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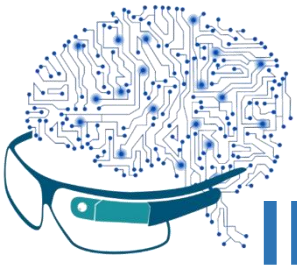
2023 IEEE INTERNATIONAL CONFERENCE ON

Metrology for eXtended Reality, Artificial Intelligence and Neural Engineering

OCTOBER 25-27, 2023

MILANO, ITALY



IEEE MetroXRAINE

PROGRAM

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BUSINESS AND TECHNOLOGY CONSULTING

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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 2023 IEEE International Conference on Metrology for eXtended Reality, Artificial Intelligence, and Neural Engineering (IEEE MetroXRAINE 2023).

MetroXRAINE 2023 promotes synergies among experts in emerging technologies highly influencing frontier applications: eXtended Reality, Brain-Computer Interface, and Artificial Intelligence, with special attention to the measurement and its quality on the field (applied metrology).

In Industry 4.0 framework, manufacturing systems and processes become able to respond to rapidly changing conditions and requirements. Adaptivity is driven by the integration of advanced technologies such as Artificial Intelligence and advanced interfaces. In the context of Health 4.0, adaptivity is equally pivotal. Health 4.0 envisions a healthcare system that leverages digital technologies and data to provide more personalized, efficient, and patient-centered care. Brain-Computer Interfaces and Extended Reality technologies are powerful man-machine interfaces for enhancing adaptivity in both Industry 4.0 and Health 4.0. They provide new ways to interact with technology and data, enabling more efficient and personalized responses to changing conditions. However, these technologies must be deployed thoughtfully, addressing the ethical, privacy, and security aspects that come with their use in these transformative contexts.

The organization of this second edition of the Conference is coordinated by the Polytechnics of Milan, the National Research Council of Italy - STIIMA, the University of Naples Federico II, the University of Salento, the University of Bath, and the Ulster University.

MetroXRAINE 2023 Technical Program consists of 142 oral presentations scheduled over three days. Presentations are organized in six Plenary (three Scientific and three Tutorial), five General and 20 Special Sessions. Special Sessions aim to create a focus on specific topics, where researchers can make knowledge, familiarize, exchange ideas, and build cooperation. In

addition, four Special Events (*ID4MetroXrAi* on Industry 4.0, *MetroVAI4ensic* on forensic technologies, law and ethics, *PsychoBit* on digital psychology, and a *Youth* Program), four Panels Sessions, a student contest, three demo sessions, and interactive company expositions are hosted within the conference.

The received extended abstracts were submitted to a peer-review process. Relevance, quality, significance, and novelty of the 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.

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

- Springer - Information Systems Frontiers;
- Elsevier - Computer Standards and Interfaces;
- Springer - Soft Computing;
- MDPI - Sensors;
- MDPI - Metrology.

MetroXRAINE 2023 is honored to have well-claimed experts in eXtended Reality, Artificial Intelligence, and Neural Engineering as Plenary Keynote Speakers:

- Dr. Martin Milton, from the International Bureau of Weights and Measures (Bureau International des Poids et Mesures, BIPM), will present the first day “The SI Reference Point: a digital reference for measurement units and quantities”;
- Dr. Christoph Runde, from the Virtual Dimension Center, Fellbach, Germany-European Association for Extended Reality will give a talk on “XR Standardization-The status quo and path ahead of us” on October 26;
- Prof. Reinhold Scherer, from the University of Essex, United Kingdom, will present the second day of the Conference “Non-invasive Neuroadaptive Neural Interfaces: Learning to Learn” on October 27.

We are grateful to the Keynote Speakers for joining the Conference.

To recognize the most outstanding paper presented at the annual *2023 IEEE International Conference on Metrology for eXtended Reality, Artificial Intelligence, and Neural Engineering*, the Best Conference Paper Award sponsored by Ksenia Security will be assigned. Other awards will be assigned to the Best Paper of Pillar AI (Artificial Intelligence) and of Pillar NE (Neural Engineering) sponsored by MDPI BioMedInformatics, to the Best Paper in Applied Metrology sponsored by MDPI Metrology, to the Best Paper presented by a Young Researcher sponsored by MDPI Sensors. Furthermore, the Best Poster, the Best Demo and the Best Graphical Abstract Awards will be assigned.

We sincerely want to thank all the sponsors and the patronages who made this event possible.

The *2023 IEEE International Conference on Metrology for eXtended Reality, Artificial Intelligence, and Neural Engineering* is about to begin. Scientists, technologists, and companies please enjoy the Conference!

October 2023

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IEEE MetroXRAINE 2023 Keynote Speakers

Plenary Session - Wednesday October 25 - H 11:30

The SI Reference Point: a digital reference for measurement units and quantities

Martin **Milton**

Bureau International des Poids et Mesures

ABSTRACT

The International Bureau of Weights and Measures (Bureau International des Poids et Mesures, BIPM) is developing digital implementations of its services and supporting the work of the CIPM in coordinating a digital transformation of metrology world-wide.

The foundation of the new digital services from the BIPM will be the SI Reference Point, which will be a machine-actionable service providing authoritative information about the SI as currently published in the SI Brochure. The SI Reference Point will provide digital references for the SI units and prefixes, as well as the associated defining constants and kinds of quantity. It will include links to external references for kinds of quantities, made available by CIE and IUPAC, for example, or developed in collaboration with ISO/IEC, and a digital reference for the fundamental constants that will be developed in collaboration with CODATA.

The functionality of the SI Reference Point will be presented together with information about other new services from the BIPM. These will include machine access to the universal coordinated timescale (UTC) which is disseminated by the BIPM and its underpinning data.

SPEAKER BIOGRAPHY

Dr Martin Milton received a BA in Physics from Oxford University in 1981 and a PhD in Laser Physics from Southampton University in 1990 followed by an MBA from the London Business School in 1991.

Dr Milton joined the BIPM in October 2012 as Director Designate and became Director on 1 January 2013. Before his move to the BIPM, Dr Milton spent 31 years at the National Physical Laboratory (NPL), United Kingdom where he was a Fellow in the Analytical Science Division.

As Director of the BIPM he manages 71 staff and oversees the impact of the programme of work and relations with stakeholders, including principally the 64 Member States and 36 Associates States and Economies.

During his term as Director, the BIPM has introduced the new definitions for the SI base units which has changed the global perspective on metrology at the highest level. He is now driving

forward the digital transformation of metrology and of BIPM's services. In 2022, he sought the approval of Member States a new initiative to increase participation in the work of the BIPM to reach the goal of universal engagement conceived by the founding nations in 1875.
Dr Milton has published more than 100 papers in peer-reviewed journals and has received several awards including most recently the Finkelstein Medal of the Institute of Measurement and Control for notable contributions to measurement internationally.

Plenary Session - Thursday October 26 - H 11:00

XR Standardization - The status quo and path ahead of us

Christoph **Runde**
Virtual Dimension Center, Fellbach, Germany-European Association for eXtended Reality

ABSTRACT
XR standards are the basis to achieve XR interoperability, intuitive user interfaces, and they are the basis to avoid vendor lock-in and re-inventing the wheel. Standards generally describe mature technologies/methods and therefore define the state of the art. They are therefore generally not in the focus of research projects. Standards make it possible to identify those areas of work that can be the subject of innovative services and those who don't; expenditures for R&D can thus be concentrated in such innovative fields. However, the landscape of XR norms, XR standards, XR guidelines and XR recommendations is extremely broad, scattered and confusing today. Dozens of organizations are working on the topic, some of which in operate a number of working groups. We estimate at least many hundreds of documents to be relevant. There is no institution today that overviews, classifies and transfers knowledge about XR standardization to the public.
In his talk Christoph Runde will give a global overview of XR norms, XR standards, XR guidelines and recommendations. He will present active organzations, running XR standardization activities and an analysis of published XR norms, XR standards and XR guidelines. He will adress future standardisation needs and refer to strategic issues such as platform economy and standardization strategies from the EU, US and China.

SPEAKER BIOGRAPHY

With more than 25 years of industry experience, Christoph Runde is one of the pioneers in the field of professional systems and applications of virtual reality (VR) and augmented reality (AR). After starting his career at Porsche, he joined the Fraunhofer Institute for Manufacturing Engineering and Automation (IPA) in 1999, where he led the institute's activities in VR/AR and achieved a Ph.D. degree. From 2007 on he developed the Virtual Dimension Center (VDC) to one of the biggest and most successful cluster initiatives for VR/AR in Europe. Under Christoph's leadership, the VDC was decorated with the European Cluster Management Excellence Label GOLD and numerous awards for its innovation capabilites and its quality of services. Christoph's expertise is in demand by governmental bodies and VC funds, which he supports as an advisor. In parallel to his position as director of VDC, Christoph acts as the Vice President for Industry of the European Virtual Reality Association (EuroVR). In 2017 Christoph was awarded with a honorary professorship by the Heilbronn University.

Plenary Session - Friday October 27 - H 11:00

Non-invasive Neuroadaptive Neural Interfaces: Learning to Learn

Reinhold **Scherer**

University of Essex, UK

ABSTRACT

Neural interfaces are closed-loop feedback systems that enable real-time decoding of neural activity and on-demand neuromodulation of neural circuits. They provide direct access to motor, sensory, emotional, and cognitive functions and open up completely new and unprecedented possibilities for human-machine interaction and cognitive enhancement.

Brain-Computer Interfaces (BCI) enable their users to interact with external devices by converting signals measured from the brain into messages for the device. Messages are encoded by patterns embedded in brain signals generated intentionally or unintentionally by the user. Patterns intentionally created by users can be used directly to control devices. Patterns elicited unintentionally can be used to monitor neural processes and assess psychological states such as cognitions and emotions to trigger an adaptive response of the device (neuroadaptive). The

main barriers to the use of spontaneous electroencephalogram (EEG)-based BCI technologies are the wide variation in performance when using BCIs and the inability of BCIs to provide meaningful control to a large proportion of users.
In this talk, I will argue that EEG-based online co-adaptive BCIs, which automatically adjust or recalculate the model parameters of the algorithms that translates the patterns, help to overcome the above problems. I will also present ideas on how BCI technology can be used to detect system errors in virtual reality (VR) and how it can be used to help people whit Math Anxiety.

SPEAKER BIOGRAPHY

Reinhold Scherer is Professor of Brain-Computer Interfaces (BCI) and Neural Engineering (NE), Co-Director of the Essex BCI-NE Laboratory and current Head of the School of Computer Science and Electronic Engineering (CSEE), University of Essex, Colchester, UK. He received the MSc degree in 2001 and the PhD degree in Computer Science in 2008, and the Habilitation (venia docendi) in Applied Computer Science from Graz University of Technology (TU Graz), Austria, in 2016. From 2008 to 2010, he was a postdoctoral fellow at the Department for Computer Science & Engineering, University of Washington, Seattle, USA. From 2010 to 2016 he was Assistant Professor and from 2016 to 2018 Associate Professor at the Institute of Neural Engineering, TU Graz. From 2011 to 2018, he was deputy director of the Institute of Neural Engineering. He joined CSEE in 2019.
His primary research interests are in the areas of online brain-machine co-adaptation, statistical and adaptive signal processing, mobile brain and body imaging, and rehabilitation. Active research topics focus on gaining deeper insights into brain dynamics and mechanisms underlying motor and cognitive learning, with the goal of improving the interpretability of brain rhythms and thereby optimizing the performance of spontaneous EEG-based BCI interaction and rehabilitation protocols. He has published numerous scientific papers and holds patents. He is an associate editor of the journals Scientific Reports, Frontiers in Neuroprosthetics, and Brain-Computer Interfaces, and a board member of the International BCI Society.

Melting machine learning with in-sensor computing

Danilo **Pau**

STMicroelectronics

ABSTRACT

Nowadays, we are experiencing mode sophisticated machine learning models such as Minerva, PaLM, GPT-3 somehow regardless of the complexity they feature. These models poses some hard questions: how much energy is it required to train them? how can they scale across four billion android users? Is there any limit to model hyper-parametrization? how to avoid data contamination? what is the proper training data vs parameter ration? Is this approach sustainable for the future of the planet?

For the experts on embedded computing, the obvious counter action to this trend is to look for tiny machine learning solutions. Indeed, since 2019 TinyML Foundation and MLCommons created a vibrant community focused on developing low power devices with open benchmarks mainly concentrating on micro-controllers and neural processing units. Unfortunately, sensor devices were poorly considered as execution targets because of their extreme specific properties. One shall look to them not with a “more Moore” opportunity and vice versa with a mindset “less is more”. With that in mind, this talk will review a couple of sensors which are aimed to push forward the tiny concept to the extreme low boundary both in term of power consumption, die area and accuracy. Two examples will be elaborated about in sensor machine learning computing: inertial and pressure sensor with two different computing paradigms.

SPEAKER BIOGRAPHY

Danilo Pau (h-index 25, i10-index 65) graduated in 1992 at Politecnico di Milano, Italy. One year before his graduation, he joined SGS-THOMSONS (now STMicroelectronics) as interns on Advanced Multimedia Architectures, and he worked on memory reduced HDMAC HW design. Then MPEG2 video memory reduction. Next, on video coding, transcoding, embedded 2/3 graphics, and computer vision. Currently, his work focuses on developing solutions for tiny machine learning tools.

Since 2019 Danilo is an IEEE Fellow; he served as Industry Ambassador coordinator for IEEE Region 8 South Europe, was vice-chairman of the "Intelligent Cyber-Physical Systems" Task Force within IEEE CIS, was IEEE R8 AfI member in charge of internship initiative. Today he is a Member of the Machine Learning, Deep Learning and AI in the CE (MDA) Technical Stream Committee CESoc. He was AE of IEEE TNNLS. He wrote the IEEE Milestone on Multiple Silicon Technologies on a chip, 1985 which was ratified by IEEE BoD in 2021 and IEEE Milestone on MPEG Multimedia Integrated Circuits, 1984-1993 which was ratified in 2022. He served as TPC member to TinyML EMEA forum and is the chair of the TinyML On Device Learning working group. He serves as 2023 IEEE Computer Society Fellow Evaluating Committee Members.
With over 83 application patents, 150 publications, 113 MPEG authored documents and 66 invited talks/seminars at various Universities and Conferences, Danilo's favorite activity remains supervising undergraduate students, MSc engineers and PhDs.

Tutorial Session - Thursday October 26

How to use successfully Natural Language Processing and AI-based solutions

Danny **Kuivenhoven**
HEAD OF DIGITAL TRANSFORMATION @ TELEPERFORMANCE EMEA

Vincenzo **Giliberti**
DIGITAL TRANSFORMATION LEADER @ TELEPERFORMANCE ITALY GROUP

ABSTRACT
In the customer experience industry, there is a growing need for innovative solutions that can enhance the quality of interactions with customers while reducing costs. Natural Language Processing (NLP) and Artificial Intelligence (AI) are two technologies that have emerged as

promising tools for achieving these goals. By leveraging NLP and AI, companies can better understand customer needs, improve communication and engagement, and ultimately drive business growth.
This presentation will focus on how NLP and AI-based solutions are being successfully used in the customer experience industry. It will cover topics such as sentiment analysis, chatbots, voice assistants, and personalized recommendations, as well as the challenges associated with implementing these technologies. Additionally, the talk will include real-world case studies and demonstrations of how these technologies can be applied to various industries, including healthcare, retail, and finance.
Through this presentation, attendees will gain a deeper understanding of how NLP and AI can transform the customer experience industry and drive business growth. They will also learn about the latest trends and best practices in this field, as well as practical strategies for implementing NLP and AI-based solutions in their own organizations.

SPEAKERS BIOGRAPHY

Danny Kuivenhoven is currently Head of Digital Transformation @ Teleperformance EMEA. His task, and passion, is to deliver added value by driving innovation with engaged people and professional services. He has over 20 years' experience in ICT, with specialization in customer experience, business processes, innovation and operational excellence. He has a degree in management information technology (The Hague University of Applied Sciences).

Vincenzo Giliberti is currently Digital Transformation Leader @ Teleperformance ITALY GROUP. His task, and passion, is to open innovation, also serving as Program Manager for ICT R&D UE funded projects. He has over 20 years' experience in ICT, with specialization in Digital Innovation, Added Value Solutions, Business Process Management. He has a PhD and a Degree in Engineering (Politecnico di Bari).

Tutorial Session - Friday October 27

Neurofeedback for the treatment of specific diseases and health promotion: methods and techniques

Luciana **Lorenzon**
Italian Society of Neurofeedback and QEEG

ABSTRACT

Neurotherapy is rapidly evolving into a primary care option for many specific diseases.
This presentation will examine some of these cutting-edge applications of neurofeedback that promote neuroplasticity and restore information flow within regulating neural circuits promoting health and increasing performance. For the last ten years an interest has been growing in how to combine the eeg markers from QEEG (quantitative electroencephalography analysis) and sLoRETA (standardized low-resolution electromagnetic tomographic analysis) data to design effective protocols.
This Tutorial provide an overview of physiological monitoring ad self- regulation tools designed for professionals who want to incorporate neuroscience-based methods into their practice. The different techniques used to regulate brain circuits will be presented.

