methods use advanced sensing technologies, such as electrical impedance tomography (EIT), force myography (FMG), surface electromyography (sEMG) and novel nanocomposite-based pressure and strain sensors, to detect the physiological and biomechanical signals related to gesture execution. Recent breakthroughs in sensor integration, signal processing, and embedded machine learning enable the design of ultra-efficient, real-time classification systems that are suitable for deployment on resource-constrained edge devices. Compact, energy-efficient and context-resilient solutions can thereby realize a dynamic gesture recognition.

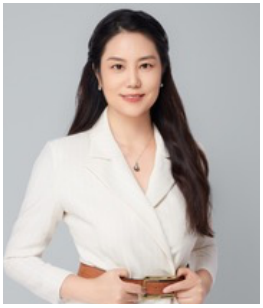
From high-accuracy sign language interpretation to real-time robotic programming and continuous rehabilitation monitoring, wearable, camera-free technologies are setting new standards for gesture-based interaction. This talk outlines a forward-looking vision for smart, secure and inclusive human–machine communication, driven by the convergence of sensing innovation and edge intelligence.

SPEAKER BIOGRAPHY

Olfa Kanoun is a Full Professor of measurement and sensor technology at Chemnitz University of Technology, Germany. She received her diploma in electrical engineering and information technology from the Technical University of Munich in 1995 and her Ph.D. from the University of Bundeswehr Munich in 2001. Prof. Kanoun is a world-renowned expert in sensors and sensor system design with over two decades of experience. Her research focuses on impedance

spectroscopy, impedimetric sensors, energy harvesting, wireless sensors, and micro- and nanosensors. Her expertise extends to self-powered wireless sensors, energy transfer, and flexible polymer sensors based on nanomaterials for physical and chemical measurements. She has made several significant contributions to the development of intelligent field sensors based on impedance spectroscopy, wireless sensors, and sensor systems based on nanotechnology. In 2022 she served as co-chair of the collaborative research center on hybrid society where she elaborated manifold methods of camera-free hand gesture recognition.
She has been recognized as one of the 2% world's best scientists since 2019, according to an analysis by Ioannidis et al. In 2018 she has been awarded by the Faculty Course Award of the IEEE IM Society and in 2022 by the IEEE IM Society Technical Award for pioneering the evolution of impedance spectroscopy from laboratory scale to field sensors.
Throughout her career, Prof. Kanoun has led numerous fundamental research and collaborative projects. She supervised more than 50 dissertations and has published over 700 papers in peer-reviewed scientific journals and international conferences.

Plenary Session - Thursday October 23 - H 11:10



Development and Standardization of BCI

Yuntao **Yu**
Chair of Brain-Computer Interfaces - ISO/IEC JTC 1/SC 43

ABSTRACT

The BCI field is currently at a pivotal point in its development, showing significant potential for growth and wide-ranging applications. During the talk, we will provide a comprehensive overview of the development of BCI technology and its standardization by ISO/IEC JTC 1/SC 43. We highlight key milestones, solutions taken by companies and regulatory authorities to facilitate the market entry of BCI products. What's more, we present diverse applications of BCI in various fields that include both healthcare and non-medical settings, emphasizing the urgent need for standardization. Additionally, we introduce the status of ISO/IEC JTC 1/SC 43, including its structure and ongoing projects related to BCI standardization. We will also discuss the future work for BCI standardization, emphasizing the importance of risk management, ethical guidelines, and global collaboration.

SPEAKER BIOGRAPHY

Ms. **Yuntao Yu** is a professor of engineering, working for China Electronics Standardization Institute as Convenor of ISO/IEC JTC 1 China Mirror Committee. Ms. Yuntao Yu represents China's responsibility for technology standardization research work in JTC 1. She Organizes and promotes information technology standardization work, supporting the development of relevant regulations. Ms. Yuntao Yu is the project manager of over 70 standards setting projects and acts as the project leader for over 30 national research projects. Ms. Yuntao Yu Serves as Chair of ISO/IEC JTC 1/SC 43 (Brain-computer Interfaces), Vice Chair of IEC/ISO JSyC BDC (Bio-digital Convergence), the convenor of ISO/IEC JTC 1/SC 36/WG 4 (Management and delivery) and other international positions, as well as leads the development work of related international standards. She was awarded the IEC 1906 Award in 2016.

Plenary Session - Friday October 24 - H 11:10

Quantum Computing and its Synergies with AI

Federico **Mattei**
IBM Quantum Ambassador

ABSTRACT

Quantum computing is rapidly evolving and we will soon be able to perform previously impossible calculations for the benefit of business and scientific research.
These new computers leverage the laws of quantum mechanics and will soon allow to solve intractable problems for classical computer in the field of simulating nature and optimization. Several artificial intelligence algorithms will also receive an advantage from quantum computers, for example in categorization and anomaly detection. Quantum AI could add value to find new patterns with less data in complex data structure with better trainability.
Artificial Intelligence algorithms are also used to support quantum computing calculation to optimize transpilation of circuits and to help quantum code developers.
Many synergies are emerging between quantum computation and artificial intelligence; two disruptive technologies which combined will completely transform the way we perform calculations in scientific research and business.

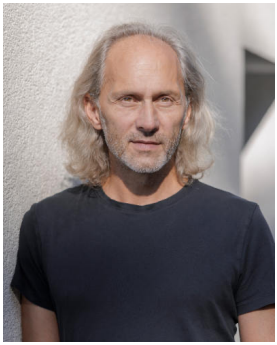
SPEAKER BIOGRAPHY

Federico Mattei is a Ph.D. in Theoretical Physics at La Sapienza University in Rome. He joined IBM as a specialist in mobile computing projects, during the first year of work he obtained a Master in Business Management at the Politecnico di Milano.

For over fifteen years, Federico has been involved in designing and developing innovative projects for the financial services sector and has a solid experience in mobile, cognitive, social, collaboration and analytics solutions.

He managed a team of client technical leaders focused on Financial Services Sector and he was also client architect on some important banking clients in Italy.

Today he is IBM Quantum Ambassador in IBM Research and he is responsible to engage clients and develop the ecosystems of IBM Quantum in Italy.



Brain-computer interfaces for neurorehabilitation, communication, brain assessment and brain mapping

Christoph **Guger**

g.tec medical engineering GmbH

ABSTRACT

Brain-computer interfaces (BCIs) have evolved from experimental tools to powerful systems with real-world clinical and scientific applications. This talk provides an overview of how BCIs are revolutionizing four key areas of neuroscience and medicine: neurorehabilitation, communication, brain assessment, and brain mapping.

In neurorehabilitation, BCIs like recoveriX enable patients with stroke, multiple sclerosis, or Parkinson's disease to regain motor functions—years after the initial diagnosis—by merging motor imagery, visual feedback, and electrical stimulation into a closed-loop training protocol.

In the domain of communication, BCIs offer new hope for individuals with severe motor impairments, such as ALS or locked-in syndrome, allowing them to express themselves via brain-driven spelling devices and P300-based systems.

For brain assessment, BCIs are used in patients with disorders of consciousness to detect command-following abilities and residual brain activity that may not be observable through traditional methods.

Finally, in neurosurgery and epilepsy treatment, BCI-based high-gamma mapping and cortiQ technology provide fast and reliable identification of functional brain areas—even under anesthesia—enabling safer and more precise interventions.

The talk highlights scientific findings, clinical results, and future visions for integrating BCIs into daily neurological practice, emphasizing their potential to transform patient care and human-computer interaction.

SPEAKER BIOGRAPHY

Christoph Guger is the founder and CEO of g.tec medical engineering GmbH. He studied Biomedical Engineering at the Technical University of Graz, Austria and at the John Hopkins University in Baltimore, USA. During his studies, he concentrated on BCI systems and developed

many of the early foundations for bio-signal acquisition and processing in real-time. g.tec produces and develops BCIs that help disabled people communicate or control their environments by their thoughts, regain motor functions after a stroke, and achieve other goals. The products and research activities have been widely presented in peer-reviewed research publications, demonstrating the high quality of g.tec's tools and methods. He is running several international BCI research projects.

Tutorial Session - Thursday October 23 - H 12:10

XR as part of the everyday in engineering

Claudio **Colangeli**
Siemens Industry Software

ABSTRACT

The keynote will discuss the transformative potential of Extended Reality (XR) technologies in shaping the "Industrial Metaverse": a virtual realm where digital twins create interactive and immersive experiences. The Industrial Metaverse is characterized by digital twins, software-defined automation, physical knowledge, data and AI. The term XR covers mixed reality, holographic visualization, and virtual and augmented reality, offering real-time interactions in digital environments. Despite its promising future, the current use of XR in engineering remains largely demonstrative, with limited integration into daily practices. This presentation aims to explore both the barriers and the disruptive possibilities that could propel XR into routine engineering processes. As companies experience global industrial changes, the demand for sustainable, shorter product lifecycles grows. This drives the digitalization of innovation processes, where digital twin and XR technologies play a pivotal role in facilitating efficient, zero-prototype development. As pioneer of the digital revolution, Siemens join forces with key partners to advance AI-driven digital twin and immersive technologies. The presentation will showcase selected examples from simulation and testing applications across fields such as aerodynamics, acoustics, and structural dynamics. These will exhibit the limitations hindering XR's full potential and highlight disruptive aspects that could lead to the development of the industrial metaverse paradigm, letting XR become integral to everyday engineering practices.

SPEAKER BIOGRAPHY

Dr. **Claudio Colangeli** is currently employed at Siemens Industry Software in Leuven (Belgium). He is working as Research Engineering Manager for the IoT and Artificial Intelligence research team dealing with experimental applications in mechatronics and transportation industry. After obtaining a PhD degree in Industrial Engineering at the Polytechnic University of Marche (Italy) in 2017, his career in industry continues at Siemens with the role of technical expert in acoustics with focus on virtual environments for subjective and objective assessment of noise and vibrations perception. Over the years, he expands his research focus towards digital twins and IoT-based technologies, currently including processing automation and data-centric AI.

Tutorial Session - Friday October 24 - H 12:10

Abel: Towards Artificial Empathy - A Social Robot for Natural Interactions

Enzo Pasquale **Scilingo**
University of Pisa, Italy

ABSTRACT

In this talk, we present Abel, a hyper-realistic humanoid robot designed to advance social robotics by integrating multiple AI-driven modules for language processing, contextual recognition, and emotional perception. Abel is equipped with a sophisticated modular AI framework, enhancing its ability to engage in fluid, natural interactions with humans, moving beyond scripted responses toward situational awareness and empathic behavior.

We will explore the underlying AI framework that enables Abel to perceive emotions, interpret context, and generate coherent, emotionally-aligned responses. The system ensures that verbal and non-verbal communication are seamlessly synchronized and contextually appropriate, fostering a more human-like interaction experience.

To demonstrate Abel's capabilities, the talk will feature a live, real-time interaction, where Abel will engage with the audience, showcasing its ability to adapt responses, express emotions, and sustain meaningful conversation. This demonstration will highlight how advanced embodiment, multimodal AI processing, and human-robot interaction design contribute to a more immersive and natural social experience.

SPEAKER BIOGRAPHY

Enzo Pasquale Scilingo, Ph.D., is a Full Professor of Electronic and Information Bioengineering at the University of Pisa. Currently, he conducts research at both the Department of Information Engineering and the E. Piaggio Research Center. He has extensive teaching responsibilities, supervises multiple Ph.D. students, and leads the CP-TECH Lab - Computational Physiology and Human-Technology Interaction Lab at the Department of Information Engineering. He has coordinated several European research projects, including:

- EC-FP7-ICT-247777 PSYCHE project (Personalised Monitoring Systems for Care in Mental Health).
- H2020-PHC-2015-689691 NEVERMIND project (Neurobehavioural Predictive and Personalised Modelling of Depressive Symptoms during Primary Somatic Diseases with ICT-enabled Self-management Procedures).
- H2020-FETPROACT-2018-01-824153 POTION project (Promoting Social Interaction through Emotional Body Odors).

His main research interests include wearable monitoring systems, artificial intelligence for biomedical applications, affective computing, human-computer interfaces, social robotics, biomedical and biomechanical signal processing, modeling, control, and instrumentation.

He has authored over 300 publications, including peer-reviewed journal articles, international conference papers, and book chapters. He is also the co-author of three books published by Springer.

He serves as a reviewer for numerous international journals and is an active member of program and scientific committees for annual international conferences. He is the Editor-in-Chief of the Bioelectronics section of the journal Electronics and serves on the Editorial Boards of PLOS ONE, Scientific Reports (Nature), IEEE Journal of Biomedical and Health Informatics, IEEE Transactions on Affective Computing, Frontiers in Bioengineering and Biotechnology, Frontiers in Robotics and AI (Bionics and Biomimetics section), Frontiers in Neuroscience (Neural Technology section), ETRI Journal.

IEEE MetroXRAINE 2025 Special Events

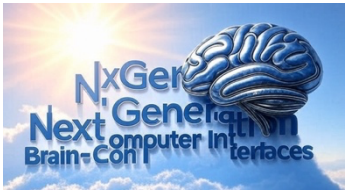
Special Event - Wednesday October 22 - H 16:50

ID4MetroXRAI 2025

The concept of a sustainable and resilient digital factory requires a reliable human-machine coevolution relationship enabled by AI, digital technologies, and collaborative robotics. In the context of digitalization and the circular economy, one of the key challenges for policymakers and managers is to adopt profitable technologies while prioritizing and safeguarding human well-being.
This approach embodies the principles of the Industry 5.0 paradigm, focusing on the integration of digital technologies and automation with strategies centered on digital twins and Human Digital Twins in future manufacturing systems.
The event aims to facilitate the discussions between experts from both industry and academia, fostering an exchange of ideas and perspectives. With this purpose, a special focus during the event will be placed on productivity, sustainability, and enabling technologies within the framework of funded projects and initiatives, such as the Italian PNRR or other financing funds, through a poster session planned during the Welcome Party. This poster session is an opportunity to disseminate projects and the research group's funded activities, which can be exposed during the event.

Special Event - Thursday October 23 - H 09:00

NxGenBCI 2025: Next generation Brain-Computer Interfaces



Non-invasive brain-computer interfaces (BCIs) aim to translate brain activity into commands. Despite their promising results for counteracting neurological symptoms, current systems fail to detect the users' intent in 15-30% of subjects (referred to as "BCI inefficiency"), limiting the diffusion of BCIs beyond laboratory settings. Efforts have been made to improve BCI usability by providing guidelines and predictors of performance. Yet, BCIs remain barely used in clinical settings and by patients in their daily life.
The NxGenBCI event will address current challenges in clinical BCI research by identifying and discussing key methodological and technological aspects to enhance its efficacy. The workshop will comprise oral and poster presentations on advanced approaches to address "BCI inefficiency" across various disciplines, specifically: i) neurophysiology (through characterization

of neural processes underlying BCI performance), ii) engineering (through development of novel approaches to improve capture and detection of users' intent), and iii) clinical (through proposing recommendations for designing and conducting clinical protocols). Then the workshop will provide an opportunity for industry representatives to showcase their products through oral presentations and demonstrations. Finally, panel discussions comprising industry representatives, researchers, and clinicians will be held.
This event aims to gather individuals interested in clinical applications of BCI, including clinicians, researchers from diverse fields, and industry professionals. The objective is to establish a lively dialogue among these disciplines.

Special Event - Thursday October 23 - H 09:00

AIRevEdu - Advanced Education and Training: Navigating the AI Revolution

This special event is dedicated to exploring innovative educational methods, skill development programs, and collaborative training strategies, with a particular emphasis on the transformative role of Artificial Intelligence (AI). Our focus is on preparing professionals for the rapidly evolving sectors of Industry 5.0 and Health 5.0, where AI is not just a tool but a fundamental driver of change.
Experts, educators, and industry leaders will share their insights on effective training tools, cutting-edge curriculum development, and best practices to enhance workforce capabilities in an AI-driven world. We'll delve into the challenges posed by AI's rapid advancements, including the need for continuous upskilling, ethical considerations, and the imperative to bridge the gap between technological innovation and human expertise.
Our goal is to foster continuous learning, promote crucial knowledge exchange, and build a skilled, future-ready workforce capable of driving advancements in education methods and smart infrastructure while effectively harnessing AI's potential. Join us in shaping the future of education and training for a smarter, more equitable, human centered and sustainable work society, proactively ready to embrace the opportunities and overcome the challenges presented by AI.

Special Event - Thursday October 23 - H 14:30

Data Ethics and Quality in the AI Era

As artificial intelligence systems become increasingly embedded in our lives, ethical concerns around data have taken center stage. Data is not neutral - it reflects human decisions, societal structures, and potential biases. When poor-quality data - often noisy, inconsistent, or incomplete - is used to train AI systems, it can amplify existing inequalities and lead to unfair or unreliable outcomes. This makes data quality a critical ethical issue. Ensuring fairness, transparency, and accountability in AI requires not only rigorous technical design, but also a careful evaluation of the data that fuels these systems.

In response, the European Union has introduced the EU AI Act-its first comprehensive regulation on artificial intelligence. Much like the GDPR transformed data protection, this legislation aims to set a global standard for responsible AI, promoting safety, sustainability, and ethical integrity while supporting innovation.

This regulatory landscape is further enriched by the Data Act, which complements the GDPR without undermining it. The Data Act reaffirms that it does not create a new legal basis for the processing of personal data and emphasizes the importance of key principles such as data minimization and privacy by design and by default - both essential for maintaining trust in data - driven technologies.

Among the tools identified to ensure the reliability and fairness of AI, metrology - the science of measurement - plays a key role. By promoting accuracy and transparency, it helps build systems that people can trust. For this reason, MetroXRAINE, where Metrology and AI are foundational pillars, will host a panel discussion with experts in ethics, law, sociology, and AI to explore how we can shape equitable and responsible AI ecosystems.

Special Event - Friday October 24 - H 09:00

PsychoBit 2025: Advancing Psychological Research Through Emerging Technologies

As technology continues to evolve, its influence on psychological research, evaluation, assessment, and intervention grows exponentially.

PsychoBit 2025 is dedicated to exploring the integration of cutting-edge technologies - including augmented and virtual reality, biosensors, large language models (LLMs), machine learning, and robotics - into psychological research and practice.

Key topics include, but are not limited to:

- Immersive environments for psychological assessment and therapy
- Behavioral and psychophysiological data analysis

- Biofeedback applications for mental health and well-being
- Advanced AI algorithms for psychological data analysis and diagnostics
- Applications of robotics (e.g., social robotics, educational robotics)

This special event aims to promote interdisciplinary collaboration between psychology and computational sciences focusing on empirical studies, theoretical advancements, and innovative applications that enhance psychological evaluation, assessment, and therapeutic interventions.

