CONFERENCE PROGRAM

IEEE

UNIVERSITÀ CAMPUS BIO-MEDICO DI ROMA

2026 IEEE INTERNATIONAL WORKSHOP ON

METROLOGY for INDUSTRY 4.0 & IoT

UNIVERSITÀ CAMPUS BIO-MEDICO DI ROMA

METRO IND4.0 & IoT ROMA 2026

JUNE 10 - 12 2026

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Welcome Message from the General Chairs

On behalf of the Organizing Committee, we are pleased to welcome you to the *2026 IEEE International Workshop on Metrology for Industry 4.0 and IoT (hereafter "Metroind4.0&IoT")*. It is a great pleasure to host you at this 9th edition of *Metroind4.0&IoT*, and we sincerely hope that it will provide you with new valuable insights into latest advances in in electronic instrumentation and measurement and it will promote or consolidate fruitful collaborations between participants. Such collaborations may emerge during both the scientific and social program of the conference.

This ninth edition is being held at Università Campus Bio-Medico di Roma (UCBM), Rome, Italy. This is the third time that UCBM has been responsible for organizing *Metroind4.0&IoT*, however the first two editions were held virtually due to the COVID-1919 emergency. However, the successful organization of *Metroind4.0&IoT* would not have been possible without the dedication and expertise of the organising committee, which included active participation from the University of Florence, University of Brescia, University of Bologna, Sungkyunkwan.

This prestigious event brings together leading academics, industry experts, and practitioners from around the world to discuss the critical role of metrology in the rapidly evolving fields of Industry 4.0 and the Internet of Things (IoT).

During the workshop, attendees will explore a comprehensive programme featuring cutting-edge research, innovative methodologies, and practical applications that are shaping the future of instrumentation, measurement, sensors design and fabrication, algorithms and data analysis techniques in various fields. Key topics at this year's conference include advances in Sensors and AI in sport sciences, measurement technologies and sensors in healthcare robotics, medical applications and plant sciences, use in wearable systems in many scenarios, the use of 3d printing sensors and computer vision in Industry 4.0. Specific applications of measurement techniques and AI-algorithms in cardiovascular and neurological diseases will also be presented.

The program is organized in 36 parallel sessions over the 3 days. We warmly thank the researchers who proposed the 28 special sessions, the colleagues that submitted more than 150 papers, and all those involved in the review process, as well as the chairs of both the special and the general sessions that constitute the backbone of this workshop.

All the extended abstracts underwent a rigorous peer-review process based on relevance, quality, significance and novelty. The conference proceedings will be submitted for publication in the IEEEXplore Digital Library. We would like to thank all the reviewers who contributed to the selection process and helped improve the high scientific quality of the workshop.

In addition to the technical sessions for presenting scientific papers, *Metroind4.0&IoT 2026* features many other relevant scientific activities.

- **Three tutorials covering three relevant fields**:
  Alberto Morato (CNR-IEIIT, University of Padova) will present a tutorial titled "Design and Validation of Deterministic Distributed Measurement Systems Using TSN in Hybrid Wired/Wireless Networks";
  Salvatore Dello Iacono (University of Brescia) will present a tutorial titled "Smart Cities and

Smart Mobility";
Chiara Romano (UCBM) will focus on "Wearable sensors for cardiorespiratory monitoring: from technologies to signal processing algorithms and open challenges".

- **Three keynote Lectures**.
  We would like to express our sincere gratitude to our distinguished speakers:
  Sarthak Misra (University of Twente, The Netherlands) with the lecture "Wireless Control at the Microscale";
  Arash Ajoudani (Fondazione Istituto Italiano di Tecnologia, Italy) with "Wearables, Surroundables, and AI for Next-Generation Healthcare, Sports, and Robotics"
  Marco Paggi (IMT School for Advanced Studies Lucca, Italy) with "Stretchable, flexible and printed electronics on compliant substrates: Virtual testing protocols based on fracture mechanics".
- **Two technical visits**.
  The first one at the Simulation Center of UCBM, a center designed to become a benchmark in advanced education and training, combining technology, research, and immersive teaching methodologies to deliver an innovative learning experience. The second one at the Agri Research and Teaching Center. An innovative lab conceived as an advanced innovation hub and a distinctive model of strategic facility, representing one of the first productive applications of this model in Europe. We are grateful to Campus Bio-Medico spa for organizing this activity.
- **A Challenge** focused on "Wearable Systems and Smart Devices" that involved 14 groups of young researchers.
- **A round table** on experiential laboratory education.
- **Two Demo** focused on the impact of technology 4.0 on healthcare and on education.

We really want to thank patrons and sponsors for supporting this event.

MetroInd4.0&IoT assigned 5 awards: The "Best Conference Paper Award", the "Best Paper Presented by a Young Researcher", sponsored by the "IEEE Young Professionals Affinity Group" of the IEEE Italy Section, the "Best Paper Presented by a Woman", the "Soft Science Paper Award", sponsored by Soft Science Journal, and the Best Poster Award.

We hope that your participation at IEEE MetroInd4.0&IoT 2026 will be intellectually stimulating and professionally rewarding. We trust you will find the conference inspiring and enriching. We look forward to your contributions toward advancing the field of metrology in Industry 4.0 and the IoT.

The *2026 IEEE International Workshop on Metrology for Industry 4.0 and IoT* is about to begin! Metrologists, industrial ICT engineers, and IoT designers, enjoy the workshop!

June 2026

Emiliano Schena, *Università Campus Bio-Medico di Roma, Italy*
Alessio Gizzi, *Università Campus Bio-Medico di Roma, Italy*
Davide Brunelli, *Università of Bologna, Italy*
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IEEE MetroInd4.0&IoT 2026 Keynote Speakers

Keynote Lecture - Wednesday June 10 - H 14:00

Wireless Control at the Microscale

Sarthak **Misra**

Surgical Robotics Laboratory, University of Twente, The Netherlands

ABSTRACT

Miniaturized agents can be steered wirelessly within confined and hard-to-reach environments. Such operation at millimeter and micrometer scales requires accurate measurement, reliable feedback, and effective visualization.

This talk presents research from the Surgical Robotics Laboratory on the steering of miniaturized agents using magnetic and acoustic fields. It addresses methods for generating and modulating actuation fields, control strategies for directing agent motion, and techniques for monitoring agent behavior during operation. Ultrasound- and fluorescence-based imaging methods are presented for localization and tracking.

The presentation discusses key technical challenges associated with real-time control and observation of small, untethered agents, with emphasis on precision, stability, and repeatability at small scales.

SPEAKER BIOGRAPHY

Sarthak Misra is a Full Professor in the Department of Biomechanical Engineering at the University of Twente, The Netherlands. He is also affiliated with the Department of Biomaterials and Biomedical Technology at the University of Groningen and the University Medical Center Groningen. Prof. Misra obtained his PhD in Mechanical Engineering from Johns Hopkins University, USA. Prior to his doctoral studies, he worked for three years as a dynamics and controls analyst at MacDonald, Dettwiler and Associates, contributing to the International Space Station program. He received his Master of Engineering degree in Mechanical Engineering from McGill University, Canada. He is the recipient of multiple prestigious awards, including European Research Council (ERC) Starting, Consolidator, and Proof-of-Concept grants, as well as the

Netherlands Organisation for Scientific Research (NWO) VENI, VIDI, and VICI awards. He has also received the NASA Space Flight Awareness Award. Prof. Misra previously served as Co-Chair of the IEEE Robotics and Automation Society Technical Committee on Surgical Robotics and as Area Co-Chair of the IFAC Technical Committee on Biological and Medical Systems. His research interests lie in applied mechanics across macro- and micro-scales, with a focus on the modeling and control of electromechanical systems for medical robotics applications.

Keynote Lecture - Thursday June 11 - H 10:45

Wearables, Surroundables, and AI for Next-Generation Healthcare, Sports, and Robotics

Arash **Ajoudani**
Fondazione Istituto Italiano di Tecnologia, Italy

ABSTRACT

Wearables, ranging from physiological sensors to smart textiles and lightweight exoskeletons, provide continuous, high-resolution insight into individual states such as fatigue, stress, movement quality, and cognitive load. In parallel, surroundables, i.e., ambient sensing ecosystems built from cameras, LiDAR, mmWave, UWB, and intelligent environments, offer contextual, multi-person, and task-aware monitoring without the need for instrumentation on the body. Individually, each class of technology offers powerful but partial perspectives: wearables provide intimate, personalized data; surroundables provide scalable, non-invasive situational awareness. When integrated, however, they create a unified human-centric perception pipeline capable of robust, multimodal estimation of physical workload, ergonomics, intent, and health risks. This fusion opens the way to adaptive assistance in healthcare, sports performance augmentation, and human–robot interaction, where robots, AI systems, and clinical tools can dynamically adjust their behavior based on a holistic understanding of human states. This talk will explore how each or combination of these two technological ecosystems can unlock a new generation of responsive, intelligent, and safe human-centered applications, from proactive clinical monitoring and rehabilitation robotics to predictive fatigue management in sports and next-generation assistive AI.

SPEAKER BIOGRAPHY

Arash Ajoudani is the director of the Human-Robot Interfaces and Interaction (HRI^2) laboratory at IIT. He is a recipient of the European Research Council (ERC) grants Real-Move (ERC POC 2023) and Ergo-Lean (ERC STG 2019), the coordinator of the Horizon-2020 project SOPHIA, the co-coordinator of the Horizon-2020 project CONCERT, and a principal investigator of the Horizon Europe project Tornado, HORIZON-MSCA project RAICAM, and the national projects LABORIUS, COROMAN, and ReFinger. He is a recipient of the IEEE Robotics and Automation Society (RAS)

Early Career Award 2021, and winner of the MECSPE Robotics and AI Awards 2025, SmartCup Liguria award 2023, Amazon Research Awards 2019, of the Solution Award 2019 (MECSPE2019), of the KUKA Innovation Award 2018, of the WeRob best poster award 2018, and of the best student paper award at ROBIO 2013. His PhD thesis was a finalist for the Georges Giralt PhD award 2015 - best European PhD thesis in robotics. He was also a finalist for the best paper award on human-robot interaction at ICRA2024, the best paper award mobile manipulation at IROS 2022, the best paper award at Humanoids 2022 (oral category), the Solution Award 2020 (MECSPE2020), the best conference paper award at Humanoids 2018, the best interactive paper award at Humanoids 2016, the best oral presentation award at Automatica (SIDRA) 2014, and for the best manipulation paper award at ICRA 2012. He is the IIT principal investigator of s the Robotics for Manufacturing (R4M) joint lab of the Leonardo labs, and of the IIT-Intellimech JOiiNT lab. He is the author of the book "Transferring Human Impedance Regulation Skills to Robots" in the Springer Tracts in Advanced Robotics (STAR), and several publications in journals, international conferences, and book chapters. He is currently serving as an elected IEEE RAS AdCom member (Class 2024 and Class 2027) and as a Senior Editor of the International Journal of Robotics Research (IJRR). He has been serving as a member of scientific advisory committee and as an associate editor for several international journals and conferences such as IEEE RAL, ICRA, IROS, ICORR, etc. He is a scholar of the European Lab for Learning and Intelligent Systems (ELLIS). His main research interests are in physical human-robot interaction, mobile manipulation, robust and adaptive control, assistive robotics, and tele-robotics.

Stretchable, flexible and printed electronics on compliant substrates: Virtual testing protocols based on fracture mechanics

Marco **Paggi**
IMT School for Advanced Studies Lucca, Italy

ABSTRACT

Stretchable strain sensors have become increasingly critical in applications such as tactile sensing for bioinspired robots, human-machine interactions, biomedical instruments/tools, wearable healthcare systems, and diagnosis of rehabilitation of dermal diseases. The reliability of such sensors bonded or printed on compliant substrates (skin, textiles, polymers, paper) strongly depends upon the mechanical compatibility of the sensor and the substrate materials. This lecture summarizes research results in the field of computational mechanics to develop accurate virtual testing methodologies for the analysis of failure modes (debonding, cracking, etc.) in such devices, as a guide for reliability testing protocols.

SPEAKER BIOGRAPHY

Marco Paggi is a Full Professor of Structural Mechanics at the IMT School for Advanced Studies Lucca, Italy. He serves as the Deputy Rector and directs both the Multi-scale Analysis of Materials (MUSAM) research unit and the MUSAM-Lab. He received his PhD in Structural Mechanics from the Politecnico di Torino, Italy, in 2005. In 2010, he was awarded an Alexander von Humboldt Research Fellowship at Leibniz Universität Hannover, Germany. He has held visiting positions at several prestigious institutions, including Université Paris-Est (France), the University of Girona (Spain), the Indian Institute of Technology Delhi (India), Tongji University (China). His research focuses on contact mechanics, fracture mechanics, and multiphysics simulations, with applications to a wide range of structural and material systems. He is author of over 250 peer-reviewed publications and has been the Principal Investigator of numerous EU-funded projects, including two prestigious grants from the European Research Council (ERC).

