



2022 IEEE INTERNATIONAL WORKSHOP ON

Metrology for eXtended Reality, Artificial
Intelligence and Neural Engineering

OCTOBER 26-28, 2022

ROME, ITALY



PROGRAM

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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 2022 IEEE International Conference on Metrology for eXtended Reality, Artificial Intelligence, and Neural Engineering (IEEE MetroXRaine 2022).

Complex problems require highly interdisciplinary approaches. Cyber-Physical Human Systems (CPHS) are the new emerging scenarios characterized by the integration of physical and human components in a synthetic hybrid system. In the context of Industry 4.0, the human being not only exercises a defined role in an organization, but becomes part of a highly composite automated system. In industry or in healthcare, the smart machines, non-human components of CPHS, are more and more connected to the physical environment through sensors of all kinds. Thanks to a distributed intelligence, the non-human actors can elaborate information and make decisions, resulting highly empowered by technology innovation. Also humans benefit from the new technological opportunities, by interacting with new-generation user interfaces, they obtain a strengthening of cognitive, sensorial, and motor skills.

The conference event mainly aimed at creating a synergy between experts in eXtended Reality, Brain-Computer Interface, and Artificial Intelligence, with special attention to the measurement.

The organization of this first edition of MetroXRaine 2022 is coordinated by the Ulster University, the University Federico II of Naples, and the University of Salento.

MetroXRaine 2022 Technical Program consists of 140 oral presentations scheduled over three days. Presentations are organized in a Workshop and 26 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, three special events, two panels, a student contest, 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 going to be submitted for publication in the IEEEExplore 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 MDPI Journals: Sensors,

Information, Bioengineering, Clinical Medicine, and Journal of Imaging.

MetroXRaine 2022 is honored to have experts in eXtended Reality, Artificial Intelligence, and Neural Engineering as Invited Speakers:

- Prof. Mariano Alcañiz, from Polytechnic University of Valencia, Spain, will present the first day “How to characterize human cognition using extended reality and cognitive neuroscience: the concept of Extended Reality-based Behavioral Biomarkers (XRBB)?”
- Prof. Gernot Müller-Putz, from the University of Graz, Austria, will present the first day “Movement decoding from non-invasive EEG: a chance for the spinal cord injured?” on October 27.
- Jim Spohrer, from International Society of Service Innovation Professionals (ISSIP), will give a talk on “The Future of AI and IA”, on the last day of the Conference.

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

To recognize the most outstanding paper presented at the annual 2022 *IEEE International Conference on Metrology for eXtended Reality, Artificial Intelligence, and Neural Engineering*, the Best Conference Paper Award sponsored by MDPI BioMedInformatics Journal will be assigned. Other awards will be assigned to the Best Paper presented by a Young Researcher sponsored by Micron, and to the Best Paper Presented by a Woman, this last sponsored by MDPI Sensor Journal. In addition the best PhD Contribution and the Best Poster Awards will be assigned.

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

The 2022 *IEEE the 2022 IEEE International Conference on Metrology for eXtended Reality, Artificial Intelligence, and Neural Engineering* is about to begin. Scientists, technologists, and companies enjoy the Conference!

October 2022

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IEEE MetroXRaine 2022 Keynote Speakers

Plenary Session - Wednesday, October 26, 2022 - H 11:30

How to characterize human cognition using extended reality and cognitive neuroscience: the concept of Extended Reality-based Behavioral Biomarkers (XRBB)

Mariano Alcañiz

UNIVERSITY OF VALENCIA, SPAIN



ABSTRACT

To assess and characterize the different facets of human cognition is a complex challenge with numerous applications. Current assessment tools have limited facility for making ecologically valid predictions; they are based on explicit measures, such as self-report questionnaires, interviews, and projective measures. Effects such as social desirability, data interpretation, and subject knowledge can negatively affect the reliability and validity of these techniques. One of the challenges to be faced in the development of a performance-based methodology to measure cognitive cognition is how to generate real-life situations with triggers that allow us to study the different cognitive dimensions under controlled laboratory conditions. A way to address this question is to take advantage of Extended Reality (XR) to recreate real-life situations that might arise in performance-based assessments. More concretely, it is possible to obtain biomarkers for human cognition classification using a computational psychology paradigm based on implicit brain processes measured through psychophysiological signals and behavior of subjects while exposed to complex social conditions replicas using virtual reality interfaces. This led to a new conceptualization of biomarkers that we have named XR-based Behavioral Biomarkers or XRBB.

In this talk, we introduce the concept of XRBB and present several examples of how XRBB can be used for human cognition assessment. We describe different research projects' results and we conclude with a discussion of potential future implications.

SPEAKER BIO

Mariano Alcañiz, Ph.D., is founding director of the Immersive Neurotechnologies Lab (LabLENI) at UPV and Full Professor (tenure position) of Biomedical Engineering at the Polytechnic University of Valencia.

His general research interests hover around a better understanding and enhancement of human cognition combining insights and methods from computer science, psychology, and neuroscience. His work is centered on using empirical, behavioral science methodologies to explore people as they interact in these digital worlds, but he also engages in research geared towards developing new ways to produce Extended Reality (XR) simulations. Towards this end, he has been involved in projects related to clinical psychology, neurodevelopmental disorders, consumer neuroscience, organizational neuroscience, education and training.



He has published more than 350 academic papers, in interdisciplinary journals such as Scientific Reports and PLoS One, as well domain-specific journals in the fields of biomedical engineering, computer science, psychology, marketing, management, psychology, and education. His work has been continuously funded by the Spanish Research Agency and the European Commission for 30 years.

Plenary Session - Thursday, October 27, 2022 - H 11:00

Movement decoding from non-invasive EEG: a chance for the spinal cord injured?

Gernot Müller-Putz

GRAZ UNIVERSITY OF TECHNOLOGY



ABSTRACT

"Making the paralyzed move" is a dream for many researchers but even more for people suffering from a spinal cord injury (SCI) or other diseases leading to non-functional limbs and therefore a dramatic decrease in quality of life. A lesion in the cervical vertebra lead to dysfunction of breathing and all motoric and sensory functions. The restoration of hand and arm function has been a research topic since the late '90s of the last century. Relatively soon, the ambition of "reading" the intention of movement from brain activity and transferring it into real movement with the help of a brain-computer interface (BCI) emerged.

This talk will introduce the approach of the Graz BCI group how to decode arm/hand movements from non-invasive EEG, starting from movement onset detection, trajectory decoding and error-processing. Detection of hand grasps and differentiation of grasp types will be discussed. A critical discussion on the possibilities and chances for people with spinal cord injury will conclude the talk.

SPEAKER BIO

Prof. Dr. **Gernot Müller-Putz** is head of the Institute of Neural Engineering and its associated Laboratory of Brain-Computer Interfaces. He received his MSc in electrical and biomedical engineering in 2000, his PhD in electrical engineering in 2004 and his habilitation and "venia docendi" in medical informatics from Graz University of Technology in 2008.

Since 2014 he is full professor for semantic data analysis. He has gained extensive experience in the field of biosignal analysis, brain-computer interface research, EEG-based neuroprosthesis control, communication with BCI in patients with disorders of consciousness, hybrid BCI systems, the human somatosensory system, and BCIs in assistive technology over the past 21 years. He has also managed several national projects (State of Styria) and international projects (Wings for Life, EU Projects). Recently, he coordinated an EU Horizon 2020 project, MoreGrasp. Furthermore, he organized and hosted seven international Brain-Computer Interface Conferences over the last 15 years in Graz, the 8th Conference in Sept. 2019.

He is Associate Editor of IEEE Transactions in Biomedical Engineering and Associate Editor of the Brain-Computer Interface Journal. He has authored more than 185 peer reviewed publications and more than 200 contributions to conferences which were cited more than 19400 times (h-index 70).

In 2015, he was awarded with an ERC Consolidator Grant "Feel your Reach" from the European Research Council. In May 2017 he received the Ludwig-Guttman Award from the German Medical Spinal Cord Injury Association (DMGP). In May 2018 he was elected into the Board of Directors of the International Brain-Computer Interface Society. In May 2019 he received the science prize of the state of Styria. Since August 2019 he is Editor in Chief of Frontiers in Human Neuroscience: Brain-Computer Interface.

Plenary Session - Friday, October 28, 2022 - H 11:00

The Future of AI and IA

Jim Spohrer

INTERNATIONAL SOCIETY OF SERVICE INNOVATION PROFESSIONALS



ABSTRACT

This talk explores the future of Artificial Intelligence (AI) and Intelligence Augmentation (IA). First, a roadmap for solving AI is proposed. Second, an approach to measuring IA is suggested. Finally, the importance of trust, purpose, and human values are examined as "reality" is extended for populations of evolving responsible entities learning to invest systematically in becoming better future versions of themselves.

SPEAKER BIO

Jim Spohrer is a student of service science and open-source, trusted AI. He is a retired IBM executive, who is a member of the Board of Directors of the non-profit International Society of Service Innovation Professionals (ISSIP). At IBM, he served as Director for Open Source AI/Data, Global University Programs, IBM Almaden Service Research, and CTO IBM Venture Capital Relations Group. At Apple, he achieved Distinguished Engineer Scientist Technologist (DEST) for authoring and learning platforms. After MIT (BS/Physics), he developed speech recognition systems at Verbex (Exxon), then Yale (PhD/Computer Science AI). With over ninety publications and nine patents, awards include AMA ServSIG Christopher Lovelock Career Contributions to the Service Discipline, Evert Gummesson Service Research, Vargo-Lusch Service-Dominant Logic, Daniel Berg Service Systems, and PICMET Fellow for advancing service science. In 2021, Jim was appointed a UIDP Senior Fellow (University-Industry Demonstration Partnership).

IEEE MetroXRaine 2022 Tutorials

Tutorial - Wednesday, October 26, 2022 - H 12:30

Design and deployment of interoperable deeply quantized neural networks for in-sensor and micro-controller computing

Davide Denaro
STMICROELECTRONICS



ABSTRACT

Balancing storage, efficient computing, accuracy, mapping to silicon and power consumption is a challenge when trying to use low bit-depth neural network. Case studies encompassing anomaly detector and classifier model design are complex tasks if neural networks are investigated targeting ultra-low power devices such as sensors and microcontrollers. Deeply Quantized Neural Networks (DQNNs) offer the most interesting approach to these tasks. The design and the training of DQNN also is not a trivial task. Unfortunately, current off the shelf microcontrollers are not yet able to exploit their potentialities. Realization of custom energy efficient hardware accelerators sometime may represent a viable alternative in terms of energy efficiency, especially applied to a raising field such as in-sensing neural computing. Hybrid Neural Networks variants developed with experimental deep learning tools, can achieve interesting accuracies compared to more traditional design approaches. In this talk all those aspects will be discussed with reference to latest efforts of ST including a) tools for efficient deployment on micro controllers for image processing b) custom ultra-low power hardware circuitry for real-time execution of the Hybrid Neural Network with traditional CMOS technologies and implemented with field-programmable gate array, c) latest ST solutions for in sensor deep learning computing. Part of the talk will include associated demo and code inspection.

SPEAKER BIO

Davide Denaro joined STMicroelectronics since 2004 after working for various IT companies. He was engaged in numerous research projects in the Computer Vision, Wearables and IoT domains. Currently He is Senior Software Designer Engineer in the Artificial Intelligent Software and Tools Group. He got master degree in Computer Science at Università degli Studi di Catania.

Tutorial - Thursday, October 27, 2022 - H 14:40

Real-Time EEG Streaming with *Helmate*

Marco Nalin
ab medica



ABSTRACT

EEG is traditionally used in medicine as a diagnostic tool for some neurological disorders, including epilepsy, brain tumor, strokes, brain damages, etc. However, in recent years many research works have proven that EEG can be used also for innovative applications, including (but not limiting to) Brain Computer/Machine Interfaces (including robotic artifacts), neurofeedback training and mindfulness exercises, mood/emotion recognition and assessment, patient engagement monitoring. Despite the huge amount of work, such applications of EEG in real life are still significantly limited by the complexity of the setup of an EEG, creating a gap between the research domain and the existence of products on the market. Some solutions appeared, but many of them are not certified medical devices, thus limiting the acceptance from healthcare professionals.

Ab medica offers a wireless wearable EEG monitor, called *Helmate*, working with dry electrodes. *Helmate* provides data from 8 channels (sampling at 512 or 1024Hz), which can be configured in 10 different positions compatible with the 10/20 standard. The device is also CE certified as medical device in class IIA, including the compliance with the IEC 60601-1-11, which allows for the device to be used in home environment. Thanks to its characteristics, the device can be setup in a few minutes and be used in real life conditions, without the limitations of being connected to a computer through cables or the need to wear a backpack to carry the amplifier.

The tutorial will demonstrate the use of the device, the processing, tagging and filtering of the signal, and the extraction of the data stream in real time, for integration with external softwares.

SPEAKER BIO

Marco Nalin received his M.Sc. in Electronic Engineering at the University of Padova, Italy, in 2005. From 2004 to 2012 he worked at San Raffaele Hospital, in the "e-Services for Life and Health" department. From 2013 to 2020 he worked as Program Manager in the R&D department of the telemedicine company Telbios, in Milan. His role was cooperating and coordinating several tele-medicine related projects, mostly funded by the European Commission. Since December 2020 he's Program Manager in the R&D team of *ab medica*. His research interests include personal health systems, mobile health, neuroscience, wellbeing and disease prevention, cognitive robotics and edutainment, surgery robotics, cloud computing, privacy and security.

Tutorial - Friday, October 28, 2022 - H 14:40

Immersive Training & Simulation for Electronic Equipment

Salvatore D'Onofrio
LEONARDO



ABSTRACT

In the last decade, the Virtual Reality (VR) is emerged as a potentially disruptive technology capable to immerse a user within a virtual environment in order to interact with virtual object generated by a computer. The recent developments of low costs VR technologies and Mixed Reality (MR) devices, such as Google Glass, Microsoft Hololens, Vuzix and many others, are capturing interest of users and researchers, suggesting that VR/MR could be the next springboard for technological innovation as also highlighted its inclusion as enabling technology of Industry 4.0 paradigm.