Special Event - Friday October 24 - H 09:00

DHEAL-COM4MetroXRAI

Community care is a healthcare model that aims to bring care close to citizens, reducing the need to travel to hospitals for basic or mid-level services. The main objective is to improve access to care, especially for people with mobility difficulties in rural or peripheral areas and patients with chronic diseases.
Health professionals increasingly use digital technology to maximize community engagement and effectively implement health interventions, a phenomenon evidenced by the COVID-19 pandemic. Digital technology offers better health information dissemination, communication, and data management. It has started to complement the human-based interactions offered by traditional grassroots outreach to improve the support of people in their communities. The DHEAL-COM project has been funded for the establishment of a Life Science Hub at the national level for the development and support of IT and new technology research activities aimed at enabling the improvement of patient monitoring, management, and treatment opportunities at the patient's home or in Community healthcare facilities, according to the needs of primary, secondary, and tertiary users and of the territories. The DHEAL-COM4MetroXRAI event will highlight the project results, advance research in digital solutions for community care, welcome external contributions in this area, and present concrete use cases of the exploitation of digital solutions in community care practice. The special focus during the event will be on training healthcare professionals to properly use the latest digital technologies, highlighting the opportunities, risks, and challenges by presenting the legal and ethical dimensions of the application of digital technologies to community care.

IEEE MetroXRAINE 2025 Panels

Special Event - Wednesday October 22 - H 09:30

Project 22HLT05 MAIBAI - Developing a metrological framework for assessment of image-based Artificial Intelligence systems for disease detection

The exponential increase in healthcare data, as well as the fast-paced technology developments, have resulted in promising novel image-based AI systems for disease detection and risk prediction. However, the adoption of AI in clinical settings remains limited, mostly due to the limited data quality and interoperability across heterogeneous clinical centers and electronic health records, the absence of robust validation procedures, and the distrust of predictions and decisions generated by AI systems.

Focusing on breast cancer screening and starting from the experience of the **European Metrology Partnership Project 22HLT05 MAIBAI**, this special session aims at discussing the main strategies that can be adopted to face the above issues, with the design of a standardised and impartial framework for performance, generalisability and suitability assessment of AI systems in the clinical domain. Special attention will be devoted to the development of large-scale and high-quality medical imaging databases, the categorization of data based on clinically relevant subgroups and image acquisition key factors, their integration with synthetic data generated with data-driven information approaches, the AI benchmarking in terms of robustness, accuracy and fairness, and the provision of visual explanation techniques, to make the decision process more transparent and interpretable.

Special Event - Friday October 23 - H 09:00

Empowering Sustainability through AI: Balancing Innovation and Environmental Responsibility

As the world tries to face pressing environmental challenges, the integration of Artificial Intelligence (AI) with sustainability has emerged as a critical strategy for mitigating these issues. The potential of AI has a great potential in driving the progress toward a more sustainable future, from optimizing resource usage to predicting environmental disasters.

This panel will explore the transformative role of AI in enhancing sustainability across different environmental domains. In this context, AI can be applied in a variety of situations, for instance to protect marine ecosystems, mitigate pollution, preserve endangered habitats, and improve

the living conditions of local communities. On the other hand, it is also crucial to examine the environmental footprint of AI itself, including energy consumption and e-waste generation, and discuss strategies for making AI systems more sustainable.
This panel is organized and sponsored by IEEE Women in Engineering (WiE) Affinity Group of the IEEE Italy Section: hence, a key objective is also to highlight innovative research conducted by women working in research, engineering and STEM disciplines. Indeed, a more sustainable world is inextricably linked to a more equitable and inclusive one, where everyone has the opportunity to thrive and contribute to the environmental protection.

Special Event - Friday October 23 - H 14:30

Toward a European Committee for BCI Standardization

In 2023, the EIC ISO JTC1 TC 43 was established to promote the international standardization process for Brain-Computer Interface (BCI) technologies. Since then, several national committees have been formed to support and enrich the standardization efforts from the ground up. Continental-level committees could play a key role in harmonizing standardization efforts under the guidance of EIC ISO JTC1 TC 43, with the goal of promoting product quality and effectiveness, sustainability of production processes, and ensuring user safety and privacy.
Within this context, the panel brings together key stakeholders involved in the ongoing creation of a European Committee for BCI Standardization, fostering dialogue and collaboration at the continental level.

IEEE MetroXRAINE 2025 Venue

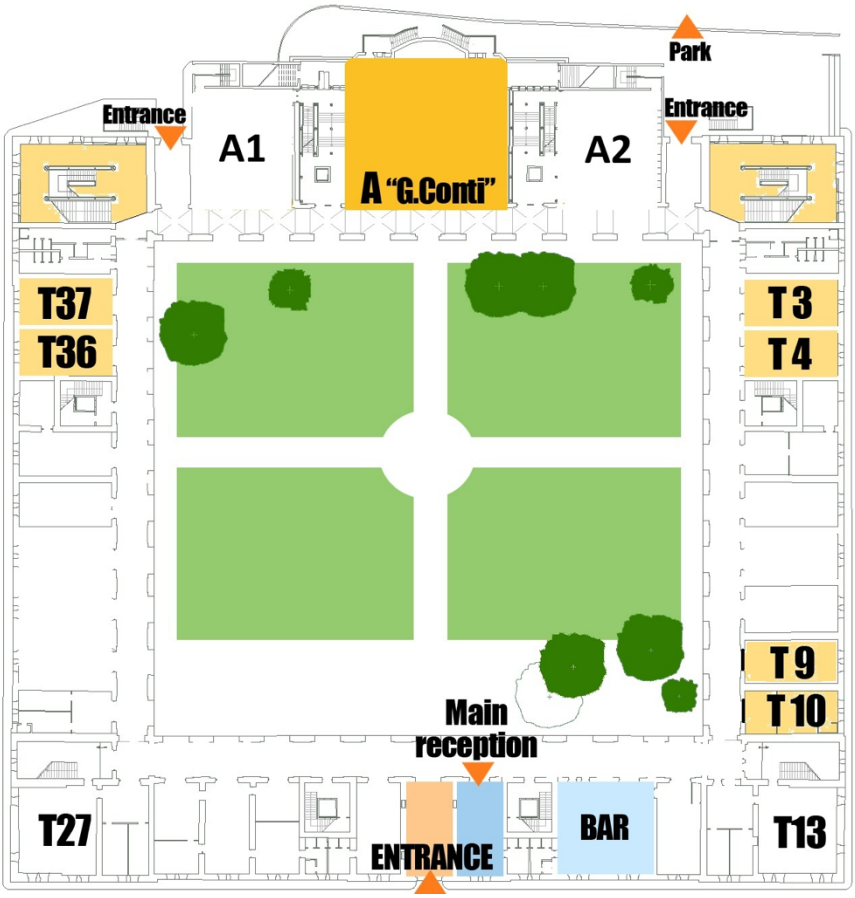
IEEE MetroXRAINE 2025 will be held at the Università Politecnica delle Marche - Faculty of Economics - Ex Caserma Villarey, Ancona.

The Faculty of Economics of the "Università Politecnica delle Marche" (UNIVPM) is centred in the Caserma Villarey, a striking architectural landmark in Ancona. This modern building features a sleek, contemporary design with large glass facades. Centrally located and just steps from the city park (Cardeto Park), it serves as a hub that unites the entire student community in a well-maintained, dynamic environment.

ADDRESS

Piazzale Martelli Raffaele, 8
60121 Ancona

Venue Map


Park
Entrance
Entrance
A1
A "G.Conti"
A2
T37
T36
T3
T4
T9
T10
Main reception
T27
ENTRANCE
BAR
T13

IEEE MetroXRAINE 2025 Social Events

Welcome Party - Wednesday, October 22

The IEEE MetroXRAINE **Welcome Party** will be held at the Università Politecnica delle Marche - Faculty of Economics - Conference Venue - on Wednesday, October 22 - 19:00.

Conference Dinner - Thursday, October 23

The IEEE MetroXRAINE **Conference Dinner** will be held at the "Sala delle Polveri", located within the historic *Mole Vanvitelliana* on Thursday, October 23 - 20:00.
ADDRESS - Mole Vanvitelliana - Banchina Giovanni da Chio, 28 - Ancona

Wine and Cheese Tasting Party - Friday, October 24

On Friday, October 24 - 18:50, after the Closing Ceremony, there will be the "**Wine and Cheese Tasting Party**" at the Università Politecnica delle Marche - Conference Venue.

IEEE MetroXRAINE 2025 Patronages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Program Schedule - Wednesday, Oct 22

WEDNESDAY OCTOBER 22					
	Aula Magna G.Conti	**Room T37**	**Room T3**	**Room T4**	**Room T36**
09:00 - 09:30	**OPENING CEREMONY -** Aula Magna G. Conti				
09:30 - 11:10	Session 1.1 - Advanced Human-Machine Interactions for Complex and Critical Environments	Session 1.2 - Integrated approaches to study the nervous system in health and disease - PART I	Session 1.3 - Advanced Techniques in Interaction Dynamics and Cybersecurity through Digital Devices	Session 1.4 - Fractal signals from the brain: from basic to biomedical applications	SPECIAL SESSION **Project 22HLT05 MAIBAI - Developing a metrological framework for assessment of image-based Artificial Intelligence systems for disease detection - PART I** Event promoted by INRiM
11:10 - 11:40	Coffee Break / Demo Session #1 / Poster Session #1				
11:40 - 12:40	KEYNOTE LECTURE - Olfa Kanoun, Chemnitz University of Technology **Redefining Human-Machine Interaction: Intelligent Camera-Free Wearable Gesture Recognition at the Edge**				
12:40 - 13:40	TUTORIAL - Christoph Guger, g.tec medical engineering GmbH **Brain-computer interfaces for neurorehabilitation, communication, brain assessment and brain mapping**				SPECIAL SESSION **Project 22HLT05 MAIBA - PART II**
	Aula Magna G.Conti	**Room T37**	**Room T3**	**Room T4**	**Room T36**
14:40 - 16:20	Session 2.1 - Employing Artificial Intelligence as Catalyst for Industrial Innovation	Session 2.2 - Violence Recognition and Measurement through Artificial Intelligence	Session 2.3 - Metrology in Respiratory Medicine: The Critical Role of Validation and Calibration in Ensuring Data Quality	Session 2.4 - General Session - PART I	
16:20 - 16:50	Coffee Break / Demo Session #1 (cont) / Poster Session #1 (cont)				
16:40	GROUP PHOTO				
16:50 - 18:20	SPECIAL EVENT - **ID4MetroXRAI** - Panel Session - Aula Magna				
18:20 - 19:00	Industry 4.0: Productivity, Sustainability, and Enabling Technologies in the Framework of Italian PNRR and Other Funded Projects				
19:00 - 20:30	**WELCOME PARTY & POSTER PRESENTATION**				

Program Schedule - Thursday, Oct 23

THURSDAY OCTOBER 23					
	Aula Magna G.Conti	**Room T37**	**Room T3**	**Room T4**	**Room T36**
09:00 - 10:40	Session 3.1 - Wearable sensors and AI in biomedical, sports, and industrial applications	Session 3.2 - Integrated approaches to study the nervous system in health and disease - PART II	Session 3.3 - WORKSHOP - Shaping the Future of Interaction: Integrating AI, Human Factors, and Immersive Technologies in HCI - PART I	SPECIAL EVENT **NxGenBCI 2025 - PART I**	SPECIAL EVENT - **AIRevEdu - Advanced Education and Training: Navigating the AI Revolution** - PART I
10:40 - 11:10	Coffee Break / Demo Session #2 / Poster Session #2				
11:10 - 12:10	KEYNOTE LECTURE - Yuntao Yu, Chair of Brain-Computer Interfaces - ISO/IEC JTC 1/SC 43 **Development and Standardization of BCI**				
12:10 - 13:10	TUTORIAL - Claudio Colangeli, Siemens Industry Software **XR as part of the everyday in engineering**			SPECIAL EVENT **NxGenBCI 2025 - PART II**	SPECIAL EVENT - **AIRevEdu - Advanced Education and Training: Navigating the AI Revolution** - PART II
13:10 - 14:30	Lunch / Demo Session #2 (cont) / Poster Session #2 (cont)				
	Aula Magna G.Conti	**Room T37**	**Room T3**	**Room T4**	**Room T36**
14:30 - 16:10	Session 4.1 - Distributed Learning and Hybrid AI: Bridging Technology, Society, and Ethics	Session 4.2 - Advanced age-friendly sensors and technologies for prevention and health monitoring	Session 4.3 - WORKSHOP - Shaping the Future of Interaction: Integrating AI, Human Factors, and Immersive Technologies in HCI - PART II	SPECIAL EVENT **NxGenBCI 2025 - PART III**	SPECIAL EVENT - **Data Ethics and Quality in the AI Era** - PART I
16:10 - 16:40	Coffee Break / Demo Session #2 (cont) / Poster Session #2 (cont)				
16:40 - 18:20	Session 5.1 - Sensors, Extended Reality and Artificial Intelligence for Human Behavior Analysis	Session 5.2 - Non-Contact Measurement Techniques and AI for Smart Industry	Session 5.3 - WORKSHOP - Shaping the Future of Interaction: Integrating AI, Human Factors, and Immersive Technologies in HCI - PART III	SPECIAL EVENT **NxGenBCI 2025 - PART IV**	SPECIAL EVENT - **Data Ethics and Quality in the AI Era** - PART II
20:00	**CONFERENCE DINNER** - *Mole Vanvitelliana - Sala delle Polveri*				

Program Schedule - Friday, Oct 24

FRIDAY OCTOBER 24					
	Aula Magna G.Conti	**Room T37**	**Room T3**	**Room T4**	**Room T36**
09:00 - 10:40	Session 6.1 - Generative Artificial Intelligence and Digital Twins for Empowering Health	Session 6.2 **PsychoBit - PART I**	PANEL - **Empowering Sustainability through AI** Promoted by IEEE WiE Italy Section AG	Youth Program	SPECIAL EVENT - **DHEAL-COM4MetroXRAI** - PART I
10:40 - 11:10	Coffee Break / Demo Session #3 / Poster Session #3				
11:10 - 12:10	KEYNOTE LECTURE - Federico Mattei, IBM Quantum Ambassador **Quantum Computing and its Synergies with AI**				
12:10 - 13:10	TUTORIAL - Enzo Pasquale Scilingo, University of Pisa **Abel: Towards Artificial Empathy - A Social Robot for Natural Interactions**				SPECIAL EVENT - **DHEAL-COM4MetroXRAI** - PART II
13:10 - 14:30	Lunch / Demo Session #3 (cont) / Poster Session #3 (cont)				
	Aula Magna G.Conti	**Room T37**	**Room T3**	**Room T4**	**Room T36**
14:30 - 16:10	Session 7.1 - From Brain Dynamics to Real-World Applications: Functional Neuroimaging and BCI Advances	Session 7.2 **PsychoBit - PART II**	Session 7.3 - Biomimetic Memristive Nanotechnologies for Artificial Intelligence, Edge Computing and Neuromorphic Engineering Applications	PANEL - **Toward a European Committee for BCI Standardization**	SPECIAL EVENT - **DHEAL-COM4MetroXRAI** - PART III
16:10 - 16:40	Coffee Break / Demo Session #3 (cont) / Poster Session #3 (cont) / Youth Forum				
16:40 - 18:20	Session 8.1 - Brain-Computer Interfaces in Healthcare and Rehabilitation	Session 8.2 **PsychoBit - PART III**	Session 8.3 - Emerging Technologies for Health Monitoring and Personalized Medicine	Session 8.4 - General Session - PART II	
18:20 - 18:50	CLOSING AND AWARD CEREMONY				
18:50 - 19:30	WINE AND CHEESE TASTING PARTY				

Technical Program - Wednesday, Oct 22

08:30 - 18:00	*Università Politecnica delle Marche - Faculty of Economics* **REGISTRATIONS**

09:00 - 09:30	*Aula Magna G. Conti* **OPENING CEREMONY - WELCOME ADDRESSES**

09:30 - 11:10	*Aula Magna G. Conti* **Session 1.1 - Advanced Human-Machine Interactions for Complex and Critical Environments** **Chairs:** Michael Kuhl, *Mittweida University of Applied Sciences, Germany* Flaviana Tagliaferri, *Mittweida University of Applied Sciences, Germany*

09:30 **The Impact of Non-Task-Related Neural Activity in EEG-Based Motor Imagery Classification**
Simone Bove, Martino Giaquinto, Gennaro Percannella, Alessia Saggese and Mario Vento (University of Salerno, Italy)

09:50 **Stay Quiet: Investigating the Effect of Overt Speech on EEG Classification Performance**
Patrick Bings (DFKI, Germany); Niklas Kueper (German Research Center for Artificial Intelligence, Germany & University of Duisburg Essen, Germany); Elsa A. Kirchner (University Duisburg-Essen, Germany & German Research Centre for Artificial Intelligence, Germany)

10:10 **Enhancing Decision-Making in Human-Machine Teams**
Akashdeep Nijjar and Ittipat Promnorakid (University of Essex, United Kingdom); Tom Reed (DSTL, United Kingdom); Chistopher Baker (Queen's University Belfast, United Kingdom & Liverpool John Moores University, United Kingdom); Stephen Hinton and Stephen Fairclough (Liverpool John Moores University, United Kingdom); Riccardo Poli and Caterina Cinel (University of Essex, United Kingdom)

10:30 **A Proposal for an Self-Rescue System Based on Offline LLM for Minor Injuries After an Earthquake**
Francesco Carotenuto (University of Naples Federico II, Italy); Giovanni Acampora (University of Naples Federico II & Istituto Nazionale di Fisica Nucleare, Italy); Aldo Zollo (University of Naples Federico II, Italy)

10:50 **TinyML-Based Hazardous Gas Detection for Intelligent Personal Protective Equipment**
Celina Kudrin-Gusten, Michael Kuhl, Valentin Barth and Hang Yu (Mittweida University of Science, Germany)

09:30 - 11:10 *Room T37*
Session 1.2 - Integrated approaches to study the nervous system in health and disease - PART I
Chairs: Leandro Donisi, *University of Campania Luigi Vanvitelli, Italy*
Giuseppe Prisco, *University of Molise, Italy*

09:30 **Keeping Balance at Sea and Ashore: Investigating Habituation-Adaptation Dynamics in Postural Control Among Seafarers and Healthy Adults**
Federica Pescaglia (Institute of Biomedical and Neural Engineering, Iceland); Lorena Guerrini (Reykjavik University, Iceland & University of Campania L. Vanvitelli, Italy); Carmine Gelormini, Ida Maruotto and Marco Recenti (Reykjavik University, Iceland); Hannes Petersen (Akureyri Hospital, Iceland); Halldór Jónsson jr and Paolo Gargiulo (Reykjavik University, Iceland)

09:50 **SMOTE and ADASYN to Augment Neuroradiomics Data: a Comparative Analysis**
Bukhtawar Zamir (University of Campania Luigi Vanvitelli, Italy); Noemi Pisani (University of Naples Federico II, Italy); Maria Agnese Pirozzi (University of Campania Luigi Vanvitelli, Italy); Maria Teresa Pellecchia (Scuola Medica Salernitana University of Salerno, Italy); Leandro Donisi and Fabrizio Esposito (University of Campania Luigi Vanvitelli, Italy)

10:10 **Dynamic T2* Mapping of Resting State Functional Connectivity: a Multi-Echo fMRI Approach**
Giordano Ponetti and Giulia Bosello (University G. d'Annunzio Chieti Pescara, Italy); Fedele Dono and Giacomo Evangelista (University Hospital, Chieti, Italy); Piero Chiacchiaretta, Stefano L. Sensi, Massimo Caulo, Mauro Gianni Perrucci and Antonio Ferretti (University G. d'Annunzio Chieti Pescara, Italy)