IEEE MetroInd4.0&IoT 2026 Tutorials

Tutorial Session - Wednesday June 10 - H 18:00

Design and Validation of Deterministic Distributed Measurement Systems Using TSN in Hybrid Wired/Wireless Networks

Alberto **Morato**
CNR-IEIIT, University of Padova, Italy

ABSTRACT

The evolution toward Industry 4.0 and 5.0 is driving measurement systems from isolated devices to distributed, networked infrastructures where sensing data directly feed real-time control and safety-critical decisions. In this context, conventional best-effort communication is no longer sufficient: bounded latency, deterministic delivery, and precise time synchronization become metrological requi-rements, not merely networking features. Time-Sensitive Networking (TSN) extends standard Ether-net with synchronized clocks, traffic scheduling, and fault-tolerance mechanisms, enabling sub-microsecond alignment and predictable end-to-end latency in distributed instrumentation systems.

As measurement architectures increasingly demand modularity, mobility, and reduced wiring, deter-ministic guarantees must also extend to wireless domains. The integration of TSN with advanced Wi-Fi and 5G technologies introduces new challenges in synchronization transfer, jitter containment, con-figuration complexity, and cross-layer performance optimization. Achieving consistent timing accura-cy across hybrid wired/wireless infrastructures requires careful architectural design and rigorous vali-dation strategies.

This tutorial presents a holistic framework for designing and validating deterministic distributed measurement systems based on TSN and hybrid communication technologies. Drawing on experi-mental testbeds and industrial use cases, it discusses performance assessment methodologies, timing verification techniques, and reliability evaluation approaches. The goal is to provide attendees with practical design guidelines and validated integration strategies to ensure measurement accuracy, scala-bility, and resilience in next-generation Industry 4.0 and IoT environments.

SPEAKER BIOGRAPHY

Alberto Morato received the M.Sc. and Ph.D. degrees in Automation Engineering and Information Engineering from the University of Padova, Italy, in 2017 and 2022, respectively. He is researcher at the National Research Council of Italy (CNR-IEIIT) and Adjunct Professor at the University of Padova. Current research interests include the Industrial Internet of Things (IIoT), Time-Sensitive Networking (TSN), functional safety, and distributed measurement systems in hybrid wired-wireless and 5G environments. Member of the IEEE Instrumentation and Measurement Society (IEEE-IMS) and the IEEE-IMS Technical Committee on Measurements and Networking (TC37). He serves in the organizing and technical program committees of several international conferences. Guest Editor for Sensors from MDPI.

Tutorial Session - Thursday June 11 - H 14:00

Smart Cities and Smart Mobility

Salvatore **Dello Iacono**
University of Brescia, Italy

ABSTRACT

Starting from the evolution of urban mobility toward more connected, data-driven, and sustainable systems, the tutorial will introduce the main IoT building blocks, including embedded sensors, low-power communication technologies, edge and cloud platforms, and data analytics solutions. Particular attention will be given to how these technologies support the monitoring, optimization, and management of mobility services and infrastructures, especially in the context of light and sustainable mobility.
The session will also discuss the main ICT challenges related to interoperability, scalability, resilience, and real-time data integration in complex urban environments. To complement the methodological overview, the tutorial will present applicative case studies showing how IoT devices can be effectively deployed in real scenarios, such as renewable-energy charging stations for light electric vehicles and systems for cyclist monitoring. Overall, the tutorial aims to provide participants with both a conceptual framework and practical insights into the development of smarter and more sustainable urban mobility ecosystems.

SPEAKER BIOGRAPHY

Salvatore Dello Iacono (IEEE Member) is an Assistant Professor with the Department of Information Engineering at the University of Brescia, Italy. He carries out research on inertial measurement systems and positioning algorithms; he is actively involved in research on sustainable light mobility, with interests in battery modeling and battery management systems. His main areas of expertise include embedded real-time signal processing on microcontrollers and DSPs, and Industrial IoT (IIoT) devices.

Wearable sensors for cardiorespiratory monitoring: from technologies to signal processing algorithms and open challenges

Chiara **Romano**

Measurements and Biomedical Instrumentation Unit
Dept. of Engineering, Università Campus Bio-Medico di Roma, Italy

ABSTRACT

The growing demand for continuous health monitoring in clinical, occupational, and sports settings is driving the development of wearable systems capable of reliably estimating cardiorespiratory parameters outside traditional laboratory environments. However, translating raw sensor data into accurate heart rate (HR) and respiratory rate (RR) estimates requires careful algorithm design, robust signal processing, and rigorous metrological validation, particularly in the presence of motion artifacts and signal quality degradation.

This tutorial presents a comprehensive framework for the design and validation of wearable systems for cardiorespiratory monitoring systems. Starting from sensor selection and characterization, it covers the full signal processing pipeline, HR and RR extraction via both time-domain peak detection and frequency-domain windowed analysis, and motion artifact mitigation through multi-sensor fusion and signal quality index evaluation. Practical examples drawn from real acquisition campaigns across different activity levels are also discussed.

The tutorial aims to provide attendees with actionable guidelines for developing and benchmarking wearable cardiorespiratory systems, addressing the trade-offs between algorithm complexity, temporal resolution, and robustness to real-world disturbances.

SPEAKER BIOGRAPHY

Chiara Romano received the Ph.D. degree in 2024 from the Università Campus Bio-Medico di Roma (UCBM), Italy. She was then a visiting postdoctoral researcher at the Technical University of Munich (TUM), Germany, working on wearable sensors for exosuits. She is currently a Postdoctoral Researcher at the Measurements and Biomedical Instrumentation Unit, Dept. of Engineering, UCBM. Her research focuses on the design, development, and validation of

wearable systems and algorithms for monitoring physiological parameters in clinical, occupational, and sports settings. She is active in editorial activities as Guest Editor for biomedical engineering journals and serves as reviewer for international peer-reviewed journals. She is an IEEE Graduate Student Member, a member of the IEEE Instrumentation & Measurement Society, and served as Secretary of the IEEE Student Branch at UCBM.

IEEE MetroInd4.0&IoT 2026 Technical Visits

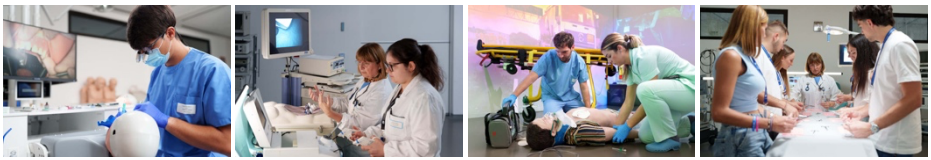
During IEEE MetroInd4.0&IoT 2026, participants will have the opportunity to take part in technical visits to two facilities of the Università Campus Bio-Medico di Roma. Further details are provided below. For more information and to book a visit, please ask at the registration desk.

Agri Research and Teaching Center

As an integrated response to the major contemporary global challenges, including food security, environmental sustainability, efficient management of natural resources, technological innovation and the protection of human health, the "Agri Research and Teaching Center" of Campus Bio-Medico was established. It is conceived as an advanced innovation hub and a distinctive model of strategic facility, representing one of the first productive applications of this model in Europe. In an increasingly complex and interconnected context, it is necessary to adopt models capable of simultaneously addressing these critical issues, according to a systemic vision linked to the One Health paradigm, which connects the environment, human beings and production systems. It's within this framework that the Agri Research and Teaching Center takes shape, as an integral part of the Social Green Masterplan, conceived as an evolved ecosystem integrating research, healthcare, education and environmental sustainability.

Simulation Center

Designed to become a benchmark in advanced education and training, the UCBM Simulation Center combines technology, research, and immersive teaching methodologies to deliver an innovative learning experience. Healthcare professionals, companies, students, and residents can engage in complex clinical scenarios in a completely safe environment, developing both technical and non-technical skills through experiential learning. Continuously evolving, the Center is ready to host the latest innovations in medical simulation and healthcare engineering.



IEEE MetroInd4.0&IoT 2026 Venue

IEEE MetroInd4.0&IoT 2026 will be held at the **Università Campus Bio-Medico di Roma** - **CU.BO.** Cultural Box.

The new development is dedicated to interdisciplinary activities and aims to complement the current university buildings with the goal of enhancing the quality of campus life. The new spaces have a modular design to allow an array of functions and to encourage interaction with the local community, in the spirit of innovative mobility, economic and environmental sustainability.

ADDRESS

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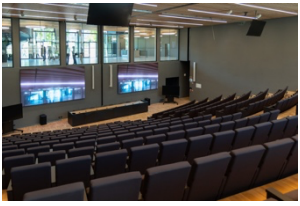
Roma

Use the QRCode to open the location on *Google Maps*



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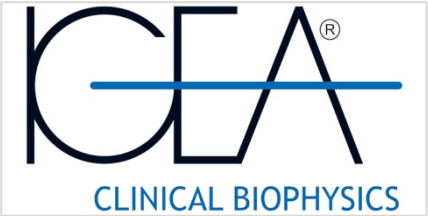

WEDNESDAY, JUNE 10					
13:30 - 14:00	**OPENING CEREMONY - WELCOME ADDRESSES -** *Auditorium CuBO* Prof. Bruno Vincenzi, *Dean of the Department of Medicine, Università Campus Bio-Medico di Roma* Prof. Simonetta Filippi, *Vice Rector for Internazionalization, Università Campus Bio-Medico di Roma* Prof. Alessio Gizzi, *Dean of the Department of Engineering, Università Campus Bio-Medico di Roma* Prof. Emiliano Schena, *Vice Rector for Education, Università Campus Bio-Medico di Roma*				
14:00 - 15:00	*Auditorium CuBo* - KEYNOTE LECTURE - Sarthak Misra, *University of Twente, The Netherlands* Wireless Control at the Microscale				
	Room CB27A	**Room CB27B**	**Room CB28A**	**Room CB28B**	
15:00 - 16:00	S1.1 - Metrological characterization of AI-based measurement systems: how to find a compromise between measurement accuracy, hardware requirements, and computational cost	S1.2 - General Session - PART I	S1.3 - AI-Driven Sensor Systems for Reliable Measurement and Safety in Environmental and Biomedical Applications	S1.4 - Sensor, IoT, and AI-driven Technologies for Sustainable Agrifood Industry 5.0, Quality Assurance, Food Production, and Food Safety - PART I	
16:00 - 16:30	COFFEE BREAK				Room CB30B
16:30 - 18:00	S2.1 - Wearable Sensors: From Design and Optimization to Manufacturing and Testing	S2.2 - Applications of Machine Learning and Computer Vision in Industry 4.0	S2.3 - Cardiovascular engineering: from sensors to decision support systems	S2.4 - Measurements and Virtual Measurements Toward Industry 5.0: Approaches and Solutions for Smart Manufacturing	Wearable and Smart Device Challenge
18:00 - 19:00	*Auditorium CuBo* - TUTORIAL - Alberto Morato, *CNR-IEIIT, University of Padova* Design and Validation of Deterministic Distributed Measurement Systems Using TSN in Hybrid Wired/Wireless Networks				
19:00	WELCOME PARTY - *Università Campus Bio-Medico di Roma - CuBo*				

Program Schedule - Thursday, June 11

THURSDAY, JUNE 11					
	Room CB27A	**Room CB27B**	**Room CB28A**	**Room CB28B**	
09:00 - 10:15	S3.1 - Advances And Emerging Solutions In Measurements For Environmental And Human Health Monitoring In Industry And Healthcare - PART I	S3.2 - Challenges and Advances in Vision-Based Frameworks for Monitoring and Assessment of Occupational Safety and Ergonomics	S3.3 - Innovations in Early detection and monitoring of neurological and psychological disorders	S3.4 - Smart Measurement Systems: From Gas Sensing to Diagnostics	
10:15 - 10:45	COFFEE BREAK				
10:45 - 11:45	*Auditorium CuBo* - KEYNOTE LECTURE - Arash Ajoudani, *Fondazione Istituto Italiano di Tecnologia, Italy* Wearables, Surroundables, and AI for Next-Generation Healthcare, Sports, and Robotics				
11:45 - 13:00	S4.1 - Advances And Emerging Solutions In Measurements For Environmental And Human Health Monitoring In Industry And Healthcare - PART II	S4.2 - Multimodal Sensing for Human Wellbeing in Industry 5.0 and Healthcare	S4.3 - Techniques for Indoor Assisted Living	S4.4 - General Session - PART II	Technical Visit - Agri Research and Teaching Center
13:00 - 14:00	LUNCH				
14:00 - 15:00	Auditorium CuBo - TUTORIAL - Salvatore Dello Iacono, *University of Brescia* Smart Cities and Smart Mobility				
	Room CB27A	**Room CB27B**	**Room CB28A**	**Room CB28B**	
15:00 - 16:00	S5.1 - ROUND TABLE - Experiential Laboratory Education: Challenges, Practices, and Future Directions	S5.2 - Advances in 3d printed sensors and sensors for 3d printing: Closing the gap between research and industrial applications - PART I	S5.3 - Reliable wireless solutions for IoT and Industrial IoT - PART I	S5.4 - Advances In Optical Sensing For Living Systems: From Humans To Plants - PART I	Technical Visit - Agri Research and Teaching Center
16:00 - 16:30	COFFEE BREAK				
16:30 - 18:00	S6.1 - General Session - PART III	S6.2 - Advances in 3d printed sensors and sensors for 3d printing: Closing the gap between research and industrial applications - PART II	S6.3 - Reliable wireless solutions for IoT and Industrial IoT - PART II	S6.4 - Advances In Optical Sensing For Living Systems: From Humans To Plants - PART II	Technical Visit - Agri Research and Teaching Center
18:30	SHUTTLE BUS DEPARTURE FOR THE GALA DINNER				
20:00	GALA DINNER - *Ristorante Pagnanelli - Castel Gandolfo (Roma)*				