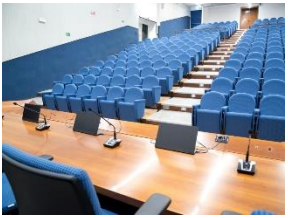
SPEAKER BIOGRAPHY

Clinical Psychologist, Psychotherapist. Certified instructor for BFE and BCIA mentor for Neurofeedback. Qeeg Diplomat and provider of Didactic Training recognized by the International QEEG Certification Board (IQCB). Founder of CINB Centro Italiano di Neurofeedback e Biofeedback and member of the International Liasons of the Applied Psycophysiology Education (Aped) program. She is a head of the Psychophysiology unit of the BFE “Medicina e Sviluppo” Center of Excellence in Treviso, Italy where she combines applied neuroscience with cognitive behavioral therapy and mindfulness. She worked as a Clinical Psychologist and Neuropsychologist in a rehabilitation and research center for diagnostic and treatment of children and adult with a wide range of difficulties including adhd, autism, concussion/brain injury, depression and anxiety. In her clinical practice, she has successfully treated patients with a wide variety of conditions using QEEG-based diagnosis, biofeedback and neurofeedback. His current focus includes a more complex assessment approaches that combines functional brain imaging (qEEG) techniques and “omics” strategies in the diagnosis and treatment of mental disorders and the effectiveness of the combination of Biofeedback, Neurofeedback and lifestyle modifications . She is a member of the Board of Directors of SINQ (Italian Society of Neurofeedback and qEEG).

IEEE MetroXRAINE 2023 Venue

IEEE MetroXRAINE 2023 will be held at the **FAST - Conference Center**.

FAST (Federazione delle Associazioni Scientifiche e Tecniche) is a federation of associations, non-profit organization, which works to create and disseminate the technical and scientific culture. The Federation brings together the most authoritative and representative associations and technical benchmark of over 50,000 members.

ADDRESS

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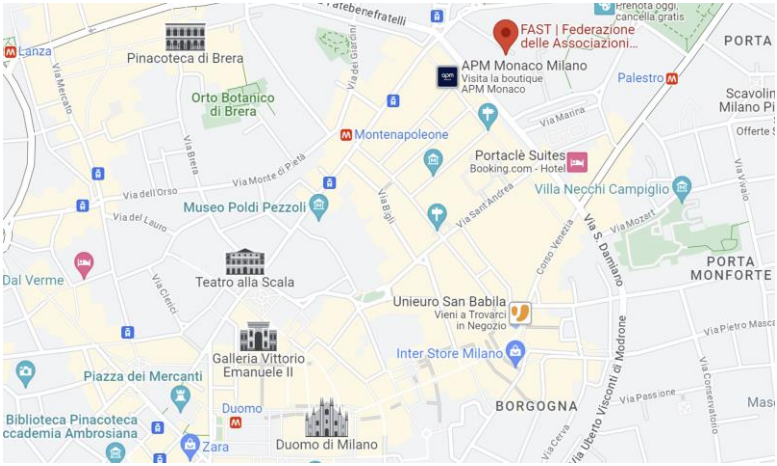

IEEE MetroXRAINE 2023 Social Events

WELCOME PARTY

Wednesday October 25 - H 18:45

The Welcome Party will be held at the ***FAST Conference Center*** on **Wednesday, October 25** - 19.00.

GALA EVENT

Thursday October 26 - H 20:30

The Gala Event will be held at "***Osteria del Treno***" on **Thursday, October 26** - 20.30.

ADDRESS
Via San Gregorio, 46
Milano

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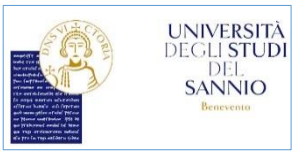
IEEE MetroXRAINE 2023 Patronages

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Program Schedule - Wednesday, October 25

WEDNESDAY OCTOBER 25				
09:00 - 09:30	OPENING CEREMONY - *Aula Maggiore*			
	Aula Maggiore	Aula Morandi	Aula A	
09:30 - 11:10	Session 1.1 - Healthcare 5.0	Session 1.2 - eXtended Reality as a gateway to the Metaverse: Practices, Theories, Technologies and Applications	Session 1.3 - Physiological Measurements: from the lab to the real world with wearable technologies	
11:10 - 11:30	COFFEE BREAK - Demo Session #1			
11:30 - 12:30	KEYNOTE SPEAKER - Martin Milton (BUREAU INTERNATIONAL DES POIDS ET MESURES) The SI Reference Point: a digital reference for measurement units and quantities *Aula Maggiore*			
12:30 - 13:30	Tutorial - Danilo Pau (STMicroelectronics) Melting machine learning with in-sensor computing *Aula Maggiore*			
13:30 - 14:30	LUNCH - Poster Session #1			
	Aula Maggiore	Aula Morandi	Aula A	Aula B
14:30 - 16:10	Session 2.1 - Sensors, Extended Reality and Artificial Intelligence for Human Behavior Analysis	Session 2.2 - Machine Learning and Deep Learning in Smart Industry	Session 2.3 - HMI (Human-Machine Interface) for Safety Assistance Systems	Session 2.4 - Advanced Image Analysis for Biomedical Applications + Machine Learning methods for biosignal modeling and interpretation
16:10 - 16:30	COFFEE BREAK - Demo Session #1 - Poster Session #1			
16:30 - 18:00	ID4MetroXrAi Panel session			
18:00 - 18:45	Industry 4.0 - Productivity, Sustainability and Enabling Technologies in the Framework of the PNRR and other funded projects			
18:45 - 20:00	Welcome Party & Poster			

Program Schedule - Thursday, October 26

THURSDAY OCTOBER 26				
	Aula Maggiore	Aula A	Aula B	Aula Morandi
09:00 - 10:40	Session 3.1 - Using Extended Reality and Artificial Intelligence for Mental State Detection with Passive BCIs	Session 3.2 - Computer-Aided Solutions in Healthcare: Bioimaging and 3D Printing	Session 3.3 - Microwaves with Artificial Intelligence: a New Paradigm for Improved Biomedical Applications	"MetroVAI4ensic EVENT": Artificial Intelligence for Criminal Investigation and Forensic Science: the Metrological perspective (includes Special Session #28 and #33)
10:40 - 11:00	COFFEE BREAK - Demo Session #2			
11:00 - 12:00	KEYNOTE SPEAKER - Christoph Runde (VIRTUAL DIMENSION CENTER, FELLBACH, GERMANY-EUROPEAN ASSOCIATION FOR EXTENDED REALITY) XR Standardization - The status quo and path ahead of us *Aula Maggiore*			
12:00 - 13:00	Tutorial - Danny Kuivenhoven (TELEPERFORMANCE EMEA) & Vincenzo Giliberti (TELEPERFORMANCE ITALY GROUP) How to use successfully Natural Language Processing and AI-based solutions *Aula Maggiore*			
13:00 - 14:20	LUNCH - Poster Session #2			
	Aula Maggiore	Aula Morandi	Aula A	Aula B
14:20 - 15:40	Session 4.1 - General Session #1 (AI)	Session 4.2 - General Session #2 (Metro)	Session 4.3 - General Session #3 (XR)	Session 4.4 - General Session #4 (NE)
15:40 - 16:00	COFFEE BREAK - Demo Session #2 - Poster Session #2			
16:00 - 17:40	Session 5.1 - Towards Industry 5.0: opportunities, challenges, and enabling technologies	Session 5.2 - The value of muscular activity monitoring in neurorehabilitation: Surface EMG and beyond	Session 5.3 - Simulation approaches and Artificial Intelligence for healthcare and biomedical engineering	Session 5.4 - PANEL Telemedicine: From Italy to the World
20:30	Gala Event			

Program Schedule - Friday, October 27

FRIDAY OCTOBER 27					
	Aula Maggiore	Aula Morandi	Aula A	Aula B	Sala Riunioni
09:00 - 10:40	Session 6.1 - Data Science in Life Cycle Assessment for Ecosystemic Services	Session 6.2 - SPECIAL EVENT - PsychoBit (pt 1)	Session 6.3 - Soft Metrology: Advances for psychological and human factors in digital society	Session 6.4 - PANEL WiE - AI: across innovations and ethics	Youth Program - Contest
10:40 - 11:00	COFFEE BREAK - Demo Session #3 - Award Ceremony for "Best Graphical Abstract"				
11:00 - 12:00	KEYNOTE SPEAKER - Reinhold Scherer (UNIVERSITY OF ESSEX, UNITED KINGDOM) Non-invasive Neuroadaptive Neural Interfaces: Learning to Learn *Aula Maggiore*				
12:00 - 13:40	Session 7.1 - Memristor Models, Devices, Circuits and Systems for Artificial Intelligence Applications	Session 7.2 - SPECIAL EVENT - PsychoBit (pt 2)	Session 7.3 - PANEL Metrology for health: main challenges in making new technologies metrologically compliant	Session 7.4 - Active brain-computer interfaces for daily-life applications	
13:40 - 14:40	LUNCH - Poster Session #3				
14:40 - 15:40	Tutorial - Luciana Lorenzon (ITALIAN SOCIETY OF NEUROFEEDBACK AND QEEG) Neurofeedback for the treatment of specific diseases and health promotion: methods and techniques *Aula Maggiore*			Youth Program - Forum	
15:40 - 16:00	COFFEE BREAK - Demo Session #3 - Poster Session #3				
	Aula Maggiore	Aula Morandi	Aula A		
16:00 - 17:40	Session 8.1 - Smart service technologies for vulnerable actors	Session 8.2 - SPECIAL EVENT - PsychoBit (pt 3)	Session 8.3 - General Session		
17:40 - 18:00	CLOSING AND AWARD CEREMONY				

Technical Program - Wednesday, October 25

08:30 - 18:00	*FAST - Conference Center* **REGISTRATIONS**

09:00 - 09:30	*Aula Maggiore* **OPENING CEREMONY - WELCOME ADDRESSES**

09:30 - 11:10	*Aula Maggiore* **Session 1.1 - Healthcare 5.0** **Chairs:** Daniele Spoladore, *STIIMA - National Research Council, Italy* Vera Colombo, *STIIMA - National Research Council, Italy*

09:30 **Proof of Concept of Using HoloLens 2 for AR Immersive Training in Complex Medical Scenarios**
Alessio Nocera, University of Pisa, Italy
Sara Condino, University of Pisa, Italy
Vincenzo Ferrari, University of Pisa, Italy

09:50 **An Ontology-Based Mixed Reality Application to Support Car Reconfiguration for Drivers With Disabilities**
Atieh Mahroo, STIIMA-CNR, Unversity of Milano Bicocca, Italy
Daniele Spoladore, STIIMA - National Research Council, Italy
Angelo Davalli, National Institute for Insurance Against Accidents at Work, Italy

10:10 **Towards Calibration-Less BCI-Based Rehabilitation**
Mushfika Sultana, University of Essex, United Kingdom
Christoph Reichert, Leibniz Institute for Neurobiology, Germany
Catherine M. Sweeney-Reed, Otto Von Guericke University Magdeburg, Germany
Serafeim Perdikis, University of Essex, United Kingdom

10:30 **A Digital Twin Approach for Stroke Risk Assessment in Atrial Fibrillation Patients**
Matteo Falanga, University of Bologna, Italy
Antonio Chiaravalloti, Santa Maria delle Croci Hospital AUSL della Romagna, Italy
Corrado Tomasi, Santa Maria delle Croci Hospital AUSL della Romagna, Italy
Cristiana Corsi, University of Bologna, Italy

10:50 **A Deep Learning Coronary Artery Centerlines Mapping From Contrast-Enhanced CT Images of the Heart**
Matteo Leccardi, Politecnico di Milano, Italy
Marco Paracchini, Politecnico di Milano, Italy
Luca Mainardi, Politecnico di Milano, Italy
Marco Marcon, Politecnico di Milano, Italy
Pietro Cerveri, Politecnico di Milano, Italy

09:30 - 11:10 *Aula Morandi*
Session 1.2 - eXtended Reality as a gateway to the Metaverse: Practices, Theories, Technologies and Applications
Chairs: Giuseppe Caggianese, I*CAR, National Research Council, Italy*
Nicola Capece, *University of Basilicata, Italy*

09:30 **Storytelling in the Metaverse: From Desktop to Immersive Virtual Reality Storyboarding**
Federico Manuri, Politecnico di Torino, Italy
Andrea Sanna, Politecnico di Torino, Italy
Francesco De Pace, TU Wien, Austria

09:50 **An Metaverse, a Year After: Evolution of XR Tools and Generative-AI**
Saverio Iacono, University of Genoa - DIBRIS, Italy
Daniele Zolezzi, University of Genoa - DIBRIS, Italy
Gianni Vercelli, University of Genoa - DIBRIS, Italy

10:10 **A Novel Methodology for the Optimisation of Photogrammetry Data of Physical Objects for Use in Metaverse Virtual Environments**
Duke Gledhill, University of Huddersfield, United Kingdom
Matthew Novak, University of Huddersfield, United Kingdom

10:30 **An Educational Approach for Mixed Reality Visualization of Agro-Meteorological Parameters**
Nicola Felice Capece, University of Basilicata, Italy
Gilda Manfredi, University of Basilicata, Italy
Gabriele Gilio, University of Basilicata, Italy
Ugo Erra, University of Basilicata, Italy
Francesco Toscano, University of Basilicata, Italy
Costanza Fiorentino, University of Basilicata, Italy
Paola D'Antonio, University of Basilicata, Italy

10:50 **Digital Practices: Introducing Social Dimension in Digital Twins**
Luca Sabatucci, National Research Council, Italy
Agnese Augello, National Research Council, Italy
Giuseppe Caggianese, National Research Council, Italy
Luigi Gallo, National Research Council, Italy

09:30 - 11:10 *Aula A*

Session 1.3 - Physiological Measurements: from the lab to the real world with wearable technologies

Chairs: Alessandra Angelucci, *Politecnico di Milano, Italy*
Andrea Aliverti, *Politecnico di Milano, Italy*

09:30 **Expanding the Frontiers of Wearable Brain-Computer Interfaces Combining Augmented Reality and Visually Evoked Potentials**
Leopoldo Angrisani, University of Naples Federico II, Italy
Pasquale Arpaia, University of Naples Federico II, Italy
Egidio De Benedetto, University of Naples Federico II, Italy
Luigi Duraccio, Politecnico di Torino, Italy
Fabrizio Lo Regio, University of Naples Federico II, Italy
Annarita Tedesco, University of Naples Federico II, Italy

09:50 **A Novel Ecological EEG Protocol to Assess Cognitive Load During Balance Task in Rehabilitation Settings**
Augusto Bonilauri, Politecnico di Milano, Italy
Elisa Gervasoni, IRCCS Fondazione Don Carlo Gnocchi ONLUS, Italy
Alessandro Torchio, IRCCS Fondazione Don Carlo Gnocchi ONLUS, Italy
Marco Nalin, ab medica, Italy
Francesca Sangiuliano Intra, Free University of Bolzano-Bozen, Italy
Irene Del Chicca, ab medica, Italy
Cosimo Puttilli, ab medica, Italy
Davide Cattaneo, IRCCS Fondazione Don Carlo Gnocchi ONLUS, Italy
Francesca Baglio, IRCCS Fondazione Don Carlo Gnocchi ONLUS, Italy

10:10 **Development and Validation of a Wearable System for Multi-Parametric Stress Level Assessment**
Francesca Cestaro, Politecnico di Milano, Italy
Beatrice De Marchi, Politecnico di Milano, Italy
Andrea Aliverti, Politecnico di Milano, Italy

10:30 **Data Quality Assessment for the Validation of Synchronization Performance in an Innovative Wireless Multi-Node Monitoring Platform**
Alessio Serrani, Politecnico di Milano, Kalpa Srl, Italy
Andrea Aliverti, Politecnico di Milano, Italy

10:50 **Design and Evaluation of a Wearable Single-Lead ECG for Continuous Monitoring**
Alessandra Angelucci, Politecnico di Milano, Italy
Oswaldo W Parra Villamar, Politecnico di Milano, Italy
Piergiuseppe Agostoni, IRCCS Centro Cardiologico Monzino, University of Milan, Italy
Andrea Aliverti, Politecnico di Milano, Italy

11:10 - 11:30	*FAST - Conference Center* **COFFEE BREAK / DEMO SESSION #1** **Chair:** Nicola Moccaldi*, University of Naples Federico II, Italy*