10:30 **Impact of Brain Parcellation on MRI-Derived Neurovascular Coupling Estimates Across Large-Scale Functional Networks**
Federica Franza, Mario Cirillo, Marcello Silvestro, Francesca Trojsi, Antonio Russo, Fabrizio Esposito and Maria Agnese Pirozzi (University of Campania Luigi Vanvitelli, Italy)

10:50 **Exploring Heart Rate Variability During a Postural Control Task Using Virtual Reality and a Moving Platform**
Vittorio Santoriello (University of Naples Federico II, Italy); Sara Collodel (Reykjavik University, Iceland); Lorena Guerrini (Reykjavik University, Iceland & University of Campania L. Vanvitelli, Italy); Federica Pescaglia (Institute of Biomedical and Neural Engineering, Iceland); Halldór Jónsson jr (Reykjavik University, Iceland); Hannes Petersen (Akureyri Hospital, Iceland); Francesca Angelone (University of Sannio, Italy);

Carlo Ricciardi, Francesco Amato and Maria Romano (University of Naples Federico II, Italy); Paolo Gargiulo (Reykjavik University, Iceland)

09:30 - 11:10 *Room T3*

Session 1.3 - Advanced Techniques in Interaction Dynamics and Cybersecurity through Digital Devices

Chairs: Donato Impedovo*, University of Bari Aldo Moro, Italy*
Vincenzo Gattulli*, University of Bari Aldo Moro, Italy*

09:30 **Deceptive Beauty: Evaluating the Impact of Beauty Filters on Deepfake and Morphing Attack Detection**
Sara Concas, Simone Maurizio La Cava, Andrea Panzino, Ester Masala, Giulia Orrù and Gian Luca Marcialis (University of Cagliari, Italy)

09:50 **Adversarial Machine Learning in Cyber Social Security**
Vita Santa Barletta, Christian Catalano, Mattia Colucci, Samuele del Vescovo and Antonio Piccinno (University of Bari, Italy)

10:10 **AI-Based Detection of Negative Digital Acts: the Case of Cyberaggression**
Alessia Monaco and Fabrizia Devito (University of Bari "Aldo Moro", Italy); Luca Musti (VANTIA srl, Italy)

10:30 **Touch Dynamics and Continuous Authentication: Towards Mobile Security with New Innovative Algorithms and Features**
Stefania Bello, Vincenzo Gattulli and Donato Impedovo (University of Bari "Aldo Moro", Italy)

10:50 **Unintended Identification in HAR Systems: Evaluating Privacy Risks**
Gianpaolo Perelli, Jefferson David Rodriguez Chivata and Sara Concas (University of Cagliari, Italy); Giulia Avvisati and Massimo Capozza (Wallife, Italy); Marco Micheletto (University of Calabria, Italy); Giulia Orrù and Gian Luca Marcialis (University of Cagliari, Italy)

09:30 - 11:10 *Room T4*

Session 1.4 - Fractal signals from the brain: from basic to biomedical applications

Chairs: Camillo Porcaro, *University of Padova, Italy*
Nicola Moccaldi, *University of Naples Federico II, Italy*

09:30 **A Machine Learning Pipeline for Evaluating Pre-Stimulus EEG Features and Their Impact on Post-Stimulus TMS-EEG Responses**
Sadaf Moaveninejad, Antonio Luigi Bisogno, Simone Cauzzo, Maurizio Corbetta and Camillo Porcaro (University of Padova, Italy)

09:50 **Enhancing Brain-Computer Interfaces: Machine Learning Analysis of Alpha-Beta ERD and Fractal Dimension in Motor Imagery EEG**

Sadaf Moaveninejad (University of Padova, Italy); Franca Tecchio (National Research Council, Italy); Francesco Ferracuti (Università Politecnica delle Marche, Italy); Sabrina Iarlori (Università degli Studi eCampus, Italy); Andrea Monteriù (Università Politecnica Delle Marche, Italy); Camillo Porcaro (University of Padova, Italy)

10:10 **Power Spectra and Fractal Complexity in Neurocognitive Disorders: a QEEG Study Protocol**
Giulia Negro and Michele Rossi (Golgi Cenci Foundation, Italy); Paola Cassini (ASP Golgi Redaelli, Italy); Payam Tabaee Damavandi (University of Milano Bicocca, Italy); Tino Emanuele Poloni (Golgi Cenci Foundation, Italy); Camillo Porcaro (University of Padova, Italy)

10:30 **Exploring Subcortical and Cortical Neural Complexity in Migraine: a Fractal and Spectral Analysis Approach**
Camillo Porcaro and Sadaf Moaveninejad (University of Padova, Italy); Romain Aubonnet (Università di Roma Tor Vergata, Italy); Karolina Armonaite (Kaunas University of Technology, Lithuania); Sara Gilli (Sapienza University of Rome Polo Pontino ICOT Latina, Italy); Giorgio Di Lorenzo (Università di Roma Tor Vergata, Italy); Gianluca Coppola (Sapienza University, Italy)

10:50 **Fractal Complexity of Brain Networks: Mapping Criticality by Detrended Fluctuation Analysis**
Lorenzo Pini, Simone Cauzzo, Sadaf Moaveninejad, Maurizio Corbetta and Camillo Porcaro (University of Padova, Italy)

09:30 - 11:10 *Room T36*
Session 1.5 - SPECIAL SESSION - Project 22HLT05 MAIBAI - Developing a metrological framework for assessment of image-based Artificial Intelligence systems for disease detection - PART I
Chair: Alessandra Manzin, *INRiM, Italy*

09:30 **AI in breast cancer screening, where is it coming in?**
Ruben Van Engen, Carlijn Roozemond (Dutch Expert Centre for Screening - LRCB, Nijmegen, Netherlands)

09:50 **Trials and tribulations of collecting sufficient mammography images to cover the various sub-groups within a screening population**
Alistair Mackenzie (Royal Surrey NHS Foundation Trust, Guildford, UK)

10:10 **Role of synthetic data in the development of AI models for breast cancer screening**
Alessandra Manzin (Istituto Nazionale di Ricerca Metrologica - INRiM, Torino, Italy)

10:30 **Practical considerations and quality assessment of breast cancer detection models using mammography**
Danny Panknin (Physikalisch-Technische Bundesanstalt - PTB, Berlin, Germany)

10:50 **Beyond regions of interest: reconciling radiologist expectations with diverse XAI approaches in mammography**
Aleksander Sadikov (University of Ljubljana, Slovenia)

11:10 - 11:40	*Università Politecnica delle Marche - Faculty of Economics* **COFFEE BREAK**

11:10 - 11:40	*Room T9 - T10* **DEMO SESSION #1** **Chair:** Nicola Moccaldi, *University of Naples Federico II, Italy*
DEMO #1.1	**BCI-Controlled Assistive Robot Navigation Using g.tec EEG: A Real-Time Demonstration** Karameldeen Omer, Università Politecnica delle Marche, Italy
DEMO #1.2	**Telepalpation System for Stiffness Recognition through Neuromorphic Vibrotactile Feedback in VR** Alessandro Profili, Scuola Superiore Sant'Anna di Pisa, Italy
DEMO #1.3	**Augmented Reality with Mass Models** Dean Müller, University of Applied Sciences Mittweida, Germany

11:10 - 11:40	*Università Politecnica delle Marche - Faculty of Economics* **POSTER SESSION #1** **Session Coordinators:** Alessandra Angelucci, *Politecnico di Milano, Italy* Daniele Spoladore, *National Research Council, Italy*

PS01 **Enhanced EEG Complexity and Spectral Alterations in Migraine: a PSD and Higuchi's Fractal Dimension Analysis Using ICA and PCA Spatial Filters**
Camillo Porcaro and Sadaf Moaveninejad (University of Padova, Italy); Romain Aubonnet (Università di Roma Tor Vergata, Italy); Sara Gilli (Sapienza University of Rome Polo Pontino ICOT Latina, Italy); Gianluca Coppola (Sapienza University, Italy); Giorgio Di Lorenzo (Università di Roma Tor Vergata, Italy)

PS02 **A Novel Algorithm Based on Ankle-Mounted IMU Configuration for Computing Spatiotemporal Parameters**
Giuseppe Prisco (University of Molise, Italy); Alfonso M Ponsiglione (University of Naples Federico II, Italy); Fabrizio Esposito (University of Campania Luigi Vanvitelli, Italy); Sergio Lerma Lara (CSEU, La Salle. UAM, Spain); Paolo Gargiulo (Reykjavik University, Iceland); Antonella Santone (University of Molise, Italy); Mario Cesarelli (University of Sannio, Italy); Francesco Amato (University of Napoli Federico II, Italy); Leandro Donisi (University of Campania Luigi Vanvitelli, Italy)

PS03 **Validity of an Automatic Approach for Acceleration Signal Segmentation During Weight Lifting**

Giuseppe Prisco (University of Molise, Italy); Maria Agnese Pirozzi and Fabrizio Esposito (University of Campania Luigi Vanvitelli, Italy); Antonella Santone (University of Molise, Italy); Mario Cesarelli (University of Sannio, Italy); Paolo Gargiulo (Reykjavik University, Iceland); Francesco Amato (University of Napoli Federico II, Italy); Leandro Donisi (University of Campania Luigi Vanvitelli, Italy)

PS04 **Assessing the Consistency of EEG Connectome Topology Across Different Parcellation Approaches**

Marianna Chianese (University of Campania Luigi Vanvitelli, Italy); Federica Pescaglia (Institute of Biomedical and Neural Engineering, Iceland); Lorena Guerrini (Reykjavik University & University of Campania L. Vanvitelli, Italy); Carmine Gelormini and Ida Maruotto (Reykjavik University, Iceland); Gylfi Örn Þormar (Landspitali University Hospital, Iceland); Fabrizio Esposito and Leandro Donisi (University of Campania Luigi Vanvitelli, Italy); Paolo Gargiulo (Reykjavik University, Iceland)

PS05 **Exploring Center of Pressure Dynamics Across Age and Gender During Complex Postural Challenges**

Lorena Guerrini (Reykjavik University & University of Campania L. Vanvitelli, Italy); Vittorio Santoriello (University of Naples Federico II, Italy); Federica Pescaglia (Institute of Biomedical and Neural Engineering, Iceland); Alfonso M Ponsiglione (University of Naples Federico II, Italy); Vincenzo Minutolo (University of Campania Luigi Vanvitelli, Italy); Hannes Petersen (Akureyri Hospital, Iceland); Halldór Jónsson jr and Paolo Gargiulo (Reykjavik University, Iceland)

PS06 **Comparative Analysis of Deep Learning Models for Cyberbullying Detection Across Social Platforms**

Stefania Bello, Vincenzo Gattulli and Alessia Monaco (University of Bari "Aldo Moro", Italy)

PS07 **Trade-off Evaluation Between Privacy and Data Utility Through the Application of Fully Homomorphic Encryption During ML Models Training for Classifying Misogyny Content**

Vita Santa Barletta, Paolo Buono, Danilo Caivano, Domenico Desiato and Roberto La Scala (University of Bari Aldo Moro, Italy)

PS08 **Cyberbullying: an Interdisciplinary Survey of the Dark Side of Social Networks**

Alessia Anna Catalano (University of Salento, Italy); Christian Catalano (University of Bari Aldo Moro, Italy); Andrea Chezzi, Emanuela Ingusci and Luca Mainetti (University of Salento, Italy)

PS09 **A Method for Diabetic Retinopathy Detection Through Radiomics and Machine Learning**

Simona Correra and Valeria Sorgente (University of Molise, Italy); Mario Cesarelli (University of Sannio, Italy); Paolo Gargiulo (Reykjavik University, Iceland); Antonella Santone and Francesco Mercaldo (University of Molise, Italy)

PS10 **A Novel Spiking Neural Network Approach for Hand Motion Assessment in Awake Neurosurgery**
Luigi G Troconis, Francesco Vella, Alessandro Freddi, Riccardo Felicetti and Andrea Monteriù (Università Politecnica delle Marche, Italy)

PS11 **A Glimpse on HCAI Frameworks: a Scoping Review to Adapt Them to Mixed Reality**
Aurelio Sepe, Simone Spera, Otino Pio Santosuosso, Giuliana Vitiello, Andrea Antonio Cantone and Alireza Mortezapour (University of Salerno, Italy)

PS12 **Exploring Focus Groups as a Tool for Knowledge Acquisition and Conceptualization Phases in Ontology Engineering**
Daniele Spoladore (National Research Council, Italy); Sara Vannelli and Filippo Visintin (University of Florence, Italy); Alberto Trombetta (University of Insubria, Italy)

PS13 **Extended Reality and Artificial Intelligence to Support the Treatment of Prostate Cancer**
Rocco Rizzo, Giovanni D'Errico, Giulia Pellegrino, Cristina Barba and Lucio Tommaso De Paolis (University of Salento, Italy)

PS14 **Automated Timed Up and Go Test Segmentation via Pose Detection**
Aram Sibar Algilani, Sebastian Victor Aguilar and Dario Salvi (Malmö University, Sweden); Filippo Palumbo (National Research Council, Italy)

PS15 **Generative AI-Driven 3D Printing of Conformable, Skin-Inspired Actuators for Advanced Wearable Technologies**
Raffaele Pugliese, Silvia Badini, Stefano Regondi and Vera Colombo (Nemo Lab, Italy)

PS16 **Effects of Skin Color on the Accuracy of Heart Rate Detection of Commercial Wearable Devices: An Exploratory Pilot**
Hussein Jaber, Carl Magnus Olsson and Dario Salvi (Malmö University, Sweden)

PS17 **EbESCNN: a Eye Binary Event Spiking Convolutional Neural Network Architecture for Event-Based Eye Tracking**
Luigi G Troconis, Francesco Vella, Alessandro Freddi and Andrea Monteriù (Università Politecnica delle Marche, Italy)

PS18 **A Graph-Based Representation for Magnetic Resonance Imaging Metadata Leveraging Neo4j**
Pierluigi Reali, Emilia Lenzi, Lorenzo Auletta, Maria G Signorini and Letizia Tanca (Politecnico di Milano, Italy)

PS19 **A Pipeline for Lithium-Ion Battery Data Integration and Remaining Useful Life Estimation**
Luca Martiri, Andrea Moschetti and Loredana Cristaldi (Politecnico di Milano, Italy)

PS20 **About the Importance of Open Data in Biomedical Research**
Giuseppe Cesarelli and Stefano Franceschini (University of Naples Parthenope, Italy); Michela Russo (University of Naples Federico II, Italy); Francesca Angelone (University

of Sannio, Italy); Leandro Donisi (University of Campania Luigi Vanvitelli, Italy); Paolo Gargiulo (Reykjavik University); Antonella Santone and Francesco Mercaldo (University of Molise, Italy)

PS21 **Creating an Augmented Reality-Based Assistant to Support the Toolmaking Process**
Ronja Schneider, Jonas Trezl, Dean Müller and Philipp Klimant (Mittweida University of Applied Sciences, Germany)

PS22 **A Proposal for a VR Serious Game for Training of Earthquake Early Warning Systems for Wearable Devices in the Context of Critical Environment**
Francesco Carotenuto (University of Naples Federico II, Italy); Giovanni Acampora (University of Naples Federico II & Istituto Nazionale di Fisica Nucleare, Italy); Aldo Zollo (University of Naples Federico II, Italy)

PS23 **Real-Time Hand Gesture Recognition System with User Identification for Industrial Applications**
Marco Esposito (Università Politecnica delle Marche, Italy); Sara Raggiunto (CNIT & Università Politecnica Delle Marche, Italy); Luisiana Sabbatini, Alberto Belli, Sara Bruschi, Lorenzo Palma, Emanuele Storti, Stefano Rossini and Paola Pierleoni (Università Politecnica delle Marche, Italy)

PS24 **6-Axis Sensors to Support Environment Detection on Safety Waistcoats for Employees in the Intralogistics Sector**
Kevin Blümel, Finn Hölzel and Michael Kuhl (Mittweida University of Applied Sciences, Germany)

PS25 **Neurophysiological Correlates of Human Trust in Machines: EEG-Based Assessment Using Error-Related Potentials and P300**
Happy Chidi Onyeoru (University of Sheffield, United Kingdom); Christ Wirth (School of Medical Sciences, University of Manchester, United Kingdom); Mahnaz Arvaneh (The University of Sheffield, United Kingdom)

PS26 **Enhancing Sensors Accuracy for Deploying Precision Agriculture in the Field**
Danilo Pietro Pau (STMicroelectronics, Italy); Francesco Saccani, Michele Amoretti and Stefano Caselli (University of Parma, Italy)

PS27 **Measuring Environmental Sustainability of Industrial Machinery: from Energy Consumption to Avoidable Emissions**
Leopoldo Angrisani, Mauro D'Arco, Egidio De Benedetto, Luigi Duraccio, Immacolata Esposito and Annarita Tedesco (University of Naples Federico II, Italy)

11:40 - 12:40	*Aula Magna G. Conti* **PLENARY SESSION - KEYNOTE LECTURE** **Chair**: Pedro Ramos, *Instituto Superior Técnico - University of Lisboa*

Redefining Human-Machine Interaction: Intelligent Camera-Free Wearable Gesture Recognition at the Edge

Olfa Kanoun, *Chemnitz University of Technology, Germany*

12:40 - 13:40	*Aula Magna G. Conti* **TUTORIAL SESSION** **Chair**: Nicola Moccaldi, *University of Naples Federico II, Italy*

Brain-computer interfaces for neurorehabilitation, communication, brain assessment and brain mapping

Christoph Guger, *g.tec medical engineering GmbH*

12:40 - 13:40	*Room T36* **Session 1.5 - SPECIAL SESSION - Project 22HLT05 MAIBAI - Developing a metrological framework for assessment of image-based Artificial Intelligence systems for disease detection - PART II** **Chair:** Alessandra Manzin, *INRiM, Italy*

13:40 - 14:40	*Università Politecnica delle Marche - Faculty of Economics* **LUNCH / DEMO SESSION #1 / POSTER SESSION #1**

Still presenting Demos of the **Demo Session #1** and Posters of the **Poster Session #1**.