Leonardo has developed the MORPHEUS-XR that is an innovative suite of applications that is able to provide a revolutionary approach to training by using an extended reality environment in which the users can interact with the virtual mock-up of the unit composing a complex system.

It is an interesting solution to satisfy highly standardized procedures and complex tasks, allowing both instructors and operators to have access to increasingly complex and varied contents in which simulations and simulators play a great role.

It makes use of Head Mounted Display components integrated with a very high performance workstation to realize an easy way to familiarize with systems and its components in order to perform both operative and maintenance procedures in a virtual simulated scenario.

The tutorial will demonstrate the use of MORPHEUS-XR by showing a training use case about the maintenance of an electronic equipment.

SPEAKER BIO

Salvatore D'Onofrio received his PhD in Computer Science at the University of Sannio in 2007. He is currently a CTO member of Leonardo, a leading company in the Aerospace, Defense and Security sector, where he is mainly involved in R&D activities focused on Virtual / Mixed Reality and Modelling & Simulation technologies, applied to training and maintenance.

He has published more than 20 papers in IEEE journals and conference proceedings, concerning the copyright protection of digital images and videos and some papers in Leonardo scientific journals concerning virtual reality technologies and cloud computing.

In 2018 he received the Leonardo innovation award for a support and training project through mixed reality.

IEEE MetroXR AINE 2022 Dx4health

Wednesday, October 26, 2022 - H 09:30



Organizzazione delle Nazioni Unite per l'Educazione, la Scienza e la Cultura

- Cattedra UNESCO "Educazione alla salute e allo sviluppo sostenibile",
- Università degli Studi di Napoli Federico II, Napoli (Italia)



Designing, testing and implementing innovative solutions for health in the framework of the twin transitions: challenges and enablers

There are a number of challenges we face that require a collaborative effort across strategic international, national and local levels, and need to be paralleled by an interdisciplinary approach aimed at overcoming the knowledge silos that hinder the adoption of innovative solutions that already proved their effectiveness. Indeed, still there are organizational, technological, administrative bottlenecks blocking the transfer and scale-up of innovations into services that can generate medium and long term return on the well-being of people and the functioning of economies and societies.

The RSCN, NET4Age-Friendly and ProMIS networks have been developing a collaboration to build valuable synergies between different knowledge fields towards establishing new local and regional ecosystems and promote the growth of existing ones in Europe, working in health and well-being towards an age-friendly digital world.

CIRIAPA and CIRMIS Unina interdepartmental Centers have been collaborating to support interdisciplinary activities for the digital transformation of health and care.

The aim of this workshop is to share experiences and good practice concepts with the METROXR AINE community of stakeholders, to foster their engagement in collaborative activities and contribute to drive forward the twin transitions: digital and environmental.

09:30 - 10:45 CEST

INTRODUCTORY SESSION

Moderator: Maddalena Illario, Federico II University and Hospital, NET4Age-Friendly COST Action

09:30 Welcome and introduction

Maria Triassi, Pasquale Arpaia and Guido Iaccarino, *Federico II University*, Annamaria Colao, *Federico II UNESCO Chair*, Arturs Mietulis, *Science division, World Health Organization Headquarters in Geneva*

09:45 Innovative responses to global challenges and threats: mHealth Hub experience

Arturs Mietulis, *Science division, WHO Headquarters, Geneva*

09:55 The opportunities of the digital transformation of health and care towards 2030

Irina Calderon, *European Commission DG CNCT*

10:05 NET4Age-Friendly Community: implementing Smart Health Age-Friendly Environments (SHAFE)

Carina Dantas, *SHINE 2Europe, NET4Age-Friendly, SHAFE Network*

10:15 Building synergies in the digital transformation of health and care: opportunities arising in the ARUA African network

Pasquale Maffia, *University of Glasgow*

10:25 From urban districts to eco-districts: artificial intelligence and data sharing to improve the impact of the built environment

Mario Losasso, *Federico II University*

10:45 Discussion & question time

10:45 - 11:30

Coffee break & networking

11:30 - 12:30 CEST

WORKING SESSION 1 - The Technology perspective

Moderator: John Farrell, RSCN

11:30 Knowledge mapping in a complex domain: the SHAFE challenge

Pedro Roseiro, *National Portuguese ICT Cluster -TICE, NET4Age-Friendly COST Action*

11:40 Knowledge engineering in digital healthcare ecosystems

Antonio Rinaldi, *Federico II University*

11:50 Sensing solutions for independent ageing

Bruno Andò, *University of Catania*

12:00 Integrating health and environmental monitoring: RADAR innovative approach to contrast AMR

Ion Arrizabalaga, *Agencia de Qualitat I Avaluació Sanitàries de Catalunya*

12:10 3D Community Aware Virtual Spaces as Smart Living Environments for Physical Activity and Rehabilitation

Hugo Paredes, *INES-TEC, Porto*

12:20 Discussion & question time

12:30 - 14:30

Lunch break

14:30 - 15:30 CEST

WORKING SESSION 2 - The Organizational perspective

Moderators: Simona Pestina, *ITU*; Cristina Mele, *Federico II DEMI*

14:30 Ethics & privacy in the digital world

Francisco Florez-Revuelta, *University of Alicante, Chair COST Action GoodBrother*

14:40 The evolution of professional identity in the twin transitions

Lorenzo Mercurio, *Federico II University*

14:50 The social elements and stakeholders engagement: the experience of “Viva gli Anziani”

Giuseppe Liotta, *Tor Vergata University*

15:00 Exploiting innovative solutions to strengthen integrated approach to community care and cure service provision

Alberto Pilotto, *EO Galliera*

15:10 Discussion & question time

15:30 - 16:00

Coffee break & networking

16:00 - 17:00 CEST

WORKING SESSION 3 - The Education and Training perspective

Moderator: John Farrell, *RSCN*

16:00 Addressing the challenge of interdisciplinarity in the academia

Pasquale Arpaia, *Federico II University*

16:10 Which use for new digital tools and e-didactics in the Health Systems

Paolo Michelutti, *Italian Ministry of health/national agency for regional health systems*

- 16:20 Good practice models to enable the process of learning during continuous interdisciplinary professional development perspective towards digital transformation**
Regina Roller-Wirnsberger, *Graz University*
- 16:30 The viewpoint of the students: balancing in-person and web-based value of training and education**
Antonino Esposito, *Federico II Medical Students Representative*
- 16:40 Discussion & question time**
- 16:50 Final remarks**
John Farrell, *RSCN*

Thursday, October 27, 2022 - H 15:00

Hands on interdisciplinary laboratory

The aim of the interdisciplinary laboratory is to provide an opportunity for knowledge exchange on the scale-up experiences of innovative solutions carried out by the quadruple helix innovation ecosystems of the european Reference Sites for Active and Healthy Ageing. An overview of the organisation of the RSCN network along the quadruple helix of innovation will be provided, sharing enablers, bottlenecks and perspectives for knowledge exchange. During the event, there will be an opportunity for a "hands on" activity aimed at the simulated implementation of a technology in the real setting of health services with a person-centred approach.

15:00 - 17:30 CEST

Hands on interdisciplinary laboratory

Chairs: Maddalena Illario, John Farrell, Antonio Esposito, Pasquale Arpaia

Introductory speech

Arturs Mietulis, *Digital Health and Innovation, WHO Europe*

15:00 Part 1: Intro session

Presentation of the RS model and by 4 Reference Sites of challenges they are facing in the journey of digital transformation of health and care.

RSCN illustrates the quadruple helix model and how it should work. Each focuses on a specific challenge.

- Reference Site Madrid. Ana Miquel
- Reference Site Scotland. Andrea Pavlickova
- Reference Site Three Revers Food Delta. Edwig Goossens
- Reference Site Thessaloniki. Despoina Mantziari

15:30 Part 2: Innovation session

Several **examples** of types of solutions that might be suitable will be presented by Federico II engineering students, that could be adapted/adopted/scaled up.

- Solution 1: Andrea Zingoni, Tuscia University
- Solution 2: Vincenzo Moscato, Federico II University
- Solution 3: Carina Dantas. Shine2Europe.
- Solution 4: Leandro Donisi, Giuseppe Cesarelli, Federico II University

16:00 Part 3: 4 Break-down sessions

Participants will be split in 4 separated sessions, each including one of the 4 RS expert and picking up 1 of the 4 challenges

The role play will consist of simulating the adaptation, adoption and scale-up of one or more solutions to address by “representatives” of the 4 helix of RS.

The Blueprint “persona” methodology will be shared with PhD students before the meeting.

Support printed materials will be provided (persona templates, quadruple helix tables etc).

17:00 Part 3: Presentation of results in plenary session by a student-rapporteur

The rapporteurs will also include a focus on bottlenecks and enablers elements to adaptation, adoption and scale-up.

17:30 Final Considerations

Maddalena Illario, John Farrell, Antonio Esposito, Pasquale Arpaia



Cattedra UNESCO "Educazione alla salute e allo sviluppo sostenibile",
Università degli Studi di Napoli Federico II,
Napoli (Italia)



IEEE MetroXRaine 2022 Venue

IEEE MetroXRaine 2022 will take place at the **Italian National Research Council Headquarters**, Piazzale Aldo Moro 7, Roma. The entrance is in Via dei Marrucini (on the left of the main entrance)



Reach the Venue

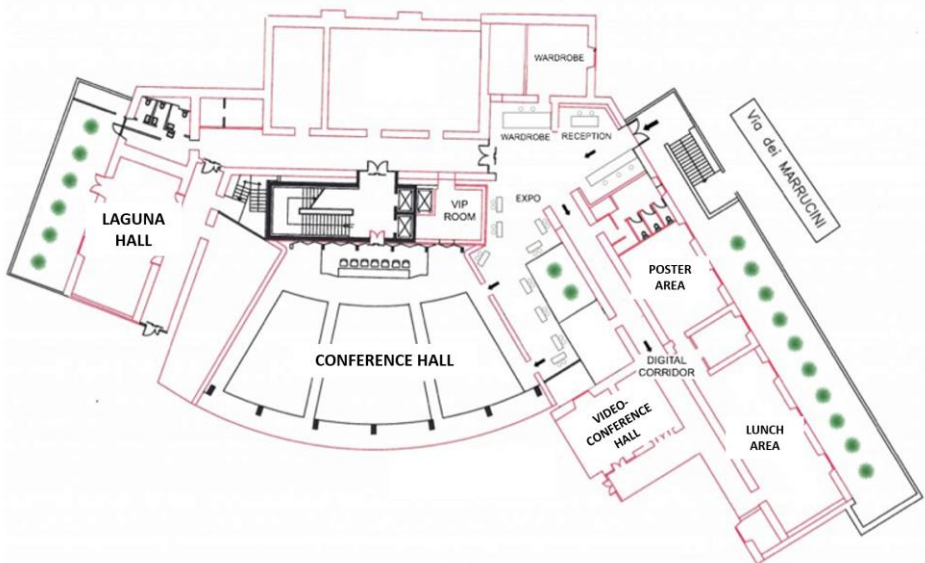
**National Research Council
Headquarters**

Piazzale Aldo Moro, 7
Roma

CONFERENCE HALLS

IEEE MetroXRaine 2022 Technical Sessions will be held in the following Rooms:

- Conference Hall
- Marconi Hall (First Floor)
- Laguna Hall
- Video-Conference Hall



IEEE MetroXR AINE 2022 Social Events

WELCOME PARTY

Wednesday, October 26, 2022

H 19:00

The IEEE MetroXR AINE 2022 Welcome Party will be held at **Taverna de Pasquino** - Piazzale Tiburtino, 17 - Roma. Taverna de Pasquino is about 8 minutes walking from the Conference Venue.



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GALA DINNER

Thursday, October 27, 2022

H 20:00

The Gala Dinner will be held at Restaurant **Lo Scoglio di Frisio** - Via Merulana, 256 - Roma. The restaurant is about 20 minutes walking from the Conference Venue. The closest metro stop is "Vittorio Emanuele".