DEMO #1.1 **Machine learning for hacking embedded devices**
Francesco Caputo, Federico II University of Naples, Italy

DEMO #1.2 **ActivE3-SocialBike application**
Vera Colombo, CNR-STIIMA, Italy

DEMO #1.3 **From low density to ultra high-density EEG: different BCI applications in virtual reality**
Leonhard Schreine, g.tec medical engineering GmbH, Austria

11:30 - 12:30	*Aula Maggiore* **PLENARY SESSION - KEYNOTE SPEAKER** **Chair**: Luca Mari, Università Carlo Cattaneo - LIUC, Italy

The SI Reference Point: a digital reference for measurement units and quantities

Martin Milton, *Bureau International des Poids et Mesures*

12:30 - 13:30	*Aula Maggiore* **PLENARY SESSION - TUTORIAL** **Chair**: Pasquale Arpaia, University of Naples Federico II, Italy

Melting Machine Learning with in-sensor Computing

Danilo Pau, *STMicroelectronics*

13:30 - 14:30	*FAST - Conference Center* **LUNCH / POSTER SESSION #1** **Session Coordinator:** Sandra Costanzo, *University of Calabria, Italy*

PS01 **Assessment and Ontological Modeling of Physical and Cognitive Impairments to Foster the Employment of People With Disabilities**
Daniele Spoladore, STIIMA, National Research Council, Italy
Chiara Tagliaferri, STIIMA, National Research Council, Italy
Carlo Valli, Il Seme - Società Cooperativa Sociale, Italy
Marta Fontana, Il Seme - Società Cooperativa Sociale, Italy

Ilaria Liprino, Il Seme - Società Cooperativa Sociale, Italy
Angelo Davalli, National Institute for Insurance Against Accidents at Work, Italy

PS02 **A Scalable VR-Based System to Assess Driving-Related Abilities in People With Disability**
Sara Arlati, STIIMA, National Research Council, Italy
Vera Colombo, STIIMA, National Research Council, Italy
Angelo Davalli, National Institute for Insurance Against Accidents at Work, Italy
Massimo Improta, National Institute for Insurance Against Accidents at Work, Italy
Nicola Ortolani, National Institute for Insurance Against Accidents at Work, Italy
Marco Sacco, STIIMA, National Research Council, Italy

PS03 **WeAIR: Wearable Swarm Sensors for Air Quality Monitoring to Foster Citizens' Awareness of Climate Change**
Giovanna Maria Dimitri, University of Siena, Italy
Lorenzo Parri, University of Siena, Italy
Alessandro Pozzebon, University of Padova, Italy
Eleonora Vitanza, University of Siena, Italy
Ada Fort, University of Siena, Italy
Chiara Mocenni, University of Siena, Italy

PS04 **Training Program on Sign Language: Social Inclusion Through Virtual Reality in ISENSE Project**
Alessia Bisio, Politecnico di Torino, Italy
Enrique Yeguas-Bolívar, University of Córdoba, Spain
Pilar Aparicio-Martínez, University of Córdoba, Spain
María Dolores Redel-Macías, University of Córdoba, Spain
Sara Pinzi, University of Córdoba, Spain
Stefano Rossi, University of Tuscia, Italy
Juri Taborri, University of Tuscia, Italy

PS05 **Comparison of Data Compression Methods for Implanted Real-Time Peripheral Nervous System**
Antonio Coviello, Politecnico di Milano, Italy
Anna Bersani, Politecnico di Milano, Italy
Paolo Motto Ros, Politecnico di Torino, Italy
Fabiana Del Bono, Politecnico di Torino, Italy
Danilo Demarchi, Politecnico di Torino, Italy
Umberto Spagnolini, Politecnico di Milano, Italy
Maurizio Magarini, Politecnico di Milano, Italy

PS06 **Jewelry Recognition via Encoder-Decoder Models**
José M Alcalde-Llergo, University of Tuscia, Italy
Enrique Yeguas-Bolívar, University of Córdoba, Spain
Andrea Zingoni, University of Tuscia, Italy
Alejandro Fuerte-Jurado, GAC Travel, Spain

PS07 **The Use of Artificial Intelligence for Sign Language Recognition: From a Literature Overview to the ISENSE Project**
Juri Taborri, Università of Tuscia, Italy

Pietro Fornai, Università of Tuscia, Italy
Enrique Yeguas-Bolívar, University of Córdoba, Spain
María Dolores Redel-Macías, University of Córdoba, Spain
Marlene Hilzensauer, Universität Klagenfurt, Austria
Alexandra Pecher, Universität Klagenfurt, Austria
Manfred Leisenberg, Fachhochschule Des Mittelstands, Germany
Alessia Melis, Blue Cinema TV srl, Italy
Stefano Rossi, Università of Tuscia, Italy

PS08 **Comparing Supervised Machine-Learning Algorithms to Measure the Number of Technical Actions in Industrial Environments**
Juri Taborri, University of Tuscia, Italy
Daniele Melloni, University of Tuscia, Italy
Andrea Zingoni, University of Tuscia, Italy
Francesco Marcolin, ErgoCert srl, Italy
Alessandro Bertoz, ErgoCert srl, Italy
Marco Bordignon, ErgoCert srl, Italy
Stefano Rossi, University of Tuscia, Italy

PS09 **Emotion Personalization With Machine Learning Using EEG Signals and Dry Electrodes**
Hamza Amrani, University of Milano-Bicocca, Italy
Daniela Micucci, University of Milano-Bicocca, Italy
Marco Nalin, ab medica, Italy
Paolo Napoletano, University of Milano-Bicocca, Italy

PS10 **Data Engineering Techniques for Efficient and Accurate Human Physical Activities Data Collection: A Summary of the State-Of-The-Art**
Javidan Abdullayev, Western Caspian University, Azerbaijan
Andrea Zingoni, University of Tuscia, Italy

PS11 **Handling and Docking of the Da Vinci Surgical Robot Using Mixed Reality**
Jafar Hamad, University of Pisa, Italy
Alessio Nocera, University of Pisa, Italy
Vincenzo Ferrari, University of Pisa, Italy

PS12 **Predictive Maintenance of Actuated Quarter-Turn Valves Using Artificial Intelligence**
Matteo Intravaia, University of Florence, Italy
Marco Bindi, University of Florence, Italy
Nicola Lucchesi, Velan ABV srl, Italy
Gianluca Losi, Velan ABV srl, Italy
Carlos A. Iturrino-Garcia, University of Florence, Italy
Libero Paolucci, University of Florence, Italy
Francesco Grasso, University of Florence, Italy
Simone Gabbrielli, Velan ABV srl, Italy

PS13 **Comparison of Two Video-Based Methods for Knee Joint Angle Measurement: A Preliminary Study**
Luca Ceriola, University Niccolò Cusano, Italy

Ilaria Mileti, University Niccolò Cusano, Italy
Juri Taborri, University of Tuscia, Italy
Marco Donati, Motustech, Italy
Stefano Rossi, University of Tuscia, Italy
Fabrizio Patanè, University Niccolò Cusano, Italy

PS14 **The Role of System Modeling on Artificial Intelligence: A Review of Emerging Trends**
Saad Aldoihi, King Abdulaziz City for Sciences and Technology, Saudi Arabia
Khalid Alblalaihid, King Abdulaziz City for Sciences and Technology, Saudi Arabia
Fozah Alzemaia, King Saud University, Saudi Arabia
Alia Almoajel, King Saud University, Saudi Arabia

PS15 **Automatic Liver Vessels Segmentation Using ResDense UNet and an Appropriate Preprocessing Pipeline**
Matteo Cavicchioli, Politecnico di Milano, Italy
Ludovica Pierelli, Fondazione MIAS Academy, Italy
Giacomo Pugliese, Fondazione MIAS Academy, Italy
Pietro Cerveri, Politecnico di Milano, Italy

PS16 **Multiscale Digital Platforms for Safety Management and Maintenance of Road Networks**
Silvia Fabbrocino, University of Naples Federico II, Italy
Manuela Valeri, University of Molise, Italy
Giovanni Fabbrocino, University of Molise, Italy
Ilaria Trizio, National Research Council, Italy
Francesca Savini, National Research Council, Italy

14:30 - 16:10 *Aula Maggiore*
Session 2.1 - Sensors, Extended Reality and Artificial Intelligence for Human Behavior Analysis
Chairs: Andrea Zingoni, *University of Tuscia, Italy*
Juri Taborri, *University of Tuscia, Italy*

14:30 **xHits: An Automatic Team Performance Metric for VR Police Training**
Jakob C Uhl, AIT Austrian Institute of Technology GmbH, PLUS University of Salzburg, Austria
Quynh Nguyen, AIT Austrian Institute of Technology GmbH, PLUS University of Salzburg, Austria
Yannick Hill, Vrije Universiteit Amsterdam, The Netherlands
Markus Murtinger, USECON GmbH, AIT Austrian Institute of Technology GmbH, Austria
Manfred Tscheligi, AIT Austrian Institute of Technology GmbH, PLUS University of Salzburg, Austria

14:50 **A VR Serious Game to Increase Empathy Towards Students With Phonological Dyslexia**
José M Alcalde-Llergo, University of Tuscia, Italy
Enrique Yeguas-Bolívar, University of Córdoba, Spain

Pilar Aparicio-Martínez, University of Córdoba, Spain
Andrea Zingoni, University of Tuscia, Italy
Juri Taborri, University of Tuscia, Italy
Sara Pinzi, University of Córdoba, Spain

15:10 **Exploring Emotional Responses in Virtual Reality Through Skin Conductance Signal**
Edoardo Maria Polo, Politecnico di Milano, Italy
Alberto Valdes Rey, Politecnico di Milano, Italy
Maximiliano Mollura, Politecnico di Milano, Italy
Alessia Paglialonga, National Research Council, Italy
Riccardo Barbieri, Politecnico di Milano, Italy

15:30 **Time-Delay Tolerance of Visual and Olfactory Feedback in Multi-Sensory Extended Reality**
Guandong Li, Fuzhou University, China
Haoyuan Zheng, Fuzhou University, China
Yuhao Lu, Fuzhou University, China
Guohua Wu, Fuzhou University, China
Zhongheng Sun, Fuzhou University, China
Hongyi Lan, Fuzhou University, China
Natalie Culligan, Maynooth University, Ireland
Ralf Bierig, Maynooth University, Ireland
Joseph Timoney, Maynooth University, Ireland
Ting Bi, Maynooth University, Ireland

15:50 **Prediction of Football Players' Performance Indicators via Random Forest Algorithm**
Gianluca Morciano, University of Tuscia, Italy
Andrea Zingoni, University of Tuscia, Italy
Giuseppe Calabrò, University of Tuscia, Italy

14:30 - 16:10 *Aula Morandi*
Session 2.2 - Machine Learning and Deep Learning in Smart Industry
Chairs: Ada Fort, *University of Siena, Italy*
Simone Bonechi, *University of Siena, Italy*

14:30 **Deep Learning Techniques for Text Generation to Support Augmentative and Alternative Communication**
Alessia Lucia Prete, University of Siena, Italy
David Landi, LiquidWeb S. R. L., Italy
Paolo Andreini, University of Siena, Italy
Monica Bianchini, University of Siena, Italy

14:50 **Enhancing Fluorescence Image Analysis Through Deep Learning**
Paolo Andreini, University of Siena, Italy
Simone Bonechi, University of Siena, Italy
Alessandro Mecocci, University of Siena, Italy

Giuseppe Ferorelli, BioMeriéux Italia, Italy
Veronica Lucia Rossi, BioMeriéux Italia, Italy
Giorgio Chini, BioMeriéux Italia, Italy
Antonio Sanesi, BioMeriéux Italia, Italy

15:10 **Graph Neural Networks for Drug Discovery: An Integrated Decision Support Pipeline**
Pietro Bongini, University of Siena, Italy

15:30 **Prognostic Analysis of Switching Devices in DC-DC Converters**
Matteo Intravaia, University of Florence, Italy
Marco Bindi, University of Florence, Italy
Lorenzo Becchi, University of Florence, Italy
Gabriele Lozito, University of Florence, Italy
Libero Paolucci, University of Florence, Italy
Francesco Grasso, University of Florence, Italy
Antonio Luchetta, University of Florence, Italy
Carlos A. Iturrino-Garcia, University of Florence, Italy

15:50 **Enhancing Museum Security With Advanced Scene-Based Action Recognition Techniques**
Giacomo Nunziati, University of Siena, Italy
Christian Di Maio, University of Siena, Italy
Angel Martinez Palomares, University of Siena, Italy
Alessandro Mecocci, University of Siena, Italy

14:30 - 16:10 *Aula A*
Session 2.3 - HMI (Human-Machine Interface) for Safety Assistance Systems
Chairs: Michael Kuhl, University of Applied Sciences, Germany
Maurice Rekrut, German Research Center for Artificial Intelligence

14:30 **Toward Safe Human Machine Interface and Computer-Aided Diagnostic Systems**
Yuki Hagiwara, Fraunhofer IKS, Germany
Delfina Espinoza, Fraunhofer IKS, Germany
Philipp Schleiss, Fraunhofer IKS, Germany
Núria Mata, Fraunhofer IKS, Germany
Nguyen Anh Vu Doan, Fraunhofer IKS, Germany

14:50 **In the Loop of Safe Driving: An Assessment of HMI Strategies Enabled by Intelligent Driver Monitoring Systems With Daily Drivers**
Roberta Presta, University Suor Orsola Benincasa, Italy
Chiara Tancredi, University Suor Orsola Benincasa, Italy
Laura Mancuso, University Suor Orsola Benincasa, Italy

15:10 **Human in the Loop for XR Training: Theory, Practice and Recommendations for Effective and Safe Training Environments**
Daniele Pretolesi, AIT - Austrian Institute of Technology, Austria

Olivia Zechner, AIT - Austrian Institute of Technology, Austria
Setareh Zafari, AIT - Austrian Institute of Technology, Austria
Manfred Tscheligi, University of Salzburg, Austria

15:30 **Towards Intuitive Extended Reality-Based Robot Control and Path Planning: Comparison of Augmented Reality and Mixed Reality-Based Approaches**
Mohammad-Ehsan Matour, Mittweida University of Applied Sciences, Germany
Christian Thormann, Mittweida University of Applied Sciences, Germany
Alexander Winkler, Mittweida University of Applied Sciences, Germany

15:50 **Comparing the Effects of Dry, Water and Gel-Based Electrodes on EEG-Based Overt Speech Classification**
Tobias Jungbluth, German Research Center for Artificial Intelligence, Germany
Maurice Rekrut, German Research Center for Artificial Intelligence, Germany
Antonio Krüger, German Research Center for Artificial Intelligence, Germany

14:30 - 16:10 *Aula B*

Session 2.4 - Advanced Image Analysis for Biomedical Applications - Machine Learning methods for biosignal modeling and interpretation

Chairs: Francesco Isgrò, *University of Naples Federico II, Italy*
Egidio De Benedetto, *University of Naples Federico II, Italy*

14:30 **Objective Assessment of the Bias Introduced by Baseline Signals in XAI Attribution Methods**
Giorgio Dolci, University of Verona, Italy, Georgia State University, USA
Federica Cruciani, University of Verona, Italy
Ilaria Boscolo Galazzo, University of Verona, Italy
Vince Calhoun, Georgia State University, USA
Gloria Menegaz, University of Verona, Italy

14:50 **Sparse to Dense Ground Truth Pre-Processing in Hyperspectral Imaging for In-Vivo Brain Tumour Detection**
Guillermo Vazquez, Universidad Politécnica de Madrid, Spain
Alberto Martín-Pérez, Universidad Politécnica de Madrid, Spain
Manuel Villa, Universidad Politécnica de Madrid, Spain
Gonzalo Rosa, Universidad Politécnica de Madrid, Spain
Jaime Sancho Aragón, Universidad Politécnica de Madrid, Spain
Pedro L. Cebrián, Universidad Politécnica de Madrid, Spain
Alejandro Martinez de Ternero, Universidad Politécnica de Madrid, Spain
Pallab Sutradhar, Universidad Politécnica de Madrid, Spain
Angel Perez-Nuñez, Instituto de Investigación Sanitaria Hospital 12 de Octubre, Spain
Luis Jimenez-Roldan, Instituto de Investigación Sanitaria Hospital 12 de Octubre, Spain
Alfonso Lagares, Instituto de Investigación Sanitaria Hospital 12 de Octubre, Spain
Miguel Chavarrias, Universidad Politécnica de Madrid, Spain
Eduardo Juarez, Universidad Politécnica de Madrid, Spain
Cesar Sanz, Universidad Politécnica de Madrid, Spain

15:10 **Assessing the Features on Blood Glucose Level Prediction in Type 1 Diabetes Patients Through Explainable Artificial Intelligence**
Giovanni Annuzzi, University of Naples Federico II, Italy
Pasquale Arpaia, University of Naples Federico II, Italy
Lutgarda Bozzetto, University of Naples Federico II, Italy
Sabatina Criscuolo, University of Naples Federico II, Italy
Salvatore Giugliano, University of Naples Federico II, Italy
Marisa Pesola, University of Naples Federico II, Italy

15:30 **Merging Contour-And Region-Aware Branches in the UNet Decoder to Enhance Osseous Segmentation in Shoulder CT Scans**
Luca Marsilio, Politecnico di Milano, Italy
Matteo Rossi, Politecnico di Milano, Italy
Alfonso Manzotti, Hospital Fatebenefratelli, Italy
Davide Marzorati, SUPSI, Switzerland
Pietro Cerveri, Politecnico di Milano, Italy

15:50 **CSP-LSTM Based Emotion Recognition From EEG Signals**
Jerrin Thomas Panachakel, College of Engineering Trivandrum, India
Ranjana H, College of Engineering Trivandrum, India
Sana Parveen K, College of Engineering Trivandrum, India
Sidharth Sidharth, College of Engineering Trivandrum, India
Ashish Abraham Samuel, College of Engineering Trivandrum, India

16:10 - 16:30 *FAST - Conference Center*
COFFEE BREAK / DEMO SESSION #1 / POSTER SESSION #1

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

16:30 - 18:45 *Aula Maggiore*
Special Event - ID4MetroXrAi

The special event ID4MetroXrAi will discuss the basis for a new concept of a sustainable and resilient digital factory in which AI, digital technologies, and collaborative robotics will establish a trustworthy human-machine coevolution relationship and lead to high-performance, inclusive, and sustainable human-machine working systems organized.