14:40 - 16:20	*Aula Magna G. Conti* **Session 2.1 - Employing Artificial Intelligence as Catalyst for Industrial Innovation** **Chairs:** Loris Cannelli, *SUPSI-USI, Switzerland* Christian Laurano, *Politecnico di Milano, Italy*

14:40 **Advanced Knowledge Distillation Pipeline with Dynamic Weighted-Smoothed Loss for a Robust Deep Network Deployment in Resource-Constrained Embedded Systems**

Francesco Rundo (University of Catania, Italy); Giulia Castagnolo and Carmelo Pino (STMicroelectronics, Italy); Massimo Orazio Spata (University of Catania & STMicroelectronics, Italy); Angelo Alberto Messina and Michele Calabretta (STMicroelectronics, Italy); Sebastiano Battiato (University of Catania, Italy)

15:00 **Estimation of Remaining Useful Life of Lithium-Ion Batteries and Output Uncertainty Evaluation**
Luca Martiri, Andrea Moschetti, Loredana Cristaldi and Marco Faifer (Politecnico di Milano, Italy)

15:20 **Advanced Non-Local Pipeline for Domain-Adapted Intelligent Power Device Defects Analysis for a Robust Traction Inverter in Next Generation Electric Cars**
Carmelo Pino (STMicroelectronics, Italy); Francesco Rundo (University of Catania, Italy); Giulia Castagnolo (STMicroelectronics, Italy); Massimo Orazio Spata (University of Catania & STMicroelectronics, Italy); Angelo Alberto Messina and Michele Calabretta (STMicroelectronics, Italy); Sebastiano Battiato (University of Catania, Italy)

15:40 **Investigation of the Relationship Between High and Low Frequency Resistances of Li-Ion Batteries: a Machine Learning Approach**
Simone Barcellona (Politecnico di Milano, Italy); Loris Cannelli (SUPSI-USI, Switzerland); Lorenzo Codecasa (Politecnico di Milano, Italy); Silvia Colnago (Ricerca sul Sistema Energetico RSE SpA, Italy); Loredana Cristaldi and Christian Laurano (Politecnico di Milano, Italy); Gabriele Maroni (SUPSI-USI, Switzerland)

16:00 **Towards Machine Learning-Based Ontology Mapping to Bridge O*Net and ESCO Skills**
Sabatina Criscuolo (National Research Council of Italy, Italy & University of Naples Federico II, Italy); Daniele Spoladore (National Research Council, Italy); Atieh Mahroo (Italian National Research Council & University of Milano-Bicocca, Italy); Eleonora Conti and Barbara Volta (University of Modena and Reggio Emilia, Italy); Francesco Isgrò and Pasquale Arpaia (University of Naples Federico II, Italy); Marco Sacco (National Research Council, Italy)

14:40 - 16:20 *Room T37*
Session 2.2 - Violence Recognition and Measurement through Artificial Intelligence
Chairs: Malvina Halilaj, *University of Tirana, Albania*
Paolo Sernani, *University of Macerata, Italy*

14:40 **Violence Detection from Emergency Room Reports**
Lorenzo Caresio, Matteo Delsanto, Calogero Jerik Scozzaro and Enrico Mensa (University of Turin, Italy); Davide Colla (Italy); Carlo Mamo (ASL-TO5, Italy); Alessio Pitidis (Istituto Superiore di Sanità, Italy); Arianna Vitale (A.O. Ordine Mauriziano di Torino, Italy); Daniele P Radicioni (University of Turin, Italy)

15:00 **LSFES: a Linguistic Structure Feature Extraction System for Hate Speech and Offensive Language Classification**
Waleed Abdullah Mohammed Alromaema (Università Politecnica delle Marche, Italy & Healthcare Engineering Srl, Italy); Claudio E. Casetti (Politecnico di Torino, Italy); Aldo F. Dragoni (Università Politecnica Delle Marche, Italy)

15:20 **Preventing Violence Using AI-Powered Surveillance and Indoor Positioning Systems**
Erisa Bekteshi (University of Tirana, Albania); Arlinda Ymeri (University of Shkoder, Albania); Claudio Pascarelli (University of Salento, Italy)

15:40 **Real-Time Violence Detection in Video Footage Using a Mobile-Friendly CNN-Based Model**
Malvina Halilaj (University of Tirana, Albania); Valeria Cannone and Aldo F. Dragoni (Università Politecnica Delle Marche, Italy); Paolo Sernani (University of Macerata, Italy)

16:00 **Spotting the Aggressor: Pose-Based Violence Detection Through Spatial-Temporal Deep Learning Techniques**
Alessandro Rongoni, Lorenzo Longarini, Mariorosario Prist (Università Politecnica delle Marche, Italy); Geremia Pompei (Institute for Chemical-Physical Processes National Research Council, Italy); Aldo F. Dragoni (Università Politecnica Delle Marche, Italy)

14:40 - 16:20 *Room T3*
Session 2.3 - Metrology in Respiratory Medicine: The Critical Role of Validation and Calibration in Ensuring Data Quality
Chairs: Francesca Pennati, *Politecnico di Milano, Italy*
Maria Antonella LoMauro, *Politecnico di Milano, Italy*

14:40 **Comparing Respiratory Rate and Minute Ventilation Measures Between Commercial-Grade Wearable Devices and a Metabolic Cart**
Pietro Massone, Sara Bernasconi, Leo Bernardin and Alessandra Angelucci (Politecnico di Milano, Italy); Martina Mazzarello (Massachusetts Institute of Technology, USA); Andrea Aliverti (Politecnico di Milano, Italy)

15:00 **Ensuring Reliability in Preclinical Lung Imaging: a Comparison of Micro-CT Calibration Techniques**
Francesca Pennati and Davide Buseghin (Politecnico di Milano, Italy); Martina Buccardi (University of Parma, Italy); Erica Ferrini (Chiesi Farmaceutici S.P.A, Italy); Andrea Aliverti (Politecnico di Milano, Italy); Fabio Franco Stellari (Chiesi Farmaceutici, Italy)

15:20 **Changes in Interpretation of Lung Volumes According to Respiratory References: The Emblematic Case of Osteogenesis Imperfecta**
Antonella LoMauro and Andrea Aliverti (Politecnico di Milano, Italy)

15:40 **Impact of Device Non-Ideality on Respiratory Oscillometry Measures**
Elena Barzanti, Raffaele Dellacà and Chiara Veneroni (Politecnico di Milano, Italy)

16:00 **Evaluating Tidal Volume Variations Across Dimensions: Displacement, Diameter, Perimeter, and Area During Exercise - a Case Study**
Antonella LoMauro and Andrea Aliverti (Politecnico di Milano, Italy)

14:40 - 16:20	*Room T4* **Session 2.4 - General Session - PART I** **Chairs:** Alessandra Angelucci, *Politecnico di Milano, Italy* Egidio De Benedetto, *University of Naples Federico II, Italy*

14:40 **Policy Perspectives on Challenges, Barriers and Potential Enablers of Large-Scale AI-Driven Solutions in Cardiology**
Carina Dantas (SHINE 2Europe & ICBAS - University of Porto, Portugal); Miriam Cabrita and Daniel Dias (SHINE 2Europe, Portugal); Saskia Haitjema (University Medical Center Utrecht, Greece); Folkert Asselbergs (Amsterdam University Medical Centre, Portugal)

15:00 **A Preliminary Study on Band-Specific Multivariate Multiscale Fuzzy Entropy of EEG in Mild Cognitive Impairment**
Pasquale Arpaia and Maria Cacciapuoti (University of Naples Federico II, Italy); Olimpia Criscuolo (Fondazione Peppino Scoppa Onlus, Italy); Sabatina Criscuolo (National Research Council of Italy, Italy & University of Naples Federico II, Italy); Egidio De Benedetto (University of Naples Federico II, Italy); Antonio Masciullo (University of Salento, Italy); Marisa Pesola (University of Naples Federico II, Italy); Raissa Schiavoni (University of Salento, Italy); Annarita Tedesco (University of Naples, Federico II, Italy)

15:20 **Escape Together - Measuring Efficiency, Presence and Cognitive Load in a Collaborative Telepresence Task**
Jennifer Brade, Sarah Mandl, Valeska Vitt, Franziska Klimant, Anja Strobel and Martin Dix (Chemnitz University of Technology, Germany)

15:40 **Monitoring Nasal Skin Temperature with a Contact Sensor: Insights from a Pilot Study on Stress**
Sara Bernasconi (Politecnico di Milano, Italy); Niccolò Antonello (EssilorLuxottica Smart Eyewear Lab, Italy); Alice Scandelli and Federica Villa (Politecnico di Milano, Italy); Diana Trojaniello (EssilorLuxottica Smart Eyewear Lab, Italy); Andrea Aliverti (Politecnico di Milano, Italy)

16:00 **Multivariate Glucose Prediction with BiLSTM and Explainable AI in an Inter-Subject Framework**
Giovanni Annuzzi, Pasquale Arpaia and Lutgarda Bozzetto (University of Naples Federico II, Italy); Sabatina Criscuolo (National Research Council of Italy, Italy & University of Naples Federico II, Italy); Andrea De Maria and Marisa Pesola (University of Naples Federico II, Italy)

16:20 - 16:50	*Università Politecnica delle Marche - Faculty of Economics* **COFFEE BREAK / DEMO SESSION #1 / POSTER SESSION #1**

Still presenting Demos of the **Demo Session #1** and Posters of the **Poster Session #1**.

16:40	*Università Politecnica delle Marche - Faculty of Economics* **GROUP PHOTO**

16:50 - 19:00	*Aula Magna G. Conti* **SPECIAL EVENT ID4MetroXRAI 2025** **Chair:** Pedro Ramos, *Instituto Superior Técnico - University of Lisboa, Portugal*

16:50 PANEL SESSION

Speakers
Paolo Perani, Sustainability Manager ELDS Division, ABB
Guido Ancarani, Business Development, DIGITECFER
Romano Iazurlo, Eletronic Division, LEONARDO
Massimo Iaculo, Director, MICRON
Edoardo Mola, CEO, PRAXI Intellectual Property

18:20 Industry 4.0: Productivity, Sustainability, and Enabling Technologies in the Framework of Italian PNRR and Other Funded Projects – Pitch Session

Chair: Pedro Ramos, *Instituto Superior Técnico - University of Lisboa, Portugal*

Speakers
Mauro Mazzieri, Equipe srl, Luca Casadei, Ksenia Security - Smart RSA Project
Francesco Spegni, UnivPM - Most project
Ronja Schneider, Mittweida University of Applied Sciences -Tool MakAR Project

19:00 Welcome Party & Poster Session

PS28 **From Simulated Toolpath to Power Signatures: Virtual Sensors Enabling Sustainable Machining Digital Twins**

PS29 **PEMS-ML: Personalized education in measurement science and technology**

PS30 **Toward a more reliable scientific evidence by means of forensic metrology. A novel approach against miscarriage of justice**

PS31 **MUSE: Multi-Sensor Wearable Device for Telemedicine. Presenta: Leila Es Sebar**

PS32 **Supporting architects in the reconfiguration of living environments: the AgeIt Decision Support System & application**

PS33 **MORE4WATER - Combined monitoring and forecast for a sustainable management of water resources and timely adaptation to drought**

PS34 **SismUp: a mobile app for early warning of seismic events in the Irpinia area**

PS35 **An advanced instrumentation laboratory for superconducting cables and magnets within the IRIS project**

PS36 **SocialBike: a multi-player dual-task game to promote inclusion through physical exercise**

PS37 **XREN: Extended reality tools to support learning activities in engineering**

PS38 **Digital Twins for the built environment**

PS39 **SMART RSA Residential Care with a High Level of Digital Technology**

PS40 **Creating an Augmented Reality-Based Assistant to Support the Toolmaking Process**

PS41 **Supporting architects in the reconfiguration of living environments: the AgeIt Decision Support System & application"**

19:00 - 20:30	*Università Politecnica delle Marche - Faculty of Economics* **WELCOME PARTY**

Technical Program - Thursday, Oct 23

08:30 - 18:00	*Università Politecnica delle Marche - Faculty of Economics* **REGISTRATIONS**

09:00 - 10:40	*Aula Magna G. Conti* **Session 3.1 - Wearable sensors and AI in biomedical, sports, and industrial applications** **Chair:** Lorenzo Scalise, *Università Politecnica delle Marche, Italy*

09:00 **Hypoglycemia Prediction from Pre-Exercise Continuous Glucose Monitoring Time Series: Deep-Learning Versus Feature-Based Machine-Learning Approaches**
Agnese Piersanti, Libera Lucia Del Giudice, Greta Beltramba (Università Politecnica delle Marche, Italy); Christian Göbl (Medical University of Vienna, Austria); Laura Burattini (Università Politecnica delle Marche, Italy); Andrea Tura (CNR Institute of Neuroscience, Italy); Micaela Morettini (Università Politecnica delle Marche, Italy)

09:20 **Towards Low-Power Continuous Electrochemical Sweat Monitoring in Smart Glasses**
Mehmet Akif Acar and Marco Carminati (Politecnico di Milano, Italy)

09:40 **Efficient Single-Lead ECG Analysis System with Multi-Lead Reconstruction**
Elia Ceroni, Paolo Andreini, Monica Bianchini (University of Siena, Italy)

10:00 **Machine Learning-Based Detection of Sport-Specific Jumps Using Wearable Inertial Sensor**
Luna Panni (Università Politecnica Delle Marche, Italy); Federico Citarelli (K-sport, Italy); Gloria Cosoli and Marco Arnesano (Università eCampus, Italy); Lorenzo Scalise (Università Politecnica delle Marche, Italy)

10:20 **Comparison of Real-Time Marker-Less and Optoelectronic 3D Human Pose Estimation Systems for Cyclist Pose Analysis**
Davide Todesca, Davide Fabiocchi, Jose Alfonso Farias, Nicola Giulietti, Marco Carnevale, Hermes Giberti (University of Pavia, Italy)

09:00 - 10:40	*Room T37* **Session 3.2 - Integrated approaches to study the nervous system in health and disease - PART II** **Chairs:** Paolo Gargiulo, *Reykjavik University, Iceland* Leandro Donisi, *University of Campania Luigi Vanvitelli, Italy*

09:00 **Influence of Age and Gender on Cortical Activity During Postural Control**
Lorena Guerrini (Reykjavik University, Iceland & University of Campania L. Vanvitelli, Italy); Federica Pescaglia (Institute of Biomedical and Neural Engineering, Iceland); Carmine Gelormini (Reykjavik University, Iceland); Vittorio Santoriello (University of Naples Federico II, Italy); Vincenzo Minutolo (University of Campania Luigi Vanvitelli, Italy); Giorgio Di Lorenzo (Università di Roma Tor Vergata, Italy); Hannes Petersen (Akureyri Hospital, Iceland); Halldór Jónsson jr and Paolo Gargiulo (Reykjavik University, Iceland)

09:20 **AI-Driven Integration of EEG and Motor Assessment to Explore Motor-Cognitive Interaction in Multiple Sclerosis**
Nicola Valè, Ilaria Siviero and Gloria Menegaz (University of Verona, Italy); Ander Ramos-Murguialday (TECNALIA San Sebastián, Spain); Silvia Savazzi (University of Verona, Italy); Sofia Straudi (University of Ferrara, Italy); Alberto Gajofatto, Riccardo Orlandi and Mauro Crestani (University of Verona, Italy); Marialuisa Gandolfi (University of Verona & Neuromotor and Cognitive Rehabilitation Research Centre, Italy); Silvia Francesca Storti (University of Verona, Italy)

09:40 **Exploring Brain Connectivity Correlates of Muscular Activity and Postural Sway**
Marianna Chianese and Simone Papallo (University of Campania Luigi Vanvitelli, Italy); Giuseppe Prisco (University of Molise, Italy); Rosa De Micco and Alessandro Tessitore (University of Campania Luigi Vanvitelli, Italy); Paolo Gargiulo (Reykjavik University, Iceland); Fabrizio Esposito and Leandro Donisi (University of Campania Luigi Vanvitelli, Italy)

10:00 **Brain Network Dynamics Across Resting-State and the BioVRSea Task Using EEG Microstate Analysis**
Carmine Gelormini (Reykjavik University, Iceland); Federica Pescaglia (Institute of Biomedical and Neural Engineering, Iceland); Lorena Guerrini (Reykjavik University, Iceland & University of Campania L. Vanvitelli, Italy); Halldór Jónsson jr (Reykjavik University, Iceland); Hannes Petersen (Akureyri Hospital, Iceland); Riccardo Brun (University of Padova, Italy); Giorgio Di Lorenzo (Università di Roma Tor Vergata, Italy); Paolo Gargiulo (Reykjavik University, Iceland)

10:20 **A Neuroradiomic Approach for Age-Group Classification of Healthy Human Brains**
Noemi Pisani (University of Naples Federico II, Italy); Maria Agnese Pirozzi, Federica Franza and Alessandro Pasquale De Rosa (University of Campania Luigi Vanvitelli, Italy); Francesco Amato (University of Naples Federico II, Italy); Antonio Gallo, Mario Cirillo, Leandro Donisi and Fabrizio Esposito (University of Campania Luigi Vanvitelli, Italy)

09:00 - 10:40 *Room T3*

Session 3.3 - WORKSHOP

Shaping the Future of Interaction: Integrating AI, Human Factors, and Immersive Technologies in HCI - PART I

Chairs: Marta Mondellini, *National Research Council, Italy*
Mario Covarrubias, *Politecnico di Milano, Italy*

09:00 **Affect Adaptation for Virtual Reality: a Review of Efforts in Affective Computing**
Oliver Guy, Markos Mentzelopoulos, Christina Moutsiana and Alexandra Psarrou (University of Westminster, United Kingdom)

09:20 **The Way Mood Shapes Emotions: from Experiments to a Mood Assessment Application**
Claudia Rabaioli (University of Milano-Bicocca, Italy); Nicolo Dozio and Riccardo Giussani (Politecnico di Milano, Italy); Aurora Saibene and Daniele Luigi Romano (University of Milano-Bicocca, Italy); Francesco Ferrise (Politecnico di Milano, Italy); Francesca Gasparini (University of Milano-Bicocca, Italy)

09:40 **The Uncanny Valley: is It the Body or the Mind?**
Clara Gangemi (IMT School for Advanced Studies Lucca, Italy); Francesco Bossi (University of Pisa, Italy); Caterina Vannucci (IMT School for Advanced Studies Lucca, Italy); Lorenzo Cominelli and Enzo Pasquale Scilingo (University of Pisa, Italy); Pietro Pietrini (IMT School for Advanced Studies Lucca, Italy)

10:00 **Neuro-Physiological and Subjective Measures of Presence Experience in Virtual Reality: Insights from a Scoping Review**
Aurelio Sepe, Andrea Antonio Cantone, Simone Spera, Otino Pio Santosuosso, Giuliana Vitiello and Alireza Mortezapour (University of Salerno, Italy)

10:20 **Ensuring Equitable Guidance: a Context-Based Approach to Bias Detection in AI Advisors**
Agnese Augello and Luca Sabatucci (National Research Council, Italy); Pietro Neroni (Cognitive Systems Lab, Italy); Luigi Casoria and Giuseppe Caggianese (National Research Council, Italy)

09:00 - 10:40 *Room T4*

Session 3.4 - SPECIAL EVENT - NxGenBCI 2025: Next generation Brain-Computer Interfaces - PART I

Chair: Luigi Lavorgna

09:00 **Welcome & opening remarks**

09:20 **Core clinical applications of Brain-Computer Interfaces**

Parkinson's Disease: Clinical and Humoral Biomarkers
Pietro Cortelli, Bologna University

Multiple Sclerosis: Between Challenges and Innovation
Vincenzo Brescia Morra, Federico II University of Naples

Epilepsy and emerging trends
Adolfo Mazzeo, Sapienza University of Rome

09:00 - 11:00	*Room T36* **Session 3.5.1 - SPECIAL EVENT - AIRevEdu - Advanced Education and Training: Navigating the AI Revolution - PART I** **Chairs:** Giacomo di Noto, *University of Modena and Reggio Emilia, Italy* Andrea Gaggioli, *Catholic University of the Sacred Heart, Italy*

09:00 **An Immersive Hazelnut Tree Pruning Simulator for Agricultural Operator Training**
Davide Fabiocchi, Marco Carnevale, Hermes Giberti, Silvia La Placa, Carol Sergenti (University of Pavia, Italy)

09:20 **Real Versus Metaverse Experiences: a Pilot Study**
Eleonora Diletta Sarcinella (Università Cattolica del Sacro Cuore, Italy & The Way, Italy); Katusha Gerardini, Sabrina Bartolotta, Andrea Ubaldi, Andrea Gaggioli and Alice Chirico (Università Cattolica del Sacro Cuore, Italy)