FRIDAY, JUNE 12					
	Room CB27A	**Room CB27B**	**Room CB28A**	**Room CB28B**	
09:30 - 10:30	S7.1 - Measurement Systems and Robotics for Biomedical Applications - PART I	S7.2 - Sensor Technologies and Algorithms for Physiological Monitoring: From Occupational to Sports Applications - PART I	S7.3 - General Session - PART IV	S7.4 - Education 5.0: Next-Generation Training through Pedagogical Innovation and AI/XR Technologies	Technical Visit - Simulation Center
10:30 - 11:00	COFFEE BREAK				
11:00 - 12:00	*Auditorium CuBo* - KEYNOTE LECTURE - Marco Paggi, *IMT School for Advanced Studies Lucca, Italy* Stretchable, flexible and printed electronics on compliant substrates: Virtual testing protocols based on fracture mechanics				
12:00 - 13:15	S8.1 - Measurement Systems and Robotics for Biomedical Applications - PART II	S8.2 - General Session - PART V	S8.3 - Sensor- and AI-based Methods for Monitoring and Performance Measurements in Clinical and Sport Domains within the Industry 4.0 Framework	S8.4 - Sensor, IoT, and AI-driven Technologies for Sustainable Agrifood Industry 5.0, Quality Assurance, Food Production, and Food Safety - PART II	Technical Visit - Simulation Center
13:15 - 14:00	LUNCH				
14:00 - 15:00	*Auditorium CuBo* - TUTORIAL - Chiara Romano, *Università Campus Bio-Medico di Roma, Italy* Wearable sensors for cardiorespiratory monitoring: from technologies to signal processing algorithms and open challenges				
	Room CB27A	**Room CB27B**	**Room CB28A**	**Room CB28B**	
15:00 - 16:00	S9.1 - Advanced Sensing And Measurement Technologies For Intelligent And Human-Aware Cyber-Physical Systems	S9.2 - Sensor Technologies and Algorithms for Physiological Monitoring: From Occupational to Sports Applications - PART II	S9.3 - 3D-Printed Electronics and Sensors for Industry 4.0: Materials, Processes, and Metrology	S9.4 - Sensor, IoT, and AI-driven Technologies for Sustainable Agrifood Industry 5.0, Quality Assurance, Food Production, and Food Safety - PART III	
16:00 - 16:30	Closing and Award Ceremony				

Technical Program - Wednesday, June 10

12:00 - 17:00	*Università Campus Bio-Medico di Roma - CuBo* **REGISTRATIONS**

13:30 - 14:00	*Auditorium CuBo* **OPENING CEREMONY - WELCOME ADDRESSES**

Institutional greetings
Prof. Bruno **Vincenzi**, Dean of the Department of Medicine, *Università Campus Bio-Medico di Roma*
Prof. Simonetta **Filippi**, Vice Rector for Internazionalization, *Università Campus Bio-Medico di Roma*
Prof. Alessio **Gizzi**, Dean of the Department of Engineering, *Università Campus Bio-Medico di Roma*
Prof. Emiliano **Schena**, Vice Rector for Education, *Università Campus Bio-Medico di Roma*

14:00 - 15:00	*Auditorium CuBo* **KEYNOTE LECTURE** **Chair:** Lorenzo Ciani, *University of Florence, Italy*

Wireless Control at the Microscale

Sarthak Misra, *University of Twente, The Netherlands*

15:00 - 16:00	*Room CB27A - CuBo* **S1.1 - Metrological characterization of AI-based measurement systems: how to find a compromise between measurement accuracy, hardware requirements, and computational cost** **Chair:** Gloria Cosoli, *eCampus University, Italy*

15:00 **A Novel Hybrid Methodology for Defect Detection Through the Combination of Sensing Technologies and Artificial Intelligence**
Alessandro Annessi (eCampus University, Italy); Antonio Luca Alfeo (University of Pisa, Italy); Gloria Cosoli (Università eCampus, Italy); Francesca Righetti (Pegaso University, Italy); Milena Martarelli and Paolo Castellini (Polytechnic University of Marche, Italy); Marco Arnesano (Università eCampus, Italy)

15:15 **Calibration and Validation of a Low-Cost MEMS Microphone for Indoor Acoustic Comfort Measurement**
Valentina Pasquinelli, Matteo Manzoni, Serena Serroni, Milena Martarelli and Gian Marco Revel (Università Politecnica delle Marche, Italy)

15:30 **Classifying Power System Faults from Protection Relay Recordings Using Traditional Machine Learning Methods**
Olli Väänänen, Pasi Puttonen and Teppo Flyktman (JAMK University of Applied Sciencess, Finland)

15:45 **Characterizing GPU Capacity and Computational Cost in Production AI Inference Using a Replica-Centric Measurement Framework**
Ankur Gupta (Linkedin, USA & Syracuse University, USA)

15:00 - 16:00 *Room CB27B - CuBo*
S1.2 - General Session - PART I
Chairs: Martina Pulcinelli, *Università Campus Bio-Medico di Roma, Italy*
Vincenzo Lavorgna, *Università Campus Bio-Medico di Roma, Italy*

15:00 **Challenges and Opportunities of Automated Vulnerability Assessment in Industry 4.0**
João Videira (LASIGE, Portugal); André Souto (University of Lisbon, Portugal); José Cecílio (University of Lisbon / Lasige, Portugal)

15:15 **An Automated Measurement Platform for ML-Based Fault Diagnosis in Light UAV**
Ioan Tudosa (University of Sannio, Italy); Francesco Picariello (Universitas Mercatorum, Italy); Eulalia Balestrieri (University of Sannio, Italy)

15:30 **Cybersecurity Aspects of Artificial Intelligence Driven System for Railway Infrastructure Telemetry**
Ivaylo Atanasov (Technical University of Sofia, Bulgaria); Evelina Pencheva (Todor Kableshkov University of Transport, Bulgaria)

15:45 **Metrology Meets Cybersecurity: A Measurement-Oriented Perspective on ADC Vulnerability Evaluation**
Ioan Tudosa and Eulalia Balestrieri (University of Sannio, Italy)

15:00 - 16:00 *Room CB28A - CuBo*
S1.3 - AI-Driven Sensor Systems for Reliable Measurement and Safety in Environmental and Biomedical Applications
Chairs: Salvatore Calcagno, *University of Reggio Calabria, Italy*
Filippo Laganà, *University of Catanzaro, Italy*

15:00 **Rainwater Quality Monitoring System for in-Situ Physicochemical Soil-Related Analysis**
Elena Stuppia, Giuseppe Talotta and Filippo Laganà (Magna Graecia University of Catanzaro, Italy); Laura Manin (University Magna Græcia of Catanzaro, Italy & University of Rijeka, Croatia); Antonino S. Fiorillo and Salvatore Andrea Pullano (Magna Graecia University of Catanzaro, Italy)

15:15 **CNN-Based Algorithm for Detecting Tomato Seed Oil Adulteration Using Thermal and Volatilomic Features**
Laura Manin (University Magna Græcia of Catanzaro, Italy & University of Rijeka, Croatia); Elena Stuppia and Filippo Laganà (Magna Graecia University of Catanzaro, Italy); Srecko Valic (Ruđer Bošković Institute, Croatia); Syed Islam (University of Missouri-Columbia, USA); Salvatore Andrea Pullano (Magna Graecia University of Catanzaro, Italy)

15:30 **Optimized LSTM with Attention Mechanism for Elderly Real-Time Activity Recognition and Tracking in Assisted Living Environments**
Luigi Bibbo (University Mediterranea of Reggio Calabria, Italy); Filippo Laganà (Magna Graecia University of Catanzaro, Italy); Salvatore Calcagno, Giovanni Angiulli and Mario Versaci (University Mediterranea of Reggio Calabria, Italy)

15:45 **Temperature-Based Calibration of E-Field Sensor for Superficial Hyperthermia**
Marco Di Cristofano, Francesca Giuppa, Costanza Rodio and Marta Cavagnaro (Sapienza University of Rome, Italy)

15:00 - 16:00 *Room CB28B - CuBo*
S1.4 - Sensor, IoT, and AI-driven Technologies for Sustainable Agrifood Industry 5.0, Quality Assurance, Food Production, and Food Safety - PART I
Chairs: Francesco Bonavolontà, *University of Naples Federico II, Italy*
Maria Teresa Verde, *University of Naples Federico II, Italy*

15:00 **IoT Based Smart Lysimeter for Automated Crop Coefficient Prediction**
Alexander Kocian, Fatjon Cela, Giulia Carmassi, Stefano Chessa, Paolo Milazzo and Luca Incrocci (University of Pisa, Italy)

15:15 **Integrating Patented IoT Systems and Decision Support Models for Real-Time Abiotic Stress Management in Intensive Greenhouse Horticulture: The Sele Plain Case Study**
Antonio Dell'Isola (Evja, Italy); Giuliano Bonanomi (University of Naples Federico II, Italy); Antonio Affinito, Simone Scarpa and Davide Parisi (Evja, Italy)

15:30 **A Machine Learning Framework for Soft and Durum Wheat Classification from Hyperspectral Images**
Michele Magarelli (Università Degli Studi di Bari, Italy); Florinda Artuso (ENEA, Italy); Donato Romano (Università Degli Studi di Bari Aldo Moro, Italy & Istituto Nazionale di Fisica Nucleare - INFN, Italy); Pierfrancesco Novielli (Università Degli Studi di Bari Aldo Moro and INFN-BA, Italy); Alessandra Pasquo (ENEA, Italy); Pierpaolo Di Bitonto (Università Degli Studi di Bari Aldo Moro, Italy); Antonia Lai (ENEA, Italy); Sabina Tangaro (Università Degli Studi di Bari Aldo Moro and INFN, Italy)

15:45 **IoT System for Precision Viticulture: Multi-Pathogen Detection and Yield Mapping via State-of-the-Art Object Detection Model and Georeferenced Inference**

Lindo Nepi, Marco Fiorentini, Adriano Mancini, Luigi Ledda and Roberto Pierdicca (Università Politecnica delle Marche, Italy)

16:00 - 16:30	*Università Campus Bio-Medico di Roma - CuBo* **COFFEE BREAK**

16:30 - 18:00	*Room CB27A - CuBo* **S2.1 - Wearable Sensors: From Design and Optimization to Manufacturing and Testing** **Chairs:** Carlo Massaroni, *Università Campus Bio-Medico di Roma, Italy* Lorenzo Zoboli, *Università Campus Bio-Medico di Roma, Italy*

16:30 **Metrological Characterization of 3D-Printed Soft Dielectric Interlayers with Tunable Compressive Mechanical Behavior**
Mariangela Pinnelli, Vincenzo Saroli, Riccardo De Santis, Sergio Silvestri, Emiliano Schena and Carlo Massaroni (Università Campus Bio-Medico di Roma, Italy)

16:45 **Influence of Raster Angle on the Electromechanical Performance of Single-Layer FDM-Printed Flexible Strain Sensors**
Vincenzo Saroli and Andrea Addabbo (Università Campus Bio-Medico di Roma, Italy); Soumyajyoti Maji (University of Galway, Ireland); Sergio Silvestri, Emiliano Schena and Carlo Massaroni (Università Campus Bio-Medico di Roma, Italy)

17:00 **Effect of High-Stiffness TPU Encapsulation on the Metrological Performance of a Wearable Fiber Bragg Grating Cardiorespiratory Sensor**
Isabel del Pilar Moscol Albanil, Emiliano Schena and Daniela Lo Presti (Università Campus Bio-Medico di Roma, Italy)

17:15 **Characterization of Water-Activated Porous Elastomers Processed by Fused Deposition Modeling for Soft Strain Sensors Manufacturing**
Vincenzo Saroli, Riccardo De Santis, Sergio Silvestri, Emiliano Schena and Carlo Massaroni (Università Campus Bio-Medico di Roma, Italy)