PROGRAM

16:30 - 18:00 **ID4MetroXrAi Panel session**

From Industry 4.0 to Industry 5.0: state of the art and related evolution

- Romano Iazurlo, *Head of Material & Process Technologies Leonardo Company*

- Bianca Maria Colosimo, *Full Professor Manufacturing technology and systems Politecnico di Milano*
- Lorenzo Cappanarri, *CEO & Co-Founder at AnotheReality*
- Luca Lilla, *CX & Innovation Strategist, WeRo*

Round Table – Q&A
Chair: Marco Sacco, *Research Director Stiima CNR*

18:00 - 18:45 Industry 4.0 - Productivity, Sustainability and Enabling Technologies in the Framework of the PNRR and other funded projects

- Productivity, Sustainability and Enabling Technologies in the Framework of the PNRR: Mics - Spoke 8 - Daria Battini, *Spoke 8 Leader*
- EURECA-PRO Alliance: European University on Responsible Consumption and Production - Flaviana Tagliaferri, *Research Associate - Hochschule Mittweida*

19:00 - 20:00 *FAST - Conference Center*
WELCOME PARTY / POSTER SESSION ID4MetroXrAi
Session Coordinator: Enza Panzardi, *University of Siena, Italy*

POSTER SESSION 1 - Data-driven and Artificial Intelligence Perspectives in Measurements for Battery Characterization Systems

Chairs: Simone Barcellona, Emil Petkovski, *Politecnico di Milano, Italy*

PS01 **Improving Remaining Useful Life Estimation of Lithium-Ion Batteries When Nearing End of Life**
Luca Martiri, Politecnico di Milano, Italy
Davide Azzalini, Politecnico di Milano, Italy
Benedetta Flammini, Politecnico di Milano, Italy
Loredana Cristaldi, Politecnico di Milano, Italy
Francesco Amigoni, Politecnico di Milano, Italy

PS02 **Electrical Vehicle Fleet Management for Industrial Environment With Battery SoH Prediction Through Neural Networks**
Paolo Cova, University of Parma, Italy
Nicola Delmonte, University of Parma, Italy
Stefano Ferrari, Università degli Studi di Milano, Italy
Massimo Lazzaroni, Università degli Studi di Milano, Italy
Roberto Menozzi, University of Parma, Italy
Danilo Santoro, University of Parma, Italy
Marco Simonazzi, University of Parma, Italy

PS03 **Transformer Neural Network for Early Battery Capacity Prediction Based on Electrochemical Impedance Spectroscopy**
Zhansheng Ning, University of Twente, The Netherlands
Prasanth Venugopal, University of Twente, The Netherlands
Gert Rietveld, University of Twente, The Netherlands
Thiago Batista Soeiro, University of Twente, The Netherlands

PS04 **Test and Measurement of Lead-Acid and Lithium Battery Packs Performance for Telecom Applications, Case Study: Radio Access Network (RAM)**
Othmane Hamzaoui, University of Caen & Orange Innovation, France
Brian Françoise, Orange Innovation, France
Hussein Obeid, University of Caen Base Normandy, France
Stephane Le Masson, Orange Innovation, France
Hamid Gualous, University of Caen Base Normandy, France

PS05 **Cycle Aging Effect on Lithium-Ion Battery Resistance: A Machine Learning Approach**
Simone Barcellona, Politecnico di Milano, Italy
Loris Cannelli, SUPSI-USI, Switzerland
Silvia Colnago, Politecnico di Milano, Italy
Christian Laurano, Politecnico di Milano, Italy
Luigi Piegari, Politecnico di Milano, Italy

PS06 **State of Health Estimation for Li-Ion Battery Using Machine Learning**
Riya Sharma, Thapar University, India
Anju Bala, Thapar University, India
Ashima Singh, Thapar University, India
Mukesh Singh, Thapar University, India

POSTER SESSION 2 - Embedded AI for Sensor Data Analysis

Chairs: Enza Panzardi, Irene Cappelli, *University of Siena, Italy*

PS07 **TinyRCE: Forward Learning Under Tiny Constraints**
Danilo Pietro Pau, STMicroelectrnics, Italy
Prem K. Ambrose, STMicroelectrnics, Italy
Fabrizio M. Aymone, STMicroelectrnics, Italy
Andrea Pisani, STMicroelectrnics, Italy

PS08 **A Comparison of Time Series Prediction Techniques for the Realization of a Smart Thermostat**
Antonio Lanciotti, Università Politecnica Delle Marche, Italy
Carlo Lucadei, Ksenia Security Innovation, Italy
Paolo Sernani, University of Macerata, Italy
Aldo F. Dragoni, Università Politecnica Delle Marche, Italy

PS09 **Bearing Failure Classification With Low Complexity Neural Network**
Elia Landi, University of Siena, Italy
Ada Fort, University of Siena, Italy
Marco Mugnaini, University of Siena, Italy

Filippo Spinelli, University of Siena, Italy
Riccardo Moretti, University of Siena, Italy

PS10 **Machine Learning Regressor for Impedance Parameter Estimation of QCM Sensors for Liquid Media Characterization**
Irene Cappelli, University of Siena, Italy
Ada Fort, University of Siena, Italy
Marco Mugnaini, University of Siena, Italy
Enza Panzardi, University of Siena, Italy
Valerio Vignoli, University of Siena, Italy

POSTER SESSION 3 - Soft Sensors for Industry 4.0

Chairs: Salvatore Grazieni, *University of Catania, Italy*, Maria Gabriella Xibilia, *University of Messina, Italy*

PS11 **Estimating Finite-Time Delay in Dynamical Soft Sensors for Industrial Processes: Robustness to Noise**
Salvatore Graziani, University of Catania, Italy
Luca Patanè, University of Messina, Italy
Maria Gabriella Xibilia, University of Messina, Italy

PS12 **Calibration of a Clustering Algorithm to Improve the Nearshore Wave Prediction System**
Elisa Castro, University of Catania, Italy
Claudio Iuppa, University of Messina, Italy
Rosaria Musumeci, University of Catania, Italy
Luca Cavallaro, University of Catania, Italy
Maria Gabriella Xibilia, University of Messina, Italy
Luca Patanè, University of Messina, Italy
Enrico Foti, University of Catania, Italy

PS13 **Experimental Design and Maintenance, Towards a Decision-Making Approach Driven by Degradation Models, With Application to Lithium-Ion Batteries**
Antonio Pievatolo, National Research Council, Italy
Alessandro Magrini, University of Florence, Italy
Giovanni Meccariello, National Research Council, Italy
Loredana Cristaldi, Politecnico di Milano, Italy
Gabriele Patrizi, University of Florence, Italy
Nedka D Nikiforova, University of Florence, Italy

PS14 **Artificial Neural Network Modeling of Microwave Sensors for Dielectric Liquids Characterization**
Giovanni Gugliandolo, University of Messina, Italy
Zlatica D. Marinkovic, University of Niš, Serbia
Xiue Bao, Beijing Institute of Technology, China
Cristiano De Marchis, University of Messina, Italy
Filippo Battaglia, University of Messina, Italy

Mariangela Latino, University of Messina, Italy
Giuseppe Campobello, University of Messina, Italy
Giovanni Crupi, University of Messina, Italy
Nicola Donato, University of Messina, Italy

PS15 **Defect Modeling During the SLM Process for Manufacturing Microwave Devices**
Shuai Li, Beijing Institute of Technology, China
Xiue Bao, Beijing Institute of Technology, China
Giovanni Gugliandolo, University of Messina, Italy
Haoyun Yuan, Beijing Institute of Technology, China
Jinkai Li, Tangshan Research Institute of BIT, China
Linxiang Shao, Beijing Institute of Technology, China
Minghe Du, Tangshan Research Institute of BIT, China
Nicola Donato, University of Messina, Italy
Zlatica D. Marinkovic, University of Niš, Serbia
Giovanni Crupi, University of Messina, Italy
Lili Fang, Beijing Institute of Technology, China
Liming Si, Beijing Institute of Technology, China
Houjun Sun, Beijing Institute of Technology, China

PS16 **GaN HEMT Modeling Using an Optimization Strategy Based on Gated Recurrent Unit Networks**
Jialin Cai, Hangzhou Dianzi University, China
Giovanni Gugliandolo, University of Messina, Italy
Zlatica D. Marinkovic, University of Niš, Serbia
Mariangela Latino, University of Messina, Italy
Enza Fazio, University of Messina, Italy
Gianni Bosi, University of Ferrara, Italy
Antonio Raffo, University of Ferrara, Italy
Giovanni Crupi, University of Messina, Italy
Nicola Donato, University of Messina, Italy

POSTER SESSION 4 - PNRR, Industry 4.0 and beyond

PS17 **Characterization of a Linear X-Shaped-Spring Suspension With Nonlinear Damping for Industrial Vibration Control Applications**
Hossein Shabanalinezhad, University of Calabria, Italy
Piero Malcovati, University of Pavia, Italy
Cesare Svelto, Politecnico di Milano, Italy
Gianluca Gatti, University of Calabria, Italy

PS18 **Uncertainty Evaluation in Knife-Edge Laser Spot-Size Measurements for Industrial Applications**
Cesare Svelto, Politecnico di Milano, Italy
Andrey A Zhirnov, Bauman Moscow State Technical University, Russia
Anton O. Chernutsky, Bauman Moscow State Technical University, Russia
Tatyana V. Gritsenko, Bauman Moscow State Technical University, Russia
Alexey Pniov, Bauman Moscow State Technical University, Russia

Konstantin V. Stepanov, Bauman Moscow State Technical University, Russia
Valery Karasik, Bauman Moscow State Technical University, Russia
Gianluca Galzerano, Politecnico di Milano, Italy

PS19 **Prototype of an Industrial Measurement System for Thermal Conductivity of Scuba Diving Wet Suits**
Gianluca Crotti, Politecnico di Milano, Italy
Roberto Cantù, Politecnico di Milano, Italy
Stefano Malavasi, Politecnico di Milano, Italy
Gianluca Gatti, University of Calabria, Italy
Cesare Svelto, Politecnico di Milano, Italy

PS20 **Nonlinear Dynamics of a Softening-Hardening Oscillator for Energy Harvesting in Industrial Applications**
Hossein Shabanalinezhad, University of Calabria, Italy
Piero Malcovati, University of Pavia, Italy
Cesare Svelto, Politecnico di Milano, Italy
Gianluca Gatti, University of Calabria, Italy

PS21 **Vibration Energy Harvesting From Planar Excitations in Industrial Machines**
Hossein Shabanalinezhad, University of Calabria, Italy
Piero Malcovati, University of Pavia, Italy
Cesare Svelto, Politecnico di Milano, Italy
Gianluca Gatti, University of Calabria, Italy

PS22 **Optical Fiber Sensor for Real-Time Monitoring of Industrial Structures and Application to Urban Telecommunication Networks**
Tatyana V. Gritsenko, Bauman Moscow State Technical University, Russia
German Yu. Chesnokov, National Research University Higher School of Economics, Russia
Kirill I. Koshelev, Bauman Moscow State Technical University, Russia
Roman I. Khan, Bauman Moscow State Technical University, Russia
Konstantin V. Stepanov, Bauman Moscow State Technical University, Russia
Olga V. Valba, National Research University Higher School of Economics, Russia
Anton O. Chernutsky, Bauman Moscow State Technical University, Russia
Cesare Svelto, Politecnico di Milano, Italy
Andrey A Zhirnov, Bauman Moscow State Technical University, Russia
Alexey Pniov, Bauman Moscow State Technical University, Russia
Valery Karasik, Bauman Moscow State Technical University, Russia

PS23 **IoT Sensor for Measuring Corrosion in Metal Artworks**
Adriano Demetrio, Politecnico di Milano, Italy
Marco Faifer, Politecnico di Milano, Italy
Christian Laurano, Politecnico di Milano, Italy
Kumar Sunilkumar Pawar, Politecnico di Milano, Italy
Sergio Toscani, Politecnico di Milano, Italy

PS24 **The MICS Project: A Data Science Pipeline for Industry 4.0 Applications**
Loredana Cristaldi, Politecnico di Milano, Italy
Parisa Esmaili, Politecnico di Milano, Italy
Giambattista Gruosso, Politecnico di Milano, Italy

Alessio La Bella, Politecnico di Milano, Italy
Massimo Mecella, Sapienza Università di Roma, Italy
Riccardo Scattolini, Politecnico di Milano, Italy
Ala Arman, Sapienza Università di Roma, Italy
Gian Antonio Susto, University of Padova, Italy
Letizia Tancaa, Politecnico di Milano, Italy

PS25 **Control and Thermal Design of a Bi-Directional Grid Interface Converter for Fast-Recharging Stations Developed in the Framework of the Italian PNRR Research Activities**

Nicola Toscani, Politecnico di Milano, Italy
Paolo De Carli, Politecnico di Milano, Italy
Stefano Rampoldi, Politecnico di Milano, Italy
Matteo Sposito, ePEBBs Srl, Italy
Andrea Polastri, ePEBBs Srl, Italy
Mattia Rossi, Tampere University, Finland
Francesco Castelli-Dezza, Politecnico di Milano, Italy

PS26 **Digital Technologies for the Design of Human-Robot Collaborative Cells**

Christian Cella, Politecnico di Milano, Italy
Paolo Rocco, Politecnico di Milano, Italy
Andrea Zanchettin, Politecnico di Milano, Italy

Technical Program - Thursday, October 26

08:30 - 18:00	*FAST - Conference Center* **REGISTRATIONS**

09:00 - 10:40	*Aula Maggiore* **Session 3.1 - Using Extended Reality and Artificial Intelligence for Mental State Detection with Passive BCIs** **Chairs:** Nicola Moccaldi, *University of Naples Federico II, Italy* Giovanna Mastrati, *University of Naples Federico II, Italy*

09:00 **Dreams Emotions Identified Without Awakenings by Machine and Deep Learning From EEG Signals in REM Sleep**
Luis Alfredo Moctezuma, University of Tsukuba, Japan
Felix Ipanaque Arevalo, University of Tsukuba, Japan
Marta Molinas, Norwegian University of Science and Technology, Norway
Takashi Abe, University of Tsukuba, Japan

09:20 **Towards Neuroadaptive Augmented Reality Piano Tutorials**
Florian Maitz, Graz University of Technology, Austria
Lucchas Ribeiro Skreinig, Graz University of Technology, Austria
Denis Kalkofen, Graz University of Technology, Austria
Selina Christin Wriessnegger, Graz University of Technology, Austria

09:40 **Toward an EEG-Based System for Monitoring Cognitive Load in Neurosurgeons**
Pasquale Arpaia, University of Naples Federico II, Italy
Roberta Ayadi, IRCCS Carlo Besta Neurological Institute, Italy
Giovanni Carone, IRCCS Carlo Besta Neurological Institute, Italy
Nicolò Castelli, IRCCS Carlo Besta Neurological Institute, Italy
Anna Della Calce, University of Naples Federico II, Italy
Irene Del Chicca, ab medica, Italy
Mirco Frosolone, National Research Council, Italy
Ludovica Gargiulo, University of Naples, Federico II, Italy
Giovanna Mastrati, University of Naples Federico II, Italy
Nicola Moccaldi, University of Naples Federico II, Italy
Marco Nalin, ab medica, Italy