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IEEE MetroXRINE 2022 Patronages



IEEE MetroXRaine 2022 Sponsors



Program Schedule - Wednesday, October 26

WEDNESDAY, OCTOBER 26				
09:00 - 09:30	OPENING CEREMONY - <i>Conference Hall</i>			
	Conference Hall	Marconi Hall	Laguna Hall	Videoconference Hall
09:30 - 11:10	Session 1.1 Artificial intelligence, machine learning and computer vision in healthcare	Session 1.2 Instrumentation and Measurement for Battery-powered XR headsets and neural interfaces	Session 1.3 SPECIAL EVENT - Digital for Health - PART 1	Session 1.4 User Performance Assessment/Measurement in XR
11:10 - 11:30	COFFEE BREAK / DEMO SESSION			
11:30 - 12:30	KEYNOTE SPEAKER - Mariano Alcañiz, University of Valencia How to characterize human cognition using extended reality and cognitive neuroscience: the concept of Extended Reality-based Behavioral Biomarkers (XRBB) <i>Conference Hall</i>			
12:30 - 13:20	TUTORIAL - Davide Denaro, STMicroelectronics Design and deployment of interoperable deeply quantized neural networks for in-sensor and micro-controller computing <i>Conference Hall</i>			
13:20 - 14:30	LUNCH / POSTER SESSION #1			
	Conference Hall	Marconi Hall	Laguna Hall	Videoconference Hall
14:30 - 16:10	Session 2.1 eXtended Reality as a gateway to the Metaverse: Practices, Theories, Technologies and Applications	Session 2.2 Motor Imagery - based Brain-Computer Interfaces: improving user performance to go beyond the laboratory	Session 2.3 SPECIAL EVENT - Digital for Health - PART 2	Session 2.4 Ultra-low-power data sensing and processing based on artificial intelligence technologies
16:10 - 16:30	COFFEE BREAK / DEMO SESSION			
16:30 - 17:50	Session 3.1 Human bodily perception. Enhanced dimensions for eXtended Reality and neural engineering	Session 3.2 Artificial Intelligence, Metrology and eXtended Reality for Criminal Investigation and Forensic Science	Session 3.3 SPECIAL EVENT - Digital for Health - PART 3	Session 3.4 Anomaly detection on Cyber Physical Systems
19:00	WELCOME PARTY - Taverna de Pasquino			

Program Schedule - Thursday, October 27

THURSDAY, OCTOBER 27				
	Conference Hall	Marconi Hall	Laguna Hall	Videoconference Hall
09:00 - 10:40	Session 4.1 Machine learning analysis and simulation approaches for biomedical engineering - PART 1	Session 4.2 PANEL - Res4NET	Session 4.3 SPECIAL EVENT - Psychobit - PART 1	
10:40 - 11:00	COFFEE BREAK / DEMO SESSION			
11:00 - 12:00	KEYNOTE SPEAKER - Gernot Müller-Putz, Graz University of Technology Movement decoding from non-invasive EEG: a chance for the spinal cord injured? <i>Conference Hall</i>			
	Conference Hall	Marconi Hall	Laguna Hall	Videoconference Hall
12:00 - 13:40	Session 5.1 Machine learning analysis and simulation approaches for biomedical engineering - PART 2	Session 5.2 PANEL - WIE Italy Section AG	Session 5.3 SPECIAL EVENT - Psychobit - PART 2	
13:40 - 14:40	LUNCH / POSTER SESSION #2			
14:40 - 15:30	TUTORIAL - Marco Nalin, ab medica Real-Time EEG Streaming with Helmate <i>Conference Hall</i>			
15:30 - 15:50	COFFEE BREAK / DEMO SESSION			
	Conference Hall	Marconi Hall	Laguna Hall	Videoconference Hall
15:50 - 17:30	Session 6.1 Immersive Teleoperation and Medical AI	Session 6.2 Biosignal-based Measurements of Mental States	Session 6.4 SPECIAL EVENT - Digital for Health - Lab Activity	Session 6.3 Metrological methods and results on eXtended Reality, Artificial Intelligence and Neural Engineering in Healthcare
20:00	GALA DINNER - Lo Scoglio di Frisio Restaurant			

Program Schedule - Friday, October 28

FRIDAY, OCTOBER 28				
	Conference Hall	Marconi Hall	Laguna Hall	Videoconference Hall
09:00 - 10:40	Session 7.1 AI-enabled solutions for e-health and value-cocreation	Session 7.2 Legal aspects on Science & Society in Brain Computer Interface	Session 7.3 Neural Data Contest - PART 1	Session 7.4 SPECIAL EVENT - Bitscope - PART 1
10:40 - 11:00	COFFEE BREAK / DEMO SESSSION			
11:00 - 12:00	KEYNOTE SPEAKER - Jim Spohrer, International Society of Service Innovation Professionals The Future of AI and IA <i>Conference Hall</i>			
	Conference Hall	Marconi Hall	Laguna Hall	Videoconference Hall
12:00 - 13:40	Session 8.1 Sensors, Extended Reality and Artificial Intelligence for Human Behavior Analysis	Session 8.2 Soft Sensors for Industry 4.0	Session 8.3 Neural Data Contest - PART 2	Session 8.4 SPECIAL EVENT - Bitscope - PART 2
13:40 - 14:40	LUNCH / POSTER SESSION #3			
14:40 - 15:30	TUTORIAL - Salvatore D'Onofrio, Leonardo Immersive Training & Simulation for Electronic Equipment <i>Conference Hall</i>			
15:30 - 15:50	COFFEE BREAK / DEMO SESSSION			
	Conference Hall	Marconi Hall	Laguna Hall	Videoconference Hall
15:50 - 17:30	Session 9.1 Intrinsic Uncertainty in EEG-based Passive Brain Computer Interface (BCI)	Session 9.2 Effective brain-computer interfaces based on active paradigms and extended reality	Session 9.3 Ph.D. Forum	Session 9.4 From Artificial Intelligence to Extended Reality for Emergency and Disaster Management
17:30 - 17:50	CLOSING AND AWARD CEREMONY <i>Conference Hall</i>			

Technical Program - Wednesday, October 26

08:30 - 17:00

REGISTRATION

Room: Foyer

09:00 - 09:30 CEST

OPENING SESSION - WELCOME ADDRESSES

Room: Conference Hall

09:30 - 11:10 CEST

Session 1.1 - Artificial intelligence, machine learning and computer vision in healthcare

Room: Conference Hall

Chairs: Esteban José Palomo, *University of Málaga, Spain*

Andrea Apicella, *University of Naples Federico II, Italy*

09:30 Deep Learning Model for Blood Pressure Estimation From PPG Signal

Minseong Kim, Electronics and Telecommunications Research Institute, Korea

Hyeonjeong Lee, Electronics and Telecommunications Research Institute, Korea

Kwang-Yong Kim, Electronics and Telecommunications Research Institute, Korea

Kyu Hyung Kim, Electronics and Telecommunications Research Institute, Korea

09:50 CASPAR: Cloud-Based Alzheimer's, Schizophrenia and Parkinson's Automatic Recognizer

Selene Tomassini, Università Politecnica delle Marche, Italy

Paolo Sernani, Università Politecnica delle Marche, Italy

Nicola Falcionelli, Università Politecnica delle Marche, Italy

Aldo F. Dragoni, Università Politecnica delle Marche, Italy

10:10 Sign Detect: An App to Detect Sign Language

Dhruvisha Vikas Mondhe, University of Mumbai, India

Rutuja Patil, University of Mumbai, India

Vaishnavi Jadhav, University of Mumbai, India

Priyal Agarwal, University of Mumbai, India

Lifna Challissery Samu, University of Mumbai, India

10:30 Pneumonia Detection in Chest X-Ray Images Using Convolutional Neural Networks

Esteban J. Palomo, University of Malaga, Spain

Miguel Zafra-Santisteban, University of Malaga, Spain

Rafael M. Luque-Baena, University of Malaga, Spain

10:50 Stenosis Detection in Coronary Angiography Images Using Deep Learning Models

Rafael M. Luque-Baena, University of Malaga, Spain
Irene Romero-Granados, University of Malaga, Spain
[Ariadna Jiménez-Partinen, University of Malaga, Spain](#)
Esteban J. Palomo, University of Malaga, Spain
Manuel Jiménez-Navarro, Hospital Universitario Virgen de la Victoria, Spain

09:30 - 11:10 CEST

Session 1.2 - Instrumentation and Measurement for Battery-powered XR headsets and neural interfaces

Room: Marconi Hall

Chairs: Loredana Cristaldi, *Politecnico di Milano, Italy*

Emil Petkovski, *Politecnico di Milano, Italy*

09:30 [INVITED] Data-Driven Parameter Identification of an Electrochemical Model for Lithium-Ion Batteries With Artificial Intelligence

[Weihan Li, Hüttenstr. 5, Institute for Power Electronics and Electrical Drives, RWTH Aachen University, Germany](#)

Dirk Sauer, RWTH Aachen, Germany

10:10 Automated Test Equipment for Battery Characterization: A Proposal

Silvia Colnago, Politecnico di Milano, Italy

Marco Faifer, Politecnico di Milano, Italy

[Emil Petkovski, Politecnico di Milano, Italy](#)

Luigi Piegari, Politecnico di Milano, Italy

10:30 An Application of Failure Modes, Effects and Criticality Analysis (FMECA) Method to the Assessment of Battery Life Cycle

Loredana Cristaldi, Politecnico di Milano, Italy

[Elena Molena, Politecnico di Milano, Italy](#)

Emil Petkovski, Politecnico di Milano, Italy

10:50 State of Health Analysis for Lithium-Ion Batteries Considering Temperature Effect

Farzaneh Lashgari, Politecnico di Milano, Italy

[Emil Petkovski, Politecnico di Milano, Italy](#)

Loredana Cristaldi, Politecnico di Milano, Italy

09:30 - 10:45 CEST

Session 1.3 - Designing, testing and implementing innovative solutions for health in the framework of the twin transitions: challenges and enablers

Room: Laguna Hall

Moderator: Maddalena Illario, *Federico II University and Hospital, NET4Age-Friendly COST Action*

09:30 Welcome and introduction

Maria Triassi, Pasquale Arpaia and Guido Iaccarino, *Federico II University*, Arturs Mietulis, *WHO-Europe Headquarters*

MODERATOR: Maddalena Illario, *Federico II University and Hospital*, *NET4Age-Friendly COST Action*

09:45 Innovative responses to global challenges and threats: mHealth Hub experience

Arturs Mietulis, *Digital Health and Innovation, WHO Europe Headquarters*

09:55 The opportunities of the digital transformation of health and care towards 2030

Irina Calderon, *European Commission DG CNCT*

10:05 NET4Age-Friendly Community: implementing Smart Health Age-Friendly Environments (SHAFE)

Carina Dantas, *SHINE 2Europe*, *NET4Age-Friendly, SHAFE Network*

10:15 Building synergies in the digital transformation of health and care: opportunities arising in the ARUA African network

Pasquale Maffia, *University of Glasgow*

10:25 From urban districts to eco-districts: artificial intelligence and data sharing to improve the impact of the built environment

Mario Losasso, *Federico II University*

10:45 Discussion & question time

09:30 - 11:10 CEST

Session 1.4 - User Performance Assessment/Measurement in XR

Room: Video-Conference Hall

Chairs: Joseph Gabbard, *Virginia Tech, US*

Antonio Uva, *Politecnico di Bari, Italy*

09:30 Investigating the Effects on User Performance and Perceived Workload of Environmental Noise in Immersive Virtual Reality

Vito Modesto Manghisi, Polytechnic University of Bari, Italy

Francesco Martellotta, *Polytechnic University of Bari, Italy*

Alessandro Evangelista, *Polytechnic University of Bari, Italy*

Claudia Giliberti, *Inail, Italy*

Raffaele Mariconte, *Inail, Italy*

Maurizio Diano, *Inail, Italy*

Valerio Galasso, *Inail, Italy*

Antonio Emmanuele Uva, *Polytechnic University of Bari, Italy*

09:50 A Comprehensive UX Index to Evaluate Industrial Tasks From a Human-Centered Perspective

Riccardo Karim Khamaisi, University of Modena and Reggio Emilia, Italy

Fabio Grandi, *University of Modena and Reggio Emilia, Italy*

Elisa Prati, University of Modena and Reggio Emilia, Italy
Margherita Peruzzini, University of Modena and Reggio Emilia, Italy
Marcello Pellicciari, University of Modena and Reggio Emilia, Italy

10:10 Augmented Reality for Assembly Operation Training: Does Immersion Affect the Recall Performance?

Andrea Generosi, Università Politecnica delle Marche, Italy
Thomas Agostinelli, Università Politecnica delle Marche, Italy
Maura Mengoni, Università Politecnica delle Marche, Italy
Silvia Ceccacci, University of Macerata, Italy

10:30 Assist the VR Trainer - Real-Time Dashboard and After-Action Review for Police VR Training

Markus Murtinger, USECON GmbH, AIT Austrian Institute of Technology GmbH, Austria
Jakob C Uhl, AIT Austrian Institute of Technology GmbH, Austria
Helmut Schrom-Feiertag, AIT Austrian Institute of Technology GmbH, Austria
Quynh Nguyen, AIT Austrian Institute of Technology GmbH, Austria
Birgit Harthum, USECON GmbH, Austria
Manfred Tscheligi, University of Salzburg, AIT Austrian Institute of Technology GmbH, Austria

10:50 Quantifying User Behaviour in Multisensory Immersive Experiences

Reza Amini Gougeh, INRS-EMT, University of Québec, Canada
Belmir J. de Jesus Jr., INRS-EMT, University of Québec, Canada
Marilyn Karla Soares Lopes, INRS-EMT, University of Québec, Canada
Marc-Antoine Moineau, INRS-EMT, University of Québec, Canada
Walter Schubert, INRS-EMT, University of Québec, Canada
Tiago Falk, INRS-EMT, University of Québec, Canada

11:10 - 11:30

COFFEE BREAK

Room: Room Polifunzionale / Room 3D / Foyer

11:10 - 11:30

DEMO SESSION 1.1

Room: Foyer

Chair: Nicola Moccaldi, *University of Naples Federico II, Italy*

Interactive Augmented Reality loaded pallet shape checking experience

Alessandro Luchetti, University of Trento, Italy

HappyFeat, an interactive and efficient BCI Framework (for clinical applications)

Arthur Desbois, Paris Brain Institute / INRIA

11:30 - 12:30 CEST

PLENARY SESSION

Room: Conference Hall

Chair: Marco Sacco, *National Research Council, Italy*

How to characterize human cognition using extended reality and cognitive neuroscience: the concept of Extended Reality-based Behavioral Biomarkers (XRBB)

Mariano Alcañiz, *University of Valencia*

11:30 - 12:30 CEST

Working sessions: Addressing the challenges for person-centered and technology-supported services. Working session 1: The technology perspective

Room: Laguna Hall

Moderator: John Farrell, *RSCN*

11:30 Process mapping for complex systems: the ontology challenge

Pedro Roseiro, *National Portuguese ICT Cluster -TICE, NET4Age-Friendly COST Action*

11:40 Knowledge engineering in digital healthcare ecosystems

Antonio Rinaldi, *Federico II University*

11:50 Sensing solutions for independent ageing

Bruno Andò, *University of Catania*

12:00 Integrating health and environmental monitoring: RADAR innovative approach to contrast AMR

Ion Arrizabalaga, *Agencia de Qualitat i Avaluació Sanitàries de Catalunya*

12:10 Discussion & question time

12:30 - 13:20 CEST

TUTORIAL SESSION

Room: Conference Hall

Chair: Aldo Franco Dragoni, *Università Politecnica delle Marche, Italy*

Design and deployment of interoperable deeply quantized neural networks for in-sensor and micro-controller computing