09:40 **Toward Context-Aware, Immersive Testing for Innovative Formative Assessment**
Federica Morleo and Pasquale Anselmi (University of Padua, Italy); Alessandra Vitanza (Institute of Cognitive Sciences and Technologies - CNR, Italy)

10:00 **MetaHumanTutor: a Realistic AI-Based Virtual Assistant for Physics in Higher Education**
Leonardo Mogianesi (Unimore, Italy & Unicam, Italy); Giulia Paludo (University of Trento, Italy); Francesco Rasponi, Daniela Amendola and Andrea Perali (Unicam, Italy)

10:20 **Embodiment in Nature: How Avatar Choice Shapes an Underwater Virtual Reality Experience**
Antonella Giangualano (Mind and Behavior Technological Center, Italy & University of Milan-Bicocca, Italy); Paolo Boffi (Polytechnic University of Milan & University of Milan-Bicocca, Italy); Sofia Adelaide Osimo, Mona Yavari and Alessandro Gabbiadini (Mind and Behavior Technological Center & University of Milan-Bicocca, Italy); Pier Luca Lanzi (Politecnico di Milano, Italy); Alberto Gallace (Mind and Behavior Technological Center & University of Milan-Bicocca, Italy)

10:40 **Higher Education Students' Perception of AI for Self-Learning: a Preliminary Study**
Daniele Spoladore and Sara Arlati (National Research Council, Italy); Alberto Trombetta (University of Insubria, Italy)

10:40 - 11:10	*Università Politecnica delle Marche - Faculty of Economics* **COFFEE BREAK**

10:40 - 11:10	*Room T9 - T10* **DEMO SESSION #2** **Chair:** Nicola Moccaldi, *University of Naples Federico II, Italy*

DEMO #2.1 **Markie: A Vision-Based Fiducial Object Input Device for Inclusive Interaction in Virtual Environments**
José Manuel Alcalde Llergo, University of Cordoba, Spain

DEMO #2.2 **Violence Detector App**
Valeria Cannone, Università Politecnica delle Marche, Italy

DEMO #2.3 **Immersive Exploration of the Rock Churches of the Sassi di Matera**
Valerio Colonnese, University of Basilicata, Italy

10:40 - 11:10	*Università Politecnica delle Marche - Faculty of Economics* **POSTER SESSION #2** **Session Coordinators:** Selene Tomassini, *University of Trento, Italy* Sara Arlati, *National Research Council, Italy*

PS01 **AI-Based Emotion Recognition in Education: Identifying Dyslexic and Non-Dyslexic Learners**
Michele Materazzini (University of Tuscia, Italy); Pilar Aparicio-Martínez (University of Córdoba, Spain); Alessia Melis and Daniele Baldacci (Blue Cinema TV srl, Italy); Enrique Yeguas-Bolívar (University of Córdoba, Spain); Giuseppe Calabrò and Juri Taborri (University of Tuscia, Italy)

PS02 **Digital Interventions for Social Isolation: Virtual Reality and Educational Programs for Older Adults**
Barbara Gomez-Peña (University of Cordoba, Spain); José M Alcalde-Llergo (University of Tuscia & University of Córdoba, Spain); María Álvarez Cantos, Alessia Bisio, Mariana Buenestado-Fernández, Pilar Aparicio-Martínez (University of Córdoba, Spain); Juri Taborri (University of Tuscia, Viterbo, Italy); Enrique Yeguas-Bolívar (University of Córdoba, Spain)

PS03 **Enhancing Accessibility and Learning: the History of Nursing Through Virtual Reality**
Alessia Bisio and Pilar Aparicio-Martínez (University of Córdoba, Spain); Ibrahim Ramadan (University of Testing, Palestine); José M Alcalde-Llergo (University of Tuscia & University of Córdoba, Spain); Andrea Zingoni (University of Tuscia, Italy); Enrique Yeguas-Bolívar (University of Córdoba, Spain)

PS04 **Adopting Post-Hoc Explainable Reinforcement Learning in Healthcare Scenarios**
Daniele Melloni and Andrea Zingoni (University of Tuscia, Italy)

PS05 **eStudy: a Novel Human-Centric AI-Based Platform to Customize Educational Contents on the Scholars' Needs**
Daniele Melloni (University of Tuscia, Italy); Sofia Cramerotti, Francesco Zambotti, Nicoletta Rivelli and Daniele De Martin (Erickson S.p.A., Italy); Enrique Yeguas-Bolívar

(University of Córdoba, Spain); Giuseppe Calabrò (University of Tuscia, Italy); José M Alcalde-Llergo (University of Tuscia & University of Córdoba, Spain); Andrea Zingoni (University of Tuscia, Italy)

PS06 **A Survey on Extended Reality in Disaster Management: Integrating XR, IoT, and Machine Learning for Enhanced Situational Awareness**
Edona Krasniqi and Visar Shehu (South East European University, Macedonia, the former Yugoslav Republic of)

PS07 **Navigation Assistance Feature for Visually Impaired Visitors in a Personalized Museum Experience**
Brigida Bonino, Franca Giannini and Katia Lupinetti (CNR-IMATI, Italy)

PS08 **A Dual VR-Physical Climbing System for Cognitive Support in Young Adults with Disabilities**
Mario Covarrubias (Politecnico di Milano, Italy); Emma Mencaci (Aspoc Lab Ets, Italy); Marco Tarabini, Carlalberto Francia and Manuela Galli (Politecnico di Milano, Italy)

PS09 **Virtual Reality and Biosignals for Labor Pain Relief: A Pilot Study**
Vittorio Santoriello, Alfonso M Ponsiglione, Carmine Giugliano and Carmen Buonaguro (University of Naples Federico II, Italy); Luigi Gallo (Pegaso University, Italy & National Research Council, Italy); Giuseppe Caggianese (National Research Council of Italy, Italy); Marco Cascella (University of Salerno, Italy); Giuseppe De Pietro (Pegaso Telematic University, Italy); Andrea Chirico (Sapienza University of Rome, Italy); Antonio Giordano (Temple University, USA); Francesco Amato, Maria Romano and Maurizio Guida (University of Naples, Federcio II, Italy)

PS10 **The Role of Gender in Conflict Prediction**
Sylvie Cerise, Consuelo Rubina Nava and Stefano Tedeschi (Università della Valle d'Aosta, Italy); Paola Pisano (Università degli Studi di Torino, Italy)

PS11 **Sport DB 3.0: Use of Wearables for Cardiac Self-Monitoring During Sport**
Agnese Sbrollini (Università Politecnica Delle Marche, Italy); Sofia Romagnoli (Aragon Institute of Engineering Research (I3A) Zaragoza University, Spain); Antonio Nocera, Micaela Morettini, Ennio Gambi and Laura Burattini (Università Politecnica delle Marche, Italy)

PS12 **Enhancing Awareness in the Design of Dissemination and Teaching Activities: Using Context for Integrating Knowledge Sharing and Technology**
Andrea Zingoni (University of Tuscia, Italy); Chiara Tagliaferri (Consiglio Nazionale delle Ricerche, Italy); Pasquale Arpaia (University of Naples Federico II, Italy); Valentina Bello (University of Pavia, Italy); Loredana Cristaldi (Politecnico di Milano, Italy); Valentina Elisabetta Ferrara (Università degli Studi di Milano-Bicocca Milano, Italy); Nicola Moccaldi (University of Naples Federico II, Italy); Antonio Moschitta (University of Perugia, Italy); Marisa Pesola (University of Naples Federico II, Italy); Fabio A. Schreiber, Letizia Tanca and Leila Es Sebar (Politecnico di Milano, Italy)

PS13 **IM-MetaLAB: the First Digital Laboratory for Teaching the Fundamental Concepts of Instrumentation and Measurement in Metaverse**
Francesco Bonavolontà, Annalisa Liccardo and Rosario Schiano Lo Moriello (University of Naples Federico II, Italy); Enzo Caputo (Meditech Competence Center, Italy); Antonio Monaco (Gav Projects srl, Germany)

PS14 **Enhancing Technical Maintenance Procedures Through VR and Haptic Devices**
Francesco de Pandi (University of Naples Federico II, Italy & Leonardo S.p.a, Italy); Nazaro Aversano and Salvatore Musto (Leonardo S.p.A., Italy); Francesco Bonavolontà, Annalisa Liccardo and Rosario Schiano Lo Moriello (University of Naples Federico II, Italy); Francesca Matarese (Leonardo S.p.A., Italy); Enzo Caputo (Meditech Competence Center, Italy); Giorgio de Alteriis (University of Naples Federico II, Italy)

PS15 **Single-Trial EEG Classification of Semantic Visual Targets in a Novel Oddball Task**
Mian Kou, Daniel J Blackburn and Mahnaz Arvaneh (The University of Sheffield, United Kingdom)

PS16 **Reproducible Physiological Features in Affective Computing: a Preliminary Analysis on Arousal Modeling**
Andrea Gargano (University of Pisa, Italy); Jasin Machkour (Technische Universität Darmstadt, Germany); Mimma Nardelli and Enzo Pasquale Scilingo (University of Pisa, Italy); Michael Muma (Technische Universität Darmstadt, Germany)

PS17 **The Cost of Simplicity: How Reducing EEG Electrodes Affects Source Localization and BCI Accuracy**
Eva Guttmann-Flury (Shanghai Jiao Tong University, China & Westlake University, China); Wei Yanyan, Zhao Shan and Jian Zhao (Shanghai Jiao Tong University, China); Mohamad Sawan (Westlake University, China & Polytechnique Montréal, Canada)

PS18 **Enhancing Explainability of Time Series Anomaly Detection for NVH Testing**
Lan Jia, Bram Cornelis and Claudio Colangeli (Siemens Industry Software NV, Belgium); Konstantinos Gryllias (KU Leuven & DMMS Group, Flanders Make, Belgium)

PS19 **Distributed Sensor for Water Detection via Data-Driven TDR Inversion**
Marco Scarpetta, Alessandra Moretto, Maurizio Spadavecchia and Nicola Giaquinto (Politecnico di Bari, Italy)

PS20 **Feasibility and Acceptability of P300-Based Brain-Computer Interface Neurofeedback Training for Cognitive Enhancement**
Jin Ni, Joshua Giles and Mahnaz Arvaneh (The University of Sheffield, United Kingdom)

PS21 **Soft Tissue Radiodensitometric Longitudinal Differences are Associated with Cardiovascular Risks in Elderly Subjects**
Marco Recenti (Reykjavik University, Iceland); Alfonso M Ponsiglione, Carlo Ricciardi, Michela Russo and Francesco Amato (University of Naples Federico II, Italy); Magnús Kjartan Gíslason (Institute of Biomedical and Neural Engineering, Reykjavik University,

Iceland); Milan Chang (Icelandic Gerontological Research Institute, Landspitali, Reykjavik, Iceland); Paolo Gargiulo (Reykjavik University, Iceland)

PS22 **Telepalpation System for Stiffness Recognition of Tissue Digital Twins Through Neuromorphic Vibrotactile Feedback in Virtual Reality**
Alessandro Profili, Flaminia Piretta and Marton Csaba Mezei (Sant'Anna School of Advanced Studies, Italy); Muhammad Adnan Adnan Khalil (Sant'Anna School of Advanced Studies & National University of Sciences and Technology, NUST, Italy); Fabrizia Auletta, Mariangela Filosa and Calogero Maria Oddo (Scuola Superiore Sant'Anna, Italy)

PS23 **Embodied Conversational Virtual Humans in 3D Environments: Towards Scalable and Immersive AI Interactions**
Alberto Altozano, Jose Roda Belles, Maria Eleonora Minissi, Mariano Alcaniz and Javier Marìn-Morales (Universitat Politecnica de Valencia, Spain)

PS24 **EEG Correlates of Vection: a Systematic Literature Review**
Gael Van der Lee, François Cabestaing and Hakim Mohammed (University of Lille, France)

PS25 **Development of a Human-Inspired Long-Term Memory for Interactive Conversational Agents**
Angelo De Marco, Federico Galatolo, Lorenzo Cominelli, Marco Pardini, Mario Giovanni C.A. Cimino, Alberto Greco and Enzo Pasquale Scilingo (University of Pisa, Italy)

PS26 **S-SMOTE: An Optimized Oversampling Approach for Knee Osteoarthritis Classification Using Secondary Label Analysis**
Ida Maruotto and Federica Kiyomi Ciliberti (Reykjavik University, Iceland); Davide Raineri (University of Piemonte Orientale, Italy); Halldór Jónsson Jr (Landspitali Hospital, Iceland); Paolo Gargiulo (Reykjavik University, Iceland)

PS27 **Re-Engaging Driver Attention Using ChatGPT: a VR-EEG Study on Stress Impact and Driving Performance**
Alaa Zaki Elfiqi (The American University in Cairo, Egypt); Seif Eldawlatly (Ain Shams University, Egypt & The American University in Cairo, Egypt); Khalil I. Elkhodary (The American University in Cairo, Egypt)

PS28 **Distinguishing Startle from Surprise Events Based on Physiological Signals**
Mansi Sharma (German Center for Artificial Intelligence, Germany & Saarland University, Germany); Alexandre Duchevet (Fédération ENAC ISAE-SUPAERO ONERA, Université de Toulouse, France); Florian Daiber (German Research Center for Artificial Intelligence (DFKI), Germany); Jean-Paul Imbert (Fédération ENAC ISAE-SUPAERO ONERA, Université de Toulouse, France); Maurice Rekrut (German Research Center for Artificial Intelligence (DFKI) & Saarland Informatics Campus, Germany)

PS29 **Evaluation of Galvanic Skin Response from Subjective Quality Assessment Subject to Participants' Experience with 360 Videos on HMD**
Majed Elwardy and Yan Hu (Blekinge Institute of Technology, Sweden)

PS30 **Deepfake Forensic Analysis: Source Dataset Attribution and Legal Implications of Synthetic Media Manipulation**
Massimiliano Cassia, Luca Guarnera, Mirko Casu, Ignazio Zangara and Sebastiano Battiato (University of Catania, Italy)

PS31 **Comparative Study of Reinforcement Learning-Enhanced Control Strategies for Nonlinear Multidimensional Systems**
Patryk Bałazy (AGH University of Krakow, Poland)

PS32 **Can Anatomical Information Guide the Performance of Convolutional Neural Networks for Classifying Neurodegenerative Diseases Using Brain MRI?**
Giulia Maria Mattia and Noura Osman (Univ Toulouse, Inserm, ToNIC, Toulouse, France); Lydia Chougar (Sorbonne Université, Paris Brain Institute, AP-HP, Hôpital de la Pitié Salpêtrière, France & The Neuro - Montreal Neurological Institute, McGill University, Canada); Pierre Todeschini (Univ Toulouse, Inserm, ToNIC, Toulouse, France); Wassilios G. Meissner (CHU Bordeaux, Service de Neurologie des Maladies Neurodégénératives, IMNc, France & New Zealand Brain Research Institute, Christchurch, New Zealand); Margherita Fabbri and Olivier Rascol (Univ Toulouse, Inserm, ToNIC, MSA French Reference Center, Univ. Hospital Toulouse, Toulouse, France); David Grabli (Sorbonne Université, Paris Brain Institute, AP-HP, Hôpital de la Pitié Salpêtrière, France); Bertrand Degos (Assistance Publique Hôpitaux de Paris, Service de Neurologie, Hôpital Avicenne, France); Marie Vidailhet (Sorbonne Université, Paris Brain Institute, AP-HP, Hôpital de la Pitié Salpêtrière, France); Alice Faucher (Assistance Publique Hôpitaux de Paris, Service de Neurologie, Hôpital Avicenne, France); Jean-Christophe Corvol and Stéphane Lehéricy (Sorbonne Université, Paris Brain Institute, AP-HP, Hôpital de la Pitié Salpêtrière, France); Patrice Péran (Univ Toulouse, Inserm, ToNIC, Toulouse, France)

PS33 **Self-Attentive Deep Fusion Framework with Transformer-Based Semantics for Emergency Head CT Reporting**
Selene Tomassini, Abdallah Zeggada, Carlo Cosimo Quattrocchi, Farid Melgani and Paolo Giorgini (University of Trento, Italy)

PS34 **Personalized Multi-Agent Recommendation System for Monitoring and Coaching Through Wearable and Non-Invasive Sensors**
Nicola Davolio, Fiorenzo Colarusso and Selay Yüksel (Nivara, The Netherlands); Sara Casaccia (Università Politecnica delle Marche, Italy)

PS35 **Emotional Matters: Psychometric Design of Response Formats for Assessing Emotional Awareness in Volumetric Contexts**

Gloria Simoncini and Francesca Borghesi (University of Turin, Italy); Eleonora Diletta Sarcinella (Università Cattolica del Sacro Cuore, Italy & The Way, Italy); Alice Chirico (Università Cattolica del Sacro Cuore, Italy); Pietro Cipresso (University of Turin, Italy)

PS36 **When Emotions Move: Validating Virtual Environments for Affect Dynamics**
Francesca Borghesi, Gloria Simoncini and Vittorio Murtas (University of Turin, Italy); Eleonora Diletta Sarcinella (Università Cattolica del Sacro Cuore, Italy & The Way, Italy); Alice Chirico (Università Cattolica del Sacro Cuore, Italy); Pietro Cipresso (University of Turin, Italy)

11:10 - 12:10 *Aula Magna G. Conti*
PLENARY SESSION - KEYNOTE LECTURE
Chair: Karl McCreadie, *Ulster University, United Kingdom*

Development and Standardization of BCI

Yuntao Yu, *Chair of Brain-Computer Interfaces - ISO/IEC JTC 1/SC 43*

12:10 - 13:10 *Aula Magna G. Conti*
TUTORIAL SESSION
Chair: Paolo Castellini, *Università Politecnica delle Marche, Italy*

XR as part of the everyday in engineering

Claudio Colangeli, *Siemens Industry Software*

12:10 - 13:30 *Room T4*
SPECIAL EVENT - NxGenBCI 2025: Next generation Brain-Computer Interfaces - PART II
Chairs: Mauro Ursino, Calogero Maria Oddo, Marie-Constance Corsi

12:10 **From Neuroscience to BCI: Translating Brain Knowledge into Interfaces**

Neural Avalanches: Unraveling Metrics and Biomarkers to inform BCI
Pierpaolo Sorrentino, Inserm & Sassari University

Neurofeedback in the era of wearable BCI
Luciana Lorenzon, Centro Italiano di Biofeedback e Neurofeedback

Redefining the sensorimotor loop for human motor augmentation
Tamar Makin, University of Cambridge

12:10 - 13:10	*Room T36* **Session 3.5.2 - SPECIAL EVENT - AIRevEdu - Advanced Education and Training: Navigating the AI Revolution - PART II** **Chairs:** Andrea Zingoni, *University of Tuscia, Italy* Milena Martarelli, *Università Politecnica delle Marche, Italy* Micaela Morettini, *Università Politecnica delle Marche, Italy* Loredana Cristaldi, *Politecnico di Milano, Italy*

Dyslexia and Specific learning disorders: challenges and opportunities
Enrico Ghidoni

Pitch Session

Andrea Gaggioli - Extended Learning: the Role of AI and Extended Reality in the future of academic education

Giacomo Di Noto - EDUNEXT - Italian Universities Digital Education Hub

Loredana Cristaldi – PEMS-ML: Challenges and Opportunities in teaching Modern Measurement -Project Overview

13:10 - 14:30	*Università Politecnica delle Marche - Faculty of Economics* **LUNCH / DEMO SESSION #2 / POSTER SESSION #2**

Still presenting Demos of the **Demo Session #2** and Posters of the **Poster Session #2**.