Alessandro Perin, IRCCS Carlo Besta Neurological Institute, Italy
Mauro Picciafuoco, ab medica, Italy

10:00 **EEG Based Emotion Classification Using Two Layer Convolutional Neural Network**
Thiruselvam S, Indian Institute of Technology Madras, India
Ramasubba Reddy Machireddy, Indian Institute of Technology Madras, India

10:20 **Maths Anxiety and Cognitive States Monitoring for Neuroadaptive Learning Systems Using Electroencephalography**
Federica Armani, University of Essex, United Kingdom
Ian Daly, University of Essex, United Kingdom
Alexei Vernitski, University of Essex, United Kingdom
Helge Gillmeister, University of Essex, United Kingdom
Reinhold Scherer, University of Essex, United Kingdom

09:00 - 10:40 *Aula A*

Session 3.2 - Computer-Aided Solutions in Healthcare: Bioimaging and 3D Printing

Chairs: Francesca Angelone, *University of Naples Federico II, Italy*
Noemi Pisani, *University of Naples Federico II, Italy*

09:00 **Advanced 3D Printing of Patient-Specific Human Heart for Improved Surgical Planning**
Riccardo Forni, Reykjavik University, Iceland
Giacomo Pavan, University of Padova, Italy
Arnar E. Gunnarsson, Reykjavik University, Iceland
Carlo Ricciardi, University of Naples Federico II, Italy
Cristiana Corsi, University of Bologna, Italy
Paolo Gargiulo, Reykjavik University, Iceland

09:20 **Deep Learning Model for Video-Classification of Echocardiography Images**
Michela Destito, University Magna Graecia, Italy
Paolo Zaffino, University Magna Graecia, Italy
Jolanda Sabatino, University of Padua, Italy
Claudia Critelli, University Magna Graecia, Italy
Arber Qoku, Goethe University Frankfurt, Germany
Florian Buettner, Goethe University Frankfurt, Germany
Salvatore De Rosa, University Magna Graecia, Italy
Maria Francesca Spadea, Karlsruhe Institute of Technology, Germany

09:40 **Optimization of 3D Fused Deposition Modeling Printing Process for the Manufacturing of Devices for Medical Use**
Danilo Calderone, University of Naples Federico II, Italy
Giuseppe Cesarelli, University of Naples Federico II, Italy
Mario Cesarelli, University of Sannio, Italy
Luigi Iuppariello, AORN Santobono Pausilipon, Italy
Pasquale Guida, AORN Santobono Pausilipon, Italy

Antonio Casaburi, AORN Santobono Pausilipon, Italy
Gemma Romano, AORN Santobono Pausilipon, Italy
Francesco Amato, University of Naples Federico II, Italy
Fabrizio Clemente, National Research Council, Italy

10:00 **3D Dental Reconstruction With Photogrammetry Technology**
Francesca Angelone, University of Naples Federico II, Italy
Alfonso M Ponsiglione, University of Naples Federico II, Italy
Emilio Andreozzi, University of Naples Federico II, Italy
Danilo Calderone, University of Naples Federico II, Italy
Giuseppe Cesarelli, University of Naples Federico II, Italy
Francesco Amato, University of Naples Federico II, Italy
Maria Romano, University of Naples Federico II, Italy

10:20 **Explainable Deep Learning for Brain Cancer Detection and Localisation**
Mario Cesarelli, University of Sannio, Italy
Francesco Mercaldo, University of Molise, Italy
Antonella Santone, University of Molise, Italy

09:00 - 10:40 *Aula B*

Session 3.3 - Microwaves with Artificial Intelligence: a New Paradigm for Improved Biomedical Applications

Chairs: Sandra Costanzo, *University of Calabria, Italy*
Giovanni Buonanno, *University of Calabria, Italy*

09:00 **Microwaves and Artificial Intelligence for Biomedical Applications**
Sandra Costanzo, University of Calabria, Italy

09:20 **A Multifrequency Inverse-Scattering Technique for Brain Stroke Microwave Diagnostics**
Alessandro Fedeli, University of Genoa, Italy
Maurica Maheswaran, University of Genoa, Italy
Valentina Schenone, University of Genoa, Italy
Andrea Sciarrone, University of Genoa, Italy
Igor Bisio, University of Genoa, Italy
Fabio Lavagetto, University of Genoa, Italy
Matteo Pastorino, University of Genoa, Italy
Andrea Randazzo, University of Genoa, Italy
Claudio Estatico, University of Genoa, Italy

09:40 **A Machine Learning Approach to Microwave Sensing for Non-Invasive Alzheimer's Disease Detection**
Leonardo Cardinali, Politecnico di Torino, Italy
Mattia Spano, Politecnico di Torino, Italy
Martina Gugliermino, Politecnico di Torino, Italy
Marco Ricci, Politecnico di Torino, Italy
David O. Rodriguez-Duarte, Politecnico di Torino, Italy
Jorge A. Tobon Vasquez, Politecnico di Torino, Italy

Rosa Scapaticci, National Research Council, Italy
Roberta Palmeri, National Research Council, Italy
Lorenzo Crocco, National Research Council, Italy
Francesca Vipiana, Politecnico di Torino, Italy

10:00 **Segmentation Approach for Enhanced Biomedical Microwave Imaging**
Sandra Costanzo, University of Calabria, Italy
Giovanni Buonanno, University of Calabria, Italy
Alexandra Flores, University of Calabria, Italy

10:20 **Microwave Imaging for Brain Cancer Detection: Enhanced Accuracy With Machine Learning Approach**
Sandra Costanzo, University of Calabria, Italy
Alexandra Flores, University of Calabria, Italy
Giovanni Buonanno, University of Calabria, Italy

09:00 - 10:40 *Aula Morandi*
Session 3.4 - SPECIAL EVENT - MetroVAI4ensic - Part I
Chairs: Aldo Franco Dragoni*, Università Politecnica delle Marche, Italy*
Paolo Sernani*, University of Macerata, Italy*

09:00 **A Framework to Improve the Comparability and Reproducibility of Morphing Attack Detectors**
Nicolò Di Domenico, University of Bologna, Italy
Guido Borghi, University of Bologna, Italy
Annalisa Franco, University of Bologna, Italy
Matteo Ferrara, University of Bologna, Italy
Davide Maltoni, University of Bologna, Italy

09:20 **On the Human Ability in Detecting Digitally Manipulated Face Images**
Annalisa Franco, University of Bologna, Italy
Frøy Løvåsdal, National Police Directorate, Norway
Davide Maltoni, University of Bologna, Italy
Nicolò Di Domenico, University of Bologna, Italy

09:40 **Deep Audio Analyzer: A Framework to Industrialize the Research on Audio Forensics**
Valerio Francesco Puglisi, University of Catania, Italy
Oliver Giudice, University of Catania, Italy
Sebastiano Battiato, University of Catania, Italy

10:00 **Evaluating Deep Neural Networks for Face Recognition With Different Subsets of Mugshots From the Photo-Signaling Procedure**
Paolo Contardo, Università Politecnica Delle Marche, Italy
Nicolò Rossini, Università Politecnica Delle Marche, Italy
Selene Tomassini, Università Politecnica Delle Marche, Italy
Nicola Falcionelli, Università Politecnica Delle Marche, Italy

Aldo F. Dragoni, Università Politecnica Delle Marche, Italy
Paolo Sernani, University of Macerata, Italy

10:20 **An Innovative Tool for Uploading/Scraping Large Image Datasets on Social Networks**
Nicolò Fabio Arceri, University of Catania, Italy
Oliver Giudice, University of Catania, Italy
Sebastiano Battiato, University of Catania, Italy

10:40 - 11:00 *FAST - Conference Center*
COFFEE BREAK / DEMO SESSION #2
Chair: Nicola Moccaldi*, University of Naples Federico II, Italy*

DEMO #2.1 **Reasy - Make studying accessible and inclusive for everyone**
Andrea Zingoni, University of Tuscia, Italy

DEMO #2.2 **Social Inclusion through Virtual Reality (SONAR - ISENSE): The University Campus**
Enrique Yeguas Bolívar, University of Cordoba, Spain

DEMO #2.3 **Use of HoloLens 2 for AR immersive training in complex medical scenarios**
Alessio Nocera, University of Pisa, Italy

10:50 - 12:30 *Aula Morandi*
Session 3.4 - SPECIAL EVENT - MetroVAI4ensic - Part II
Chair: Veronica Scotti*, Politecnico di Milano, Italy*

10:50 **A Metrological Approach to Ethical and Legal Issues in Artificial Intelligence**
Alessandro M Ferrero, Politecnico di Milano, Italy
Veronica Scotti, Politecnico di Milano, Italy

11:10 **SDGs-Based AI Ethics: an Analysis of Recent Computer Vision Research**
Silvio De Magistris, University of Florence, Italy
Alberto Del Bimbo, University of Florence, Italy

11:30 **A Survey on the Applications, Limitations, and Ethical Considerations of ChatGPT in Various Industries**
Wafa Elhag, University of Doha for Science and Technology, Qatar
Dina Bouteldja, University of Doha for Science and Technology, Qatar
Seifeddine Bouallegue, University of Doha for Science and Technology, Qatar

11:50 **The Possible Relationships Between Law and Ethics Applied to AI**
Lucilla Gatt, Università Degli Studi Suor Orsola Benincasa, Italy
Ilaria Amelia Caggiano, Università Degli Studi Suor Orsola Benincasa, Italy
Maria Cristina Gaeta, Università Degli Studi Suor Orsola Benincasa, Italy
Livia Aulino, Università Degli Studi Suor Orsola Benincasa, Italy
Emiliano Troisi, Università Degli Studi Suor Orsola Benincasa, Italy

12:10 **Legal and Technical Answers to Privacy Issues Raised by AI-Based Facial Recognition Algorithms**
Claudia Capasso, University of Tuscia, Italy
Andrea Zingoni, University of Tuscia, Italy
Giuseppe Calabrò, University of Tuscia, Italy
Alessandro Sterpa, University of Tuscia, Italy

11:00 - 12:00	*Aula Maggiore* **PLENARY SESSION - KEYNOTE SPEAKER** **Chair**: Marco Sacco, STIIMA-CNR, Italy

XR Standardization - The status quo and path ahead of us

Christoph Runde, *Virtual Dimension Center, Fellbach, Germany-European Association for eXtended Reality*

12:00 - 13:00	*Aula Maggiore* **PLENARY SESSION - TUTORIAL** **Chair**: Nicola Giaquinto, Politecnico di Bari, Italy

How to use successfully Natural Language Processing and AI-based solutions

Danny Kuivenhoven, Vincenzo Giliberti, *Teleperformance*

12:30 - 13:00	*Aula Morandi* **PANEL SESSION - MetroVAI4ensic** **Moderator:** Aldo Franco Dragoni*, Università Politecnica delle Marche, Italy*

PANELISTS
Dr. Giacomo **Rogliero**, *Direzione Centrale Anticrimine, Roma*
Dr. Giuseppe **Castellucci**, *SECOM*
Avv. Veronica **Scotti**, *Politecnico di Milano*

13:00 - 14:20 *FAST - Conference Center*
LUNCH / POSTER SESSION #2
Session Coordinator: Marco Carminati, *Politecnico di Milano, Italy*
Chairs: Marco Carminati, Giorgio Ferrari, *Politecnico di Milano, Italy*

PS01 **Towards the Integration of Metaverse and Multimedia Information Retrieval**
Patrick Steinert, University of Hagen, Germany
Stefan Wagenpfeil, University of Hagen, Germany
Ingo Frommholz, University of Wolverhampton, United Kingdom
Matthias L. Hemmje, University of Hagen, Germany

PS02 **Neural Networks Embedded in Wearable Devices: A Preliminary Digital vs. Analog Comparison**
Daniele M. Crafa, Politecnico di Milano, Italy
Susanna Di Giacomo, Politecnico di Milano, Italy
Carlo Fiorini, Politecnico di Milano, Italy
Marco Carminati, Politecnico di Milano, Italy

PS03 **Blood Glucose Regulation in Type 1 Diabetes Through Optimized Nonlinear Control Strategies**
Iqra Shafeeq Mughal, University of Catania, Italy
Luca Patanè, University of Messina, Italy
Riccardo Caponetto, University of Messina, Italy

PS04 **Tangible Tactical Belt: Haptic Realism for Virtual Reality Police Training**
Markus Murtinger, USECON GmbH, AIT Austrian Institute of Technology GmbH, University of Salzburg, Austria
Jakob C Uhl, AIT Austrian Institute of Technology GmbH, University of Salzburg, Austria
Quynh Nguyen, AIT Austrian Institute of Technology GmbH, University of Salzburg, Austria
Georg Regal, AIT Austrian Institute of Technology GmbH, University of Salzburg, Austria

PS05 **Synchronisation Issues in Wireless EEG Systems for P300 Amplitude Measurement: ab medica Helmate Case Study**
Pasquale Arpaia, University of Naples Federico II, Italy
Anna Della Calce, University of Naples Federico II, Italy
Irene Del Chicca, ab medica, Italy
Ludovica Gargiulo, University of Naples Federico II, Italy
Nicola Moccaldi, University of Naples Federico II, Italy
Marco Nalin, ab medica, Italy
Mauro Picciafuoco, ab medica, Italy

PS06 **The Value of Immersive Communication Systems in Online Meetings: A Problem Statement and Literature Review**
Paolo Barzon, TNO, The Netherlands
Sylvie Dijkstra-Soudarissanane, TNO, The Netherlands
Simon Gunkel, TNO, The Netherlands
Evangelos Alexiou, TNO, The Netherlands

PS07 **Parsimonious Technologies for Sensing Upper Limb Muscles Activation**
Mahrukh Azhar, University of Strasbourg, France
Beatrice Luciani, Politecnico di Milano, Italy
Maciej Bednarczyk, University of Strasbourg, Italy
Benoit Wach, University of Strasbourg, Italy
Marta Gandolla, Politecnico di Milano, Italy
Bernard Bayle, University of Strasbourg, Italy

PS08 **An Analog-To-Information Architecture for Single-Chip Sensor-Processor Inference System**
Amir Khan, CSIC-Universidad de Sevilla, Spain
Jorge Fernandez-Berni, CSIC-Universidad de Sevilla, Spain
Ricardo Carmona-Galan, CSIC-Universidad de Sevilla, Spain

PS09 **Development of Synthetic 3D Printed Knee Joint to Assess Mechanical and Functional Properties of Degenerative Cartilage**
Federica Kiyomi Ciliberti, Reykjavik University, Iceland
Riccardo Forni, Reykjavik University, Iceland
Damiano Coato, University of Padova, Italy
Gianmarco Dolino, University of Padova, Italy
Lorena Guerrini, Reykjavik University, Iceland
Vincenzo Minutolo, University of Campania Luigi Vanvitelli, Italy
Paolo Gargiulo, Reykjavik University, Iceland

PS10 **Brain-Computer Interface to Drive Industrial Robots: An Experimental Study in Hybrid Human-Robot Manufacturing**
Luciano Magliulo, Youbiquo, Italy
Luca Conte, Youbiquo, Italy
Francesco Senatore, Youbiquo, Italy
Leopoldo Angrisani, University of Naples Federico II, Italy

PS11 **Bayesian Optimization With Multi Constraints for Planar Rotary Spring Design**
Zhicheng Hang, Politecnico di Milano, Italy
Marta Gandolla, Politecnico di Milano, Italy
Francesco Braghin, Politecnico di Milano, Italy

PS12 **A Machine Learning Approach to Classify Ventilatory Efficiency**
Giuseppe Prisco, University of Molise, Italy
Klara Komici, University of Molise, Italy
Francesco Mercaldo, University of Molise, Italy
Leandro Donisi, University of Campania Luigi Vanvitelli, Italy
Mario Cesarelli, University of Sannio, Italy
Germano Guerra, University of Molise, Italy
Antonella Santone, University of Molise, Italy

PS13 **EEG and HRV-Based Assessment of Neurosurgeons Training for Anxiety Regulation and Stress Monitoring**
Pasquale Arpaia, University of Naples Federico II, Italy
Giovanni Carone, IRCCS Carlo Besta Neurological Institute, Italy
Nicolò Castelli, IRCCS Carlo Besta Neurological Institute, Italy

Giovanni D'Errico, Politecnico di Torino, Italy
Ludovica Gargiulo, University of Naples Federico II, Italy
Luigi Maffei, University of Lisbon, Portugal
Giovanna Mastrati, University of Naples Federico II, Italy
Nicola Moccaldi, University of Naples Federico II, Italy
Marco Nalin, ab medica, Italy
Alessandro Perin, IRCCS Carlo Besta Neurological Institute, Italy
Mauro Picciafuoco, ab medica, Italy
Cosimo Puttilli, ab medica, Italy
Pedro M. Ramos, University of Lisbon, Portugal
Rachele Robbio, University of Naples Federico II, Italy