Davide Denaro, *STMicroelectronics*

13:20 - 14:30

LUNCH

Room: Room Polifunzionale / Room 3D / Foyer

14:00 - 14:30

POSTER SESSION #1

Chairs: Oscar Tamburis, *National Research Council of Italy*

Egidio De Benedetto, *University of Naples Federico II, Italy*

Room: Room Polifunzionale / Room 3D / Foyer

PS-1 A Study of Synchronization Deviation Between Vision and Haptic in Multi-Sensorial Extended Reality

Zheng Li, Fuzhou University, China
Xiabin Yuan, Fuzhou University, China
Yijing Chen, Fuzhou University, China
Siyan Xie, Fuzhou University, China
Liangkai Li, Fuzhou University, China
Yi An, Fuzhou University, China
Yinheng Lin, Fuzhou University, China
Zhijun Zhao, Fuzhou University, China
Joseph Timoney, Maynooth University, Ireland
Ting Bi, Maynooth University, Ireland

PS-2 The Metaverse - A Universe of Human Digital Clones

Sherwin S Jaleel, IBM, United Kingdom

PS-3 The Impact of Ankle-Foot Orthosis on Walking Features of Drop Foot Patients

Federica Amitrano, University of Naples Federico II, Italy
Armando Coccia, University of Naples Federico II, Italy
Giuseppe Cesarelli, University of Naples Federico II, Italy
Leandro Donisi, University of Naples Federico II, Italy
Gaetano Pagano, ICS Maugeri SB, Italy
Mario Cesarelli, University of Naples Federico II, Italy
Giovanni D'Addio, ICS Maugeri SB, Italy

PS-4 Virtual Reality User-Scene Interaction: Head-Rotation Versus Joystick Movements

Salvatore Livatino, University of Hertfordshire, United Kingdom
Alessandro Zocco, Elettronics Group (ELT), Italy
Yasir Iqbal, University of Hertfordshire, United Kingdom
Phillip Gainley, University of Hertfordshire, United Kingdom
Giuseppe Morana, University of Hertfordshire, United Kingdom
Giovanni Maria Farinella, University of Catania, Italy

PS-5 Detecting Cognitive Decline Using a Novel Doodle-Based Neural Network

Connor Pearson, University of East Anglia, United Kingdom
Beatriz de la Iglesia, University of East Anglia, United Kingdom
Saber Sami, University of East Anglia, United Kingdom

PS-6 EEG Features of the Interaction Between Sense of Agency and Body Ownership: A Motor Imagery BCI Case Study

Pasquale Arpaia, University of Naples Federico II, Italy
Mariano D'Angelo, Karolinska Institutet, Sweden

Giovanni D'Errico, Politecnico di Torino, Italy
 Lucio Tommaso De Paolis, University of Salento, Italy
 Antonio Esposito, University of Naples Federico II, Italy
 Sabrina Grassini, Politecnico di Torino, Italy
 Nicola Moccaldi, University of Naples Federico II, Italy
 Angela Natalizio, Politecnico di Torino, Italy
 Benito Luigi Nuzzo, University of Salento, Italy

PS-7 Medical Imaging: Artificial Intelligence (AI) and Decision Uncertainty - a Short Survey

Giuseppe Schirripa Spagnolo, University of Roma Tre, Italy
Fabio Leccese, University of Roma Tre, Italy

PS-8 Spaceborne SAR Interferometry and Augmented Reality as Tools to Assess the Vulnerability of Cultural Heritage Sites

Theodoros Gatsios, Harokopio University of Athens, Greece
 Meng Zhu, Chinese Academy of Sciences, China
 Fulong Chen, Chinese Academy of Sciences, China
 Athanasia-Maria Tompolidi, Harokopio University of Athens, Greece
 Constantinos Loupasakis, National Technical University of Athens, Greece
 Michalis Fragiadakis, National Technical University of Athens, Greece
 Pantelis Soupios, King Fahd University of Petroleum and Minerals, Saudi Arabia
 Eleni Grigorakou, National Technical University of Athens, Greece
 Zeinep Achmet, National Technical University of Athens, Greece
 Georgia Kalousi, Terra Spatium S.A., Greece
 Konstantinos Mytakidis, Terra Spatium S.A., Greece
 Vasiliki Eleutheriou, Ministry of Culture and Sports, Greece
 Rozalia Christodouloupoulou, Ministry of Culture and Sports, Greece
 Dionysia Michalopoulou, Ministry of Culture and Sports, Greece
 Eleni Kanaki, Ministry of Culture and Sports, Greece
 Dionysia Mavromati, Ministry of Culture and Sports, Greece
 Panagiotis Elias, National Observatory of Athens, Greece
 Pavlos Krassakis, Harokopio University of Athens, Greece
 Issaak Parcharidis, Harokopio University of Athens, Greece

PS-9 Modulation of Error-Related Negativity Under Construction of Internal Model

Kiyoyuki Osugi, National Institute of Information and Communications Technology, Japan
Yusuke Yokota, National Institute of Information and Communications Technology, Japan
 Yasushi Naruse, National Institute of Information and Communications Technology, Japan

14:30 - 16:10 CEST

Session 2.1 - eXtended Reality as a gateway to the Metaverse: Practices, Theories, Technologies and Applications

Room: Conference Hall

Chairs: Giuseppe Caggianese, *National Research Council of Italy*
 Ugo Erra, *University of Basilicata, Italy*

14:30 An Easy Hand Gesture Recognition System for XR-Based Collaborative Purposes

Nicola Felice Capece, University of Basilicata, Italy

Gilda Manfredi, University of Basilicata, Italy

Vincenzo Macellaro, University of Basilicata, Italy

Pietro Carratù, Youbiquo Srl, Italy

14:50 Safeguarding Face-To-Face Communication in Augmented Reality: An Adaptive Interface

Luigi Casoria, National Research Council of Italy, Italy

Luigi Gallo, National Research Council of Italy, Italy

Giuseppe Caggianese, National Research Council of Italy, Italy

15:10 Prototyping Industrial Workstation in the Metaverse: A Low Cost Automation Assembly Use Case

Federico Manuri, Politecnico di Torino, Italy

Nicola Gravina, Politecnico di Torino, Italy

Andrea Sanna, Politecnico di Torino, Italy

Paolo Brizzi, Competence Industry Manufacturing 4.0, Italy

15:30 The Internet of Senses: A Position Paper on the Challenges and Opportunities of Multisensory Immersive Experiences for the Metaverse

Tiago H. Falk, INRS-EMT, University of Quebec, Canada

Long Bao Le, INRS-EMT, University of Quebec, Canada

Roberto Morandotti, INRS-EMT, University of Quebec, Canada

15:50 A Cross-Platform Metaverse Data Management System

Bohan Chen, Fuzhou University, China

Chengxin Song, Fuzhou University, China

Boyu Lin, Fuzhou University, China

Xin Xu, Fuzhou University, China

Ruoyan Tang, Fuzhou University, China

Yunxuan Lin, Fuzhou University, China

Yuan Yao, Fuzhou University, China

Joseph Timoney, Maynooth University, Ireland

Ting Bi, Maynooth University, Ireland

14:30 - 16:10 CEST

Session 2.2 - Motor Imagery - based Brain-Computer Interfaces: improving user performance to go beyond the laboratory

Room: Marconi Hall

Chairs: Fabien Lotte, *Inria Bordeaux Sud-Ouest, France*

Léa Pillette, *Univ. Bordeaux, France*

14:30 Identifying Factors Influencing the Outcome of BCI-Based Post Stroke Motor Rehabilitation Towards Its Personalization With Artificial Intelligence

David Trocellier, Université de Bordeaux, France

Bernard N'Kaoua, Université de Bordeaux, France

Fabien Lotte, Université de Bordeaux, France

14:50 Enhancing Motor-Imagery Brain-Computer Interface Training With Embodied Virtual Reality: A Pilot Study With Older Adults

Athanasios Vourvopoulos, Instituto Superior Técnico, Universidade de Lisboa, Portugal

Diego Blanco-Mora, Universidade da Madeira, Portugal

Audrey Aldridge, Mississippi State University, USA

Carolina Jorge, Universidade da Madeira, Portugal

Patrícia Figueiredo, Instituto Superior Técnico, Universidade de Lisboa, Portugal

Sergi Bermúdez i Badia, Universidade da Madeira, Portugal

15:10 Is Event-Related Desynchronization Variability Correlated With BCI Performance?

Sébastien Rimbart, Université de Bordeaux, France

David Trocellier, Université de Bordeaux, France

Fabien Lotte, Université de Bordeaux, France

15:30 Embedding Neurophysiological Signals

Pierre Guetschel, Radboud University, The Netherlands

Théodore Papadopoulos INRIA CRI-SAM, France

Michael Tangermann, Radboud University, The Netherlands

15:50 [INVITED] Improving Classification Accuracy of Motor Imagery Tasks With Novel Neurophysiological Markers

Sotirios Papadopoulos, University Lyon 1, France

Marco Congedo, GIPSA-Lab, France

James Bonaiuto, Institut Des Sciences Cognitives Marc Jeannerod, France

Jeremie Mattout, INSERM, France

14:30 - 15:30 CEST

Session 2.3 - Working sessions: Addressing the challenges for person-centered and technology-supported services. Working session 2: The organizational perspective

Room: Laguna Hall

Moderators: Simona Pestina, *ITU*; Cristina Mele, *Federico II DIETI*

14:30 Ethics & privacy in the digital world

Francisco Florez-Revuelta, *University of Alicante, Chair COST Action GoodBrother*

14:40 The evolution of professional identity in the twin transitions

Lorenzo Mercurio, *Federico II University*

14:50 The social elements and stakeholders engagement: the experience of “Viva gli Anziani”

Giuseppe Liotta, *Tor Vergata University*

15:00 Exploiting innovative solutions to strengthen integrated approach to community care and cure service provision

Alberto Pilotto, *EO Galliera*

15:10 Discussion & question time

14:30 - 16:10 CEST

Session 2.4 - Ultra-low-power data sensing and processing based on artificial intelligence technologies

Room: Video-Conference Hall

Chairs: Giorgio Ferrari, *Politecnico di Milano, Italy*
Michele Mastella, *University of Groningen, The Netherlands*

15:50 [INVITED] AEGNN: Asynchronous Event-Based Graph Neural Networks

Daniel Gehrig, University of Zurich, Switzerland

Simon Schaefer, Technical University of Munich, Germany

Davide Scaramuzza, University of Zurich, Switzerland

14:30 Neural Keypoint Detection for Visual Gestures on Micro-Controllers

Danilo Pietro Pau, STMicroelectronics, Italy

Davide Denaro, STMicroelectronics, Italy

Marco Lattuada, STMicroelectronics, Italy

Mahdi Mseddi, Università degli studi di Padova, Italy

15:50 Oscillatory Neural Network for Edge Computing: A Mobile Robot Obstacle Avoidance Application

Madeleine Abernot, LIRMM, University of Montpellier, CNRS, France

Hamza Amara, LIRMM, University of Montpellier, CNRS, France

Thierry Gil, LIRMM, University of Montpellier, CNRS, France

Aida Todri-Sanial, LIRMM, University of Montpellier, CNRS, France

15:10 Experimental Validation of an Analog Spiking Neural Network With STDP Learning Rule in CMOS Technology

Elisabetta Polidori, Politecnico di Milano, Italy

Giovanni Camisa, Politecnico di Milano, Italy

Alireza Mesri, Politecnico di Milano, Italy

Giorgio Ferrari, Politecnico di Milano, Italy

Cristina Polidori, Politecnico di Milano, Italy

Michele Mastella, University of Groningen, The Netherlands

Enrico Prati, Università degli Studi di Milano, Italy

15:30 Edge of Chaos Behind Bistability of the Inhomogeneous in Homogeneous Cellular Media

Alon Ascoli, Technische Universität Dresden, Germany

Ahmet Demirkol, Technische Universität Dresden, Germany

Nicolas Schmitt, Technische Universität Dresden, Germany

Ronald Tetzlaff, Technische Universität Dresden, Germany

Leon Chua, University of California, Germany

16:10 - 16:30

COFFEE BREAK

Room: Room Polifunzionale / Room 3D / Foyer

16:10 - 16:30

DEMO SESSION 1.2

Room: Foyer

Chair: Nicola Moccaldi, *University of Naples Federico II, Italy*

Interactive Augmented Reality loaded pallet shape checking experience

Alessandro Luchetti, *University of Trento, Italy*

HappyFeat, an interactive and efficient BCI Framework (for clinical applications)

Arthur Desbois, *Paris Brain Institute / INRIA*

16:30 - 18:10 CEST

Session 3.1 - Human bodily perception. Enhanced dimensions for eXtended Reality and neural engineering

Room: Conference Hall

Chairs: Silvia Serino, *Università Cattolica di Milano, Italy*

Daniele Di Lernia, *Università Cattolica di Milano, Italy*

16:30 [INVITED] The influence of visual representation factors on bio signals and its relation to Presence in Virtual Reality Environments

Selina Christin Wriessnegger, *Graz University of Technology, Austria*

Lisa-Marie Autengruber, *Graz University of Technology, Austria*

Luis-Alberto Barradas Chacón, *Graz University of Technology, Austria*

Johanna Pirker, *Graz University of Technology, Austria*

Saeed Safikhani, *Graz University of Technology, Austria*

16:50 Usability of an Embodied CAVE System for Spatial Navigation Rehabilitation in Mild Cognitive Impairment

Cosimo Tuena, *Istituto Auxologico Italiano, Italy*

Silvia Serino, *Università Cattolica di Milano, Italy*

Sara Maestri, *Istituto Auxologico Italiano, Italy*

Elisa Pedrolì, *Istituto Auxologico Italiano, Università eCampus, Italy*

Chiara Stramba-Badiale, *Istituto Auxologico Italiano, Italy*

Giulia Brizzi, *Istituto Auxologico Italiano, Italy*

Karine Goulene, *Istituto Auxologico Italiano, Italy*

Pietro Cipresso, *University of Turin, IRCCS Istituto Auxologico Italiano, Italy*

Marco Stramba-Badiale, *Istituto Auxologico Italiano, Italy*

Giuseppe Riva, *Università Cattolica di Milano, Istituto Auxologico Italiano, Italy*