17:30 **Preliminary Validation of a 3D-Printed Skin-Attached Flexible Strain Sensor for Respiratory Monitoring**
Luna Panni (Università Politecnica Delle Marche, Italy); Vincenzo Saroli (Università Campus Bio-Medico di Roma, Italy); Lucia Svampa (Università Politecnica delle Marche, Italy); Emiliano Schena (Università Campus Bio-Medico di Roma, Italy); Lorenzo Scalise (Università Politecnica delle Marche, Italy); Carlo Massaroni (Università Campus Bio-Medico di Roma, Italy)

17:45 **Wearable Pupillometry in Experimental Setting: A Comparative Study**
Jacopo Vitale, Marta Sansone and Marco D'alonzo (Università Campus Bio-Medico di Roma, Italy); Polsi Katia and Fiori Francesca (Fondazione Policlinico Universitario

Campus Bio-Medico di Roma, Italy); Giovanni Di Pino (Università Campus Bio-Medico di Roma, Italy)

16:30 - 18:00 *Room CB27B - CuBo*

S2.2 - Applications of Machine Learning and Computer Vision in Industry 4.0

Chairs: Marco Tarabini, *Politecnico di Milano, Italy*
Nicola Giulietti, *University of Pavia, Italy*

16:30 **Vision-Based Measurement System for Experimental Estimation of Air Flow in Robotic Pharmaceutical Isolators**
Michele Bedodi, Donya Ghavami and Nicola Giulietti (Università di Pavia, Italy); Davide Aprigliano (Politecnico di Milano, Italy); Hermes Giberti (Università di Pavia, Italy)

16:45 **Uncertainty in Vision-Based Non-Contact Measurements of Ropes Geometrical Parameters**
Mahmoud Ahmed Mohamed Mohamed Mostafa (Politecnico di Milano, Italy & Ain Shams University, Egypt); Carlotta Massotti, Luca Pini, Paolo Chiariotti, Emanuele Zappa and Marco Tarabini (Politecnico di Milano, Italy)

17:00 **Systematic Vision-Based Experimental Validation of Liquid Sloshing Modeling in Robotic Industrial Manipulation**
Denis Camilotto (Politecnico di Milano, Italy); Nicola Giulietti, Michele Bedodi, Donya Ghavami and Hermes Giberti (Università di Pavia, Italy)

17:15 **Synthetic Data Augmentation for Class-Imbalanced Surface Defect Classification in Cold-Rolled Steel**
Luca Pini, Leopoldo Vittorio Giraldi, Carlotta Massotti, Mahmoud Ahmed Mohamed Mohamed Mostafa, Giovanni Moschioni and Marco Tarabini (Politecnico di Milano, Italy)

17:30 **A Multi-Phase Structured Light Approach for Robust Industrial Inspection of Transparent Components Using Deep Learning**
Carlotta Massotti, Paolo Chiariotti and Luca Pini (Politecnico di Milano, Italy); Mahmoud Ahmed Mohamed Mohamed Mostafa (Politecnico di Milano, Italy & Ain Shams University, Egypt); Marco Tarabini (Politecnico di Milano, Italy)

17:45 **Hyperspectral Imaging for Moisture Analysis**
Matteo Biatta, Jiasheng Huang, Emanuele Zappa, Alfredo Cigada and Paolo Chiariotti (Politecnico di Milano, Italy)

16:30 - 18:00 *Room CB28A - CuBo*

S2.3 - Cardiovascular engineering: from sensors to decision support systems

Chairs: Massimo W. Rivolta, *University of Milan, Italy*
Agnese Sbrollini, *Polytechnic University of Marche, Italy*

16:30 **Electrocardiogram-Derived Respiration: A Systematic Review of Biomedical Signal Processing Approaches**
Agnese Sbrollini, Michela De Palma and Laura Burattini (Università Politecnica delle Marche, Italy)

16:45 **Novel 3D-Printed Electrodes for Wearable Equine ECG Monitoring Systems**
Agnese Sbrollini (Università Politecnica Delle Marche, Italy); Vincenzo Saroli (Università Campus Bio-Medico di Roma, Italy); Arianna Brizzi, Meri Gjika and MHD Jafar Mortada (Università Politecnica delle Marche, Italy); Emiliano Schena (Università Campus Bio-Medico di Roma, Italy); Laura Burattini (Università Politecnica delle Marche, Italy); Carlo Massaroni (Università Campus Bio-Medico di Roma, Italy)

17:00 **Exploration of 24-Hour ECG Signal Quality Index Using Ensemble Tree Classifier with Set of Nonlinear Features**
Elzbieta Olejarczyk (Institute of Biocybernetics and Biomedical Engineering PAS, Poland); Elzbieta Raus-Jarzabek (AGH University of Krakow, Poland); Carlo Massaroni (Università Campus Bio-Medico di Roma, Italy); María Dolores Martín Escalante and Miguel Ángel Corrales González (Internal Medicine Service, University Hospital Costa del Sol, Andalusian Health Service, Spain)

17:15 **Toward Sequential Omnipolar Mapping: Effect of Inter-Beat Variability in a 2D Simulation Study**
Francesco Maffezzoli, Roberto Sassi and Massimo W Rivolta (Università degli Studi di Milano, Italy)

17:30 **Investigation of ST Segment Slope Alternation Effect on Ballistocardiography Wave: MP Method Approach**
Mohammed Owahidur Rahman (AGH University of Krakow, Poland); Piotr Augustyniak (AGH University of Science and Technology, Poland); Elzbieta Olejarczyk (Institute of Biocybernetics and Biomedical Engineering PAS, Poland)

17:45 **Patient-Specific Computational Modeling of Reentrant Ventricular Tachycardia Using Electro-Anatomical Mapping Data**
Anna Crispino (Università Campus Bio-Medico di Roma)

16:30 - 18:00 *Room CB28B - CuBo*

S2.4 - Measurements and Virtual Measurements Toward Industry 5.0: Approaches and Solutions for Smart Manufacturing

Chairs: Giulio D'Emilia, *University of L'Aquila, Italy*
Emanuela Natale, *University of L'Aquila, Italy*
Antonella Gaspari, *Polytechnic University of Bari, Italy*

16:30 **Enabling Measurement-Driven Digital Twins Through a Modular and Protocol-Agnostic Middleware Framework**
Lucas Severiano dos Santos (Universidade Federal Fluminense, Brazil)

16:45 **Formalizing Zebra Tapes as Metrological Artefacts in Optical Rotation Measurements**
Luca Sevi, Laura Fabbiano, Antonella Gaspari, Alexandra Morvayovà and Giuseppe Domenico Zito (Politecnico di Bari, Italy); Fabrizio Freni and Roberto Montanini (University of Messina, Italy); Nicola Paone, Milena Martarelli and Vittoria Medici (Università Politecnica Delle Marche, Italy); Alessandro Schiavi and Andrea Prato (INRiM - National Institute of Metrological Research, Italy); Lorenzo Capponi (University of Ljubljana, Slovenia); Gianluca Rossi (University of Perugia, Italy)

17:00 **Automated Defect Sizing in FDM PETG Components: A Comparative Study of Segmentation Techniques**
Luciano Chiominto, Giulio D'Emilia, Emanuela Natale and Francesco Tiberi (University of L'Aquila, Italy)

17:15 **Integration of Measurements for Digitation: Challenges and Opportunities for the Industry of Tomorrow**
Antonella Gaspari and Mohamed Nasser (Politecnico di Bari, Italy); Giulio D'Emilia (University of L'Aquila, Italy); Julian Polte and Nikolaos-Stefanos Koutrakis (Fraunhofer IPK, Germany); Claudio Geisert (Fraunhofer Institute for Production Systems and Design Technology IPK, Germany)

17:30 **Neural Network-Based Indoor Positioning Using BLE Received Signal Strength: A Data-Driven Alternative to Geometric Triangulation for Industrial Safety Applications**
Lorenzo Sani (Idea-Re S. r. l., Italy); Federico Bianchi (Idea-Re, Italy); Leonardo Vincio (Università degli Studi di Perugia, Italy); Lorenzo Maiorfi (K-Digitale S. r. l., Italy); Alberto Garinei (Guglielmo Marconi University, Italy & Idea-Re, Italy); Roberto Marsili (University of Perugia, Italy)

17:45 **A Multi-Agent Framework for Task Planning and Execution in Robotic Perception and Manipulation**
Matteo Filippi (Politecnico di Milano, Italy); Nicola Giulietti, Davide Fabiocchi, Michele Bedodi, Marco Carnevale, Hermes Giberti (Università di Pavia, Italy)

16:30 - 18:00	*Room CB30B - CuBo* **Wearable and Smart Device Challenge**

18:00 - 19:00	*Auditorium CuBo* **TUTORIAL** **Chair:** Daniela Lo Presti, *Università Campus Bio-Medico di Roma, Italy*

Design and Validation of Deterministic Distributed Measurement Systems Using TSN in Hybrid Wired/Wireless Networks

Alberto Morato, *CNR-IEIIT, University of Padova*

19:00	*Università Campus Bio-Medico di Roma - CuBo* **WELCOME PARTY**

Technical Program - Thursday, June 11

08:30 - 17:00	*Università Campus Bio-Medico di Roma - CuBo* **REGISTRATIONS**

09:00 - 10:15	*Room CB27A - CuBo* **S3.1 - Advances and Emerging Solutions in Measurements for Environmental and Human Health Monitoring in Industry and Healthcare - PART I** **Chairs:** Giorgia Fiori, *University of Roma Tre, Italy* Michela Borghetti, *University of Brescia, Italy*

09:00 **A Fully Printed Cobalt-Based Metal-Organic Framework Humidity Sensor for Wearable Sweat-Rate Monitoring in Industrial Settings**
Batoul Hosseinzadeh, Sarah Tonello and Nadine La Salvia (University of Brescia, Italy); Nicola Francesco Lopomo (Politecnico di Milano, Italy); Emilio Sardini (University of Brescia, Italy)

09:15 **Preliminary Analysis of Aerosol Jet Printed Solid Contact K^+ Sensors for Rapid Soil Extraction**
Giorgia Polidori, Emilio Sardini and Mauro Serpelloni (University of Brescia, Italy)

09:30 **Investigating the Accuracy of the Spine3D System in Reconstructing Flat and Curved Surfaces**
Luca Ceriola (Università Degli Studi Niccolò Cusano & Sensor Medica, Italy); Luca Molinaro (eCampus University & Sensor Medica Srl, Italy); Juri Taborri (University of Tuscia, Viterbo, Italy); Ilaria Mileti and Gennaro Salvatore Ponticelli (University Niccolò Cusano, Italy); Stefano Rossi (University of Tuscia, Italy); Fabrizio Patanè (University Niccolò Cusano, Italy)

09:45 **Preliminary Assessment of Printed Strain Gauges for Instrumented Bioreactors**
Giona Bonomi and Mauro Serpelloni (University of Brescia, Italy); Beatrice Masante, Giovanni Putame, Stefano Gabetti and Diana Massai (Politecnico di Torino, Italy)

10:00 **Preliminary Study on Aerosol Jet Printed Temperature Sensors for Smart Pipes**
Michela Borghetti, Paolo Bellitti and Mauro Serpelloni (University of Brescia, Italy)

09:00 - 10:15	*Room CB27B - CuBo* **S3.2 - Challenges and Advances in Vision-Based Frameworks for Monitoring and Assessment of Occupational Safety and Ergonomics** **Chairs:** Alessandro Ledda, *INAL, Italy* Olivia Nocentini, *IIT, Italy*

09:00 **LED Multispectral Sensor in Recycling Garbage**
Federico Fina (Roma Tre University, Italy); Kaleem Ullah Magsi and Marco Balsi (Sapienza University of Rome, Italy); Massimo Piotto (University of Pisa, Italy); Simone Contardi (University of Pisa, Italy & Sensichips Srl, Italy); Fabio Leccese (Roma Tre University, Italy)

09:15 **Personal Protective Equipment Recognition and Deterioration Detection in Computer Vision: A Narrative Literature Review**
Olivia Nocentini, Qiyi Tong and Marta Lorenzini (Istituto Italiano di Tecnologia, Italy); Alessandro Ledda (Italian National Institute for Insurance Against Accidents at Work, Italy); Arash Ajoudani (Istituto Italiano di Tecnologia, Italy)

09:30 **A Patent Landscape of Vision-Based Vigilance Monitoring for Heavy Vehicles and Rail: Taxonomy, Trends, and Validation Gaps for Occupational Safety**
Alessandro Ledda, Enrico D'Emilia and Brunella Malorgio (INAIL, Italy); Olivia Nocentini, Marta Lagomarsino, Marta Lorenzini and Arash Ajoudani (Istituto Italiano di Tecnologia, Italy)