PS14 Analysing and Modelling Human Trust to a Navigation Robot
Happy Chidi Onyeoru, University of Sheffield, United Kingdom
Christopher Wirth, University of Manchester, United Kingdom
Mahnaz Arvaneh, University of Sheffield, United Kingdom
Joshua Giles, University of Sheffield, United Kingdom

PS15 Toward the Improvement of Probabilistic Classifiers Using Ontologies
Andrea Apicella, University of Naples Federico II, Italy
Anna Corazza, University of Naples Federico II, Italy
Francesco Isgrò, University of Naples Federico II, Italy
Roberto Prevete, University of Naples Federico II, Italy

PS16 Integrating Gaze Tracking With Augmented Reality on Mobile Devices: A Framework for Enhanced User Interaction
Lucia Cascone, University of Salerno, Italy
Andrea Francesco Abate, University of Salerno, Italy
Chiara Pero, University of Salerno, Italy
Sergio Del Sorbo, University of Salerno, Italy
Emanuele Galati, University of Salerno, Italy

PS17 An Assistive Robot in an Indoor Scenario: The Stretch Hello Robot as Environment Organizer
Mir Farooq Ali, Università Politecnica Delle Marche, Italy
David C. Nchekwube, Università Politecnica Delle Marche, Italy
Oleg Genova, Università Politecnica Delle Marche, Italy
Alessandro Freddi, Università Politecnica Delle Marche, Italy
Andrea Monteriù, Università Politecnica Delle Marche, Italy

PS18 Entropy-Based EEG Measures for Revealing Altered Neural Dynamics in Alzheimer's Disease: A Preliminary Study
Andrea Cataldo, University of Salento, Italy
Sabatina Criscuolo, 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

PS19 Raman Spectroscopy of Cells for Cancer Classification Through Machine Learning

Lerina Aversano, University of Sannio, Italy
Mario Luca Bernardi, University of Sannio, Italy
Marta Cimitile, Unitelma Sapienza University, Italy
Andrea Cusano, University of Sannio, Italy
Martina Iammarino, University of Sannio, Italy
Marco Pisco, University of Sannio, Italy
Sara Spaziani, University of Sannio, Italy
Chiara Verdone, University of Sannio, Italy

PS20 **Virtual Experience Toolkit: Enhancing 3D Scene Virtualization From Real Environments Through Computer Vision and Deep Learning Techniques**
Clara Garcia, Polytechnic University of Valencia, Spain
Pau Mora, Polytechnic University of Valencia, Spain
Mario Ortega, Polytechnic University of Valencia, Spain
Eugenio Ivorra, Polytechnic University of Valencia, Spain
Gaetano Valenza, Research Center "E. Piaggio", Italy
Mariano Alcañiz, Polytechnic University of Valencia, Spain

PS21 **Depth Map Super-Resolution Fusing Color Information**
Davide Palesano, Politecnico di Milano, Italy
Marco Paracchini, Politecnico di Milano, Italy
Marco Marcon, Politecnico di Milano, Italy
Stefano Tubaro, Politecnico di Milano, Italy

PS22 **Exploring Canopy Temperature and Height Dynamics in Forest Ecosystems**
Riyaaz Uddien Shaik, University of California, USA
Kathiravan Thangavel, RMIT University, Australia
Sriram Babu Jallu, Wageningen University, The Netherlands
Dario Spiller, Sapienza University of Rome, Italy
Roberto Sabatini, Khalifa University of Science and Technology, United Arab Emirates
Weiping Zeng, Super GeoAI Technology Inc, Canada

14:20 - 15:40 *Aula Maggiore*
Session 4.1 - General Track #1 (AI)
Chairs: Giuseppe Cesarelli, *University of Naples Federico II, Italy*
Danilo Calderone, *University of Naples Federico II, Italy*

14:20 **Electromyography Gestures Sensing With Deeply Quantized Neural Networks**
Danilo Pietro Pau, STMicroelectronics, Italy
Marc Dimbiniaina Randriatsimiovalaza, STMicroelectronics, Italy

14:40 **Objective Assessment of Tremor in Parkinson's Disease Using the RehaBEElitation Serious Game**
Luanne Cardoso Mendes, Federal University of Uberlândia, Brazil
Ariana Moura Cabral, Federal University of Uberlândia, Brazil
Camille Marques Alves, Federal University of Uberlândia, Brazil
Yann Morère, University of Lorraine, France
Adriano de Oliveira Andrade, Federal University of Uberlândia, Brazil

15:00 **Ethical Challenges of Using Artificial Intelligence in Judiciary**
Angel Mary John, Mar Gregorios College of Law, India
Aiswarya M U, Mar Gregorios College of Law, India
Jerrin Thomas Panachakel, College of Engineering, Trivandrum, India

15:20 **Aging Aware Retraining With a Sparse Update for Neuromorphic Computing**
Aswani Radhakrishnan, Digital University Kerala, India
Alex James, Digital University Kerala, India

14:20 - 15:40 *Aula Morandi*
Session 4.2 - General Track #2 (Metro)
Chairs: Simone Barcellona, *Politecnico di Milano, Italy*
Emil Petkovski, *Politecnico di Milano, Italy*

14:20 **Properties and Perspectives of Digital Holographic Microscopy for Bioaerosol Detection**
Alessandro Molani, Politecnico di Milano, Italy
Francesca Pennati, Politecnico di Milano, Italy
Andrea Aliverti, Politecnico di Milano, Italy
János Pálhalmi, DataSenseLabs Ltd., Hungary

14:40 **Early Detection of Fire in EV Battery Using Machine Learning Approach**
Ishpreet Kaur, Thapar Institute of Engineering and Technology, India
Mukesh Singh, Thapar Institute of Engineering and Technology, India
Singara Singh Kasana, Thapar Institute of Engineering and Technology, India

15:00 **TinyML Anomaly Detection in Portable Cutting Tools**
Parisa Esmaili, Politecnico di Milano, Italy
Federico Cavedo, Politecnico di Milano, Italy
Parvaneh Esmaili, Cyprus International University, Turkey
Michele Norgia, Politecnico di Milano, Italy

15:20 **Static Eccentricity Fault Analysis in Three-Phase Induction Motors Using Current Signal**
Shady S. Refaat, University of Hertfordshire Hatfield, United Kingdom
Ahmed Al-Shemmery, Texas A M University at Qatar, Qatar
Kais Abdulmawjood, Texas A M University at Qatar, Qatar
Sayed Mohammad Kameli, Texas A M University at Qatar, Qatar
Abdelaziz Abuelrub, Texas A M University at Qatar, Qatar

14:20 - 15:40 *Aula A*
Session 4.3 - General Track #3 (XR)
Chairs: Valerio De Luca, *University of Salento, Italy*
Luigi Duraccio, *Politecnico di Torino, Italy*

14:20 **The EXPERIENCE Project: Unveiling Extended-Personal Reality Through Automated VR Environments and Explainable Artificial Intelligence**
Gaetano Valenza, University of Pisa, Italy
Mariano Alcañiz, Polytechnic University of Valencia, Spain
Antonio Luca Alfeo, University of Pisa, Italy
Matteo Bianchi, University of Pisa, Italy
Vladimir Carli, Karolinska Institutet, Sweden
Vincenzo Catrambone, University of Pisa, Italy
Mario Giovanni C.A. Cimino, University of Pisa, Italy
Gabriela Dudnik, Centre Suisse d Electronique et de Microtechnique, Switzerland
Andrea Duggento, University of Rome Tor Vergata, Italy
Matteo Ferrante, University of Rome Tor Vergata, Italy
Claudio Gentili, University of Padua, Italy
Jaime Guixeres, Polytechnic University of Valencia, Spain
Simone Rossi, University of Siena, Italy
Nicola Toschi, University of Rome Tor Vergata, Italy
Virginie van Wassenhove, CEA/NeuroSpin, INSERM U992, France

14:40 **Exploring the Potential of Eye-Tracking Technology for Emotion Recognition: A Preliminary Investigation**
Mariano Alcañiz, Polytechnic University of Valencia, Spain
Leopoldo Angrisani, University of Naples Federico II, Italy
Pasquale Arpaia, University of Naples Federico II, Italy
Egidio De Benedetto, University of Naples Federico II, Italy
Luigi Duraccio, Politecnico di Torino, Italy
Lucia Gomez-Zaragoza, Polytechnic University of Valencia, Spain
Javier Marìn-Morales, Polytechnic University of Valencia, Spain
Maria Eleonora Minissi, Polytechnic University of Valencia, Spain

15:00 **Stability of Feature Detection Algorithms in Low Quality Video Encoding**
Valerio De Luca, University of Salento, Italy
Lucio T De Paolis, University of Salento, Italy

15:20 **Ethical Considerations for AI-Driven Adaptive Virtual Environments in XR Training for First Responders: An Industry Perspective**
Olivia Zechner, AIT Austrian Institute of Technology GmbH, Austria
Daniele Pretolesi, AIT Austrian Institute of Technology GmbH, Austria
Emma Jaspaert, Tilburg University, the Netherlands
Daniel García Guirao, IDENER, Spain
Manfred Tscheligi, University of Salzburg, Austria

14:20 - 15:40	*Aula B* **Session 4.4 - General Track #4 (NE)** **Chairs:** Elena Sajno, *Università di Pisa & HTLAB, Università Cattolica del Sacro Cuore, Italy*

14:20 **Cross-Subject Mindfulness Meditation EEG Decoding**
Angeliki I. Karaiskou, KU Leuven, Belgium
Carolina Varon, KU Leuven, Belgium
Kaat Alaerts, KU Leuven, Belgium
Maarten De Vos, KU Leuven, Belgium

14:40 **Mental Fatigue Evaluation for Passive and Active BCI Methods for Wheelchair-Robot During Human-In-The-Loop Control**
Karameldeen Omer, Università Politecnica delle Marche, Italy
Francesco Vella, Università Politecnica delle Marche, Italy
Francesco Ferracuti, Università Politecnica delle Marche, Italy
Alessandro Freddi, Università Politecnica delle Marche, Italy
Sabrina Iarlori, Università Politecnica delle Marche, Italy
Andrea Monteriù, Università Politecnica delle Marche, Italy

15:00 **Low-Contrast SSVEP Stimuli to Improve User Experience of Brain-Computer Interface Involving Virtual Reality**
Thibault Porssut, Capgemini Engineering, France
Alix Gouret, Capgemini Engineering, France
Dmitrii Bryzgalov, Capgemini Engineering, France
Alex Lafont, Capgemini Engineering, France
Sébastien Rouze, Wake Up and Smile, Spain
Solène Le Bars, Capgemini Engineering, France

15:20 **A Brain-Computer Interface Augmented Reality Framework With Auto-Adaptive SSVEP Recognition**
Yasmine Mustafa, Missouri University of Science and Technology, USA
Mohamed Elmahallawy, Missouri University of Science and Technology, USA
Tony T. Luo, Missouri University of Science and Technology, USA
Seif Eldawlatly, Ain Shams University, The American University in Cairo, Egypt

15:40 - 16:00 *FAST - Conference Center*
COFFEE BREAK / DEMO SESSION #2 / POSTER SESSION #2

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

16:00 - 17:40 *Aula Maggiore*
Session 5.1 - Towards Industry 5.0: opportunities, challenges, and enabling technologies
Chairs: Marco Sacco, *STIIMA - National Research Council, Italy*
Gianfranco Modoni, *STIIMA - National Research Council, Italy*

16:00 **Towards Human-Centricity Within a Sofa Factory Assembly Line: A Real-Time Location System**
Valerio Pulcini, STIIMA-CNR, Italy
Marco Sacco, STIIMA-CNR, Italy
Gianfranco Modoni, STIIMA-CNR, Italy

16:20 **An AR-Based Tool for Acquisition and Automatic Labeling of Human-Object Interactions From First Person Vision**
Luigi Seminara, University of Catania, Italy
Francesco Ragusa, University of Catania, Italy
Rosario Leonardi, University of Catania, Italy
Giovanni Maria Farinella, University of Catania, Italy
Antonino Furnari, University of Catania, Italy

16:40 **A Multi-Channel Deep-Learning Prediction Algorithm for Battery State-Of-Health Indicator**
Gabriele Patrizi, University of Florence, Italy
Marcantonio Catelani, University of Florence, Italy
Lorenzo Ciani, University of Florence, Italy
Yuchen Song, Harbin Institute of Technology, China
Datong Liu, Harbin Institute of Technology, China

17:00 **A Novel Machine Learning Algorithm for State of Health Prediction of Lithium-Ion Batteries**
Filippo Battaglia, University of Messina, Italy
Giuseppe Campobello, University of Messina, Italy
Davide Aloisio, University of Messina, Italy
Salvatore Gianluca Leonardi, National Research Council, Italy
Giovanni Gugliandolo, University of Messina, Italy
Giovanni Brunaccini, National Research Council, Italy
Francesco Sergi, National Research Council, Italy
Nicola Donato, University of Messina, Italy

17:20 **Model-Agnostic Methods for Soft Sensor Interpretability**
Luca Patanè, University of Messina, Italy
Francesca Sapuppo, University of Messina, Italy
Giuseppa Scipilliti, University of Catania, Italy
Maria Gabriella Xibilia, University of Messina, Italy

16:00 - 17:40 *Aula Morandi*
Session 5.2 - The value of muscular activity monitoring in neurorehabilitation: Surface EMG and beyond
Chairs: Marta Gandolla, *Politecnico di Milano, Italy*
Emilia Ambrosini, *Politecnico di Milano, Italy*

16:00 **High-Density Surface Electromyography Allows for Longitudinal Assessment of the Neural Drive to Muscle in Individuals With Acute Stroke**

Marco Benedini, Università degli Studi di Brescia, Italy
Hélio V Cabral, Università degli Studi di Brescia, Italy
Marta Cogliati, Università degli Studi di Brescia, Italy
Luca Falciati, Università degli Studi di Brescia, Italy
Luciano Bissolotti, Teresa Camplani Foundation, Italy
Claudio Orizio, Università degli Studi di Brescia, Italy
Laura McPherson, Washington University School of Medicine, USA
Francesco Negro, Università degli Studi di Brescia, Italy

16:20 **Upper Limb Phasic Muscle Synergies With Negative Weightings: Applications for Rehabilitation**
Alessandro Scano, National Research Council, Italy
Cristina Brambilla, National Research Council, Italy
Marta Russo, IRCCS Fondazione Santa Lucia, Italy
Andrea d'Avella, University of Messina, , IRCCS Fondazione Santa Lucia, Italy

16:40 **Feasibility of a Portable, Wearable, High-Density Surface EMG Device for Detecting Functional Hand-Object Interactions**
Andrea Bandini, Scuola Superiore Sant'Anna, Italy
Giada Zecchin, Politecnico di Milano, Italy
Francesco Iberite, Scuola Superiore Sant'Anna, Italy
Tommaso Proietti, Scuola Superiore Sant'Anna, Italy
Silvestro Micera, Scuola Superiore Sant'Anna, Italy, EPFL, Switzerland
Emilia Ambrosini, Politecnico di Milano, Italy

17:00 **An EMG-Triggered Cooperative Controller for a Hybrid FES-Robotic System**
Federica Ferrari, Politecnico di Milano, Italy
Eva Zimei, Politecnico di Milano, Italy
Marta Gandolla, Politecnico di Milano, Italy
Alessandra Pedrocchi, Politecnico di Milano, Italy
Emilia Ambrosini, Politecnico di Milano, Italy

17:20 **Towards Personalized Myoelectric Control Strategies**
Davide Costanzi, University of Verona, Italy
Marta Gandolla, Politecnico di Milano, Italy
Andrea Calanca, University of Verona, Italy

16:00 - 17:40 *Aula A*

Session 5.3 - Simulation approaches and Artificial Intelligence for healthcare and biomedical engineering

Chairs: Leandro Donisi, *University of Campania Luigi Vanvitelli, Italy*
Michela Russo*, University of Naples Federico II, Italy*

16:00 **Using Wearable Sensors and Motion Parameters for Recognizing Progressive Supranuclerar Palsy Phenotypes**
Noemi Pisani, University of Naples Federico II, Italy

Carlo Ricciardi, University of Naples Federico II, Italy
Marina Picillo, University of Salerno, Italy
Filomena Abate, University of Salerno, Italy
Anna Rosa Avallone, University of Salerno, Italy
Francesco Amato, University of Naples Federico II, Italy
Mario Cesarelli, University of Sannio, Italy

16:20 **Feasibility of Tree-Based Machine Learning Models to Discriminate Safe and Unsafe Posture During Weight Lifting**
Giuseppe Prisco, University of Molise, Italy
Maria Romano, University of Naples Federico II, Italy
Fabrizio Esposito, University of Campania Luigi Vanvitelli, Italy
Mario Cesarelli, University of Sannio, Italy
Antonella Santone, University of Molise, Italy
Leandro Donisi, University of Campania Luigi Vanvitelli, Italy