17:10 Can You Empathize With Me? Development of a 360° Video-Training to Enhance Residents' Empathic Abilities

Maria Sansoni, *Catholic University of Sacred Heart Milan, Italy*

Sabrina Bartolotta, *Catholic University of Sacred Heart Milan, Italy*

Andrea Gaggioli, *Catholic University of Sacred Heart Milan, Italy*

Giuseppe Riva, *Catholic University of Sacred Heart Milan, Italy*

17:30 Follow the Flow: A Prospective on the On-Line Detection of Flow Mental State Through Machine Learning

Elena Sajno, Università Cattolica del Sacro Cuore, University of Pisa, Italy

Andrea Beretta, ISTI - CNR, Italy

Nicole Novielli, University of Bari, Italy

Giuseppe Riva, Università Cattolica di Milano, Istituto Auxologico Italiano, Italy

17:50 [INVITED] Preliminary Personality Model for Social Robots Based on the Cognitive-Affective Processing System Theory

Andrea Gargano, University of Pisa, Italy

Lorenzo Cominelli, University of Pisa, Italy

Caterina Vannucci, IMT School for Advanced Studies Lucca, Italy

Luca Cecchetti, IMT School for Advanced Studies Lucca, Italy

Enzo Pasquale Scilingo, University of Pisa, Italy

16:30 - 18:10 CEST

Session 3.2 - Artificial Intelligence, Metrology and eXtended Reality for Criminal Investigation and Forensic Science

Room: Marconi Hall

Chairs: Aldo F. Dragoni, *Università Politecnica delle Marche, Italy*

Paolo Castellini, *Università Politecnica delle Marche, Italy*

16:30 [INVITED] Legal Evidence and Metrics

Ephraim Nissan, University of London, United Kingdom

17:10 Analyzing the Impact of Police Mugshots in Face Verification for Crime Investigations

Paolo Contardo, Università Politecnica delle Marche, Italy

Emanuele Di Lorenzo, Università Politecnica delle Marche, Italy

Nicola Falcionelli, Università Politecnica delle Marche, Italy

Aldo F. Dragoni, Università Politecnica delle Marche, Italy

Paolo Sernani, Università Politecnica delle Marche, Italy

17:30 Hyperspectral Imaging for Biological Stains Detection

Milena Martarelli, Università Politecnica delle Marche, Italy

Leonardo Melappioni, Università Politecnica delle Marche, Italy

Nicola Giulietti, Politecnico di Milano, Italy

Silvia Discepolo, Università Politecnica delle Marche, Italy

Paolo Castellini, Università Politecnica delle Marche, Italy

17:50 Intellectual Property Issues on Artificial Intelligence: An Overview Based on Current Philippine IP Landscape

John Joshua F. Montañez, Bicol State College of Applied Sciences and Technology, Philippines

16:00 - 17:00 CEST

Session 3.3 - Working sessions: Addressing the challenges for person-centered and technology-supported services. Working session 2: The education and training perspective

Room: Laguna Hall

Moderator: John Farrell, *RSCN*

16:00 Addressing the challenge of interdisciplinarity in the academia

Pasquale Arpaia, *Federico II University*

16:10 Which use for new digital tools and e-didactics in the Health Systems

Paolo Michelutti, *Italian Ministry of health/national agency for regional health systems*

16:20 Scaling up innovation: the role of scientific societies and their current challenges translating evidence to practice

Regina Roller-Wirnsberger, *Graz University*

16:30 The viewpoint of the students: balancing in-person and web-based value of training and education

Antonino Esposito, *Federico II Medical Students Representative*

16:40 Discussion & question time

16:50 Final remarks

John Farrell, *RSCN*

16:30 - 18:10 CEST

Session 3.4 - Anomaly detection on Cyber Physical Systems

Room: Video-Conference Hall

Chairs: Vincenzo Moscato, *University of Naples Federico II, Italy*

Giancarlo Sperli, *University of Naples Federico II, Italy*

16:30 DDPG Based End-To-End Driving Enhanced With Safe Anomaly Detection Functionality for Autonomous Vehicles

Giacomo Basile, University of Naples Federico II, Italy

Alberto Petrillo, *University of Naples Federico II, Italy*

Stefania Santini, *University of Naples Federico II, Italy*

16:50 Effects of Electromagnetic Inductive Attack on the Performance of a Boost DC-DC Converter

Ciro Attaianesi, *University of Naples Federico II, Italy*

Gianluca Brando, *University of Naples Federico II, Italy*

Adolfo Dannier, *University of Naples Federico II, Italy*

Andrea Del Pizzo, *University of Naples Federico II, Italy*

Luigi Pio Di Noia, University of Naples Federico II, Italy

17:10 A Deep Learning Pipeline for Network Anomaly Detection Based on Autoencoders

Antonino Ferraro, University of Naples Federico II, Italy

Antonio Galli, University of Naples Federico II, Italy

Valerio La Gatta, University of Naples Federico II, Italy

Marco Postiglione, University of Naples Federico II, Italy

17:30 A Survey on XAI for Cyber Physical Systems in Medicine

Nicola Alimonda, University of Milano - Bicocca, Italy

Luca Guidotto, University of Milano - Bicocca, Italy

Lorenzo Malandri, University of Milano - Bicocca, Italy

Fabio Mercorio, University of Milano - Bicocca, Italy

Mario Mezzanzanica, University of Milano - Bicocca, Italy

Giovanni Tosi, University of Milano - Bicocca, Italy

17:50 [INVITED] Robust Estimation of Hand Movements: From Estimation to Fault Detection

Ines Chihi, University of Luxembourg, Luxembourg

19:00

WELCOME PARTY

Taverna de Pasquino

Piazzale Tiburtino, 17 - Roma

Technical Program - Thursday, October 27

08:30 - 17:00

REGISTRATION

Room: Foyer

09:00 - 10:40 CEST

Session 4.1 - Machine learning analysis and simulation approaches for biomedical engineering - PART 1

Room: Conference Hall

Chairs: Leandro Donisi, *University of Naples Federico II, Italy*

Carlo Ricciardi, *University of Naples Federico II, Italy*

09:00 Assessing Early-Stage Parkinson's Disease Using BioVRSea

Deborah Jacob, Reykjavik University, Iceland

Romain Aubonnet, Reykjavik University, Iceland

Marco Recenti, Reykjavik University, Iceland

Sigrún Anna Audardóttir, Reykjavik University, Iceland

Torbjörg Ída Ívarsdóttir, Reykjavik University, Iceland

Bérangère Burgunder, Reykjavik University, Iceland

Itziar Mengual i Escalona, Reykjavik University, Iceland

Andrea Colacino, University of Salerno, Italy

Anna Björnsdóttir, Heilsuklasinn Parkinson Clinic, Iceland

Hannes Petersen, University of Iceland, Iceland

Paolo Gargiulo, Reykjavik University, Iceland

09:20 Assessment of Femoral Cartilage Morphological and Topological Features Using Machine Learning

Arnar E. Gunnarsson, Reykjavik University, Iceland

Federica Kiyomi Ciliberti, Reykjavik University, Iceland

Chiara Belfiori, Reykjavik University, Iceland

Alessia Lindemann, Reykjavik University, Iceland

Riccardo Forni, Reykjavik University, Iceland

Halldor Jonsson Jr., University Hospital of Iceland, Iceland

Paolo Gargiulo, Reykjavik University, Iceland

09:40 A Combined Simulation and Machine Learning Approach to Classify Severity of Infarction Patients

Anna Procopio, Università degli Studi Magna Græcia di Catanzaro, Italy

Giuseppe Cesarelli, University of Naples Federico II, Italy

Salvatore De Rosa, Università degli Studi Magna Græcia di Catanzaro, Italy

Leandro Donisi, University of Naples Federico II, Italy

Claudia Critelli, Università degli Studi Magna Græcia di Catanzaro, Italy

Alessio Merola, Università degli Studi Magna Græcia di Catanzaro, Italy
Ciro Indolfi, Università degli Studi Magna Græcia di Catanzaro, Italy
Carlo Cosentino, Università degli Studi Magna Græcia di Catanzaro, Italy
Francesco Amato, University of Naples Federico II, Italy

10:00 The Role of Muscle and Tendon in Predicting Cartilage Degeneration and Tendinopathy

Zakia Khatun, University of Salerno, Italy

Mariella Tsirilaki, University Hospital of Iceland, Iceland
Alessia Lindemann, University of Bologna, Italy
Francesco Tortorella, University of Salerno, Italy
Nicola Maffulli, University of Salerno, Italy
Halldór Jónsson Jr, University Hospital of Iceland, Iceland
Paolo Gargiulo, Reykjavik University, Iceland

10:20 Breast Density Analysis on Mammograms: Application of Machine Learning With Textural Features

Francesca Angelone, University of Naples Federico II, Italy
Alfonso Maria Ponsiglione, University of Naples Federico II, Italy
Carlo Ricciardi, University of Naples Federico II, Italy
Maria Paola Belfiore, University of Campania Luigi Vanvitelli, Italy
Gianluca Gatta, University of Campania Luigi Vanvitelli, Italy
Francesco Amato, University of Naples Federico II, Italy
Mario Sansone, University of Naples Federico II, Italy
Roberto Grassi, University of Campania Luigi Vanvitelli, Italy

09:00 - 10:40 CEST

Session 4.2 - PANEL promoted by Res4Net

Room: Marconi Hall

Research and Communication: Opportunities and Challenges

Cristina Mele, *Professor of Service Innovation, University of Naples Federico II*
Evelina Bruno, *Sociologist and Instructional designer, Federica.eu*
Fabrizio Doccula, *Associate Director of Customer Success, EMEA & LatAm, Jove*
Tullio Rossi, *Director, Animate Your Science*
Francesco Sannino, *Professor Theoretical Physics, Federico II U., Napoli, Italy and Chair and founder, Danish IAS, U. of Southern Denmark*

09:00 - 10:40 CEST

Session 4.3 - SPECIAL EVENT - Psychobit - PART 1

Room: Laguna Hall

Chair: Michela Ponticorvo, *University of Naples Federico II, Italy*

09:00 Greetings and Introduction to Software & Apps

09:40 A Web InBasket Serious Game to Prevent Cyberbullying Among Italian Preadolescents

Gianluca Mariano Colella, University of Calabria, Italy

Anna Lisa Palermi, University of Calabria, Italy

Maria Giuseppina Bartolo, University of Calabria, Italy

Rocco Servidio, University of Calabria, Italy

Angelo Mendicelli, University of Calabria, Italy

Domenico Ielasi, University of Calabria, Italy

Angela Costabile, University of Calabria, Italy

09:55 Mental Health Mobile Apps to Empower Psychotherapy: A Narrative Review

Federico Diano, University of Naples Federico II, Italy

Michela Ponticorvo, University of Naples Federico II, Italy

Luigia Sica, University of Naples Federico II, Italy

10:10 Computerized Training of Executive Functions in a Child With Specific Learning Disorders: A Descriptive Study

Raffaele Nappo, METaLab, Centro di Riabilitazione Neapolisanit, Italy

Mariangela Cerasuolo, AIAS, Italy

Francesco Ciaramella, METaLab, Centro di Riabilitazione Neapolisanit, Italy

Roberta Simeoli, University of Naples Federico II, Italy

Jessica Napolitano, Università degli Studi della Campania Luigi Vanvitelli, Italy

Maddalena Giugliano, Centro di Riabilitazione Neapolisanit, Italy

Angelo Rega, University of Naples Federico II, Italy

10:25 The Design of a Game-Based Software for Children With Autism Spectrum Disorder

Maria Luongo, University of Naples Federico II, Italy

Roberta Simeoli, University of Naples Federico II, Italy

Daide Marocco, University of Naples Federico II, Italy

Michela Ponticorvo, University of Naples Federico II, Italy

10:40 - 11:00

COFFEE BREAK

Room: Room Polifunzionale / Room 3D / Foyer

10:40 - 11:00

DEMO SESSION 2.1

Room: Foyer

Chair: Nicola Moccaldi, *University of Naples Federico II, Italy*

In the shoes of dyslexic students

Enrique Yeguas Bolívar, University of Cordoba

ASTRAS (Artificial System for TRaining and Assessment)

Angelo Rega, University of Naples Federico II

11:00 - 12:00 CEST

PLENARY SESSION

Room: Conference Hall

Chair: Damien Coyle, *Ulster University, UK*

Movement decoding from non-invasive EEG: a chance for the spinal cord injured?