09:45 **Vision-Based Safety Frameworks for Heavy Vehicle Drivers: Lessons Learned from Fatal Occupational Accidents in the Infor.MO Database by Inail**
Brunella Malorgio, Francesca Mauro, Enrico D'Emilia and Alessandro Ledda (INAIL, Italy)

10:00 **Single-Node Low-Cost IoT Sensor to Measure Indoor Environmental Quality with High Spatial Resolution**
Nibras Abo Alzahab, Edoardo Sulpizii, Vittoria Cipollone, Serena Serroni and Gian Marco Revel (Università Politecnica delle Marche, Italy)

09:00 - 10:15 *Room CB28A - CuBo*
S3.3 - Innovations in Early detection and monitoring of neurological and psychological disorders
Chairs: Milena Cukic Radenkovic, *OST St. Gallen, Switzerland*
Victoria Lopez, *CUNEF University, Madrid, Spain*

09:00 **Novel Approach in Statistical Analysis of Graph-Theoretical Indices**
Elzbieta Olejarczyk (Institute of Biocybernetics and Biomedical Engineering PAS, Poland); Adam Jozwik (University of Lodz, Poland); Vladas Valiulis, Kastytis Dapsys and Arunas Germanavicius (Vilnius University and Republican Vilnius Psychiatric Hospital, Lithuania)

09:15 **Early Detection and Monitoring of Axial Motor Disorders in Parkinson's Disease Using an AI-Based Approach**
Michele Antonio Gazzanti Pugliese di Cotrone, Franco Capone, Fernanda Irrera (Sapienza University of Rome, Italy)

09:30 **Multimodal IoT Framework for Adolescent Mood Monitoring: Integrating Smart Chair Sensing and Gamified Behavioral Assessment**

Dr. Victoria Lopez, Pavél Llamocca, Diego Riofrío-Luzcando and Diego Urgelés (CUNEF Universidad, Spain)

09:45 **Electroencephalogram-Based Emotion Recognition Using a Transformer Model with CNN Feature Extraction**
Rosheen Yasir, Aditi Site, Annariina Lohiranta and Tarmo Lipping (Tampere University, Finland)

10:00 **Decomplexification and Building Semantic Bridge for Detection and Monitoring in Psychiatry**
Milena Cukic (Ostschweizer Fachhochschule, Switzerland); In-Kyung Choi (SKKU, Korea (South))

09:00 - 10:15 *Room CB28B - CuBo*
S3.4 - Smart Measurement Systems: From Gas Sensing to Diagnostics
Chairs: Giovanni Gugliandolo, *University of Messina, Italy*
Vincenzo Saroli, *Università Campus Bio-Medico di Roma, Italy*

09:00 **Performance Evaluation of a 3D-Printed Conductive TPU Sensor for Respiratory Monitoring Under Dynamic Condition**
Vincenzo Saroli, Sergio Silvestri, Emiliano Schena, Carlo Massaroni (Università Campus Bio-Medico di Roma, Italy)

09:15 **Design and Evaluation of a UAV-Based Platform for Gaseous Biomarker Monitoring**
Letizia Cantalini, Giuseppe Ferri, Carlo Cantalini, Marcello Di Risio, Mauro Casinghini, Vincenzo Stornelli and Valentina Paolucci (University of L'Aquila, Italy)

09:30 **Drift Compensation for Electrochemical Sensors: A Preliminary TinyML Study**
Davide Cacciari, Anna Sabatini and Luca Notarianni (Università Campus Bio-Medico di Roma, Italy); Danilo Pietro Pau (STMicroelectronics, Italy); Marco Santonico, Giorgio Pennazza, Luca Vollero (Università Campus Bio-Medico di Roma, Italy)

09:45 **Synergistic Effect of CuO/Ag_2O Hybrid Structures for Rapid and Selective near-Room Temperature Hydrogen Sensing**
Sarah Ben Haj Fraj (University of Messina, Italy); Madiha Khan (Air University, Pakistan; University of Messina, Italy); Mozaffar Hussain (Air University, Pakistan); Enza Fazio and Carmelo Corsaro (University of Messina, Italy); Donatella Puglisi (Linköping University, Sweden; University of Messina, Italy); Giovanni Neri (University of Messina, Italy)

10:00 **A Hardware Interface for MOX Gas Sensors in Air Quality Monitoring**
Federico Randazzo and Laura Arruzzoli (University of Messina, Italy); Mariangela Latino (Institute for Chemical and Physical Processes - IPCF CNR, Italy); Alberto Giacobbe, Giovanni Gugliandolo, Alessandro Pistone and Nicola Donato (University of Messina, Italy)

10:15 - 10:45	*Università Campus Bio-Medico di Roma - CuBo* **COFFEE BREAK**

10:45 - 11:45	*Auditorium CuBo* **KEYNOTE LECTURE** **Chair:** Emiliano Schena, *Università Campus Bio-Medico di Roma, Italy*

Wearables, Surroundables, and AI for Next-Generation Healthcare, Sports, and Robotics

Arash Ajoudani, *Fondazione Istituto Italiano di Tecnologia, Italy*

11:45 - 13:00	*Room CB27A - CuBo* **S4.1 - Advances and Emerging Solutions in Measurements for Environmental and Human Health Monitoring in Industry and Healthcare - PART II** **Chairs:** Giorgia Fiori, *University of Roma Tre, Italy* Michela Borghetti, *University of Brescia, Italy*

11:45 **Multi-Sensor Wearable Platform for Multi-Modal Physiological Parameter Extraction in Dengue**
Isabel del Pilar Moscol Albanil, Vincenzo Lavorgna, Vincenzo Saroli (Università Campus Bio-Medico di Roma, Italy); Valeria Tomarchio (Fondazione Policlinico Campus Bio-Medico di Roma, Italy); César Chinguel, Carlos Ojeda and Gerardo Castillo (Universidad de Piura, Peru); Daniela Lo Presti and Emiliano Schena (Università Campus Bio-Medico di Roma, Italy)

12:00 **Aerosol-Jet Printed and Photonically Cured Sensors Embedded in 3D-Printed Smart Orthoses: A Preliminary Study**
Lorenzo Rossetti, Michela Borghetti and Mauro Serpelloni (University of Brescia, Italy)

12:15 **Preliminary Assessment of Manufacturing Process Variability of Composite Materials for Arterial Surrogates**
Federico Filippi, Annalisa Genovesi, Gabriele Bocchetta, Giorgia Fiori, Massimiliano Barletta, Salvatore Andrea Sciuto and Andrea Scorza (Roma Tre University, Italy)

12:30 **First Approach of Direct Ink Writing for a Sensorized Arterial Surrogate**
Federico Filippi, Andrea Iavarone, Annalisa Genovesi, Federica Mitri, Giovanni Alberto Romeo, Giorgia Fiori, Andrea De Iacovo, Alessandro Stuart Savoia, Massimiliano Barletta, Lorenzo Colace, Andrea Scorza and Salvatore Andrea Sciuto (Roma Tre University, Italy)

12:45 **Infrared Thermography for Non-Contact Monitoring of Physiological Load in Repetitive Work-like Tasks**

Laura Fabbiano, Alexandra Morvayovà, Antonella Gaspari (Politecnico di Bari, Italy); Rosario Morello (University Mediterranea of Reggio Calabria, Italy)

11:45 - 13:00 *Room CB27B - CuBo*

S4.2 - Multimodal Sensing for Human Wellbeing in Industry 5.0 and Healthcare

Chairs: Sara Casaccia, *Polytechnic University of Marche, Italy*
Carlo Massaroni, *Università Campus Bio-Medico di Roma, Italy*

11:45 **Investigation of Multi-Site Body Accelerometer and ECG Signals for Fall Detection in Worker Safety Applications**
Mariangela Pinnelli, Simone Saverio Fildi, Luca Vollero, Emiliano Schena, Roberto Setola, Carlo Massaroni (Università Campus Bio-Medico di Roma, Italy)

12:00 **Center of Pressure Estimation and CNN-Based Posture Classification from Under-Mattress Pressure Maps: Assessment of Hospital Mattress Effects**
Stefano Cimignolo, Damiano Fruet, Michela Masè and Giandomenico Nollo (University of Trento, Italy)

12:15 **Accuracy in EEG Data Systems Acquisition for Motor Imagery BCI Home Assistive Applications**
Yassine El Houm (University of Catania, Italy); Riccardo Kristen Simi and Samuele Bordini (Centro di Ricerca Enrico Piaggio, Universita Pisa, Largo Lucio Lazzarino, Italy); Lucia Pallottino (University of Pisa, Italy); Maide Bucolo (University of Catania, Italy)

12:30 **Measurement of Operator Stress and Workload in Industry 5.0: A Methodological Framework for Multimodal Sensing and Ethical Considerations**
Sara Casaccia, Vittoria Medici, Gianluca Sartini, Paolo Castellini, Nicola Paone and Milena Martarelli (Università Politecnica delle Marche, Italy)

12:45 **Non-Intrusive Sensor-Based Sleep Monitoring and Machine Learning Classification for Individuals with Disabilities in Residential Facilities: A Case Study from the MetaSalute Project**
Francesca Martelli (Ageing-Tech, Italy); Sara Meletani (Università Politecnica delle Marche, Italy); Elisa Di Natale, Giorgia Panico and Massimiliano Roccetti (Ageing-Tech, Italy); Sara Casaccia and Gian Marco Revel (Università Politecnica delle Marche, Italy); Florinda Filippini (Labirinto, Italy)

11:45 - 13:00 *Room CB28A - CuBo*

S4.3 - Techniques for Indoor Assisted Living

Chairs: Valentina Casadei, *University of Bergen, Norway*
Grazia Iadarola, *Polytechnic University of Marche, Italy*
Chiara Romano, *Università Campus Bio-Medico di Roma, Italy*

11:45 **Low-Cost Calibration of a Pressure Sensor Node for eHealth Respiratory Muscle Strength Assessment**
Yuri Lima dos Santos Silva (Federal University of Recôncavo Da Bahia, Brazil); João Carlos N Bittencourt (Federal University of Recôncavo Da Bahia, Brazil & University of Porto, Portugal); João Soares Oliveira Neto, Giselle Bárbara de Almeida Scaldaferri and Daniel Dominguez Ferraz (Federal University of Bahia, Brazil); Daniel G. Costa (University of Porto, Portugal)

12:00 **Non-Contact Overnight Breathing Monitoring During Sleep Using an Infrared Camera**
Chiara Romano, Sergio Silvestri, Emiliano Schena and Carlo Massaroni (Università Campus Bio-Medico di Roma, Italy)

12:15 **Optimizing Access Point Placement for Indoor Localization Applications by Means of Genetic Algorithms**
Pier Mattia Basciano, Fabrizio Patanè, Giovanni Farina and Salvatore Monteleone (Niccolò Cusano University, Italy)

12:30 **Expert-in-the-Loop: Interdisciplinary Innovation for Multimodal Monitoring in Dementia Care**
Valentina Casadei (University of Bergen, Norway); Grazia Iadarola (Polytechnic University of Marche, Italy); Kirsti Eikeland (Centre for Elderly and Nursing Home Medicine (SEFAS), Norway); Monica Patrascu (University of Bergen, Norway)

12:45 **A Machine Learning Method for Indoor Positioning Overcoming Measurement Errors in GNSS**
Grazia Iadarola (Polytechnic University of Marche, Italy); Fernando J. Aranda (Universidad de Extremadura & Sensory Systems Research Group, Spain); Fernando J. Álvarez (University of Extremadura, Spain)

11:45 - 13:15 *Room CB28B - CuBo*
S4.4 - General Session - PART II
Chairs: Valentina Bianchi, *University of Parma, Italy*
Mariangela Pinnelli, *Università Campus Bio-Medico di Roma, Italy*

11:45 **Identification of an IIR Filter Based on One-Bit Measurements**
Alessio De Angelis, Mario Luca Fravolini, Francesco Ferrante, Francesco Santoni and Paolo Carbone (University of Perugia, Italy)

12:00 **Open Dataset of Galvanostatic and Potentiostatic EIS Measurements on Low-Impedance Energy Storage Devices**
Gabriele Patrizi, Fabio Canzanella and Lorenzo Ciani (University of Florence, Italy)

12:15 **Optimization of Source and Receiver Placement in a 3-Dimensional Square Duct**
Gabrielle Ophelia Dies, Hervé Denayer, Elke Deckers (KU Leuven, Belgium)

12:30 **Machine Learning Enhanced e-Tongue for the Characterization of a New Paracetamol-Based Formulation for Pediatric Delivery**
Valentina Bianchi and Davide Orsini (University of Parma, Italy); Anna Scomparin (University of Turin, Italy); Dario Voinovich (University of Trieste, Italy); Roberta Cavalli (University of Turin, Italy); Ilaria De Munari (University of Parma, Italy)