16:40 **Heart Rate Variability During a Complex Postural Control Task With the BioVRSea Paradigm**
Marco Recenti, Reykjavik University, Iceland
Lorena Guerrini, Reykjavik University, University of Campania L. Vanvitelli, Iceland
Alessia Lindemann, Reykjavik University, Iceland
Simona Pierucci, Reykjavik University, Iceland
Carlo Ricciardi, University of Naples Federico II, Italy
Alfonso M Ponsiglione, University of Naples Federico II, Italy
Hannes Petersen, Akureyri Hospital, Iceland
Paolo Gargiulo, Reykjavik University, Landspitali University Hospital, Iceland

17:00 **A Cluster Analysis for Parkinson's Disease Phenotyping With Gait Parameters**
Michela Russo, University of Naples Federico II, Italy
Carlo Ricciardi, University of Naples Federico II, Italy
Marianna Amboni, University of Salerno, Italy
Antonio Volzone, University of Salerno, Italy
Paolo Barone, University of Salerno, Italy
Maria Romano, University of Naples Federico II, Italy
Francesco Amato, University of Naples Federico II, Italy

17:20 **VGG16 Architecture Based Atrial Fibrillation Detection Using ECG**
Shrikanth Rao S K, VTU, India
Roshan Joy Martis, Global Academy of Technology, Bengaluru, India
Mahesh Kolekar, Indian Institute of Technology Patna, India

16:00 - 17:40 *Aula B*
PANEL SESSION - Telemedicine: From Italy to the World
Moderators: Nicola Moccaldi, Alfonso Maria Ponsiglione, Carlo Ricciardi, *University of Naples Federico II, Italy*

PANELISTS

Hugo **Paredes**, *University of Trás-os-Montes e Alto Douro*
Paola **Lanteri**, *Foundation IRCCS Neurological Institute Carlo Besta*
Mario **Sansone**, *University of Naples Federico II*
Giovanni **Butturini**, *P. Pederzoli Hospital*
Michele **Piana**, *University of Genoa*
Lorena **Begio**, *ab medica*

20:30 - 23:00	*Osteria del Treno* **GALA EVENT**

Technical Program - Friday, October 27

08:30 - 15:00	*FAST - Conference Center* **REGISTRATIONS**

09:00 - 10:40	*Aula Maggiore* **Session 6.1 - Life Cycle Assessment and Environmental Sustainability of Measurement Systems** **Chairs:** Oscar Tamburis, *National Research Council, Italy* Stefania Amici, *National Institute of Geophysics and Volcanology*

09:00 **Sustainable Measures for Assessing the Impact of Climate Effects on Livestock Biological Variability**
Nadia Piscopo, University of Naples Federico II, Italy
Lucia Trapanese, University of Naples Federico II, Italy
Roberta Matera, University of Naples Federico II, Italy
Alessio Cotticelli, University of Naples Federico II, Italy
Oscar Tamburis, National Reasearch Council, Italy
Roberta Cimmino, ANASB, Italy
Angela Salzano, University of Naples Federico II, Italy

09:20 **The Wild Boar as an Ecosystem Service: Moving Steps Towards Biodiversity Engineering**
Luigi Esposito, University of Naples Federico II, Italy
Marika Di Paolo, University of Naples Federico II, Italy
Damiano Altieri, University of Naples Federico II, Italy
Paolo Viola, University of Tuscia, Italy
Luis J. Merino Goyenechea, Universidad de León, Spain
Riccardo Primi, University of Tuscia, Italy
Raffaele Marrone, University of Naples Federico II, Italy
Nadia Piscopo, University of Naples Federico II, Italy

09:40 **Enhancing Urban Environmental Sustainability Through Unified Stakeholders Needs Co-Creation Process (AENEA)**
Georgios Koutalieris, ENORA Innovation, Greece
Symeon Symeonidis, ENORA Innovation, Greece

Iphigeneia Kapsomenaki, ENORA Innovation, Greece
Maria João Feio, University of Coimbra, Portugal
Luigi Esposito, University of Naples Federico II, Italy
Arriel Benis, Holon Institute of Technology, Israel
Carina Dantas, SHINE 2Europe, Portugal
Miriam Cabrita, SHINE 2Europe, Portugal
Harm op den Akker, SHINE 2Europe, Portugal
Oscar Tamburis, National Reasearch Council, Italy

10:00 **Exploring the Relationship Between Performance and Environmental Sustainability in Measurement Systems: A Preliminary Study**
Leopoldo Angrisani, University of Naples Federico II, Italy
Mauro D'Arco, University of Naples Federico II, Italy
Egidio De Benedetto, University of Naples Federico II, Italy
Luigi Duraccio, Politecnico di Torino, Italy
Antonio Esposito, University of Naples Federico II, Italy
Monica Imbò, University of Naples Federico II, Italy
Annarita Tedesco, University of Naples Federico II, Italy

10:20 **Comparison of 1D and 3D Convolutional Neural Networks for Wildfire Detection Using PRISMA Hyperspectral Imagery and Domain Adaptation**
Andrea Carbone, Sapienza University of Rome, Italy
Dario Spiller, Sapienza University of Rome, Italy
Stefania Amici, National Institute of Geophysics and Volcanology, Italy
Kathiravan Thangavel, RMIT University, Australia
Roberto Sabatini, Khalifa University of Science and Technology, United Arab Emirates
Giovanni Laneve, Sapienza University of Rome, Italy

09:00 - 10:40 *Aula Morandi*
Session 6.2 - SPECIAL EVENT - PsychoBit - Part I
Chairs: Davide Marocco, *University of Naples Federico II, Italy*
Maria Luongo, *University of Naples Federico II, Italy*

09:00 **The Implementation of a Mobile Game for Social Inclusion in Multicultural School Contexts**
Alessandra Colella, University of Naples Federico II, Italy
Concetta Esposito, University of Naples Federico II, Italy
Dario Bacchini, University of Naples Federico II, Italy

09:20 **Virtual Agents and Proxemic Distances: How Social Interactions Affect Our Spatial Representations**
Scila Nunziata, University of Campania Luigi Vanvitelli, Italy
Antonella Ferrara, University of Campania Luigi Vanvitelli, Italy
Tina Iachini, University of Campania Luigi Vanvitelli, Italy
Renato Orti, University of Campania Luigi Vanvitelli, Italy
Alessandro Troise, University of Campania Luigi Vanvitelli, Italy
Gennaro Ruggiero, University of Campania Luigi Vanvitelli, Italy

09:40 **"Escape With Pulcinella": Development of a Gamified Environment and Pilot Study on Escape Rooms for Language Learning and Cultural Knowledge Acquisition**
Erica Chinzer, University of Naples Federico II, Italy
Raffaele Di Fuccio, University of Foggia, Italy
Michela Ponticorvo, University of Naples Federico II, Italy

10:00 **Affective Evaluations of Rooms in Immersive Virtual Reality: The Effect of Naturalistic Elements**
Mariachiara Rapuano, University of Campania Luigi Vanvitelli, Italy
Francesco Ruotolo, University of Campania Luigi Vanvitelli, Italy
Gennaro Ruggiero, University of Campania Luigi Vanvitelli, Italy
Loreta Cannito, University of Campania Luigi Vanvitelli, Italy
Fabiola Capitelli, University of Campania Luigi Vanvitelli, Italy
Federico Cioffi, University of Campania Luigi Vanvitelli, Italy
Massimiliano Masullo, University of Campania Luigi Vanvitelli, Italy
Luigi Maffei, University of Campania Luigi Vanvitelli, Italy
Tina Iachini, University of Campania Luigi Vanvitelli, Italy

10:20 **Enhancing Career-Related Teacher Support Through Technologies: The NEFELE Training Model**
Anna Parola, University of Naples Federico II, Italy
Luigia Simona Sica, University of Naples Federico II, Italy
Ioannis Kalemis, Hellenic Open University, Greece
Federico Diano, University of Naples Federico II, Italy
Achilles Kameas, Hellenic Open University, Greece

09:00 - 10:40 *Aula A*
Session 6.3 - Soft Metrology: Advances for psychological and human factors in digital society
Chairs: Mario Angelelli*, University of Salento, Italy*
Giovanni D'Errico*, Politecnico di Torino, Italy*

09:00 **Securing Web Technology and Navigation Against Phishing Through CNN**
Christian Catalano, University of Salento, Italy
Andrea Chezzi, University of Salento, Italy
Vita Santa Barletta, University of Bari, Italy
Angelo Corallo, University of Salento, Italy

09:20 **Development of a Behavioral Avoidance Test in Virtual Reality (VR-BAT)**
Sergio Frumento, University of Pisa, Italy
Alessio Iannizzotto, University of Pisa, Italy
Alberto Greco, University of Pisa, Italy
Enzo Pasquale Scilingo, University of Pisa, Italy
Angelo Gemignani, University of Pisa, Italy
Danilo Menicucci, University of Pisa, Italy

09:40 **Artificial Intelligence for Automotive Security: How to Support Developers in Automotive Solutions**
Vita Santa Barletta, University of Bari, Italy
Christian Catalano, University of Salento, Italy
Mirko De Vincentiis, University of Bari, Italy
Anibrata Pal, University of Bari, Italy
Michele Scalera, University of Bari, Italy

10:00 **Automotive Knowledge Base for Supporting Vehicle-SOC Analysts**
Vita Santa Barletta, University of Bari, Italy
Danilo Caivano, University of Bari, Italy
Mirko De Vincentiis, University of Bari, Italy
Anibrata Pal, University of Bari, Italy
Francesco Volpe, University of Bari, Italy

10:20 **Proposing a Natural Language Processing Approach to Detect Personal Meaning Organizations Linguistic Patterns**
Antonio Guerrieri, University of Salento, Italy
Antonino Esposito, Fondazione Neurone Onlus, Italy
Angelo Picardi, Italian National Institute of Health, Italy
Giulio Nicolò Meldolesi, Fondazione Neurone Onlus, Italy

09:00 - 10:40	*Aula B* **PANEL SESSION - AI: across innovations and ethics** **Moderator:** Veronica Scotti, *Politecnico di Milano, Italy*

IEEE **Women in Engineering Affinity Group** Panel for IEEE MetroXRAINE 2023.

PANELISTS

Luca Mari*, Università Carlo Cattaneo - LIUC, Italy*
Viola Schiaffonati, *Politecnico di Milano, Italy*
Lucilla Gatt*, Università Suor Orsola Benincasa, Italy*

09:00 - 13:40	*Sala Riunioni* **YOUTH PROGRAM - Neural Data Processing Contest**

10:40 - 11:00	*FAST - Conference Center* **COFFEE BREAK / DEMO SESSION #3 / BEST GRAPHICAL ABSTRACT AWARD** **Chair:** Nicola Moccaldi*, University of Naples Federico II, Italy*
DEMO #3.1	**Docking Da Vince Robot in Surgical Room Via Augmented Reality** Jafar Hamad, University of Pisa, Italy
DEMO #3.2	**Face your phobia! A Behavioral Avoidance Test based on Virtual Reality** Sergio Frumento, University of Pisa, Italy

DEMO #3.3 **Healer: a Telemedicine Platform in Action**
Beatrice De Marchi, Italy

Best Graphical Abstract Award

Award Commission:

- Tullio Rossi, *Animate your Science*
- Valentina Ferrara, *IULM*
- Sofia Mazzini, *Università Cattolica del Sacro Cuore*

11:00 - 12:00 *Aula Maggiore*
PLENARY SESSION - KEYNOTE SPEAKER
Chair: Damien Coyle, *University of Bath, UK*

Non-invasive Neuroadaptive Neural Interfaces: Learning to Learn

Reinhold Scherer, *University of Essex, UK*

12:00 - 14:00 *Aula Maggiore*
Session 7.1 - Memristor Models, Devices, Circuits and Systems for Artificial Intelligence Applications
Chairs: Alon Ascoli, *TU Dresden, Germany*
Ahmet Samil Demirkol, *TU Dresden, Germany*

12:00 **MemComputing Applications in Machine Learning**
Massimiliano Di Ventra, University of California, San Diego, USA

12:20 **Local Fading Memory Effects in a Tantalum Oxide ReRAM Cell From Hewlett Packard Labs**
Alon Ascoli, TU Dresden, Germany
Nicolas Schmitt, TU Dresden, Germany
Ioannis Messaris, TU Dresden, Germany
Ahmet Samil Demirkol, TU Dresden, Germany
Ronald Tetzlaff, TU Dresden, Germany
J.P. Strachan, RWTH Aachen University, Germany
Leon Chua, University of California, Germany

12:40 **A Compact SPICE Model for Current Transients within the Subthreshold Regime of Memristors**
Daniel Mannion, University College London, United Kingdom
Wing Ng, University College London, United Kingdom
Adnan Mehonic, University College London, United Kingdom
Tony Kenyon, University College London, United Kingdom

13:00 **Analog Feedback-Controlled Memristor Programming Circuit for Analog Content Addressable Memory**
Jiaao Yu, Forschungszentrum Jülich, Technical University of Munich, Germany
Paul-Philipp Manea, Forschungszentrum Jülich, RWTH Aachen University, Germany
Sara Ameli, Forschungszentrum Jülich, RWTH Aachen University, Germany
Mohammad Hizzani, Forschungszentrum Jülich, RWTH Aachen University, Germany
Amro Eldebiky, Technical University of Munich, Germany
John Paul Strachan, Forschungszentrum Jülich, RWTH Aachen University, Germany

13:20 **Mackey-Glass Time Series Forecasting by Nanowire Networks**
Gianluca Milano, Istituto Nazionale di Ricerca Metrologica, Italy
Tushar Chakrabarty, Politecnico di Torino, Italy
Carlo Ricciardi, Politecnico di Torino, Italy

13:40 **Rapid Detection of SARS-CoV-2 Antigen Utilizing Machine Learning-Enabled Graphene-Based Smart Gas Sensors**
Shirong Huang, TU Dresden, Germany
Bergoi Ibarlucea, TU Dresden, Germany
Luis Antonio Panes-Ruiz, TU Dresden, Germany
Gianaurelio Cuniberti, TU Dresden, Germany

12:00 - 13:40 *Aula Morandi*
Session 7.2 - SPECIAL EVENT - PsychoBit - Part II
Chairs: Onofrio Gigliotta, *University of Naples Federico II, Italy*
Monica Casella, *University of Naples Federico II, Italy*

12:00 **"Safer": Design and Development of a Supportive Assistant for Emotion Regulation**
Federico Diano, University of Naples Federico II, Italy
Michela Ponticorvo, University of Naples Federico II, Italy
Luigia Sica, University of Naples Federico II, Italy

12:20 **Exploring Motor Patterns in Autism Spectrum Disorder Using Raw Data and Artificial Intelligence: A Pilot Study**
Maria Luongo, University of Naples Federico II, Italy
Roberta Simeoli, University of Naples Federico II, Italy
Davide Marocco, University of Naples Federico II, Italy
Michela Ponticorvo, University of Naples Federico II, Italy

12:40 **Autoencoders as a Tool to Detect Nonlinear Relationships in Latent Variables Models**
Raffaella Esposito, University of Naples Federico II, Italy
Monica Casella, University of Naples Federico II, Italy
Nicola Milano, University of Naples Federico II, Italy
Davide Marocco, University of Naples Federico II, Italy

13:00 **WAITASEC: The Development of an Application for People' Digital Wellness**
Martina Benvenuti, University of Bologna, Italy

Sergio Sangiorgi, Unveil Consulting Srl, Italy
Marco Favilla, Unveil Consulting Srl, Italy
Roberto Lattuada, Waitasec, Italy
Kymm Li, Waitasec, Italy
Elvis Mazzoni, University of Bologna, Italy

13:20 **Putting the Pieces Together: Exploring the Dimensionality of Enhanced Baking Tray Task Indexes in School-Aged Children**
Antonietta Argiuolo, University of Naples Federico II, Italy
Federica Somma, University of Naples Federico II, Italy
Monica Casella, University of Naples Federico II, Italy
Onofrio Gigliotta, University of Naples Federico II, Italy
Michela Ponticorvo, University of Naples Federico II, Italy

12:00 - 13:40 *Aula A*
PANEL SESSION - Metrology for Health: Main Challenges in Making new Technologies Metrologically Compliant
Organizers: Loredana Cristaldi*, Politecnico di Milano, Italy*
Nicola Giaquinto*, Politecnico di Bari, Italy*
Luca Mari*, Università Carlo Cattaneo - LIUC, Italy*