Gernot Müller-Putz, *Graz University of Technology*

12:00 - 13:40 CEST

Session 5.1 - Machine learning analysis and simulation approaches for biomedical engineering - PART 2

Room: Conference Hall

Chairs: Giuseppe Cesarelli, *University of Naples Federico II, Italy*

Alfonso Maria Ponsiglione, *University of Naples Federico II, Italy*

12:00 Effect of X-Ray Scatter Correction on the Estimation of Attenuation Coefficient in Mammography: A Simulation Study

Mario Sansone, *University of Naples Federico II, Italy*

Alfonso Maria Ponsiglione, *University of Naples Federico II, Italy*

Francesca Angelone, University of Naples Federico II, Italy

Francesco Amato, *University of Naples Federico II, Italy*

Roberto Grassi, *University of Campania Luigi Vanvitelli, Italy*

12:20 Predicting Lifestyle Using BioVRSea Multi-Biometric Paradigms

Marco Recenti, Reykjavik University, Iceland

Deborah Jacob, *Reykjavik University, Iceland*

Romain Aubonnet, *Reykjavik University, Iceland*

Bérangère Burgunder, *Reykjavik University, Iceland*

Itziar Mengual i Escalona, *Reykjavik University, Iceland*

Arnar E. Gunnarsson, *Reykjavik University, Iceland*

Federica Kiyomi Ciliberti, *Reykjavik University, Iceland*

Riccardo Forni, *Reykjavik University, Iceland*

Leandro Donisi, *University of Naples Federico II, Italy, Reykjavik University, Iceland*

Hannes Petersen, *University of Iceland, Akureyri Hospital, Iceland*

Paolo Gargiulo, *Reykjavik University, Iceland*

12:40 Combining Simulation and Machine Learning for the Management of Healthcare Systems

Carlo Ricciardi, University of Naples Federico II, Italy

Giuseppe Cesarelli, *University of Naples Federico II, Italy*

Alfonso Maria Ponsiglione, *University of Naples Federico II, Italy*

Gianmaria De Tommasi, *University of Naples Federico II, Italy*

Mario Cesarelli, *University of Naples Federico II, Italy*

Maria Romano, *University of Naples Federico II, Italy*

Giovanni Improta, University of Naples Federico II, Italy
 Francesco Amato, University of Naples Federico II, Italy

13:00 **Performing a Short Sway to Distinguish Parkinsonisms**

Michela Russo, University of Naples Federico II, Italy
 Carlo Ricciardi, University of Naples Federico II, Italy
 Marianna Amboni, University of Salerno, Italy
 Marina Picillo, University of Salerno, Italy
 Gianluca Ricciardelli, Azienda Ospedaliera Universitaria OO. RR. San Giovanni di Dio e Ruggi, Italy
 Filomena Abate, University of Salerno, Italy
 Maria Francesca Tepedino, University of Salerno, Italy
 Maria Consiglia Calabrese, Azienda Ospedaliera Universitaria OO. RR. San Giovanni di Dio e Ruggi, Italy
 Mario Cesarelli, University of Naples Federico II, Italy
 Maria Romano, University of Naples Federico II, Italy

13:20 **Machine Learning and Biosignals are Able to Discriminate Biomechanical Risk Classes According to the Revised NIOSH Lifting Equation**

Leandro Donisi, University of Naples Federico II, Italy
 Giuseppe Cesarelli, University of Naples Federico II, Italy
 Edda Capodaglio, IRCCS Maugeri, Italy
 Monica Panigazzi, IRCCS Maugeri, Italy
 Mario Cesarelli, University of Naples Federico II, Italy
 Giovanni D'Addio, IRCCS Maugeri, Italy

12:00 - 13:40 CEST

Session 5.2 - PANEL WIE IEEE Italy Section AG - Analysis of a prejudice

Room: Marconi Hall

Welcome Addresses

Dajana Cassioli, *University of L'Aquila*

Panel Moderators

Patrizia Lamberti, *University of Salerno*
 Paola Lanteri, *Istituto Neurologico Carlo Besta*
 Loredana Cristaldi, *Politecnico di Milano*

Speakers

Leonardi Matilde, *Istituto Neurologico Carlo Besta*
 Alessandra Castellani, *Accademia di Belle Arti di Brera*

Testimonials

Ferdinanda Ponci, *E.ON Energy Research Center at RWTH Aachen University*
 Rabia Aziz, *PhD student, University of Salerno*

12:00 - 13:40 CEST

Session 5.3 - SPECIAL EVENT - Psychobit - PART 2

Room: Laguna Hall

12:00 Introduction to Virtual Worlds

Chair: Onofrio Gigliotta, *University of Naples Federico II, Italy*

12:05 The Role of Empathic Traits in the Interaction With Virtual Humans

Mariachiara Rapuano, University of Campania Luigi Vanvitelli, Italy

Tina Iachini, University of Campania Luigi Vanvitelli, Italy

Francesco Ruotolo, University of Campania Luigi Vanvitelli, Italy

Alessandro Troise, University of Campania Luigi Vanvitelli, Italy

Md Sheeraz Anwar, University of Campania Luigi Vanvitelli, Italy

Gennaro Ruggiero, University of Campania Luigi Vanvitelli, Italy

12:20 We Implicitly Empathize With Virtual Agents: The Effect of Motor Simulation

Scila Nunziata, University of Campania Luigi Vanvitelli, Italy

Renato Orti, University of Campania Luigi Vanvitelli, Italy

Antonella Ferrara, University of Campania Luigi Vanvitelli, Italy

Francesco Ruotolo, University of Campania Luigi Vanvitelli, Italy

Gennaro Ruggiero, University of Campania Luigi Vanvitelli, Italy

Tina Iachini, University of Campania Luigi Vanvitelli, Italy

12:35 The Role of Conscientiousness and Toxic Behaviors on Skills Development in Professional E-Sports

Mariacristina Marzano, University of Bologna, Italy

Elvis Mazzoni, University of Bologna, Italy

Martina Benvenuti, University of Bologna, Italy

12:50 Introduction to Methods

Chair: Davide Marocco, *University of Naples Federico II, Italy*

12:55 Analysing E-BTT Data: The E-TAN ANALYST Prototype

Antonietta Argiuolo, University of Naples Federico II, Italy

Michela Ponticorvo, University of Naples Federico II, Italy

13:10 Automated Categorization of Behavioral Quality Through Deep Neural Networks

Paolo Pagliuca, Institute of Cognitive Sciences and Technologies - CNR, Italy

Nicola Milano, Institute of Cognitive Sciences and Technologies - CNR, Italy

Stefano Nolfi, Institute of Cognitive Sciences and Technologies - CNR, Italy

13:25 From Principal Component Analysis to Autoencoders: A Comparison on Simulated Data From Psychometric Models

Monica Casella, University of Naples Federico II, Italy

Pasquale Dolce, University of Naples Federico II, Italy

Michela Ponticorvo, University of Naples Federico II, Italy

Davide Marocco, University of Naples Federico II, Italy

13:40 - 14:40

LUNCH

Room: Room Polifunzionale / Room 3D / Foyer

14:00 - 14:40

POSTER SESSION #2

Chairs: Oscar Tamburis, *National Research Council of Italy*

Egidio De Benedetto, *University of Naples Federico II, Italy*

Room: Room Polifunzionale / Room 3D / Foyer

PS-10 Prediction of Scalp EEG Waveforms From Forehead Electrodes Using Convolutional Neural Networks to Improve Signal-To-Noise Ratio

Kazuki Yamawaki, National Institute of Information and Communications Technology, Japan

Hiroki Watanabe, National Institute of Information and Communications Technology, Japan

Yasushi Naruse, National Institute of Information and Communications Technology, Japan

PS-11 Effect of Auditory Stimuli on Electroencephalography-Based Authentication

Nibras Abo Alzahab, Università Politecnica delle Marche, Italy

Angelo Di Iorio, Università Politecnica delle Marche, Italy

Lorenzo Scalise, Università Politecnica delle Marche, Italy

Marco Baldi, Università Politecnica delle Marche, Italy

PS-12 BISON: BCI-Based Interaction Concepts for Operating Microscopes in Neurosurgery

Maurice Rekrut, German Research Center for Artificial Intelligence (DFKI), Germany

Matthias Nadig, German Research Center for Artificial Intelligence (DFKI), Germany

Tobias Jungbluth, German Research Center for Artificial Intelligence (DFKI), Germany

Johannes Ihl, German Research Center for Artificial Intelligence (DFKI), Germany

PS-13 Adapting EEG Based MI-BMI Depending on Alertness Level for Controlling a Lower-Limb Exoskeleton

Laura Ferrero, Miguel Hernández University of Elche, Spain

Vicente Quiles, Miguel Hernández University of Elche, Spain

Mario Ortiz, Miguel Hernández University of Elche, Spain

Eduardo Iáñez, Miguel Hernández University of Elche, Spain

José M. Azorín, Miguel Hernández University of Elche, Spain

PS-14 Digital Content Interaction in 3D Environments

Franca Giannini, CNR-IMATI, Italy

Katia Lupinetti, CNR-IMATI, Italy

Marina Monti, CNR-IMATI, Italy

Mario Alvise Di Bernardo, RagTag, Italy

Sara Anastasi, INAIL, Italy

Giuseppe Augugliaro, INAIL, Italy

Luigi Monica, INAIL, Italy

PS-15 Fully Automated Approaches for Localization of Intraoperative Electrographic Electrodes

Kaiyang (Victor) Cheng, University of California, USA
Han Jie (Shawn) Liu, University of California, USA
Brianna Sun, University of California, USA
Selina Wu, University of California, USA
William Speier, University of California, USA

PS-16 Human-In-The-Loop Approach for Enhanced Mobile Robot Navigation

Karameldeen Ibrahim Mohamed Omer, 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
Camillo Porcaro, Università Politecnica delle Marche, Italy

PS-17 Deep Learning Based Detachment Segmentation: The MIRET Approach

Federico Foria, ETS, Italy
Mario Calicchio, ETS, Italy
Gabriele Miceli, ETS, Italy
Aniello Xie, RMT, Italy
Davide Cuccato, RMT, Italy
Alessandro Allegro, RMT, Italy

PS-18 Direction Decoding of Physical and Visual Perturbations From EEG

Shayan Jalilpour, Graz University of Technology, Austria
Gernot Müller-Putz, Graz University of Technology, Austria

PS-19 Threat Assessment in Police VR Training: Multi-Sensory Cues for Situation Awareness

Jakob C Uhl, AIT Austrian Institute of Technology GmbH, PLUS University of Salzburg, Austria
Markus Murtinger, USECON GmbH, AIT Austrian Institute of Technology GmbH, Austria
Olivia Zechner, AIT Austrian Institute of Technology GmbH, PLUS University of Salzburg, Austria
Manfred Tscheligi, AIT Austrian Institute of Technology GmbH, PLUS University of Salzburg, Austria

14:40 - 15:30 CEST

TUTORIAL SESSION

Room: Conference Hall

Chair: Karl McCreadie, *Ulster University, UK*

Real-Time EEG Streaming with *Helmate*

Marco Nalin, *ab medica*

15:30 - 15:50

COFFEE BREAK

Room: Room Polifunzionale / Room 3D / Foyer

15:30 - 15:50

DEMO SESSION 2.2

Room: Foyer

Chair: Nicola Moccaldi, *University of Naples Federico II, Italy*

In the shoes of dyslexic students

Enrique Yeguas Bolívar, *University of Cordoba*

ASTRAS (Artificial System for TRaining and Assessment)

Angelo Rega, *University of Naples Federico II*

15:50 - 17:30 CEST

Session 6.1 - Immersive Teleoperation and Medical AI

Room: Conference Hall

Chairs: Salvatore Livatino, *University of Hertfordshire, United Kingdom*
Saber Sami, *University of East Anglia, United Kingdom*

15:50 [INVITED] ReHaB - Towards an Ecologically Valid Symbiosis of BCI and Head-Mounted VR Displays: Focus on Collaborative Post-Stroke Neurorehabilitation

Adam Wojciechowski, Poznan University of Technology, Poland

16:10 A Cross-Language Dementia Classifier: A Preliminary Study

Flavio Bertini, *University of Parma, Italy*

Davide Allevi, *University of Bologna, Italy*

Gianluca Lutero, *University of Bologna, Italy*

Laura Calza, *University of Bologna, Italy*

Daniilo Montesi, University of Bologna, Italy

16:30 The Use of Clustering to Understand Disease Progression in Rheumatoid Arthritis

Beatriz de la Iglesia, University of East Anglia, United Kingdom

Kathapet Nawongs, *University of East Anglia, United Kingdom*

Jack Dainty, *University of East Anglia, United Kingdom*

Alexander Macgregor, *University of East Anglia, United Kingdom*

16:50 The Immersion Advantage in Command & Control: From Desktop Monitors to VR Headsets

Alessandro Zocco, Elettronics Group (ELT), Italy

Salvatore Livatino, *University of Hertfordshire, United Kingdom*

Phillip Gainley, *University of Hertfordshire, United Kingdom*

Yasir Iqbal, *University of Hertfordshire, United Kingdom*

Giuseppe Morana, *University of Hertfordshire, United Kingdom*

17:10 Immersive Visualization in Pilot Training: From Cockpit Panels to Drone Navigation

Salvatore Livatino, *University of Hertfordshire, United Kingdom*

Giuseppe Morana, *University of Hertfordshire, United Kingdom*

Yasir Iqbal, University of Hertfordshire, United Kingdom
Maya Mohamed, University of Hertfordshire, United Kingdom
Sungwoo David Hwang, University of Hertfordshire, United Kingdom
Phillip Gainley, University of Hertfordshire, United Kingdom
Hai Thanh Nguyen, HoChiMinh City University of Technical Education, Vietnam
Kate Williams, University of Hertfordshire, United Kingdom
Alessandro Zocco, Elettronics Group (ELT), Italy

15:50 - 17:30 CEST

Session 6.2 - Biosignal-based Measurements of Mental States

Room: Marconi Hall

Chairs: Antonino Raffone, *Sapienza University of Rome, Italy*

Giovanni D'Errico, *Politecnico di Torino, Italy*

15:50 Nat(UR)e: Quantifying the Relaxation Potential of Ultra-Reality Multisensory Nature Walk Experiences

Marilia Karla Soares Lopes, INRS-EMT, University of Québec, Canada

Belmir J. de Jesus, Jr., INRS-EMT, University of Québec, Canada

Marc-Antoine Moynereau, INRS-EMT, University of Québec, Canada

Reza Amini Gough, INRS-EMT, University of Québec, Canada

Olivier Rosanne, INRS-EMT, University of Québec, Canada

Walter Schubert, INRS-EMT, University of Québec, Canada, Federal University of Health Sciences of Porto Alegre, Brazil

Alcyr Alves de Oliveira, INRS-EMT, University of Québec, Canada, Federal University of Health Sciences of Porto Alegre, Brazil

Tiago Falk, INRS-EMT, University of Québec, Canada

16:10 Mindfulness-Based Emotional Acceptance in Combination with Neurofeedback for Improving Emotion Self-Regulation: A Pilot Study

Pasquale Arpaia, University of Naples Federico II, Italy

Lucia Calabrese, Sapienza University of Rome, Italy

Salvatore G. Chiarella, Sapienza University of Rome, Italy

Giovanni D'Errico, Politecnico di Torino, Italy

Lucio Tommaso De Paolis, University of Salento, Italy

Sabrina Grassini, Politecnico di Torino, Italy

Giovanna Mastrati, University of Naples Federico II, Italy

Nicola Moccaldi, University of Naples Federico II, Italy

Antonino Raffone, Sapienza University of Rome, Italy

Ersilia Vallefucio, University of Naples Federico II, Italy

16:30 Pupil Dilation and Self-Reported Emotional Response to IAPS Pictures: The Role of Emotional Regulation and Trait Mindfulness

Luca Simione, CNR, Italy

Alisha Vabba, Sapienza, University of Rome, Italy

Antonino Raffone, Sapienza, University of Rome, Italy

Marco Mirolli, CNR, Italy

16:50 Attention, Boredom and Mind-Wandering During a Vigilance Task: EEG and Ocular Markers

Antonino Esposito, LUMSA University of Rome, Italy

Eleonora Braccili, Fondazione Neurone Onlus, Italy

Federica Sgrò, Fondazione Neurone Onlus, Italy

Eleonora Chiarantano, Sapienza University of Rome, Italy

Mariagrazia D'Ippolito, IRCCS Fondazione Santa Lucia, Italy

Iolanda Pisotta, IRCCS Fondazione Santa Lucia, Italy

Alessandra Bigioni, IRCCS Fondazione Santa Lucia, Italy

Antonio Guerrieri, Fondazione Neurone Onlus, Italy

Donatella Mattia, IRCCS Fondazione Santa Lucia, Italy

Febo Cincotti, Sapienza University of Rome, Italy

17:10 Wellbeing Assessment of a Museum Experience in Virtual Reality Through UCL Measurement Tool Kit and Heart Rate Measurement: A Pilot Study

Carola Gatto, University of Salento, Italy

Lucia Calabrese, Sapienza University of Rome, Italy

Salvatore G. Chiarella, Sapienza University of Rome, Italy

Valerio De Luca, University of Salento, Italy

Giovanni D'Errico, Politecnico di Torino, Italy

Benito Luigi Nuzzo, University of Salento, Italy

Antonino Raffone, Sapienza University of Rome, Italy

Lucio Tommaso De Paolis, University of Salento, Italy

15:00 - 17:30 CEST

Session 6.3 - Designing, testing and implementing innovative solutions for health in the framework of the twin transitions: challenges and enablers.