14:30 - 16:10	*Aula Magna G. Conti* **Session 4.1 - Distributed Learning and Hybrid AI: Bridging Technology, Society, and Ethics** **Chairs:** Davide Calvaresi, *HES-SO Valais-Wallis, Switzerland* Francisco Fernández de Vega, *University of Extremadura, Spain*

14:30 **Explaining Federated Learning-Based Movie Recommendations**
Ege Soyarar and Reyhan Aydogan (Ozyegin University, Turkey); Berk Buzcu and Davide Calvaresi (HES-SO Valais-Wallis, Switzerland)

14:50 **AI-Driven Multi-Agent Systems for Automated Regulatory Analysis of Crypto Projects**
Mario Trerotola (Politecnico di Torino, Italy); Davide Calvaresi (HES-SO Valais-Wallis, Switzerland)

15:10 **Beyond Technical Transparency: Explainability as a Safeguard Against Manipulative AI**
Ermanno Petrocchi and Simona Tiribelli (University of Macerata, Italy); Berk Buzcu (HES-SO Valais-Wallis, Switzerland); Elia Pacioni (HES-SO Valais-Wallis, Switzerland &

University of Extremadura, Spain); Davide Calvaresi (HES-SO Valais-Wallis, Switzerland)

15:30 **Enhancing Blockchain Transaction Tracking: A Systematic Review of DLT-Based Financial Systems**
Mario Trerotola (Politecnico di Torino, Italy); Davide Calvaresi (HES-SO Valais-Wallis, Switzerland)

15:50 **Decentralized Optical Music Recognition Using YOLO and FedGP for Music Education**
Andrea Marselletti (Universidad de Extremadura, Spain); Elia Pacioni (HES-SO Valais-Wallis, Switzerland & University of Extremadura, Spain); Francisco Fernández de Vega (University of Extremadura, Spain); Davide Calvaresi (HES-SO Valais-Wallis, Switzerland)

14:30 - 16:10 *Room T37*
Session 4.2 - Advanced age-friendly sensors and technologies for prevention and health monitoring
Chairs: Sandra Costanzo, *University of Calabria, Italy*
Filippo Cavallo, *University of Florence, Italy*

14:30 **Preventing Elderly Injuries: a Pose-Based Framework for Fall Detection**
Lorenzo Longarini, Alessandro Rongoni, Aldo F. Dragoni (Università Politecnica delle Marche, Italy); Geremia Pompei (Institute for Chemical-Physical Processes National Research Council of Italy, Italy); Mariorosario Prist (Università Politecnica delle Marche, Italy)

14:50 **Living Lab Assessment for the Development of a Non-Invasive Sensor Network for Measuring Activities and Comfort in Multi-Resident Contexts**
Sara Casaccia, Sara Meletani, Gianluca Sartini and Gian Marco Revel (Università Politecnica delle Marche, Italy)

15:10 **Edge AI-Based Fall Detection with Standard RGB Cameras**
Melissa Proietti, Enrico Piergallini, Andrea Visi and Aldo F. Dragoni (Università Politecnica Delle Marche, Italy)

15:30 **KneeFlex: A Soft Wearable Knee Joint Tele-Rehabilitation Robot**
Tongyan Zhang (Queen Mary University of London, United Kingdom); Lian Zhou (Tongji University, China); Sarah Hussain Khuwaja (Queen Mary University of London, United Kingdom)

15:50 **Fractal-Shaped Transmission-Based Microwave Sensor with Machine Learning Support for Glucose Detection**
Sandra Costanzo, Antonio Curcio and Giovanni Buonanno (University of Calabria, Italy)

14:30 - 16:10 *Room T3*

Session 4.3 - WORKSHOP

Shaping the Future of Interaction: Integrating AI, Human Factors, and Immersive Technologies in HCI - PART II

Chairs: Nicola Capece, *University of Basilicata, Italy*
Giuseppe Caggianese, *National Research Council, Italy*

14:30 **Integration and Evaluation of Head Mounted Display in a Dynamic Driving Simulator for Rehabilitation Therapies**
Giuseppe Mangano, Francesco Bottino, Davide Zhou, Nicola Giulietti, Marco Carnevale, Hermes Giberti (University of Pavia, Italy)

14:50 **Immersive Virtual Reality Training for Smart Traffic Light Maintenance: a Serious Game Approach**
Marina Ricci (STIIMA CNR - Bari, Italy); Nicola Mosca (CNR, Italy); Maria di Summa (STIIMA CNR - Bari, Italy)

15:10 **Integrating Large Language Models into Extended Reality Environments for Enhanced User Experiences**
Luca Cordioli (Politecnico di Milano, Italy); Matteo Valoriani (Fifth Ingenium, Italy); Maristellaa Matera (Politecnico di Milano, Italy)

15:30 **Conceptual Design of a Personalized VR Furniture Arrangement System**
Nan Huang (Blekinge Tekniska Högskola, Sweden); Prashant Goswami, Yan Hu, Veronica Sundstedt and Abbas Cheddad (Blekinge Institute of Technology, Sweden); Muhammad Imran (IKEA of Sweden, Sweden)

15:50 **A Large Language Model-Driven Architecture for Intuitive Interaction in Virtual Reality Environments**
Valerio Colonnese, Gilda Manfredi, Nicola Felice Capece, Ugo Erra, Michele Rinaldi and Salvatore Ungaro (University of Basilicata, Italy)

14:10 - 16:10 *Room T4*

Session 4.4 - SPECIAL EVENT - NxGenBCI 2025: Next generation Brain-Computer Interfaces - PART III

Chairs: Mauro Ursino, Calogero Maria Oddo, Marie-Constance Corsi

14:10 **Advancing neuroengineering for the Next Generation of BCI**

Controlling a BCI in Chronic Stroke Rehabilitation: A Tale of Two Learners
Serafeim Perdikis, University of Essex

Real-time Human Factors assessment during aerospace flight operations and training: a neuroscience perspective
Fabio Babiloni, University of Rome Sapienza, BrainSigns srl

Implantable neuroprostheses to understand and restore neural functions
Silvestro Micera, Sant'Anna School of Advanced Studies

15:30 **Hands-on by our sponsors (part 1)**

- Brain Products GmbH
- Brainsigns

14:30 - 16:10 *Room T36*
Session 4.5 - SPECIAL EVENT - Data Ethics and Quality in the AI Era PART I
Chair: Vincenzo Marchese, *Architectural Thinking - Training & Consulting*

Digital and AI Ethics – a humanistic perspective
Alessandra Castellani

A juridical approach to mitigate ethics risks
Veronica Scotti

Data quality from the start
Andrea Aliverti

16:10 - 16:40 *Università Politecnica delle Marche - Faculty of Economics*
COFFEE BREAK / DEMO SESSION #2 / POSTER SESSION #2

Still presenting Demos of the **Demo Session #2** and Posters of the **Poster Session #2**.

16:40 - 18:20 *Aula Magna G. Conti*
Session 5.1 - Sensors, Extended Reality and Artificial Intelligence for Human Behavior Analysis
Chairs: Andrea Zingoni, *University of Tuscia, Italy*
Enrique Yeguas Bolívar, *University of Córdoba, Spain*

16:40 **Markerless Upper Limb Motion Tracking: A Comparative Evaluation of Multi-View Approaches**
Albin Bajrami (Università Politecnica delle Marche, Italy & Università di Genova, Italy); Gloria Beraldo (National Research Council of Italy (CNR-ISTC), Italy); Matteo Claudio Palpacelli (Università Politecnica delle Marche, Italy); Tapio Heikkilä (Technical Research Centre of Finland, Finland); Gabriella Cortelessa (National Research Council of Italy (CNR-ISTC), Italy)

17:00 **Comparison of Machine Learning Algorithms for Recognizing Italian Sign Language Using a Wearable Measurement System**
Martina Spagna, Juri Taborri and Stefano Rossi (University of Tuscia, Italy)

17:20 **Leveraging Virtual Reality and Technological Tools to Enhance Sign Language Education in Healthcare Competences**

María Álvarez Cantos (University of Cordoba, Spain); José M Alcalde-Llergo (University of Tuscia, Italy & University of Córdoba, Spain); Barbara Gomez-Peña, Alessia Bisio, Pilar Aparicio-Martínez and María Del Mar Molina Herrera (University of Córdoba, Spain); Stefano Rossi (University of Tuscia, Italy); Enrique Yeguas-Bolívar (University of Córdoba, Spain)

17:40 **Characterizing Normotypical Developmental Patterns in Early Childhood: An Exploratory Unsupervised Learning Study**
Alberto Fernández-Merchán (University of Cordoba, Spain); José M Alcalde-Llergo (University of Tuscia, Italy & University of Córdoba, Spain); Andrea Zingoni (University of Tuscia, Italy); Araceli Sanchez Raya and Carolina Perez Dueñas (University of Cordoba, IMIBIC, CAIT, Spain); Enrique Yeguas-Bolívar (University of Córdoba, Spain)

18:00 **The "Viterbo2025-1.0" Dataset for Training AI Algorithms for Criminal Actions Detection and Recognition**
Andrea Zingoni (University of Tuscia, Italy); José M Alcalde-Llergo (University of Tuscia & University of Córdoba, Spain); Daniele Melloni, Riccardo Nervini (University of Tuscia, Italy); Matteo Sperandio and Nicola Fantasia (Architectures & Emerging Technologies Practice - AlmavivA, Italy); Enrique Yeguas (University of Cordoba, Spain)

16:40 - 18:20 *Room T37*
Session 5.2 - Non-Contact Measurement Techniques and AI for Smart Industry
Chairs: Alessandro Annessi, *Università Politecnica delle Marche, Italy*
Emilio Di Lorenzo, *Siemens Digital Industries Software*

16:40 **Artificial Intelligence-Based Vision Systems for Automated Footwear Disassembly**
Vittoria Medici, Pietro Laureati and Nicola Paone (Università Politecnica delle Marche, Italy)

17:00 **Noise Injection Framework for Development of Noise-Robust Predictive Maintenance Solutions**
Urszula Jachymczyk, Paweł Knap, Adam Szulęcki (AGH University of Kraków, Poland)

17:20 **1D CNN-Based Domain Adaptation for Robust Fault Diagnosis**
Paweł Knap and Urszula Jachymczyk (AGH University of Krakow, Poland)

17:40 **Design and Validation of Low-Cost MEMS Sensor Networks for AI-Based Predictive Maintenance in Industry 4.0**
Julia Jeleńska, Paweł Knap, Urszula Jachymczyk and Maciej Wiszniewski (AGH University of Krakow, Poland)

18:00 **Comparative Study of Two Non-Contact Methods for 3D Reconstruction of Surface Defects for Industrial Purposes**
Davide Zhou, Fabio Spazzini, Valentina Furlan, Nicola Giulietti, Hermes Giberti (University of Pavia, Italy)

16:40 - 18:20	*Room T3* **Session 5.3 - WORKSHOP** **Shaping the Future of Interaction: Integrating AI, Human Factors, and Immersive Technologies in HCI - PART III** **Chairs:** Giuseppe Caggianese, *National Research Council, Italy* Marta Mondellini, *National Research Council, Italy*

16:40 **An AI-Enhanced Virtual Reality Platform for Improving Well-Being and Emotional States of Neurological Patients: from Immersive Scenarios to Adaptive Clinical Pathways**
Raffaele Pugliese (Nemo Lab, Italy); Roberto Pierdicca (Università Politecnica delle Marche, Italy); Cecilia Vona, Sina Rahimzadeh and Flavio Tonetto (Deep Reality, Italy); Vera Colombo, Silvia Bolognini and Stefano Regondi (Nemo Lab, Italy)

17:00 **Enhancing Adaptive Sports Participation for Students with Disabilities Through Virtual Reality Kayaking Simulations**
Mario Covarrubias (Politecnico di Milano, Italy); Emma Mencaci (Aspoc Lab Ets, Italy); Marco Tarabini, Carlalberto Francia and Manuela Galli (Politecnico di Milano, Italy)

17:20 **Towards Real-Time Classification of Surface EMG Using Multi-Scale Time-Frequency Representation Fusion and Transfer Learning**
Sarah Hussain Khuwaja, Balvinder Dhillon, M Hasan Shaheed (Queen Mary, University of London, United Kingdom); Maham Mahnoor Mughal (Mehran University of Engineering & Technology, Pakistan); Siraj Hussain (Integrated Biomedical & Electrical Lab (IBEL Lab), United Kingdom)

17:40 **Tailored Immersive Environments: Advancing Neurodivergent Support Through Virtual Reality**
Elia Moscoso-Thompson and Katia Lupinetti (CNR-IMATI, Italy); Irene Capasso (University of Genoa, Italy); Fabrizio Ravicchio (CNR, Italy); Brigida Bonino and Franca Giannini (CNR-IMATI, Italy); Andrea Canessa and Silvio P. Sabatini (University of Genoa, Italy); Lucia Ferlino and Chiara Malagoli (CNR, Italy)

18:00 **Evaluation of Mental Workload and Stress While Driving with and Without Steering Aids in a Virtual City Scenario**
Sara Arlati (National Research Council, Italy); Simone Costantini (Politecnico di Milano, Italy); Camilla Zanco and Marta Mondellini (National Research Council, Italy); Vera Colombo (Nemo Lab, Italy); Marco Sacco (National Research Council, Italy); Giovanna Rizzo (CNR Istituto di Sistemi e Tecnologie Industriali Intelligenti per il Manifatturiero Avanzat, Italy); Fabio A. Storm (Scientific Institute IRCCS Eugenio Medea, Italy); Alfonso Mastropietro (National Research Council, Italy)

16:40 - 18:30	*Room T4* **Session 5.4 - SPECIAL EVENT - NxGenBCI 2025: Next generation Brain-Computer Interfaces - PART IV** **Chairs:** Mauro Ursino, Calogero Maria Oddo, Marie-Constance Corsi

16:40 **Hands-on by our sponsors (part 2)**

- Abmedica s.p.a.
- VIBraTE project

17:20 **BCIs in Practice: Clinical Advances and Ethical Challenges**

Roundtable chaired by Elisabetta Maida, University of Campania "Luigi Vanvitelli" and Yuntao Yu, Chair of ISO/IEC JTC 1/SC 43

18:20 **Closing Ceremony**

16:40 - 18:20	*Room T36* **Session 5.5 - SPECIAL EVENT - Data Ethics and Quality in the AI Era PART II** **Chair:** Vincenzo Marchese, *Architectural Thinking - Training & Consulting*

Data labelling significantly impacts its quality
Erika Giorgini

Mitigating risks
Daniele Spoladore

Implementation challenges in the real world
Roberta Russo

20:00	*Mole Vanvitelliana - Sala delle Polveri* *Banchina Giovanni da Chio, 28 - 60121 Ancona* **CONFERENCE DINNER**

08:30 - 16:00	*Università Politecnica delle Marche - Faculty of Economics* **REGISTRATIONS**

09:00 - 10:40	*Aula Magna G. Conti* **Session 6.1 - Generative Artificial Intelligence and Digital Twins for Empowering Health** **Chairs:** Micaela Morettini, *Università Politecnica delle Marche, Italy* Agnese Piersanti, *Università Politecnica delle Marche, Italy*

09:00 **Synthetic Data Generation for Addressing Class Imbalance in Medical Datasets: a Case Study on Mitral Regurgitation Post-NeoChord Procedure**
Federica Serra (University of Padove, Italy); Agnese Piersanti (Università Politecnica delle Marche, Italy); Florinda Mastro and Antonella Cecchetto (University of Padova, Italy); Andrea Tura (CNR Institute of Neuroscience, Italy); Gino Gerosa (University of Padova Medical School, Italy)

09:20 **Generating Synthetic Metabolic and Hormonal Data via Physiological in-Silico Modeling: Assessment of Reliability in Different Fitness Conditions**
Maria Concetta Palumbo (CNR Institute for Applied Computing, Italy); Micaela Morettini (Università Politecnica Delle Marche, Italy)

09:40 **Enhancing the Physiological Plausibility of GAN-Generated Blood Glucose in Type 1 Diabetes with Monotonicity Constraints**
Elisa Pellizzari (University of Padova, Italy); Omer Mujahid (University of Girona, Spain); Francesco Prendin (University of Padova, Italy); Oriol Bustos (University of Girona, Spain); Giacomo Cappon and Andrea Facchinetti (University of Padova, Italy); Josep Vehi (University of Girona, Spain)

10:00 **Procedural Generation of 3D Models for the Virtual Representation of Accessible Apartments**
Maximilian Putz and Sven Winkler (University of Technology Chemnitz, Germany); Manuel Heinzig (University of Applied Sciences Mittweida, Germany); Marc Ritter (University of Applied Sciences Mittweida & Chemnitz University of Technology, Germany); Franziska Klimant (University of Technology Chemnitz, Germany)

10:20 **Single Hidden Layer Perceptron GAN for Mixed Meal Continuous Glucose Monitoring Data**
Libera Lucia Del Giudice, Agnese Piersanti and Morgan Salotti (Università Politecnica delle Marche, Italy); Christian Göbl (Medical University of Vienna, Austria); Laura

Burattini (Università Politecnica delle Marche, Italy); Andrea Tura (CNR Institute of Neuroscience, Italy); Micaela Morettini (Università Politecnica Delle Marche, Italy)

09:00 - 10:40 *Room T37*
Session 6.2 - PSYCHOBIT - PART I
Chairs: Nicola Milano, *University of Naples Federico II, Italy*
Clara Nobile, *University of Naples Federico II, Italy*

09:00 **Digital Creativity and Self-Discovery: the Effects of the Use of New Technologies on the Young People Well-Being**
Valeria Sarnelli (University of Naples Federico II, Italy); Luca Fusco (University of Naples Parthenope, Italy); Luigia Simona Sica (University of Naples Federico II, Italy)

09:20 **From Laboratory to Real Life: Psychometric Properties of a VR-Based Ecological Memory Assessment Tool**
Valentina Mancuso (eCampus University, Italy); Flaminia Franchini (IRCCS Fondazione Santa Lucia, Italy); Sara Arlati and Selen Naz Saritas (STIIMA National Research Counc); Simona Gabriella Di Santo (Istituto di Tecnologie Biomediche, Consiglio Nazionale delle Ricerche, Italy); Marco Cavallo and Elisa Pedroli (eCampus University, Novedrate, Italy)

09:40 **Spatial Memory Rehabilitation Using Low-Cost Virtual Reality in Patients with Mild Cognitive Impairment: Methodological Proposal**
Chiara Stramba-Badiale (Applied Technology for Neuro-Psychology Lab, IRCCS Istituto Auxologico Italiano, Milan, Italy.); Cosimo Tuena (eCampus University, Italy); Diana Biondi (Applied Technology for Neuro-Psychology Lab, IRCCS Istituto Auxologico Italiano, Milan, Italy); Karine Goulene (IRCCS Istituto Auxologico Italiano, Milan, Italy); Francesca Borghesi, Gloria Simoncini and Pietro Cipresso (University of Turin, Italy); Sandra Morelli, Mirko Rossi and Giuseppe D'Avenio (National Center for Innovative Technologies in Public Health, Istituto Superiore di Sanità, Italy); Marco Stramba-Badiale (Neurology and Rehabilitation, IRCCS Istituto Auxologico Italiano, Italy); Giuseppe Riva (Humane Technology Lab, Università Cattolica del Sacro Cuore, Milan, Italy)