PANELISTS
Gugliemo **Tozzi**, *Accredia (Institutional Relations Specialist)*
Silvia **Busoli Badiale**, *IMQ (Product Conformity Assessment / Medical Devices Expert)*
Yuntao **Yu**, *IEC (ISO/IEC JTC1 on Brain-computer interfaces Chair)*
Simone **Germani** and Giuseppina **Polino**, *CEI Technical Officer (CT324 on BCI)*

12:00 - 13:40 *Aula B*
Session 7.4 - Active brain-computer interfaces for daily-life applications
Chairs: Marco Nalin, *ab medica, Italy*
Antonio Esposito, *University of Naples Federico II, Italy*

12:00 **Improving Common Spatial Patterns in Brain-Computer Interface Using Dynamic Time Warping and EEG Normalization**
Mohamed A A Mohamed, University of Sheffield, United Kingdom
Mahnaz Arvaneh, University of Sheffield, United Kingdom
Payam Soulatiantork, University of Sheffield, United Kingdom
Kai Keng Ang, Institute for Inforcomm Research, A*STAR, Singapore
Phua Kok Soon, Institute for Inforcomm Research, A*STAR, Singapore
Salem SL Mansour, University of Sheffield, United Kingdom

12:20 **EEG-Based Self-Paced Decoding of Upper Limb Movement Intention in Healthy Subjects**
Matteo Ceradini, Scuola Superiore Sant'Anna, Italy
Stefano Tortora, University of Padova, Italy
Luca Tonin, University of Padova, Italy
Silvestro Micera, Scuola Superiore Sant'Anna, Italy, EPFL, Switzerland

12:40 **Decoding Motion Trajectories in an Online Upper Limb BCI: Linear Regression Vs Deep Learning**
Niall McShane, Ulster University, United Kingdom
Attila Korik, University of Bath, United Kingdom
Karl McCreadie, Ulster University, United Kingdom
Darryl Charles, Ulster University, United Kingdom
Damien Coyle, University of Bath, United Kingdom

13:00 **Investigation of Neurophysiological Biomarkers Using Dry Electrodes EEG Device in Patients With Neurological Diseases Undergoing Motor Neurorehabilitation: Protocol Trial**
Agnese Seregni, Casa di Cura Igea, Italy
Peppino Tropea, Casa di Cura Igea, Italy
Luca Chiveri, Casa di Cura Igea, Italy
Su-Chun Huang, Institute of Experimental Neurology-INSPE, Italy
Marco Nalin, ab medica, Italy
Marta Tacchini, Institute of Experimental Neurology, San Raffaele Vita-Salute University, Italy
Irene Del Chicca, ab medica, Italy
Giancarlo Comi, Casa di Cura Igea, San Raffaele Vita-Salute University, Italy
Letizia Leocani, Institute of Experimental Neurology, San Raffaele Vita-Salute University, Italy
Massimo Corbo, Casa di Cura Igea, Italy

13:20 **Virtual Hand Illusion-Based Motor Imagery Guidance System for Stroke Patients: A Pilot Study**
Hojun Jeong, Sungkyunkwan University, Korea
Haemin Jung, Sungkyunkwan University, Korea
Minyoung Kim, CHA University School of Medicine, Korea
Jonghyun Kim, Sungkyunkwan University, Korea

13:40 - 14:40 *FAST - Conference Center*
LUNCH / POSTER SESSION #3
Session Coordinator: Nicola Giaquinto, *Politecnico di Bari, Italy*

PS01 **Machine Learning for Anomaly Detection in Induction Motors**
Simone Mari, University of L'Aquila, Italy
Giovanni Bucci, University of L'Aquila, Italy
Fabrizio Ciancetta, University of L'Aquila, Italy
Edoardo Fiorucci, University of L'Aquila, Italy
Andrea Fioravanti, University of L'Aquila, Italy

PS02 **Sinc-EEGNet for Improving Performance While Reducing Calibration of a Motor Imagery-Based BCI**

Pasquale Arpaia, University of Naples Federico II, Italy
Elisa Bertone, University of Naples Federico II, Italy
Antonio Esposito, University of Naples Federico II, Italy
Angela Natalizio, Politecnico di Torino, Italy
Marco Parvis, Politecnico di Torino, Italy
Alessandra Pedrocchi, Politecnico di Milano, Italy
Andrea Pollastro, University of Naples Federico II, Italy

PS03 **Advanced Electrical Characterization of Memristive Arrays for Neuromorphic Applications**

Stefan Wiefels, Forschungszentrum Jülich GmbH, Germany
Xiaohua Liu, Forschungszentrum Jülich GmbH, Germany
Kristoffer Schnieders, Forschungszentrum Jülich GmbH, Germany
Mathias Schumacher, aixACCT Systems GmbH, Germany
Rainer Waser, Forschungszentrum Jülich GmbH, Germany
Lutz Nielen, aixACCT Systems GmbH, Germany

PS04 **Feasibility and Accuracy of a Dry and Wireless EEG Helmet for Upper Limb Motor Imagery-Based Brain-Computer Interfaces**

Matteo Ceradini, Scuola Superiore Sant'Anna, Italy
Michael Lassi, Scuola Superiore Sant'Anna, Italy
Elena Losanno, Scuola Superiore Sant'Anna, Italy
Alexander Gontran-Massey, Université de Franche-Comté, France
Marco Nalin, ab medica, Italy
Irene Del Chicca, ab medica, Italy
Cosimo Puttilli, ab medica, Italy
Silvestro Micera, Scuola Superiore Sant'Anna, Italy, EPFL, Switzerland
Andrea Bandini, Scuola Superiore Sant'Anna, Italy

PS05 **Closed-Loop In-Memory Computing for Energy-Efficient Matrix Eigendecomposition**

Piergiulio Mannocci, Politecnico di Milano, Italy
Elisabetta Giannone, Politecnico di Milano, Italy
Daniele Ielmini, Politecnico di Milano, Italy

PS06 **Serious Games for Cybersecurity: How to Improve Perception and Human Factors**

Vita Santa Barletta, University of Bari, Italy
Miriana Calvano, University of Bari, Italy
Federica Caruso, University of L'Aquila, Italy
Antonio Curci, University of Bari, Italy
Antonio Piccinno, University of Bari, Italy

PS07 **Estimation of Ground NO2 Measurements From Sentinel-5P Tropospheric Data Through Categorical Boosting**

Francesco Mauro, University of Sannio, Italy
Luigi Russo, University of Sannio, Italy
Fjoralba Sota Janku, University of Sannio, Italy
Alessandro Sebastianelli, European Space Agency

Silvia Liberata Ullo, University of Sannio, Italy

PS08 **Early Prevention of Heart Attacks Using Memristor-Based Machine Learning and Surface Enhanced Raman Spectroscopy With Collapsible Nanofinger**
Ye Zhuo, University of Southern California, USA
Zerui Liu, University of Southern California, USA
Deming Meng, University of Southern California, USA
Pan Hu, University of Southern California, USA
Wenhao Song, University of Southern California, USA
Yunxiang Wang, University of Southern California, USA
Ruoyu Zhao, University of Southern California, USA
Tse-Hsien Ou, University of Southern California, USA
Sushmit Hossain, University of Southern California, USA
Alyna Xinxia Tang, Shanghai high school international division, China
J. Joshua Yang, University of Southern California, USA
Wei Wu, University of Southern California, USA

PS09 **Analytical Derivation of Sharp-Edge-Of-Chaos Domain in a One-Dimensional Memristor Array**
Ahmet Samil Demirkol, TU Dresden, Germany
Alon Ascoli, TU Dresden, Germany
Ioannis Messaris, TU Dresden, Germany
Ronald Tetzlaff, TU Dresden, Germany

PS10 **STeMMA - Telerehabilitation System With Area Muscle Monitoring**
Francesca D'Ordia, CID Software Studio S.P.A., Italy
Egidio De Benedetto, University of Naples Federico II, Italy

POSTER SESSION - Metrology and AI: how well they can get along?

Chairs: Marco Scarpetta, Nicola Giaquinto, *Politecnico di Bari*

PS11 **U-Net Convolutional Neural Network for Optic Disc Segmentation**
Vito Ivano D'Alessandro, Polytechnic University of Bari, Italy
Francesco Adamo, Polytechnic University of Bari, Italy
Luisa De Palma, Polytechnic University of Bari, Italy
Daniel Lotano, Polytechnic University of Bari, Italy
Marco Scarpetta, Polytechnic University of Bari, Italy

PS12 **The SNOWED Dataset and Its Application to Po River Monitoring Through Satellite Images**
Marco Scarpetta, Polytechnic University of Bari, Italy
Mattia Alessandro Ragolia, Polytechnic University of Bari, Italy
Maurizio Spadavecchia, Polytechnic University of Bari, Italy
Paolo Affuso, Polytechnic University of Bari, Italy
Nicola Giaquinto, Polytechnic University of Bari, Italy

PS13 **Machine Learning-Based Classification of the Traffic of Digital Marketing Campaigns**

Sara Abbonizio, Università Politecnica Delle Marche, Italy
Paolo Sernani, University of Macerata, Italy
Aldo F. Dragoni, Università Politecnica Delle Marche, Italy
Paolo Rinaldesi, Revelop Srl, Italy

PS14 **VO.I.C.E. FIRST: Supporting Human Assistants With Real-Time Voice Understanding**
Mario Corrado, In&Out S.p.A. - Teleperformance, Italy
Vincenzo Giliberti, In&Out S.p.A. - Teleperformance, Italy
Manuel Gozzi, Isagog Srl, Italy
Vincenzo Lanzolla, In&Out S.p.A. - Teleperformance, Italy
Guido Vetere, Isagog Srl, Italy
Domenico Zurlo, In&Out S.p.A. - Teleperformance, Italy

PS15 **A Survey on Uncertainty Assessment in ANN-Based Measurements**
Vincenzo Gallo, University of Salerno, Italy
Marco Carratù, University of Salerno, Italy
Valter Laino, University of Salerno, Italy
Consolatina Liguori, University of Salerno, Italy
Antonio Pietrosanto, University of Salerno, Italy

14:40 - 15:40 *Aula Maggiore*
PLENARY SESSION - TUTORIAL
Chair: Karl McCreadie, *Ulster University, UK*

Neurofeedback for the treatment of specific diseases and health promotion: methods and techniques

Luciana Lorenzon, *Italian Society of Neurofeedback and QEEG*

14:40 - 17:40 *FAST - Conference Center*
YOUTH PROGRAM - FORUM

15:40 - 16:00 *FAST - Conference Center*
COFFEE BREAK / DEMO SESSION #3 / POSTER SESSION #3

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

16:00 - 17:40 *Aula Maggiore*
Session 8.1 - Smart Service Technologies for Vulnerable Actors
Chairs: Irene di Bernardo, *University of Naples Federico II, Italy*
Angelo Ranieri, *University of Naples Federico II, Italy*

16:00 **AI Adoption to Innovate Accounting Practice: Ethical Implications**
Giulia Napolitano, University of Naples Federico II, Italy

16:20 **Digital Healthcare Service Ecosystem: Established Approaches and New Perspectives**
Alessia Anzivino, Università Cattolica del Sacro Cuore, Italy
Roberta Sebastiani, Università Cattolica del Sacro Cuore, Italy

16:40 **Museum Accessibility: A Managerial Perspective on Digital Approach**
Gesualda Iodice, University of Naples Federico II, Italy
Francesco Carignani, University of Naples Federico II, Italy
Laura Clemente, Sapienza University of Rome, Italy
Francesco Bifulco, University of Naples Federico II, Italy

17:00 **Dealing With Learning Vulnerability: Service Robots to Nudge Student Engagement**
Angelo Ranieri, University of Naples Federico II, Italy
Irene Di Bernardo, University of Naples Federico II, Italy
Cristina Mele, University of Naples Federico II, Italy
Tiziana Russo Spena, University of Naples Federico II, Italy

17:20 **The Impact of the Metaverse on Health Professionals' Empathy**
Stefano Paolo Russo, University of Naples Federico II, Italy
Marialuisa Marzullo, University of Naples Federico II, Italy

16:00 - 17:40 *Aula Morandi*
Session 8.2 - SPECIAL EVENT - PsychoBit - Part III
Chairs: Michela Ponticorvo, *University of Naples Federico II, Italy*
Nicola Milano, *University of Naples Federico II, Italy*
Raffaella Esposito, *University of Naples Federico II, Italy*

16:00 **The Effect of Performance Features of Telepresence Robots on Personality Perception of Their Users**
Ali Asadi, University of Southern Denmark, Denmark
Kerstin Fischer, University of Southern Denmark, Denmark

16:20 **An Anthropomorphic Robot With ChatGPT for Learning Activities: The Teachers' Perspective**
Federica Sacco, Università Cattolica del Sacro Cuore, Italy
Antonella Marchetti, Università Cattolica del Sacro Cuore, Italy
Cinzia Di Dio, Università Cattolica del Sacro Cuore, Italy
Federico Manzi, Università Cattolica del Sacro Cuore, Italy
Gisella Rossini, Università Cattolica del Sacro Cuore, Italy
Davide Massaro, Università Cattolica del Sacro Cuore, Italy
Angelo Cangelosi, University of Manchester, United Kingdom
Letizia Aquilino, Università Cattolica del Sacro Cuore, Italy
Luca Raggioli, University of Manchester, United Kingdom

16:40 **Skeleton Timed Up and Go on MARIO Robot**
Alessandra Vitanza, Institute of Cognitive Sciences and Technologies - CNR, Italy
Paolo Pagliuca, Institute of Cognitive Sciences and Technologies - CNR, Italy
Filippo Cantucci, Institute of Cognitive Sciences and Technologies - CNR, Italy
Stefano Nolfi, Institute of Cognitive Sciences and Technologies - CNR, Italy

17:00 **Using Social Scripts in Human-Robot Interaction**
Alessia Fantini, University of Pisa, CNR, Italy
Giovanni Pilato, National Research Council, Italy

17:20 **Mitigating the Negative Effect of Telepresence Robots via an Empathy-Eliciting Robot Moderator**
Ali Asadi, University of Southern Denmark, Denmark
Erica Chinzer, University of Naples Federico II, Italy
Davide Marocco, University of Naples Federico II, Italy
Kerstin Fischer, University of Southern Denmark, Denmark

16:00 - 17:40 *Aula A*
Session 8.3 - General Session
Chairs: Parisa Esmaili, *Politecnico di Milano, Italy*
Christian Laurano, *Politecnico di Milano, Italy*

16:00 **Deploying Unsupervised Learning for Daily Activity Windows Analisys in Cancer Patients**
Adriano Tramontano, National Reasearch Council, Italy
Chiara Feoli, University of Naples Federico II, Italy
Oscar Tamburis, National Reasearch Council, Italy
Manuel Conson, University of Naples Federico II, Italy
Francesco Salzano, University of Cagliari, Italy
Mario Magliulo, National Reasearch Council, Italy

16:20 **A Novel Classification Model Based on Radiomics for Narrow Band Imaging in Laryngeal Cancer**
Haiyang Wang, Politecnico di Milano, Italy
Luca Mainardi, Politecnico di Milano, Italy
Francesca Ronchetti, Politecnico di Milano, Italy

16:40 **Training Intelligent Driver State Monitoring Systems: Design and Validation of an Experimental Procedure in a Driving Simulator Environment**
Roberta Presta, University Suor Orsola Benincasa, Italy
Chiara Tancredi, University Suor Orsola Benincasa, Italy
Flavia De Simone, University Suor Orsola Benincasa, Italy
Silvia Chiesa, RE:Lab, Italy
Laura Mancuso, University Suor Orsola Benincasa, Italy
Luca Marino, University Suor Orsola Benincasa, Italy

17:00 **A Modern Approach to Dimensional Inspection by Implementing Annotated 3D Cad Model in a Digital Manufacturing Environment**
Ioan-Liviu Baciu, Hexagon Manufacturing Intelligence, Italy
Claudio Bruzzo, Hexagon Manufacturing Intelligence, Italy
Romano Iazurlo, Leonardo SpA, Italy
Gianluca Rizzi, Leonardo SpA, Italy
Andrea Tarantino, Leonardo SpA, Italy

17:20 **Recognition of Greek Alphabet Characters With Memristive Neuromorphic Circuit**
Theodoros Panagiotis Chatzinikolaou, Democritus University of Thrace, Greece
Ioannis K. Chatzipaschalis, Democritus University of Thrace, Greece
Karolos-Alexandros Tsakalos, Democritus University of Thrace, Greece
Rafailia-Eleni Karamani, Democritus University of Thrace, Greece
Iosif-Angelos Fyrigos, Democritus University of Thrace, Greece
Stavros Kitsios, National Technical University of Athens, Greece
Panagiotis Bousoulas, National Technical University of Athens, Greece
Dimitrios Tsoukalas, National Technical University of Athens, Greece
Georgios Sirakoulis, Democritus University of Thrace, Greece

17:40 - 18:00 *Aula Maggiore*
CLOSING AND AWARD CEREMONY