12:45 **TinyML Fault Detection in Water Pump Systems: Leveraging Acoustic Analysis on the Edge**
Thommas Kevin Sales Flores (Federal University of Rio Grande do Norte, Brazil); João Carlos N Bittencourt (Federal University of Recôncavo Da Bahia, Brazil & University of Porto, Portugal); Thiago C. Jesus (State University of Feira de Santana, Brazil & University of Porto, Portugal); Ivanovitch Silva (Federal University of Rio Grande do Norte, Brazil); Daniel G. Costa (University of Porto, Portugal)

13:00 **A Low-Cost Hall Effect Based Magnetic Flux Leakage Approach for Structural Monitoring: A Feasability Study**
Francesco Campanella, Francesco Scardulla, Nicola Montinaro and Leonardo D'Acquisto (University of Palermo, Italy)

13:00 - 14:00	*Università Campus Bio-Medico di Roma - CuBo* **LUNCH**

14:00 - 15:00	*Auditorium CuBo* **TUTORIAL** **Chair:** Michela Borghetti, *University of Brescia, Italy*

Design and Validation of Deterministic Distributed Measurement Systems Using TSN in Hybrid Wired/Wireless Networks

Salvatore Dello Iacono, *University of Brescia, Italy*

15:00 - 16:00	*Room CB27A - CuBo* **S5.1 - ROUND TABLE - Experiential Laboratory Education: Challenges, Practices, and Future Directions** **Moderators:** Francesco Picariello, *Universitas Mercatorum, Italy* Alessia Teresa Silvestri, *Universitas Mercatorum, Italy*

15:00 - 15:45 *Room CB27B - CuBo*

S5.2 - Advances in 3d printed sensors and sensors for 3d printing: Closing the gap between research and industrial applications - PART I

Chairs: Emiliano Schena, *Università Campus Bio-Medico di Roma, Italy*
Laura Fabbiano, *Politecnico di Bari, Italy*
Rosario Schiano Lo Moriello, *University of Naples Federico II, Italy*

15:00 **Proposal of an Operational Framework for the Identification and Control of Failures in FDM Printing of Semi-Crystalline Materials**
Jordan Carducci, Gennaro Salvatore Ponticelli, Vittorio Villani, Alfio Scuderi, Simone Venettacci and Stefano Guarino (Università degli Studi Niccolò Cusano, Italy)

15:15 **Additive Manufacturing of Graphene-Based Wearable Pressure Sensors via Direct Ink Printing**
Babar Ali, Umar Farooq and Samira Lakouraj Mansouri (Sapienza University of Rome, Italy); Hossein Cheraghi Bidsorkhi (University of Sassari, Italy); Alessandro Giuseppe D'Aloia, Alessio Tamburrano, Maria Sabrina Sarto (Sapienza University of Rome, Italy)

15:30 **Diagnosis in Dry Eye Disease: A Novel System Based on Relative Humidity Monitoring**
Antonio Di Zazzo (Università Campus Bio-Medico di Roma, Italy)

15:00 - 16:00 *Room CB28A - CuBo*

S5.3 - Reliable wireless solutions for IoT and Industrial IoT - PART I

Chairs: Paolo Ferrari, *University of Brescia, Italy*
Ivanovitch Silva, *Federal University of Rio Grande do Norte, Brazil*

15:00 **Hybrid LoRa / LoRaWAN Networks Integration for Rural Areas Communication Infrastructure: Lesson Learned from a Real Use Case**
Massimiliano Gaffurini, Stefano Rinaldi, Paolo Ferrari and Emiliano Sisinni (University of Brescia, Italy); Sónia Semedo (University of Cape Verde, Cape Verde)

15:15 **Bridging Legacy WirelessHART Deployments and Modern IoT/LPWAN Networks: The LoRaWAN Case**
Enrico Brunelli, Dennis Brandão, Alessandro Depari, Paolo Ferrari, Alessandra Flammini and Emiliano Sisinni (University of Brescia, Italy)

15:30 **IoT Platform Enabling Artificial Intelligence for Predicting Blocking in OWC**
Francisco Javier Simón Fernández, Alejandro Lopez Barrios and Máximo Morales-Céspedes (Universidad Carlos III de Madrid, Spain)

15:45 **A Proposal for Type 3 AAS Communication Using Microservices in the Process Industry**
Ricardo Pasquati Pontarolli (São Paulo State University (Unesp), Brazil); Vitor Mendes Caldana (Federal Institute of São Paulo (IFSP), Brazil); Paolo Ferrari (University of Brescia, Italy); Eduardo P Godoy (São Paulo State University (Unesp), Brazil)

15:00 - 16:00	*Room CB28B - CuBo* **S5.4 - Advances in Optical Sensing for Living Systems: From Humans to Plants - PART I** **Chairs:** Daniela Lo Presti, *University Campus Bio-Medico Di Roma, Italy* Simone Pasinetti, *University of Brescia, Italy* Luca De Vito, *University of Sannio, Italy*

15:00 **A Fiber Bragg Grating-Based Device for Quantitative Finger Tapping Assessment**
Vincenzo Lavorgna (University Campus Bio-Medico di Roma, Italy & ENEA, Italy); Marco Gallinaro (University Campus Bio-Medico di Roma, Italy); Alfredo Dimo (Fondazione Policlinico Universitario Campus Bio-Medico, Italy); Daniela Lo Presti and Emiliano Schena (Università Campus Bio-Medico di Roma, Italy)

15:15 **Respiratory Monitoring in Anesthetized Mice Using an FBG-Based Soft Wearable Sensor**
Martina Pulcinelli (Università Campus Bio-Medico di Roma, Italy); Fotios Mpekris (Cyprus Institute of Neurology and Genetics, Cyprus); Daniela Lo Presti and Emiliano Schena (Università Campus Bio-Medico di Roma, Italy); Triantafyllos Stylianopoulos (University of Cyprus, Cyprus)

15:30 **Assessment of Substrate Color-Dependent Thermal Effects Under Solar Exposure in Adhesive FBG-Based Wearable Sensors for Plant Monitoring**
Ilaria Condo (Università Campus Bio-Medico di Roma, Italy); Marcella Trombetta (CIR - Center of Integrated Research, University Campus Bio-Medico of Rome, Italy); Emiliano Schena (Università Campus Bio-Medico di Roma, Italy); Sara Maria Giannitelli (CIR - Center of Integrated Research, University Campus Bio-Medico of Rome, Italy); Daniela Lo Presti (Università Campus Bio-Medico di Roma, Italy)

15:45 **Fiber Bragg Grating Sensors for in Vivo Temperature Monitoring in Murine Breast Tumor Models During Ultrasound Exposure**
Martina Pulcinelli (Università Campus Bio-Medico di Roma, Italy); Fotios Mpekris (Cyprus Institute of Neurology and Genetics, Cyprus); Daniela Lo Presti and Emiliano Schena (Università Campus Bio-Medico di Roma, Italy); Triantafyllos Stylianopoulos (University of Cyprus, Cyprus)

16:00 - 16:30	*Università Campus Bio-Medico di Roma - CuBo* **COFFEE BREAK**

16:30 - 17:45	*Room CB27A - CuBo* **S6.1 - General Session - PART III** **Chair:** Chiara Romano, *Università Campus Bio-Medico di Roma, Italy*

16:30 **Efficient Estimation of Nyquist Diagrams for Smart Health Monitoring of Electric Vehicle Batteries Using Sparse EIS Measurements**
Gabriele Patrizi, Irene Sabatino, Alessandra Musacchio, Fabio Canzanella and Lorenzo Ciani (University of Florence, Italy)

16:45 **BrAInXplore: Automated 3D Delineation and Structural Analysis of Brain MRI Data**
Chiara Bentifece (Università Politecnica Delle Marche, Italy); Selene Tomassini (University of Trento, Italy); Haidar Anbar, MHD Jafar Mortada, Ilaria Marcantoni, Agnese Sbrollini, Micaela Morettini, Laura Burattini (Università Politecnica delle Marche, Italy)

17:00 **Unsupervised Analysis of Public Street Lighting Energy Consumption Using Self-Organizing Maps**
Mariagrazia Leccisi and Fabio Leccese (Roma Tre University, Italy)

17:15 **A Modular Low-Power Environmental Monitoring Node with RAK3172 LoRaWAN Core, Dual-Path Logging and Low-Cost Sensors**
Riccardo Arciulo (4Spark, Italy); Fabio Leccese (Roma Tre University, Italy)

17:30 **Improved Embedded Structural Health Monitoring via High-Resolution Spectral Analysis Using a MEMCF-Based Algorithm**
Vincenzo Paciello (University of Salerno, Italy); Carlotta Rossi, Stefano Pavoni, Marcello Vanali, Ilaria De Munari and Valentina Bianchi (University of Parma, Italy)

16:30 - 17:45 *Room CB27B - CuBo*
S6.2 - Advances in 3d printed sensors and sensors for 3d printing: Closing the gap between research and industrial applications - PART II
Chairs: Emiliano Schena, *Università Campus Bio-Medico di Roma, Italy*
Laura Fabbiano, *Politecnico di Bari, Italy*
Rosario Schiano Lo Moriello, *University of Naples Federico II, Italy*

16:30 **Hybrid CNN-BiLSTM Estimation of CoP and Vertical GRF Using a Smart Insole: Preliminary Validation for Ergonomic Risk Assessment**
Chiara Magonette, Francesco Castelli Gattinara Di Zubiena, Zaccaria Del Prete, Eduardo Palermo (Sapienza University of Rome, Italy)

16:45 **Permittivity Measurements of 3D-Printed Dielectric Materials for Linear-to-Circular EM Field Converter in Vital Sign Radar Systems**
Matteo Pistillucci, Renato Cicchetti, Emanuele Piuzzi, Erika Pittella and Orlandino Testa (Sapienza University of Rome, Italy)

17:00 **Monitoring of Wire Arc Additive Manufacturing Using Current Transient Analysis**
Giorgio de Alteriis, Giovanni Rianna, Alessandro Scognamiglio, Rosario Schiano Lo Moriello (University of Naples, Federico II, Italy); Alessia Teresa Silvestri (Universitas Mercatorum, Italy)

17:15 **A Digital Sensitivity Analysis Technology for Extreme Intestinal Motility and Medical Device Design**
René Thierry Djoumessi (Università Campus Bio-Medico di Roma, Italy)

17:30 **Uncertainty-Aware Reverse Engineering from 3D Scan: Reporting Confidence on Maximum-Likelihood Reconstructed Geometries**
Laura Fabbiano, Lorenzo Vaiani, Antonio Boccaccio, Michele Dassisti (Politecnico di Bari, Italy)

16:30 - 17:30 *Room CB28A - CuBo*
S6.3 - Reliable wireless solutions for IoT and Industrial IoT - PART II
Chairs: Paolo Ferrari, *University of Brescia, Italy*
Ivanovitch Silva, *Federal University of Rio Grande do Norte, Brazil*

16:30 **Effect of Node Altimetry on Graph-Based Leak Localization in Water Distribution Networks**
Weliton C Rodrigues, Rodrigo Rolle and Eduardo P Godoy (São Paulo State University (Unesp), Brazil)

16:45 **Reconfigurable ESP32-Based IoMT Architecture with End-to-End Latency Analysis over Wi-Fi with 5G Backhaul**
Lemuel Clécio de Araújo and Diego R. C. Silva (Federal University of Rio Grande do Norte, Brazil); Paolo Ferrari and Emiliano Sisinni (University of Brescia, Italy)

17:00 **Temporal Recurrence Matrix Representation for Anomaly Detection in Industrial Network Traffic**
Morsinaldo Medeiros (UFRN, Brazil); Dennis Brandão (University of Brescia, Italy); Marianne Silva (Federal University of Alagoas, Brazil); Paolo Ferrari (University of Brescia, Italy); Ivanovitch Silva (Federal University of Rio Grande do Norte, Brazil)

17:15 **Evaluating Post-Quantum TLS Performance for the Internet of Things Using Raspberry Pi Devices**
Riccardo Aldrovandi (University of Bologna, Italy); Stefan Forsström (Mid Sweden University, Sweden)

16:30 - 17:30 *Room CB28B - CuBo*
S6.4 - Advances in Optical Sensing for Living Systems: From Humans to Plants - PART II
Chairs: Daniela Lo Presti, *University Campus Bio-Medico Di Roma, Italy*
Simone Pasinetti, *University of Brescia, Italy*
Luca De Vito, *University of Sannio, Italy*

16:30 **Exploring Distributed Optical Fiber Sensing for Biomedical Applications: Design and Metrological Characterization of a Monoaxial Sensing Module**

Vincenzo Lavorgna (University Campus Bio-Medico di Roma, Italy & ENEA, Italy); Marco Gallinaro (Università Campus Bio-Medico di Roma, Italy); Andrea Polimadei (Research Centre of Frascati, ENEA, Italy); Rosaria D'Amato (ENEA Frascati Research Center, Italy); Michele Arturo Caponero (ENEA Frascati Research Centre, Italy); Daniela Lo Presti, Emiliano Schena (Università Campus Bio-Medico di Roma, Italy)