Hands on interdisciplinary laboratory.

Room: Laguna Hall

Chairs: Maddalena Illario, John Farrell, Antonio Esposito, Pasquale Arpaia

15:00 Part 1: Intro session

Arturs Mielutis, *Digital Health and Innovation, WHO Europe Headquarters*

15:30 Part 2: Innovation session

16:00 Part 3: 4 Break-down sessions

17:00 Part 3: Presentation of results in plenary session by a student-rapporteur

17:30 Final Considerations

15:50 - 17:30 CEST

Session 6.4 - Metrological methods and results on eXtended Reality, Artificial Intelligence and Neural Engineering in Healthcare

Room: Video-Conference Hall

Chairs: Vincenzo Ferrari, *University of Pisa, Italy*

Elvis C. S. Chen, *Western University, Robarts Research Institute, Canada*

15:50 [INVITED] Ambient Assisted Living Using Non-Intrusive Smart Sensing and IoT for Gait Rehabilitation

Joel Santos, ISCTE - Instituto Universitário de Lisboa, Portugal

Octavian Adrian Postolache, Instituto de Telecomunicações, Instituto Universitario de Lisboa, Portugal

Diana Mendes, Instituto Universitário de Lisboa, Italy

16:10 Unified Calibration Technique for Augmented-Reality Ultrasound-Guided Interventions

Elvis C. S. Chen, Western University, Canada

Daniel Allen, Western University, Canada

Joeana Cambranis-Romero, Western University, Canada

Terry Peters, Western University, Canada

16:30 The Right Mix of Visual and Mechanical Constraints to Guide the Relative Pose Between Rigid Objects

Vincenzo Ferrari, University of Pisa, Italy

Marina Carbone, University of Pisa, Italy

Giulia Sciarrino, University of Pisa, Italy

Fabrizio Cutolo, University of Pisa, Italy

16:50 How to Mitigate Perceptual Limits of OST Display for Guiding Manual Tasks: A Proof of Concept Study With Microsoft HoloLens

Sara Condino, University of Pisa, Italy

Fabrizio Cutolo, University of Pisa, Italy

Giulia Zari, University of Pisa, Italy

Renzo D'Amato, University of Pisa, Italy

Marina Carbone, University of Pisa, Italy

Vincenzo Ferrari, University of Pisa, Italy

17:10 [INVITED] We Still Haven't Found What We are Looking for: The Role of Machine Learning and AI in the Organ-On-Chip Applications

Arianna Mencattini, University of Rome Tor Vergata, Italy

Michele D'Orazio, University of Rome Tor Vergata, Italy

Joanna Filippi, University of Rome Tor Vergata, Italy

Paola Casti, University of Rome Tor Vergata, Italy

Gianni Antonelli, University of Rome Tor Vergata, Italy

Sara Cardarelli, University of Rome Tor Vergata, Italy

Eugenio Martinelli, University of Rome Tor Vergata, Italy

20:00

GALA DINNER

Lo Scoglio di Frisio

Via Merulana, 256 - Roma

Technical Program - Friday, October 28

08:30 - 15:00

REGISTRATION

Room: Foyer

09:00 - 10:40 CEST

Session 7.1 - AI-enabled solutions for e-health and value-cocreation

Room: Conference Hall

Chairs: Cristina Mele, *University of Naples Federico II, Italy*

Tiziana Russo Spena, *University of Naples Federico II, Italy*

**09:00 The Adoption of Artificial Intelligence Technologies in the Era of "Grey Tsunami":
Prospects and Challenges**

Valentina Della Corte, *University of Naples Federico II, Italy*

Giovanna Del Gaudio, *University of Naples Federico II, Italy*

Fabiana Sepe, *University of Naples Federico II, Italy*

Simone Luongo, *University of Naples Federico II, Italy*

Anna Crisci, *University of Naples Federico II, Italy*

09:14 Minimal Robot to Foster Well-Being: The HIRO Project

Irene Di Bernardo, *University of Naples Federico II, Italy*

Marialuisa Marzullo, *University of Naples Federico II, Italy*

Cristina Mele, *University of Naples Federico II, Italy*

Tiziana Russo Spena, *University of Naples Federico II, Italy*

Stefano Paolo Russo, *University of Naples Federico II, Italy*

09:28 Blockchain Technology and Artificial Intelligence for Value Co-Creation in Healthcare

Ylenia Cavacece, *University of Naples Federico II, Italy*

Sara Ebraico, *University of Naples Federico II, Italy*

Tiziana Russo Spena, *University of Naples Federico II, Italy*

Cristina Mele, *University of Naples Federico II, Italy*

Daniele Leone, *University of Naples Parthenope, Italy*

Francesco Schiavone, *University of Naples Parthenope, Italy*

Anna Bastone, *University of Naples Parthenope, Italy*

09:42 Complementary Role of Conversational Agents in e-Health Services

Angelo Ranieri, *University of Naples Parthenope, Italy*

Andrea Ruggiero, *University of Naples Parthenope, Italy*

09:57 Healthy Food Delivery: Evidences From Italy

Fabio Greco, *University of Naples Parthenope, Italy*

Francesco Carignani, *University of Naples Parthenope, Italy*

Marco Tregua, University of Naples Parthenope, Italy
 Francesco Bifulco, University of Naples Parthenope, Italy

10:11 Constitutive Pathway of an Innovative Health-Tech Ecosystem: The Healthware Group Case Study

Federica Izzo, University "Suor Orsola Benincasa", Italy
 Domenico Salvatore, University "Suor Orsola Benincasa", Italy
 Alessandra Storlazzi, University "Suor Orsola Benincasa", Italy

10:25 Managing Health Data Through AI Mechanisms: A Case Study Analysis

Francesco Schiavone, University of Naples Parthenope, Italy
 Daniele Leone, University of Naples Parthenope, Italy
Anna Bastone, University of Naples Parthenope, Italy

09:00 - 10:40 CEST

Session 7.2 - Legal aspects on Science & Society in Brain Computer Interface

Room: Marconi Hall

Chairs: Maria Cristina Gaeta, *Università degli Studi Suor Orsola Benincasa di Napoli, Italy*
 Roberta Presta, *Università degli Studi Suor Orsola Benincasa di Napoli, Italy*

09:00 [INVITED] Metrology Favors Legal Certainty in AI

09:20 Would I Consent If It Monitors Me Better? A Technology Acceptance Comparison of BCI-Based and Unobtrusive Driver Monitoring Systems

Roberta Presta, University Suor Orsola Benincasa, Italy
 Flavia De Simone, University Suor Orsola Benincasa, Italy
 Laura Mancuso, University Suor Orsola Benincasa, Italy
 Silvia Chiesa, RE:Lab, Italy
 Roberto Montanari, University Suor Orsola Benincasa, Italy

09:40 BCI Devices and Their Legal Compliance: A Prototype Tool for Its Evaluation and Measurement

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
 Anna Anita Mollo, Università Degli Studi Suor Orsola Benincasa, Italy

10:00 BCI Devices and Their Capacity to Express Human Will Having Legal Value: A Model of Risk-Based Classification

Lucilla Gatt, University Suor Orsola Benincasa, Italy
 Ilaria Amelia Caggiano, University Suor Orsola Benincasa, Italy
Emiliano Troisi, University Suor Orsola Benincasa, Italy
 Livia Aulino, University Suor Orsola Benincasa, Italy
 Davide D'Aloia, University Suor Orsola Benincasa, Italy
 Luigi Izzo, University Suor Orsola Benincasa, Italy

10:20 Technology to Unlock the Mind: Citizen Science and Sandbox Approach for a New Model of BCI Governance

Fiorella Battaglia, Ludwig-Maximilians-Universität München, Germany

Giuseppe Di Vetta, Sant'Anna School of Advanced Studies, Italy

09:00 - 10:40 CEST

Session 7.3 - Neural Data Contest - PART 1

Room: Laguna Hall

09:00 - 10:40 CEST

Session 7.4 - SPECIAL EVENT - Bitscope - PART 1

Room: Video-Conference Hall

09:00 Introduction to the BITSCOPE Project - Vision, Progress and Impact

Tomás Ward/Erin Redmond

09:20 The BITSCOPE Data Collection Protocol

Marc Welter

09:50 Passive BCI Data Collection Protocol for Neuroaesthetics

Open Discussion - moderated Marc Welter

10:40 - 11:00

COFFEE BREAK

Room: Room Polifunzionale / Room 3D / Foyer

10:40 - 11:00

DEMO SESSION 3.1

Room: Foyer

Chair: Nicola Moccaldi, *University of Naples Federico II, Italy*

The Role of Muscle and Tendon in Predicting Cartilage Degeneration and Tendinopathy

Zakia Khatun, *Università degli Studi di Salerno, Italy & Reykjavik University, Iceland*

Solenix for ESA/ESRIN

Paulo Sacramento, ESA

11:00 - 12:00 CEST

PLENARY SESSION

Room: Conference Hall

Chair: Cristina Mele, *University of Naples Federico II, Italy*

The Future of AI and IA

Jim Spohrer, International Society of Service Innovation Professionals

12:00 - 13:40 CEST

Session 8.1 - Sensors, Extended Reality and Artificial Intelligence for Human Behavior Analysis

Room: Conference Hall

Chairs: Andrea Zingoni, *University of Tuscia, Italy*

Juri Taborri, *University of Tuscia, Italy*

12:00 Analysing the Needs of Homeless People Using Feature Selection and Mining Association Rules

José M Alcalde-Llargo, *University of Córdoba, Spain*

Carlos García-Martínez, *University of Córdoba, Spain*

Pilar Aparicio-Martínez, *University of Córdoba, Spain*

Enrique Yeguas-Bolívar, *University of Córdoba, Spain*

Manuel Vaquero-Abellán, *University of Córdoba, Spain*

12:20 Machine Learning Prediction of the Expected Performance of Football Player During Training

Gianluca Morciano, *Università Campus Bio-Medico di Roma, Italy*

Andrea Zingoni, *University of Tuscia, Italy*

Andrea Morachioli, *Consorzio Netlog SRL, Italy*

Giuseppe Calabrò, *University of Tuscia, Italy*

12:40 Recognition of Recurrent Movement Patterns of Football Players via Machine Learning

Daniele Melloni, *University of Tuscia, Italy*

Andrea Zingoni, *University of Tuscia, Italy*

Andrea Morachioli, *Consorzio Netlog SRL, Italy*

Giuseppe Calabrò, *University of Tuscia, Italy*

13:00 Determining the Difficulties of Students With Dyslexia via Virtual Reality and Artificial Intelligence: An Exploratory Analysis

Enrique Yeguas-Bolívar, *University of Córdoba, Spain*

José M Alcalde-Llargo, *University of Córdoba, Spain*

Pilar Aparicio-Martínez, *University of Córdoba, Spain*

Juri Taborri, *University of Tuscia, Italy*

Andrea Zingoni, *University of Tuscia, Italy*

Sara Pinzi, *University of Córdoba, Spain*

13:20 Exploring the Dynamics of Emotions in the Space of Colours Through the Viable Systems Approach (vSa) Perspective

Sergio Barile, Sapienza University of Rome, Italy

Clara Bassano, University of Salerno, Italy

Pietro Vito, Sapienza University of Rome, Italy

Aysel Alizada, Sapienza University of Rome, Italy

Roberto Cavaliere, University of Salerno, Italy

Paolo Barile, University of Salerno, Italy

12:00 - 13:40 CEST

Session 8.2 - Soft Sensors for Industry 4.0

Room: Marconi Hall

Chairs: Salvatore Graziani, *University of Catania, Italy*

Maria Gabriella Xibilia, *University of Messina, Italy*

12:00 Estimating Finite-Time Delay in Dynamical Soft Sensors: An Industrial Case of Study

Salvatore Graziani, University of Catania, Italy

Luca Patanè, University of Messina, Italy

Maria Gabriella Xibilia, University of Messina, Italy

12:20 Application of Data Distribution Metrics for Soft Sensors in Industrial Scenarios