10:00 **AI-Driven Eye-Tracking: Enhancing Understanding and Diagnosis of Autism Spectrum Disorder**
Valeria Formisano, Roberta Simeoli and Davide Marocco (University of Naples Federico II, Italy)

10:20 **Effects of VR-Simulated Bus Drive Experiences on Physiological Arousal and Perceived Passenger Stress**
Jan-Willem Van t Klooster, Max Friehs, Teodora Spirova and Rob Van Der Lubbe (University of Twente, The Netherlands)

09:00 - 10:40	*Room T3* **Session 6.3 - PANEL - Empowering Sustainability through AI: Balancing Innovation and Environmental Responsibility** **Chairs:** Sabatina Criscuolo, *National Research Council, Italy* Loredana Cristaldi, *Politecnico di Milano, Italy*

Measuring the Environmental Impact of Artificial Intelligence: Balancing Performance and Sustainability to Achieve Green AI
Immacolata Esposito, *PhD Candidate in Information and Communication Technology for Health at the University of Naples Federico II*

Artificial Intelligence and the Ocean: Science, Creativity, and Human Connection. From science to imagination, AI can reconnect us with the living world and inspire collective responsibility
Rosalia Maglietta, *Senior Researcher, National Research Council, Institute of Intelligent Industrial Technologies and Systems for Advanced Manufacturing*

09:00 - 10:40	*Room T4* **Session 6.4 - SPECIAL EVENT - YOUTH PROGRAM - PART I** **Organized by:** Noemi Pisani, *University of Campania "Luigi Vanvitelli", Italy* Ludovica Gargiulo, *National Research Council, Italy* Stefano Franceschini, *University of Naples "Parthenope", Italy* Alessandra Angelucci, *Politecnico di Milano, Italy*

09:00 - 10:40	*Room T36* **Session 6.5 - SPECIAL EVENT - DHEAL-COM4MetroXRAI - PART I** **Chair:** Lorena Rossi, *IRCCS INRCA - Istituto Nazionale Ricovero e Cura Anziani, Italy*

09:00 **Surface and Deep Signal Correlation in a Pediatric Dystonia Case with DBS**
Elisa Barbi and Chiara Rossi (Neuroscience and Human Genetics Department, Meyer Children's Hospital IRCCS, Italy); Edoardo Fino (Meyer Children's Hospital IRCCS Florence, Italy, University of Florence); Simone Peraio, Andrea Di Rita and Alice Noris (Department of Neurosurgery, Meyer Children's Hospital IRCCS, Florence, Italy); Sara Ciabattini (Neuroscience and Human Genetics Department, Meyer Children's Hospital IRCCS); Federico Melani (Neuroscience and Human Genetics Department, Meyer Children's Hospital IRCCS Florence, Italy); Luca Mesin (Politecnico di Torino, Italy); Renzo Guerrini and Flavio Giordano (Meyer Children's Hospital IRCCS, University of Firenze); Matteo Lenge (Meyer Children's Hospital IRCCS Florence, Italy)

09:20 **Tracking Structural Patterns in Early Brain Growth: An Automated Pipeline for Longitudinal Fetal and Neonatal MRI**
Francesco Correnti, Simona Fiori, Renzo Guerrini, Matteo Lenge (Meyer Children's Hospital IRCCS, Italy)

09:40 **DiaBeCo: a Decentralized FL Architecture for Diabetes Care with Personal Data Pods and DTs**
Luigi Fortino (Università degli Studi di Salerno, Italy); Simone De Vita and Michelangelo Esposito (I.T.Svil srl, Italy); Christian Esposito (University of Salerno, Italy)

10:00 **Supervised Machine Learning for Brain Tumor Progression Prediction on Limited and Imbalanced Data: an Exploratory Study**
Pietro Cassieri, Franco Cirillo, Christian Esposito and Giuseppe Scanniello (University of Salerno, Italy)

10:20 **Mining Community Health: Association Rules for the Design of Proximity Care Models**
Lerina Aversano (University of Foggia, Italy); Martina Iammarino (Pegaso University, Italy); Antonella Madau and Ilaria Mancino (University of Sannio, Italy); Debora Montano (University of Modena and Reggio Emilia, Italy & University of Foggia, Italy); Chiara Verdone (University of Foggia, Italy)

10:40 - 11:10	*Università Politecnica delle Marche - Faculty of Economics* **COFFEE BREAK**

10:40 - 11:10	*Room T9 - T10* **DEMO SESSION #3** **Chair:** Nicola Moccaldi, *University of Naples Federico II, Italy*

DEMO #3.1 **Spine3D - A non-invasive 3D scanning system with AI for the assessment of the posture**
Luca Molinaro, Università della Tuscia / Sensor Medica Srl

DEMO #3.2 **TEACH E-AI 2C Robotic Farm: Exploring Evolutionary Robotics and Embodied AI through Hands-On Interaction**
Clara Nobile, University of Naples Federico II, Italy

10:40 - 11:10	*Università Politecnica delle Marche - Faculty of Economics* **POSTER SESSION #3** **Session Coordinators:** Sabatina Criscuolo, *National Research Council, Italy* Noemi Pisani, *University of Campania "Luigi Vanvitelli", Italy*

PS01 **EEG Complexity Measures and Their Applications in Alzheimer's Disease Detection**
Pasquale Arpaia and Maria Cacciapuoti (University of Naples Federico II, Italy); Andrea Cataldo (University of Salento, Italy); Olimpia Criscuolo (Fondazione Peppino Scoppa Onlus, Italy); Sabatina Criscuolo (National Research Council of Italy, Italy & University of Naples Federico II, Italy); Antonio Masciullo (University of Salento, Italy); Marisa Pesola (University of Naples Federico II, Italy); Raissa Schiavoni (University of Salento, Italy); Annarita Tedesco (University of Naples, Federico II, Italy)

PS02 **A Novel Deterministic Approach for Automatic Classification of Congestive Heart Failure**

Benedetta Rega (Università degli Studi di Napoli Federico II, Italy); Alessandro Filisetti (Elettronica S.p.A., Italy); Pietro Bia (Elettronica Group, Italy); Egidio De Benedetto (University of Naples Federico II, Italy); Antonio Manna (Elettronica SpA, Italy)

PS03 **Short-Term Forecasting of Household Energy Consumption Using Recurrent Neural Networks**

Martina Botticelli (ENEA, Italy); Francesco Isgrò and Andrea Pollastro (University of Naples Federico II, Italy); Sabrina Romano (ENEA, Italy)

PS04 **Omnidirectional Photographic Capture for VR-Based Representation of Indoor Space: a Subjective Study**

Giovanni Lo Monaco, Luca Guarnera and Sebastiano Battiato (University of Catania, Italy); Salvatore Livatino (University of Hertfordshire, United Kingdom)

PS05 **Foliar Wetness Prediction Using Sensor Network Data and WaveNet-Based Deep Learning Models**

Irene Cappelli (University of Siena, Italy); Filippo Costanti (University of Florence, Italy); Elia Ceroni, Monica Bianchini and Ada Fort (University of Siena, Italy)

PS06 **Development of a Compact Neural Network for IR Background Estimation in Wearable Eye Trackers**

Alberto Pettenella (EssilorLuxottica, Italy); Daniele M Crafa and Jacopo Spagnoli (Politecnico di Milano, Italy); Luca Merigo and Tommaso Ongarello (EssilorLuxottica, Italy); Marco Carminati (Politecnico di Milano, Italy)

PS07 **Experimental Investigation of Bacterial Cellulose Based Composites as Deformation Sensors**

Salvatore Graziani, Giovanna Di Pasquale and Sara Sadat Hosseini (University of Catania, Italy); Luca Patanè (University of Messina, Italy); Antonino Pollicino (University of Catania, Italy); Francesca Sapuppo (University of Messina, Italy); Carlo Trigona (University of Catania, Italy); Maria Gabriella Xibilia (University of Messina, Italy)

PS08 **3D Virtual Activation Volume for Automated Grasping in Teleoperated Robotic Manipulation**

Antonio Di Tecco, Daniele Leonardis, Antonio Frisoli and Andrea Begni (Sant'Anna School of Advanced Studies, Italy); Claudio Loconsole (Universitas Mercatorum & Institute of Mechanical Intelligence, Scuola Superiore Sant'Anna, Italy)

PS09 **From Regulation to Implementation: EU AI Act Compliance in Engineering and Construction of the Oil & Gas and Petrochemical Sectors**

Rimma Dzhusupova (Eindhoven University of Technology, The Netherlands); Helena Holmström Olsson (Malmö University, Sweden); Jan Bosch (Chalmers University of Technology, Sweden); Mark van den Brand (Eindhoven University of Technology, The Netherlands)

PS10 **Bridging Large Language Models and Logic Programming**
Valerio Crocetti and Aldo F. Dragoni (Università Politecnica delle Marche, Italy)

PS11 **Towards AI-Driven Personalized Treatment: a Dynamic Reinforcement Learning Approach for HIV Therapy**
Giulio Pisaneschi (University of Pisa, Italy); Gabriele Gemignani (Polytecnic of Bari, Italy); Alberto Landi (University of Pisa, Italy)

PS12 **A Comparative Evaluation of Function-Calling LLMs in a Cognitive Architecture**
Marco Pardini, Federico Galatolo, Lorenzo Cominelli, Angelo De Marco and Mario Giovanni C.A. Cimino, Alberto Greco and Enzo Pasquale Scilingo (University of Pisa, Italy)

PS13 **Transfer Learning on a Deep Learning Approach to Optimize Laryngeal Cancer Detection on Endoscopic Images**
Haiyang Wang and Luca Mainardi (Politecnico di Milano, Italy)

PS14 **DMTR Norm: Improving the Performance of Handwriting Verification Model with Distortion Minimized Text Region Preprocessing**
SeYeon Jeong, MyeongHoon Lee, HyeonSu Jung and Kyungbaek Kim (Chonnam National University, Korea (South))

PS15 **Evaluating the Usability of Teach E-AI 2C Robotic Farm: An Educational Software for Introducing Young Learners to Embodied Artificial Intelligence**
Clara Nobile, Federico Diano, Alessio Manfredini, Onofrio Gigliotta, Davide Marocco and Michela Ponticorvo (University of Naples Federico II, Italy)

PS16 **Implementation of Emotional Digital Twin (EDT) for Cobot Omron TM5-700**
Enrico Mattei (A2VI-Lab, University of L'Aquila, Italy); Nicola Stampone, Michele Gabrio Ernesto Antonelli and Pierluigi Beomonte Zobel (University of L'Aquila, Italy)

PS17 **Improving Motor Imagery Decoding Through EEG Frequency Band Analysis**
Javier V. Juan (INNTEGRA, Center for Clinical Neuroscience HLM, Hospital Los Madroños, Madrid, Spain); Sergio Pacheco (Universidad Europea de Madrid, Spain); Eduardo Iáñez (Brain-Machine Interface Systems Lab, Miguel Hernández University of Elche, Spain); Mario Ortiz (Miguel Hernández University of Elche, Spain); Jesús Tornero (INNTEGRA, Center for Clinical Neuroscience HLM, Hospital Los Madroños, Madrid, Spain); José M. Azorín (Universidad Miguel Hernandez de Elche, Spain)

PS18 **A Therapist Interface for Telerehabilitation Using Virtual Glove**
Daniele Lozzi (University of L'Aquila & A2VI-Lab, Italy); Mirko Salvatore (University of L'Aquila, Italy); Enrico Mattei (A2VI-Lab, University of L'Aquila, Italy)

PS19 **Virtual Reality and Serious Games in Anger Induction: a Narrative Review**
Pasquale Arpaia (University of Naples Federico II, Italy); Javier Marìn-Morales (Universitat Politecnica de Valencia, Spain); Leonardo Saitta (Polytechnic University of Valencia, Italy & Federico II University, Italy); Ersilia Vallefuoco (University of Naples Federico II, Italy)

PS20 **Detecting Mental Stress Using EEG and Biosignals: Towards a Neuro-Adaptive System**
Michael Leitner and Selina Christin Wriessnegger (Graz University of Technology, Austria)

PS21 **Multi-Class Error-Related Potentials for Correcting Robot Navigation Mistakes: a Human-in-the-Loop Approach Using EEG Brain-Robot-Interfacing**
Karameldeen Ibrahim Mohamed Omer (Politecnica Delle Marche, Italy & University of Khartoum, Sudan); Andrea Monteriù, Alessandro Freddi, Francesco Ferracuti and Sabrina Iarlori (Università Politecnica delle Marche, Italy)

PS22 **Surface Electromyography-Based Muscle Fatigue Assessment During Hand Grasping Exercises**
Hiba Hellara and Sawsan Njeh (TU Chemnitz, Germany); Aseel Afaneh (Jordan University of Science and Technology, Jordan); Olfa Kanoun (Chemnitz University of Technology, Germany)

PS23 **A Narrative Review of Virtual Human Twins (VHTs) of Healthcare Professionals**
Ludovica Gargiulo (National Council of Research, STIIMA-CNR, Italy); Selen Naz Saritas and Ezgi Arar (National Research Council, Italy); Leonardo Saitta (Polytechnic University of Valencia, Spain & Federico II University, Italy); Matteo De Luca and Ersilia Vallefuoco (University of Naples Federico II, Italy); Sara Arlati and Marta Mondellini (National Research Council, Italy); Nicola Moccaldi (University of Naples Federico II, Italy); Giovanni D'Errico (University of Salento, Italy); Atieh Mahroo (National Research Council & University of Milano-Bicocca, Italy); Walter Terkaj (STIIMA, Italy); Marco Sacco (Italian National Research Council, Italy); Pasquale Arpaia (University of Naples Federico II, Italy)

PS24 **Single-Channel Ear-EEG for Emotion Monitoring: A Feasibility Study**
Marco Arnesano (Università eCampus, Italy); Pasquale Arpaia (University of Naples Federico II, Italy); Simone Balatti (AWEAR Technologies Inc., Italy); Gloria Cosoli (Università eCampus, Italy); Matteo De Luca (University of Naples Federico II, Italy); Ludovica Gargiulo (National Council of Research, STIIMA-CNR, Italy); Nicola Moccaldi (University of Naples Federico II, Italy); Lorenzo Pasquini and Theodore Zanto (UCSF Weill Institute for Neurosciences School, USA); Antonio Forenza (AWEAR Technologies Inc., USA)

PS25 **Towards Prediabetes Detection from Generative AI-Augmented Continuous Glucose Monitoring of Postprandial Glycemic Response Using Bi-LSTM**
Agnese Piersanti, Libera Lucia Del Giudice and Francesco Marraudino (Università Politecnica delle Marche, Italy); Christian Göbl (Medical University of Vienna, Austria); Laura Burattini (Università Politecnica delle Marche, Italy); Andrea Tura (CNR Institute of Neuroscience, Italy); Micaela Morettini (Università Politecnica Delle Marche, Italy)

PS26 **Evaluation of ChatGPT and Gemini Large Language Models for Generating Pharmacokinetic Models with SimBiology**

Libera Lucia Del Giudice, Agnese Piersanti and Alessandro Morelli (Università Politecnica delle Marche, Italy); Christian Göbl (Medical University of Vienna, Austria); Laura Burattini (Università Politecnica delle Marche, Italy); Andrea Tura (CNR Institute of Neuroscience, Italy); Micaela Morettini (Università Politecnica Delle Marche, Italy)

PS27 **Preprocessing Methods for Memristive Reservoir Computing for Image Recognition**
Rishona Daniels, Duna Wattad and Ronny Ronen (Technion - Israel Institute of Technology, Israel); David Saad (Aston University, United Kingdom); Shahar Kvatinsky (Technion - Israel Institute of Technology, Israel)

PS28 **Alpha Band EEG Resting-State Dynamic Functional Source Connectivity in First-Episode Schizophrenia**
Romain Aubonnet (Università di Roma Tor Vergata, Italy); Mahmoud Hassan (Institute of Biomedical and Neural Engineering, Reykjavik University, Iceland); Paolo Gargiulo (Reykjavik University, Iceland); Stefano Seri (Aston University, United Kingdom); Giorgio Di Lorenzo (Università di Roma Tor Vergata, Italy)

11:10 - 12:10	*Aula Magna G. Conti* **PLENARY SESSION - KEYNOTE LECTURE** **Chair**: Aldo Franco Dragoni, *Università Politecnica delle Marche, Italy*

Quantum Computing and its Synergies with AI

Federico Mattei, *IBM Quantum Ambassador*

12:10 - 13:10	*Aula Magna G. Conti* **TUTORIAL SESSION** **Chair**: Loredana Cristaldi, *Politecnico di Milano, Italy*

Abel: Towards Artificial Empathy - A Social Robot for Natural Interactions

Enzo Pasquale Scilingo, *University of Pisa, Italy*

12:10 - 13:10	*Room T4* **Session 6.4 - SPECIAL EVENT - YOUTH PROGRAM** **Organized by:** Noemi Pisani, *University of Campania "Luigi Vanvitelli", Italy* Ludovica Gargiulo, *National Research Council, Italy* Stefano Franceschini, *University of Naples "Parthenope", Italy* Alessandra Angelucci, *Politecnico di Milano, Italy*

12:10 - 13:10	*Room T36* **Session 6.5 - SPECIAL EVENT - DHEAL-COM4MetroXRAI - PART II** **Chair:** Christian Carmine Esposito, *University of Salerno, Italy*

12:10 **From Raw ECG to Classification: a Lightweight Approach to Paroxysmal AF Detection**
Ilaria Mancino (University of Sannio, Italy); Lerina Aversano and Chiara Verdone (University of Foggia, Italy); Martina Iammarino (Pegaso University, Italy)

12:30 **Latent Dirichlet Allocation with Positive/Negative Anomaly Splitting for Bilateral Cortical Analysis in Genetic Epilepsies**
Gianni Moretti, Francesco Correnti, Elisa Barbi, Simona Balestrini, Renzo Guerrini, Matteo Lenge (Meyer Children's Hospital IRCCS, Italy)

12:50 **AI-Based Modular Warning Machine for Risk Identification in Proximity Healthcare**
Chiara Razzetta (IRCCS Ospedale Policlinico San Martino, Italy); Shahryar Noei (Fondazione Bruno Kessler, Italy); Federico Barbarossa (IRCCS INRCA Scientific Direction, Italy); Edoardo Spairani (University of Pavia, Italy); Monica Roascio (Università di Genova, Italy); Elisa Barbi and Giulia Ciacci (Meyer Children's Hospital IRCCS, Italy); Sara Sommariva, Sabrina Guastavino, Michele Piana (University of Genoa, Italy); Matteo Lenge (Meyer Children's Hospital IRCCS, Italy); Gabriele Arnulfo (University Hospital Wuerzburg, Germany); Giovanni Magenes (University of Pavia, Italy); Elvira Maranesi and Giulio Amabili (IRCCS INRCA, Italy); Anna Maria Massone and Federico Benvenuto (University of Genoa, Italy); Giuseppe Jurman (Fondazione Bruno Kessler, Italy & Humanitas University, Italy); Diego Sona (Fondazione Bruno Kessler, Italy); Cristina Campi (Università di Genova & IRCCS Ospedale Policlinico San Martino, Italy)

13:10 - 14:30	*Università Politecnica delle Marche - Faculty of Economics* **LUNCH / DEMO SESSION #3 / POSTER SESSION #3**

Still presenting Demos of the **Demo Session #3** and Posters of the **Poster Session #3**.