16:45 **Dual-Material 3D-Printed FBG Wearable Sensors for Bilateral Shoulder Movement Monitoring**
Alfredo Dimo (Fondazione Policlinico Universitario Campus Bio-Medico, Italy); Vincenzo Lavorgna (University Campus Bio-Medico di Roma, Italy & ENEA, Italy); Arianna Carnevale (Fondazione Policlinico Universitario Campus Bio-Medico, Italy); Umile Giuseppe Longo, Emiliano Schena, Daniela Lo Presti (Università Campus Bio-Medico di Roma, Italy)

17:00 **Vision Based System for Automated Monitoring and Segmentation of Root Growth in Olive Trees**
Simone Pasinetti (University of Brescia, Italy); Elena Brunori, Lucrezia Trovato, Riccardo Alemanno, Roberto Mancinelli and Rosario Muleo (University of Tuscia, Italy)

17:15 **Wearable Ring-Shaped Fiber Bragg Grating Sensor for Finger Tapping and Pulse Wave Monitoring**
Elena De Vita, Mariaconsiglia Cuomo, Agostino Iadicicco and Stefania Campopiano (University of Naples Parthenope, Italy)

18:30	*Università Campus Bio-Medico di Roma - CuBo* **SHUTTLE BUS DEPARTURE FOR THE GALA DINNER**

20:00	*Ristorante Pagnanelli - Castel Gandolfo (Roma)* **GALA DINNER**

Technical Program - Friday, June 12

09:00 - 15:00	*Università Campus Bio-Medico di Roma - CuBo* **REGISTRATIONS**

09:30 - 10:30	*Room CB27A - CuBo* **S7.1 - Measurement Systems and Robotics for Biomedical Applications - PART I** **Chairs:** Arianna Carnevale, *Università Campus Bio-Medico di Roma, Italy* Letizia Mancini, *Università Campus Bio-Medico di Roma, Italy*

09:30 **Altered Muscle Recruitment and Inter-Limb Symmetry in Shoulder Function After Rotator Cuff Repair: An sEMG-Based Study**
Carla Antonacci (Università Campus Bio-Medico di Roma, Italy); Arianna Carnevale (Fondazione Policlinico Universitario Campus Bio-Medico, Italy); Letizia Mancini (Università Campus Bio-Medico di Roma, Italy & Fondazione Policlinico Universitario Campus Bio-Medico, Italy); Carlo Massaroni (Università Campus Bio-Medico di Roma, Italy); Rocco Papalia (Fondazione Policlinico Universitario Campus Bio-Medico, Italy); Emiliano Schena (Università Campus Bio-Medico di Roma, Italy); Umile Giuseppe Longo (Fondazione Policlinico Universitario Campus Bio-Medico, Italy)

09:45 **Viewpoint Effects on Markerless Upper Limb Kinematics During Musculoskeletal Rehabilitation Exercises**
Arianna Carnevale (Fondazione Policlinico Universitario Campus Bio-Medico, Italy); Letizia Mancini (Università Campus Bio-Medico di Roma, Italy & Fondazione Policlinico Universitario Campus Bio-Medico, Italy); Umile Giuseppe Longo (Fondazione Policlinico Universitario Campus Bio-Medico, Italy); Emiliano Schena (Università Campus Bio-Medico di Roma, Italy); Rocco Papalia (Fondazione Policlinico Universitario Campus Bio-Medico, Italy); Alessandro Umbrico, Andrea Orlandini and Christian Tamantini (National Research Council of Italy, Italy)

10:00 **A Comparative Study of a Thermal Camera and a Stereophotogrammetric Markerless System for Shoulder Joint Angle Estimation**
Martina Sassi (Università Campus Bio-Medico di Roma, Italy); Arianna Carnevale (Fondazione Policlinico Universitario Campus Bio-Medico, Italy); Emiliano Schena (Università Campus Bio-Medico di Roma, Italy); Leandro Pecchia (Unicamps, USA); Umile Giuseppe Longo (Fondazione Policlinico Universitario Campus Bio-Medico, Italy)

10:15 **Influence of Lighting Conditions on Markerless Motion Capture: Insights from Squat Movements**

Giovanni Spallone and Arianna Carnevale (Fondazione Policlinico Universitario Campus Bio-Medico, Italy); Letizia Mancini (Università Campus Bio-Medico di Roma, Italy & Fondazione Policlinico Universitario Campus Bio-Medico, Italy); Carla Antonacci (Università Campus Bio-Medico di Roma, Italy); Pieter D'Hoghe (Aspetar Hospital Doha, Qatar); Stefano Campi (Fondazione Policlinico Universitario Campus Bio-Medico, Italy); Carlo Massaroni (Università Campus Bio-Medico di Roma, Italy); Alessandro de Sire (University of Catanzaro Magna Graecia, Italy); Rocco Papalia (Fondazione Policlinico Universitario Campus Bio-Medico, Italy); Emiliano Schena (Università Campus Bio-Medico di Roma, Italy); Umile Giuseppe Longo (Fondazione Policlinico Universitario Campus Bio-Medico, Italy)

09:30 - 10:30 *Room CB27B - CuBo*

S7.2 - Sensor Technologies and Algorithms for Physiological Monitoring: From Occupational to Sports Applications - PART I

Chairs: Mattia Manenti, *University of Catania, Italy*
Fabrizio Marra, *Sapienza University of Rome, Italy*
Chiara Romano, *Università Campus Bio-Medico di Roma, Italy*

09:30 **Design and Optimization of a Grating Coupler and a Y-Branch Splitter in Silicon Photonics**

Radek Lacina (VSB-TUO, Czech Republic); Radovan Korček (National Research Council of Canada, Canada); Pavel Cheben (NRC Institute for Microstructural Sciences, Canada); Filip Malinka (VSB-TUO, Czech Republic); Jianhao Zhang, Rubin Ma, Jens H. Schmid (National Research Council of Canada, Canada); Ondřej Vachek, Daniel Križan and Jan Nedoma (VSB-TUO, Czech Republic)

09:45 **Inkjet-Printed IDC Sensor Integrated in a Microfluidic Platform**

Danilo Greco, Bruno Andò and Salvatore Castorina (University of Catania, Italy); Cosimo Trono, Sara Tombelli and Niccolò Marcucci (Istituto di Fisica Applicata Nello Carrara, Italy); Maria Rachele Guascito, Giuseppe Lamberti and Laura Martina (University of Salento, Italy); Nunzio Cennamo (University of Campania Luigi Vanvitelli, Italy)

10:00 **Feasibility of an FBG-Based Wearable System for Firefighters Cardiorespiratory Monitoring During Simulated Fire Suppression Training**

Daniela Lo Presti, Ilaria Condo and Martina Pulcinelli (Università Campus Bio-Medico di Roma, Italy); Vincenzo Lavorgna (University Campus Bio-Medico di Roma, Italy & ENEA, Italy); Chiara Romano, Carlo Massaroni and Mariangela Pinnelli (Università Campus Bio-Medico di Roma, Italy); Fabio Tossut (Corpo Nazionale dei Vigili del Fuoco, Italy); Roberto Setola and Emiliano Schena (Università Campus Bio-Medico di Roma, Italy)

10:15 **Assessment of an Inertial Sensor for Postural Instability Monitoring**
Bruno Andò, Mattia Manenti, Gaia Panebianco, Giovanni Mostile, Marco Cultraro and Dario Caruso (University of Catania, Italy); Mario Zappia (AOU Policlinico Vittorio Emanuele of Catania, Italy)

09:30 - 10:15 *Room CB28A - CuBo*
S7.3 - General Session - PART IV
Chair: Emiliano Schena, *Università Campus Bio-Medico di Roma, Italy*

09:30 **Metrological Characterization of a Pipeline for Pose Detection from Segmentation Masks in Photovoltaic Plants Aerial Inspection**
Vittorio Sala (SUPSI, Switzerland); Marcello Polenghi (Universitas Mercatorum, Italy); Ambra Vandone (SUPSI, Switzerland); Roberto Caldelli (Universitas Mercatorum, Italy); Claudio Loconsole (Universitas Mercatorum & Institute of Mechanical Intelligence, Scuola Superiore Sant'Anna, Italy); Anna Valente (SUPSI-ISTEPS, Italy)

09:45 **Exploring Geometry-Aware Pattern Discovery Using Matrix Profile on Multivariate IoT Data**
Arnab Mukhopadhyay (University of Bologna, Italy); Stefan Forsström (Mid Sweden University, Sweden)

10:00 **A New Perspective or Human Exale Degratation: De-VOC FLOW**
Francesco Monni (Ingegneria CH.I.S.S. SpA)

09:30 - 10:30 *Room CB28B - CuBo*
S7.4 - Education 5.0: Next-Generation Training through Pedagogical Innovation and AI/XR Technologies
Chairs: Francesco Bonavolontà, *University of Naples Federico II, Italy*
Mauro D'Angelo, *Perlatecnica ETS, Italy*
Francesco Picariello, *Universitas Mercatorum, Italy*

09:30 **AI-Supported Remote Laboratories for Measurement Education: A Preliminary Evaluation of LLM for Oscilloscope-Based Training**
Francesco Picariello (Universitas Mercatorum, Italy); Pasquale Daponte, Luca De Vito and Ioan Tudosa (University of Sannio, Italy)

09:45 **Students Engagement in Embedded Systems Education: The Case of NeaPolis Innovation Summer Campus**
Salvatore Dello Iacono (University of Brescia, Italy); Domenico Rega, Michele Palma, Mauro D'Angelo and Giovanni Di Sirio (STMicroelectronics, Italy)

10:00 **Platypus: An Edge-Based Gamified Educational Platform for IoT Learning**
Salvatore Bramante (IMT School for Advanced Studies Lucca, Italy); Filippo Ferrandino and Alessandro Cilardo (Università degli Studi di Napoli Federico II, Italy)

10:15 **Instructional Design for MOOCs on Sustainability: A Sustainability Digital Training Framework**
Evelina Bruno and Maddalena Molaro (University of Naples Federico II, Italy)

10:30 - 11:00	*Università Campus Bio-Medico di Roma - CuBo* **COFFEE BREAK**

11:00 - 12:00	*Auditorium CuBo* **KEYNOTE LECTURE** **Chair:** Alessio Gizzi, *Università Campus Bio-Medico di Roma, Italy*

Stretchable, flexible and printed electronics on compliant substrates: Virtual testing protocols based on fracture mechanics

Marco Paggi, *IMT School for Advanced Studies Lucca, Italy*

12:00 - 13:15	*Room CB27A - CuBo* **S8.1 - Measurement Systems and Robotics for Biomedical Applications - PART II** **Chairs:** Arianna Carnevale, *Università Campus Bio-Medico di Roma, Italy* Letizia Mancini, *Università Campus Bio-Medico di Roma, Italy*

12:00 **Evaluation of Surface EMG Signal Quality in Patients with Lower Limb Osteoarthritis**
Letizia Mancini (Università Campus Bio-Medico di Roma, Italy & Fondazione Policlinico Universitario Campus Bio-Medico, Italy); Arianna Carnevale and Giovanni Spallone (Fondazione Policlinico Universitario Campus Bio-Medico, Italy); Carla Antonacci (Università Campus Bio-Medico di Roma, Italy); Stefano Campi and Rocco Papalia (Fondazione Policlinico Universitario Campus Bio-Medico, Italy); Carlo Massaroni and Emiliano Schena (Università Campus Bio-Medico di Roma, Italy); Umile Giuseppe Longo (Fondazione Policlinico Universitario Campus Bio-Medico, Italy)

12:15 **Cost-Effective Bench Testing for Lower-Limb Powered Exoskeleton**
Matteo Piratoni, Ilaria Mileti, Jordan Carducci and Gennaro Salvatore Ponticelli (University Niccolò Cusano, Italy); Maurizio Petrarca (IRCCS Children's Hospital Bambino Gesù, Roma, Italy); Fabrizio Patanè (University Niccolò Cusano, Italy)

12:30 **Are We Still Searching Manually? Automatic TMS Motor Hotspot Localization via Tabu Search**
Jacopo Vitale, Annamaria Palese, Mattia Pinardi, Marco D'alonzo, Marianna Lanza, Domenico Formica, Giovanni Di Pino (Universita' Campus Bio-Medico di Roma, Italy)

12:45 **Uncertainty-Aware Digital Twins for Industry 4.0: A Metrology-Driven Conceptual Framework with a Healthcare Robotics Case Study**
Dipanwita Thakur, Vincenzo Barbuto, Claudio Savaglio, Antonella Guzzo and Giancarlo Fortino (University of Calabria, Italy)