Francesco Curreri, University of Palermo, Italy

Luca Patanè, University of Messina, Italy

Maria Gabriella Xibilia, University of Messina, Italy

12:40 A Combined Approach Using Lorentzian Fitting and ANNs for Microwave Resonator Modeling

Zlatica Marinković, University of Nis, Serbia

Giovanni Gugliandolo, University of Messina, Italy

Giuseppe Campobello, University of Messina, Italy

Giovanni Crupi, University of Messina, Italy

Nicola Donato, University of Messina, Italy

13:00 Batch Endpoint Prediction Using Local Mixture of Batch Time Experts

Francisco Souza, Radboud University, The Netherlands

Tim Offermans, Radboud University, The Netherlands

Jeroen Jansen, Radboud University, The Netherlands

13:20 Artificial Neural Networks for the Forecasting of Wave Climate in Proximity of Harbour Area

Elisa Castro, University of Catania, Italy

Giovanni Santonocito, University of Catania, Italy

Antonino Andrea Moschetto, University of Catania, Italy

Claudio Iuppa, University of Messina, Italy

Rosaria Musumeci, University of Catania, Italy

Luca Cavallaro, University of Catania, Italy

Enrico Foti, University of Catania, Italy

12:00 - 13:40 CEST

Session 8.3 - Neural Data Contest - PART 2

Room: Laguna Hall

12:00 - 13:40 CEST

Session 8.4 - SPECIAL EVENT - BitScope - PART 2

Room: Video-Conference Hall

12:00 An Introduction to the OpenViBE platform

Axel Bouneau/Fabien Lotte

12:30 Closed session BITSCOPE Consortium Management Committee

13:40 - 14:40

LUNCH

Room: Room Polifunzionale / Room 3D / Foyer

14:00 - 14:40

POSTER SESSION #3

Chairs: Oscar Tamburis, *National Research Council of Italy*

Egidio De Benedetto, *University of Naples Federico II, Italy*

Room: Room Polifunzionale / Room 3D / Foyer

PS-20 Predictive Maintenance of Industrial Equipment Using Deep Learning: From Sensory Data to Remaining Useful Life Estimation

David C. Nchekwube, 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*

Sauro Longhi, *Università Politecnica delle Marche, Italy*

Andrea Monteriù, *Università Politecnica delle Marche, Italy*

PS-21 Evaluation of the Effectiveness of a Wearable, AR-Based BCI for Robot Control in ADHD Treatment

Pasquale Arpaia, *University of Naples Federico II, Italy*

Sabatina Criscuolo, University of Naples Federico II, Italy

Egidio De Benedetto, *University of Naples Federico II, Italy*

Nicola Donato, *University of Messina, Italy*

Luigi Duraccio, *Politecnico di Torino, Italy*

- PS-22 A New Dataset of Satellite Images for Deep Learning-Based Coastline Measurement**
Marco Scarpetta, Polytechnic University of Bari, Italy
Maurizio Spadavecchia, Polytechnic University of Bari, Italy
Vito Ivano D'Alessandro, Polytechnic University of Bari, Italy
Luisa De Palma, Polytechnic University of Bari, Italy
Nicola Giaquinto, Polytechnic University of Bari, Italy
- PS-23 Semi-Automated Image Segmentation of Peri-Prostatic Tissue on MRI and Radiomics Features Stability: A Feasibility Study for Locally Advanced Prostate Cancer Detection**
Arnaldo Stanzione, University of Naples Federico II, Italy
Renato Cuocolo, University of Salerno, Italy
Gianluigi Califano, University of Naples Federico II, Italy
Andrea Ponsiglione, University of Naples Federico II, Italy
Claudia Colla Ruvolo, University of Naples Federico II, Italy
Gaia Spadarella, University of Naples Federico II, Italy
Marco De Giorgi, University of Naples Federico II, Italy
Francesca Nessuno, University of Naples Federico II, Italy
Nicola Longo, University of Naples Federico II, Italy
Massimo Imbriaco, University of Naples Federico II, Italy
- PS-24 To the Green From the Bl(u)e: An Innovative System for Monitoring Urban Green Areas**
Adriano Tramontano, National Research Council of Italy, Italy
Oscar Tamburis, National Research Council of Italy, Italy
Mario Magliulo, National Research Council of Italy, Italy
- PS-25 Artificial Neural Network for the Identification of Postural Instability in Subject Wearing Lower Limb Exoskeleton**
Ilaria Mileti, University Niccolò Cusano, Italy
Juri Taborri, University of Tuscia, Italy
Diego Torricelli, Spanish National Research Council, Spain
Stefano Rossi, University of Tuscia, Italy
Fabrizio Patanè, Niccolò Cusano University, Italy

14:40 - 15:30 CEST

TUTORIAL SESSION

Room: Conference Hall

Chair: Lucio Tommaso De Paolis, *University of Salento, Italy*

Immersive Training & Simulation for Electronic Equipment

Salvatore D'Onofrio, *Leonardo*

15:30 - 15:50

COFFEE BREAK

Room: Room Polifunzionale / Room 3D / Foyer

15:30 - 15:50

DEMO SESSION 3.2

Room: Foyer

Chair: Nicola Moccaldi, *University of Naples Federico II, Italy*

The Role of Muscle and Tendon in Predicting Cartilage Degeneration and Tendinopathy

Zakia Khatun, *Università degli Studi di Salerno, Italy & Reykjavik University, Iceland*

Solenix for ESA/ESRIN

Paulo Sacramento, ESA

15:50 - 17:30 CEST

Session 9.1 - Intrinsic Uncertainty in EEG-based Passive Brain Computer Interface (BCI)

Room: Conference Hall

Chairs: Antonio Esposito, *University of Naples Federico II, Italy*

Nicola Moccaldi, *University of Naples Federico II, Italy*

15:50 EEG-Based System for Executive Function Fatigue Detection

Andrea Apicella, *University of Naples Federico II, Italy*

Pasquale Arpaia, *University of Naples Federico II, Italy*

Paolo De Blasiis, *University of Campania Vanvitelli, Italy*

Anna Della Calce, *University of Naples Federico II, Italy*

Allegra Fullin, *University of Campania Vanvitelli, Italy*

Ludovica Gargiulo, *University of Naples Federico II, Italy*

Luigi Maffei, *University of Campania Vanvitelli, Italy*

Francesca Mancino, *University of Naples Federico II, Italy*

Nicola Moccaldi, *University of Salento, Italy*

Andrea Pollastro, *University of Naples Federico II, Italy*

Ersilia Vallefuooco, *University of Naples Federico II, Italy*

16:10 Reproducible Assessment of Valence and Arousal Based on an EEG Wearable Device

Andrea Apicella, *University of Naples Federico II, Italy*

Pasquale Arpaia, *University of Naples Federico II, Italy*

Andrea Cataldo, *University of Salento, Italy*

Giovanni D'Errico, *Politecnico di Torino, Italy*

Davide Marocco, *University of Naples Federico II, Italy*

Giovanna Mastrati, *University of Naples Federico II, Italy*

Nicola Moccaldi, *University of Salento, Italy*

Andrea Pollastro, *University of Naples Federico II, Italy*

Bernadette Ricciardi, *University of Naples Federico II, Italy*

Ersilia Vallefuooco, *University of Naples Federico II, Italy*

- 16:30 Multi-Electrode Array (MEAs) to Investigate Pathogenetic Disease Mechanisms and Pharmacological Properties in iPSC-Derived Neurons Modelling Neuropsychiatric Diseases**
Giusy Carleo, University of Federico II, Naples, Italy
Yi-Shin Lee, University of Federico II, Naples, Italy
Agnese Secondo, University of Federico II, Naples, Italy
Francesco Miceli, University of Federico II, Naples, Italy
Maurizio Tagliatela, University of Federico II, Naples, Italy
- 16:50 An Open Source Multi-Modal Data-Acquisition Platform for Experimental Investigation of Blended Control of Scale Vehicles**
Peter Redmond, Dublin City University, Ireland
Andrew Fleury, Dublin City University, Ireland
Tomas Ward, Dublin City University, Ireland
- 17:10 Signal Quality Assessment of a Wearable Electroencephalography (EEG) Device Built on a Flexible Printed Circuit: FlexEEG**
Naomi du Bois, Ulster University, United Kingdom
Ryan Beveridge, Ulster University, United Kingdom
Niall McShane, Ulster University, United Kingdom
Tony Moore, Mortronics Ltd., Ireland
Damien Coyle, Ulster University, United Kingdom

15:50 - 17:30 CEST

Session 9.2 - Effective brain-computer interfaces based on active paradigms and extended reality

Room: Marconi Hall

Chairs: Emma Colamarino, *Sapienza University of Rome, Fondazione Santa Lucia IRCCS, Italy*
Niall McShane, *Ulster University, United Kingdom*

- 15:50 Exploring Strategies for Multimodal BCIs in an Enriched Environment**
Tristan Venot, Sorbonne Université, France
Arthur Desbois, Sorbonne Université, France
Marie-Constance Corsi, Sorbonne Université, France
Laurent Hugueville, Sorbonne Université, France
Ludovic Saint-Bauzel, Sorbonne Université, France
Fabrizio De Vico Fallani, Sorbonne Université, France
- 16:10 Multimodal Feedback in Assisting a Wearable Brain-Computer Interface Based on Motor Imagery**
Pasquale Arpaia, University of Naples Federico II, Italy
Damien Coyle, University of Ulster, United Kingdom
Francesco Donnarumma, National Research Council, Italy
Antonio Esposito, University of Naples Federico II, Italy
Angela Natalizio, Politecnico di Torino, Italy
Marco Parvis, Politecnico di Torino, Italy

Marisa Pesola, University of Naples Federico II, Italy
 Ersilia Vallefucio, University of Naples Federico II, Italy

16:30 Online 3D Motion Decoder BCI for Embodied Virtual Reality Upper Limb Control: A Pilot Study

Niall McShane, University of Ulster, United Kingdom
 Karl McCreadie, University of Ulster, United Kingdom
 Darryl Charles, University of Ulster, United Kingdom
 Attila Korik, University of Ulster, United Kingdom
 Damien Coyle, University of Ulster, United Kingdom

16:50 Classifying Words in Natural Reading Tasks Based on EEG Activity to Improve Silent Speech BCI Training in a Transfer Approach

Maurice Rekrut, German Research Center for Artificial Intelligence, Germany
 Andreas Fey, Saarland University, Germany
 Matthias Nadig, German Research Center for Artificial Intelligence, Germany
 Johannes Ihl, German Research Center for Artificial Intelligence, Germany
 Tobias Jungbluth, German Research Center for Artificial Intelligence, Germany
 Antonio Krüger, German Research Center for Artificial Intelligence, Germany

17:10 Low Frequency Brain Oscillations for Brain-Computer Interface Applications: From the Sources to the Scalp Domain

Elena Mongiardini, University of Rome Sapienza, IRCCS Fondazione Santa Lucia, Italy
 Emma Colamarino, University of Rome Sapienza, IRCCS Fondazione Santa Lucia, Italy
 Jlenia Toppi, University of Rome Sapienza, IRCCS Fondazione Santa Lucia, Italy
 Valeria de Seta, University of Rome Sapienza, IRCCS Fondazione Santa Lucia, Italy
 Floriana Pichiorri, IRCCS Fondazione Santa Lucia, Italy
 Donatella Mattia, IRCCS Fondazione Santa Lucia, Italy
 Febo Cincotti, University of Rome Sapienza, IRCCS Fondazione Santa Lucia, Italy

15:50 - 17:30 CEST

Session 9.3 - Ph.D Forum

Room: Laguna Hall

Chairs: Alfonso Maria Ponsiglione, *University of Naples Federico II, Italy*
 Carlo Ricciardi, *University of Naples Federico II, Italy*

15:50 - 17:30 CEST

Session 9.4 - From Artificial Intelligence to Extended Reality for Emergency and Disaster Management

Room: Video-Conference Hall

Chairs: Silvia Liberata Ullo, *University of Sannio, Italy*
 Fabio Leccese, *Roma Tre University, Italy*

- 15:50 Early Detection of Volcanic Eruption Through Artificial Intelligence on Board**
Pietro Di Stasio, University of Sannio, Italy
Alessandro Sebastianelli, University of Sannio, Italy
Gabriele Meoni, European Space Agency, Italy
Silvia Liberata Ullo, University of Sannio, Italy
- 16:10 A Demo Setup Testing Onboard CNNs for Volcanic Eruption Detection**
Maria Pia Del Rosso, University of Sannio, Italy
Alessandro Sebastianelli, University of Sannio, Italy
Dario Spiller, Sapienza University of Rome, Italy
Silvia Liberata Ullo, University of Sannio, Italy
- 16:30 Wildfire Segmentation Analysis From Edge Computing for On-Board Real-Time Alerts Using Hyperspectral Imagery**
Dario Spiller, Sapienza University of Rome, Italy
Kathiravan Thangavel, RMIT University, Australia
Sarithchandrakumar Thottuchirayil Sasidharan, Sapienza University of Rome, Italy
Stefania Amici, National Institute of Geophysics and Volcanology, Italy
Luigi Ansalone, ASI - Italian Space Agency, Italy
Roberto Sabatini, Khalifa University of Science and Technology, United Arab Emirates
- 16:50 Hardware-In-The-Loop Simulations of Remote Sensing Disaster Monitoring Systems With Real-Time On-Board Computation**
Dario Spiller, Sapienza University of Rome, Italy
Andrea Carbone, Sapienza University of Rome, Italy
Francesco Latorre, Sapienza University of Rome, Italy
Fabio Curti, Sapienza University of Rome, Italy
- 17:10 EO Space and Multi-Source Data Visualization Using Virtual Reality in the ESA Φ-Lab**
Paulo Sacramento, Solenix for ESA, Italy
Anatole Deligant, Palacký University Olomouc, Czech Republic
Sveinung Loekken, European Space Agency, Italy
Pierre-Philippe Mathieu, European Space Agency, Italy

17:30 - 17:50 CEST

CLOSING AND AWARD CEREMONY

Room: Conference Hall