14:30 - 16:10	*Aula Magna G. Conti* **Session 7.1 - From Brain Dynamics to Real-World Applications: Functional Neuroimaging and BCI Advances** **Chairs:** Ilaria Marcantoni, *Università Politecnica Delle Marche, Italy* Andrea Monteriù, *Università Politecnica Delle Marche, Italy*

14:30 **Cerebellar Functional Connectivity Reorganization in a Split-Brain Patient**
Erica Iammarino and Ilaria Marcantoni (Università Politecnica delle Marche, Italy); Luca Reversi (Azienda Ospedaliera-Universitaria Marche, Italy); Francesco Mariotti (Università Politecnica delle Marche, Italy); Giusi Piccolantonio (Università di Verona, Italy); Nicoletta Foschi and Mojgan Ghoushi (Azienda Ospedaliera-Universitaria Marche, Italy); Luisa De Vivo (Università of Camerino, Italy); Gabriele Polonara, Mara Fabri and Laura Burattini (Università Politecnica delle Marche, Italy)

14:50 **A Data-Driven Resting-State fMRI Study of Chronic Low Back Pain: Unraveling the Relationships Between Gender, Brain Connectivity, and the Noradrenergic System**

Federica Tomaiuolo (University of Chieti-Pescara, Italy); Francesco Cerritelli (COME Collaboration, Italy); Carlo Sestieri, Teresa Paolucci, Stefano L. Sensi, Stefano Delli Pizzi and Antonio Ferretti (University of Chieti-Pescara, Italy)

15:10 **Imaginary Coherence in Parent-Infant EEG Hyperscanning: Neural and Behavioral Synchrony in Social Interactions**
Giorgia Procissi (Institute of Clinical Physiology, National Research Council, Italy); Elena Capelli and Miriam Paola Pili (University of Pavia, Italy); Lorenzo Bachi (National Research Council, Italy); Valentina Riva (Scientific Institute IRCCS E. Medea, Italy); Lucia Billeci (Institute of Clinical Physiology, National Research Council, Italy); Livio Provenzi (University of Pavia, Italy)

15:30 **Towards Effortless Brain-Machine Interaction: an SSVEP-Based BMI with Object Detection in FPV**
Karameldeen Ibrahim Mohamed Omer (Università Politecnica Delle Marche, Italy & University of Khartoum, Sudan); Andrea Monteriù (Università Politecnica Delle Marche, Italy)

15:50 **Toward Plug-and-Play BCIs: Applying Zero-Shot Deep Learning to Motor Imagery EEG Signals**
Maryam Alimardani and Berat Aras (Vrije Universiteit Amsterdam, The Netherlands)

14:30 - 16:10 *Room T37*
Session 7.2 - PSYCHOBIT - PART II
Chairs: Monica Casella, *University of Naples Federico II, Italy*
Erica Chinzer, *University of Naples Federico II, Italy*

14:30 **A Novel Framework for Evaluating Motor Sounds Using Psychometric and Biosensor Measures**
Monica Casella, Vincenzo Fusco, Elio Di Giulio, Michela Ponticorvo and Raffaele Dragonetti (University of Naples Federico II, Italy)

14:50 **AI-Powered Gamified Learning Environment for Personalized Education in Primary and Secondary Schools**
Angelo Rega (Università Telematica Pegaso, Italy & School Psychology Research and INTervention Lab, Italy); Carolina Mele and Lucia Miranda (Università Telematica Pegaso, Italy); Luigi Iovino (Garage 94 S.R.L, Italy)

15:10 **Fostering Soft Skills Through Educational Robotics: Missed Opportunities and New Directions**
Francesca De Santis (University of Macerata, Italy); Alessandra Vitanza (Institute of Cognitive Sciences and Technologies (ISTC) - CNR, Italy); Francesco Palumbo and Onofrio Gigliotta (University of Naples Federico II, Italy)

15:30 **Engaging Children in Educational Robotics Through Escape Games**

Erica Chinzer (University of Naples Federico II, Italy); Aymeric Vellinger and Antoine Hubermont (University of Namur, Belgium); Onofrio Gigliotta (University of Naples Federico II, Italy); Alessandra Vitanza (Institute of Cognitive Sciences and Technologies - CNR, Italy); Elio Tuci (University of Namur, Belgium)

15:50 **A Preliminary Study on Assessing Patient Behavioral Quality Using Deep Learning**
Paolo Pagliuca (Institute of Cognitive Sciences and Technologies - CNR, Italy); Stefania De Marco (Università della Campania Luigi Vanvitelli, Italy); Alessandra Vitanza (Institute of Cognitive Sciences and Technologies - CNR, Italy); Nicola Milano (University of Naples Federico II, Italy); Angelo Rega (Università Telematica Pegaso, Italy & School Psychology Research and INTervention Lab, Italy); Stefano Nolfi (Institute of Cognitive Sciences and Technologies - CNR, Italy)

14:30 - 16:10 *Room T3*
Session 7.3 - Biomimetic Memristive Nanotechnologies for Artificial Intelligence, Edge Computing and Neuromorphic Engineering Applications
Chairs: Alon Ascoli, *Politecnico di Torino, Italy*
Kristina Nikiruy, *Kiel University, Germany*

14:30 **A Multiterminal Setup for Complex Dynamics Characterization and Unconventional Computing in Self-Organizing Memristive Networks**
Davide Pilati (Politecnico di Torino, Italy & INRiM - Advanced Materials Metrology and Life Sciences Division, Italy); Fabio Michieletti (Politecnico di Torino, Italy); Alessandro Cultrera and Gianluca Milano (INRIM - Istituto Nazionale di Ricerca Metrologica, Italy); Carlo Ricciardi (Politecnico di Torino, Italy)

14:50 **Tunable Neural Network Implementation Using Niobium Oxide Memristors**
Andras Horvath (Peter Pazmany Catholic University, Germany); Ahmet Demirkol (Istanbul Technical University, Turkey); Alon Ascoli (Politecnico di Torino, Italy); Ronald Tetzlaff (Technische Universität Dresden, Germany)

15:10 **An Adaptive Training Method for Memristive Next Generation Reservoir Computing Systems**
Alon Ascoli, Davide Rossetti, Fernando Corinto (Politecnico di Torino, Italy); Ahmet Samil Demirkol and Ronald Tetzlaff (Technische Universität Dresden, Germany); Tzvetan Ivanov and Jonas Schneegaß (TU Ilmenau, Germany); Ilya Petrenyov, Alexander Shkurmanov, Martin Ziegler and Kristina Nikiruy (Kiel University, Germany)

15:30 **Using a SystemC Based Design and Simulation System for Hyperdimensional Computing with Multi-Level-Cell Look-Up-Tables with ReRAM**
Benjamin Seiler and John Reuben (Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany); Dietmar Fey (Chair for Computer Architecture, FAU, Erlangen, Germany)

15:50 **Low-Power Switching of Memristors Exhibiting Fractional-Order Dynamics**
Yuriy V. Pershin and Nathan Astin (University of South Carolina, USA)

14:30 - 16:10	*Room T4* **Session 7.4 - PANEL - Toward a European Committee for BCI Standardization** **Chairs:** Pasquale Arpaia, *University of Naples Federico II, Italy* Nicola Moccaldi, *University of Naples Federico II, Italy*

PANELISTS

José M. Azorín (*Director, Brain-Machine Interface Systems Lab at Universidad Miguel Hernández de Elche*)
Mahdi Davari (*CEO and Cofounder InnoBrain, SE*)
Irene Del Chicca (*ab medica*)
Jacek Eisler (*Chair of DKE/GAK 812.1.1 Brain Computer Interface VDE - DE*)
Nicola Moccaldi (*Chair of CEI/TC 324 Brain Computer Interface - IT*)
Giuseppina Polino (*Technical Officer at the Italian Electrotechnical Committee (CEI)*)
Gianluigi Rubino (*Brain Product*)
Reinhold Scherer (*Vice President of the International BCI Society*)
Yuntao Yu (*Chair of Brain-Computer Interfaces - ISO/IEC JTC 1/SC 43*)

14:30 - 18:30	*Room T36* **Session 7.5 - SPECIAL EVENT - DHEAL-COM4MetroXRAI - PART III** **ECM training event for medical practitioners**

14:30 **Ethical and legal aspects of the use of health data and the regulation of the European Health Data Space**
Christian Esposito - UNISA

15:00 **AI and digital twins exploitation in medical practice**
Matteo Lenge - MEYER

15:30 **XR usage in healthcare and practical use cases**
Marco Benadduci - INRCA & Paolo Olivetti - Tech4care

16:30 **Digital therapeutics**
Oscar Mayora - FBK

17:00 **Wearable devices and their exploitation in the healthcare**
Giuseppe Scanniello - UNISA

17:30 **Data Analytics for healthcare datasets**
Elio Masciari - UNINA

16:10 - 16:40	*Università Politecnica delle Marche - Faculty of Economics* **COFFEE BREAK / DEMO SESSION #3 / POSTER SESSION #3**

Still presenting Demos of the **Demo Session #3** and Posters of the **Poster Session #3**.

16:40 - 18:20	*Aula Magna G. Conti* **Session 8.1 - Brain-Computer Interfaces in Healthcare and Rehabilitation** **Chairs:** José M. Azorín, *Universidad Miguel Hernandez de Elche, Spain* Ludovica Gargiulo, *National Research Council, Italy*

16:40 **The Development of a Closed-Loop, Patient-Centered, Extended Reality System to Enhance Balance in People with Multiple Sclerosis: A Research Protocol**
Gabriele Perachiotti (University of Ferrara, Italy); Nicola Moccaldi (University of Naples Federico II, Italy); Giovanni D'Errico (University of Salento, Italy); Isolde Martina Busch (Università di Verona, Italy); Elisa Magosso (University of Bologna, Italy); Sofia Straudi (University of Ferrara, Italy)

17:00 **EEG Correlates of Car Sickness in Naturalistic Driving Conditions**
Lucas Benoit (IMT Atlantique & Stellantis, France); Nicolas Farrugia (IMT Atlantique, France); Eleonore Henry and Clément Bougard (Stellantis, France); Giulia Lioi (IMT Atlantique, France)

17:20 **Riemannian Geometry Methods for Enhancing EEG-Based Assessment of Mindfulness Treatment in Migraine**
Pasquale Arpaia (University of Naples Federico II, Italy); Marco Congedo (GIPSA-Lab, France); Lucrezia Di Marino (University of Naples Federico II, Italy); Elisa Visani, Licia Grazzi and Paola Lanteri (Fondazione IRCCS Istituto Neurologico Carlo Besta, Italy); Nicola Moccaldi (University of Naples Federico II, Italy); Marco Nalin (Ab Medica, Italy); Rachele Robbio (University of Naples Federico II, Italy); Dunja Duran (IRCCS Istituto Neurologico Carlo Besta, Italy)

17:40 **Exploring Performance Variability in Deep Neural Networks for Motor Imagery Classification: Towards a Zero-Calibration Brain-Computer Interface**
Pasquale Arpaia, Antonio Esposito, Enza Galasso, Fortuna Galdieri (University of Naples Federico II, Italy); Angela Natalizio and Marco Parvis (Politecnico di Torino, Italy); Andrea Pollastro (University of Naples, Federico II, Italy)

18:00 **Asynchronous Control of an Exoskeleton with BMI: Evaluation and Validation of EEG Processing and Classification Strategies for Motor Imagery**
Cristina Polo-Hortiguela, Vicente Quiles and Paula Soriano-Segura (Miguel Hernandez University of Elche, Spain); Carlo Cavaliere-Ballesta (Universidad Miguel Hernández & BMI Lab research group, Spain); Yash Bhambhani and Mario Ortiz (Miguel Hernández University of Elche, Spain); Eduardo Iáñez (Brain-Machine Interface Systems Lab, Miguel Hernández University of Elche, Spain); José M. Azorín (Universidad Miguel Hernandez de Elche, Spain)

16:40 - 18:20	*Room T37* **Session 8.2 - PSYCHOBIT - PART III** **Chairs:** Emanuele Tauro, *IRCCS Istituto Auxologico Italiano, Italy* Nicola Milano, *University of Naples Federico II, Italy*

16:40 **Personalized Biofeedback for Affective Dynamics: A Virtual Reality Framework Based on Markov Modeling**
Pietro Cipresso, Gloria Simoncini and Francesca Borghesi (University of Turin, Italy)

17:00 **Development of the User eXperience Questionnaire for Virtual Reality Applications in Healthcare (UXVR-H)**
Francesca Bruni (eCampus University, Italy); Elisa Pedroli (Istituto Auxologico Italiano, Italy)

17:20 **Human-Computer Interaction in Education: A Psychologically Grounded Approach**
Elena Dell'Aquila (Pegaso University, Italy); Michela Ponticorvo (University of Naples Federico II, Italy); Pierpaolo Limone and Raffale Di Fuccio (Pegaso University, Italy)

17:40 **Understanding Aesthetic Judgments of 20th-Century Sculptures: a Multimodal Machine Learning Approach**
Zoryana Andrusyak and Selina Christin Wriessnegger (Graz University of Technology, Austria)

18:00 **A Measurement Approach for the Assessment of Indoor Multidomain Comfort: The MULTICLIMACT Experience**
Gloria Cosoli (Università eCampus, Italy); Nibras Abo Alzahab (Marche Polytechnic University, Italy); Dianel Ago (Callisia & eCampus University, Italy); Simone Murazzo (LIS - Live Information System, Italy); Rania Christoforou (Medical Faculty, RWTH Aachen University, Germany); Mina Moayyedi and Marcel Schweiker (RWTH Aachen University, Germany); Marco Arnesano (Università eCampus, Italy); Ilaria Ciuffreda and Gian Marco Revel (Università Politecnica delle Marche, Italy)

16:40 - 18:20 *Room T3*
Session 8.3 - Emerging Technologies for Health Monitoring and Personalized Medicine
Chairs: Gianluca Rho, *University of Pisa, Italy*
Giulio Pisaneschi, *University of Pisa, Italy*

16:40 **EDArt: a Preliminary Framework for the Simulation of Hand-Movement Artifact-Corrupted Electrodermal Activity Signal**
Gianluca Rho and Nicola Carbonaro (University of Pisa, Italy); Marco Laurino (National Research Council, Italy); Alessandro Tognetti and Alberto Greco (University of Pisa, Italy)

17:00 **A Deep Learning Approach for Nystagmus Recognition in RGB Videos**
Giacomo Nunziati, Andrea Porri, Paolo Andreini, Simone Bonechi and Monica Bianchini (University of Siena, Italy); Rudi Pecci and Mattia Ronchetti (AOU Careggi-Università di Firenze, Italy); Franco Scarselli (University of Siena, Italy); Simone Vanni (Università di Firenze, Italy)

17:20 **Exploring Digital Twin Applications in Pediatric Anthropometry: a Preliminary Validation Study**
Maria Del Mar Uclés Torrente and Gema Esperanza Ruiz Gamarra (Biomedicine Program, Spain); José M Alcalde-Llergo (University of Tuscia & University of Córdoba, Spain); Manuel Vaquero Álvarez (University of Cordoba, Spain); Isabel Mª Blancas Sánchez (Occidente Azahara Healthcare Center, Spain); Enrique Yeguas-Bolívar, Manuel Vaquero-Abellán and Pilar Aparicio-Martínez (University of Córdoba, Spain)

17:40 **Integration of Wearable Sensors and Metabolic Chamber Data for Energy Expenditure Assessment: a Preliminary Study**
Giulio Pisaneschi, Gianluca Rho, Alberto Greco, Mirko Marracci, Alessio Basolo, Ferruccio Santini, Enzo Pasquale Scilingo, Alberto Landi and Paolo Piaggi (University of Pisa, Italy)

18:00 **FEV1 Trajectory Classification in COPD Patients**
Francesco Bossi, Alberto Greco, Gianluca Rho and Carlotta Marinai (University of Pisa, Italy); Pasquale Bufano, Michele Zanoletti, Eleonora Melissa and Marco Laurino (National Research Council, Italy); Francesco Di Rienzo, Carlo Vallati and Nicola Carbonaro (University of Pisa, Italy); Henrik Watz (Velocity Clinical Research Germany, Ahrensburg, Germany); Mustafa Abdo (Thoraxklinik at Heidelberg University Hospital, Germany); Alessandro Tognetti (University of Pisa, Italy)

16:40 - 18:00 *Room T4*
Session 8.4 - General Session - PART II
Chairs: Sara Casaccia, *Università Politecnica delle Marche, Italy*
Leila Es Sebar, *Politecnico di Milano, Italy*

16:40 **Development of a Measurement System Based on IoT Technologies, Artificial Intelligence and Virtual Reality for Personalized Care of Vulnerable Individuals**
Sara Meletani, Sara Casaccia, Sabrina Iarlori, Francesco Ferracuti, Andrea Monteriù (Università Politecnica delle Marche, Italy); Andrea Angelino (Ageing-Tech, Italy); Fabio Zangheri (Micro Center S.r.l, Italy); Florinda Filippini (Labirinto, Italy); Gian Marco Revel (Università Politecnica delle Marche, Italy); Francesca Martelli and Massimiliano Roccetti (Ageing-Tech, Italy)

17:00 **Design of an IoT-Based Monitoring Sensor Network and Preliminary AI-Driven Data Analysis for Health Measurement in Residential Care Homes**
Sara Meletani, Sara Casaccia, Milena Martarelli and Gian Marco Revel (Università Politecnica delle Marche, Italy); Paolo Rinaldesi (Revelop Srl, Italy); Carlo Lucadei and Marco Panichi (Ksenia Security Innovation, Italy); Aldo F. Dragoni (Università Politecnica Delle Marche, Italy); Waleed Abdullah Mohammed Alromaema (Università Politecnica delle Marche, Italy & Healthcare Engineering Srl, Italy)

17:20 **Robotic Collaborative Walker with Impedance Control and Augmented Reality for Assisted Walking and User Empowerment**

Mariolino De Cecco, Giandomenico Nollo, Alessandro Luchetti, Matteo Bonetto, Damiano Fruet and Muhammad Irtaza (University of Trento, Italy); Md Mustafizur Rahman, Ryosuke Shigeto and Isidro Butaslac (Nara Institute of Science and Technology, Japan)

17:40 **Deep Learning-Based Automated Defect Detection Systems in High-Speed Railway**
Liuchang Yang, Kang Du, Chao Xu, Jianfeng Cheng, Renwei Kang, Ting Bi and Tao Jiang (Huazhong University of Science and Technology, China)

18:20 - 18:50	*Aula Magna G. Conti* **CLOSING AND AWARD CEREMONY**

18:50 - 19:30	*Università Politecnica delle Marche - Faculty of Economics* **WINE AND CHEESE TASTING PARTY**