13:00 **Usability Assessment of a 2-DoF Wearable Wrist Robot in Activities of Daily Living**
Giorgia Giovannetti, Giovanni Di Pino and Domenico Formica (Università Campus Bio-Medico di Roma, Italy)

12:00 - 13:00 *Room CB27B - CuBo*
S8.2 - General Session - PART V
Chairs: Vincenzo Saroli, *Università Campus Bio-Medico di Roma, Italy*
Isabel del Pilar Moscol Albanil, *Università Campus Bio-Medico di Roma, Italy*

12:00 **Thermo-Electrophysiological Modeling of Excitable Cells via Bond Graph**
Riccardo Minichella (Gran Sasso Science Institute, Italy)

12:15 **Energy-Efficient Federated Learning from Sensor Data on Resource-Constrained IoT Devices**
Alessandro De Martini (University of Brescia, Italy); Stefan Forsström (Mid Sweden University, Sweden)

12:30 **Tailored Robotic Rehabilitation Treatment in Lower Limb Soft Tissue Sarcomas Reconstruction**
Andrea Demofonti (IRCCS Fondazione Don Carlo Gnocchi, Italy)

12:45 **Microwave Resonant Sensing of Dielectric Changes in Myotubes Exposed to C26 Tumor-Conditioned Medium**
Marialourdes Ingrosso and Livio D'Alvia (Sapienza University of Rome, Italy); Marianna Cosentino (Link Campus University & Sapienza University of Rome, Italy); Desiree Genovese, Zaccaria Del Prete and Emanuele Rizzuto (Sapienza University of Rome, Italy)

12:00 - 13:15 *Room CB28A - CuBo*
S8.3 - Sensor- and AI-based Methods for Monitoring and Performance Measurements in Clinical and Sport Domains within the Industry 4.0 Framework
Chairs: Juri Taborri, *University of Tuscia, Italy*
Luca Molinaro, *eCampus University, Italy*

12:00 **Inter-Rater Reliability of the Spine 3D System Comparison Between Automatic and Manually Adjusted Anatomical Landmarks in Lower Limb Postural Assessment**
Luca Molinaro (eCampus University & Sensor Medica Srl, Italy); Juri Taborri (University of Tuscia, Viterbo, Italy); Luca Ceriola (University Niccolò Cusano, Italy & Sensor

Medica, Italy); Ilaria Mileti (University Niccolò Cusano, Italy); Stefano Rossi (University of Tuscia, Italy)

12:15 **Human-in-the-Loop Simulator with a Markerless Vision System for Athlete Training in the Olympic Sport of Skeleton**
Filippo Massimiliani (University of Pavia, Italy); Stefano Gaboli (Politecnico di Milano, Italy); Carol Sergenti, Giuseppe Mangano, Davide Todesca, Nicola Giulietti, Marco Carnevale and Hermes Giberti (University of Pavia, Italy)

12:30 **Estimation of Pulse Transit Time Using Fiber Bragg Grating Sensors**
Mariaconsiglia Cuomo (University of Naples Parthenope, Italy); Maria Gragnaniello (University of Naples Federico II, Italy); Elena De Vita and Agostino Iadicicco (University of Naples Parthenope, Italy); Michele Riccio (University of Naples Federico II, Italy); Stefania Campopiano (University of Naples Parthenope, Italy)

12:45 **Motor Strategies in Rhythmic Synchronization Tasks: Does Group Size Matter?**
Jessica Vacca (University of Genoa, Italy); Giulia Sedda and Danilo Pani (University of Cagliari, Italy)

13:00 **Language-Dependent and Language-Independent Acoustic Cues in Speech Emotion Recognition**
Daniele Casali (University of Rome Tor Vergata, Italy); Valerio Cesarini (University of Rome Tor Vergata & VoiceWise, Italy); Enrico Maria Carloni and Giovanni Costantini (University of Rome Tor Vergata, Italy)

12:00 - 13:00 *Room CB28B - CuBo*
S8.4 - Sensor, IoT, and AI-driven Technologies for Sustainable Agrifood Industry 5.0, Quality Assurance, Food Production, and Food Safety - PART II
Chairs: Francesco Bonavolontà, *University of Naples Federico II, Italy*
Claudia Zoani, *ENEA, Italy*

12:00 **AI-Driven Tree Canopy Detection for Precision Agriculture Using UAV-Acquired RGB Images**
Federico Baiamonte, Antonino Pagano, Gabriele Restuccia, Matteo Ippolito, Dario De Caro, Fulvio Capodici and Ilenia Tinnirello (University of Palermo, Italy)

12:15 **Low Cost and Efficient IoT Trap System for Remote Monitoring of Olive Fruit Fly Attacks**
Maria Rizzi (Politecnico di Bari, Italy); Onofrio Marco Pistillo and Giacinto Salvatore Germinara (Università di Foggia, Italy); Pietro Spagnoletti and Daniela Panio (Federazione Regionale Coldiretti Puglia, Italy); Raffaele Fasano (NEETRA, Italy); Cataldo Guaragnella (Politecnico di Bari, Italy)

12:30 **Energy-Efficiency in Greenhouse Grown Crops by LED Lighting with Integrated Renewable Storage Energy Systems**

Karl-Johan Bergstrand (Swedish University of Agricultural Sciences, Sweden); Geni Zanol and Jorge Solis (Karlstad University, Sweden); Akihiro Funaki (Institute of Science Tokyo, Japan); David Olsson and Magnus Nilsson (Glava Energy Center, Sweden)

12:45 **Deep Reinforcement Learning for Irrigation Optimization Based on Crop-Soil Dynamics**
Romeo Silvestri and Mattia Antonini (Fondazione Bruno Kessler, Italy); Massimo Vecchio (OpenIoT Research Unit at FBK, Italy); Fabio Antonelli (Fondazione Bruno Kessler, Italy)

13:00 - 14:00	*Università Campus Bio-Medico di Roma - CuBo* **LUNCH**

14:00 - 15:00	*Auditorium CuBo* **TUTORIAL** **Chair:** Carlo Massaroni, *Università Campus Bio-Medico di Roma, Italy*

Wearable sensors for cardiorespiratory monitoring: from technologies to signal processing algorithms and open challenges

Chiara Romano, *Università Campus Bio-Medico di Roma, Italy*

15:00 - 16:00	*Room CB27A - CuBo* **S9.1 - Advanced Sensing and Measurement Technologies For Intelligent And Human-Aware Cyber-Physical Systems** **Chairs:** Alessia Noccaro, *Newcastle University, UK* Daniela Lo Presti, *University Campus Bio-Medico of Rome, Italy*

15:00 **Experimental Validation of a Wearable Textile with Integrated FBG Sensors for Simultaneous HR and RR Monitoring**
Daniel Križan, Ondřej Vachek, Filip Malinka, Radek Lacina and Jan Nedoma (VSB-TUO, Czech Republic)

15:15 **A Hybrid Optical Sensing and Data Network for Smart City Infrastructure Monitoring: A Feasibility Study**
Filip Malinka, Radek Lacina, Daniel Križan, Ondřej Vachek and Jan Nedoma (VSB-TUO, Czech Republic)

15:30 **Design and Thermal Modeling of a Li-Polymer Battery Pack for Residential Renewable Energy Storage Using MATLAB Simulink**
Ludovica Apa, Livio D'Alvia, Zaccaria Del Prete and Emanuele Rizzuto (Sapienza University of Rome, Italy)

15:45 **Teleoperated and Height-Adaptive Shared Control Strategies for a Supernumerary Robotic Arm in Physically Interactive Trimanual Tasks**
Flavia Pasquali and Clemente Lauretti (Università Campus Bio-Medico di Roma, Italy); Alessia Noccaro (Newcastle University, UK & Università Campus Bio-Medico di Roma, Italy)

15:00 - 16:00 *Room CB27B - CuBo*
S9.2 - Sensor Technologies and Algorithms for Physiological Monitoring: From Occupational to Sports Applications - PART II
Chairs: Mattia Manenti, *University of Catania, Italy*
Fabrizio Marra, *Sapienza University of Rome, Italy*
Chiara Romano, *Università Campus Bio-Medico di Roma, Italy*

15:00 **A Multimodal Smart Wearable Garment for Continuous Monitoring of Human Motor Tasks: A Multi-User Feasibility Study**
Fabrizio Marra (Sapienza University of Rome, Italy); Mariangela Pinnelli and Rita Molle (Università Campus Bio-Medico di Roma, Italy); Christian Tamantini (National Research Council of Italy, Italy); Carlo Massaroni and Francesca Cordella (Università Campus Bio-Medico di Roma, Italy); Alessandro Ledda and Mara Stefanelli (INAIL, Italy); Loredana Zollo and Emiliano Schena (Università Campus Bio-Medico, Rome, Italy); Maria Sabrina Sarto (University of Rome, La Sapienza, Italy)

15:15 **Beyond Statistical Filtering: Morphology-Based Detection of Atypical Breaths for Investigating Breathing Control During Exercise**
Andrea Nicolò and Giuseppe Greco (University of Rome Foro Italico, Italy); Emiliano Schena (Università Campus Bio-Medico di Roma, Italy); Massimo Sacchetti (University of Rome Foro Italico, Italy); Carlo Massaroni (Università Campus Bio-Medico di Roma, Italy)

15:30 **Morphological Robustness Analysis of Seismocardiogram SPAR Features Across Breathing Conditions**
Isabel del Pilar Moscol Albanil, Carlo Massaroni, Emiliano Schena and Daniela Lo Presti (Università Campus Bio-Medico di Roma, Italy)

15:45 **Real-Time Image-Guided Robot-Assisted Partial Nephrectomy: Design and Methodology of the BISTOURY-CLINICAL Protocol**
Francesco Prata (Policlinico Universitario Campus Bio-Medico di Roma, Italy)

15:00 - 16:00 *Room CB28A - CuBo*
S9.3 - 3D-Printed Electronics and Sensors for Industry 4.0: Materials, Processes, and Metrology
Chairs: Riccardo Olivieri, *University of L'Aquila, Italy*
Paolo Esposito, *University of L'Aquila, Italy*

15:00 **Feasibility of a Crossbar High-Density Eddy Current Sensor Array for Structural Health Monitoring Using Inductance to Digital Converters**
Jorge Assis (Instituto Superior Técnico, Portugal & Instituto de Telecomunicações, Portugal); Victor Santos Macedo (Universidade de Lisboa, Portugal); Luís Soldado Rosado (Instituto Superior Técnico, Portugal & Instituto de Telecomunicações, Portugal)

15:15 **A Flexible Capacitive Sensor for Biomedical Applications**
Paolo Esposito, Riccardo Olivieri, Gianluca Barile, Giuseppe Ferri and Vincenzo Stornelli (University of L'Aquila, Italy)

15:30 **A Study on Impedance Behavior of 3D-Printed Electrodes for Physiological Signal Acquisition**
Elisa Montaldi, Riccardo Olivieri, Paolo Esposito, Davide Colaiuda, Gianluca Barile, Giuseppe Ferri and Vincenzo Stornelli (University of L'Aquila, Italy)

15:45 **LoRa-Based Telemetering Node for Current and Voltage Monitoring of Street Lighting Poles**
Fabio Leccese (Roma Tre University, Italy); Riccardo Arciulo (4Spark, Italy)

15:00 - 16:00 *Room CB28B - CuBo*
S9.4 - Sensor, IoT, and AI-driven Technologies for Sustainable Agrifood Industry 5.0, Quality Assurance, Food Production, and Food Safety - PART III
Chairs: Francesco Bonavolontà, *University of Naples Federico II, Italy*
Claudia Zoani, *ENEA, Italy*

15:00 **Acoustics Related to the Queen Presence in Honey Bee (Apis Mellifera Ligustica L.) Colonies**
Andrea De Simone and Fabrizio Riente (Politecnico di Torino, Italy); Filippo Lazzari and Pier Paolo Danieli (University of Tuscia, Italy)

15:15 **AI-Driven Amodal Instance Segmentation for Precision Agriculture: Data-Efficient Apple Detection via Cross-Domain Transfer Learning**
Mehran Tarif, Mohsen Saadatpour and Davide Quaglia (University of Verona, Italy)

15:30 **Edge-VisuAlign: A Lightweight Virtual Sensor for RUL Estimation via Cross-Modal Knowledge Distillation**
Alessandro Del Prete, Zahida Mashaallah and Flora Amato (University of Naples Federico II, Italy)

15:45 **Presetting a Low-Cost IoT Sensor Network and a Commercial Sniffer for Continuous, Non-Invasive Monitoring of Ammonia and Greenhouse Gases on Dairy Farms**
Marco Bonfanti, Luigi Liotta, Vincenzo Lopreiato, Marco Tolone, Giuseppe Antonio Catalano, Carmelo Cavallo and Giuseppe Modica (University of Messina, Italy)

16:00 - 16:30	*Auditorium CuBo* **CLOSING AND AWARD CEREMONY**