





2025 IEEE INTERNATIONAL WORKSHOP ON

Metrology for Living Environment

VENICE, ITALY, JUNE 11-13, 2025

FINAL PROGRAM



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Welcome Message from the General Chairs

On behalf of the Organizing Committee, we cordially welcome you to the 2025 IEEE International Workshop on Metrology for Living Environment (*MetroLivEnv 2025*).

MetroLivEnv 2025 intends to create an active and stimulating forum where academics, researchers, and industry experts in measurement and data processing techniques for Structural Health, Comfort, Energy, Efficiency, BIM, Pollutions, and Innovative Construction Materials can meet and share new advances and research results.

Attention is paid to, but not limited to, new technologies for metrology assisted solutions for design, construction, efficient, safe, comfortable and healthy operation of the built environment including active and assisted living (AAL). Innovative solutions can be based on the IoT paradigm, BIM, sensors, signal processing, data analytics, artificial intelligence, sensor networks, interoperability standards.

The program is designed to raise the interest of a wide group of researchers, operators and decision makers from metrology and several different research fields, presenting the cuttingedge solutions in the living environment from the scientific and technological point of view. The Workshop covers all aspects of the living environment focusing on its design and life cycle, energy efficiency, structural health monitoring, measurement for comfort assessment, indoor pollution, chemical and physical parameters monitoring.

This is the fourth edition of *MetroLivEnv* and it is hosted by the Ca' Foscari University of Venice, Italy, with the support of the Polytechnic of Milan, Università della Calabria, Università Politecnica delle Marche, Università degli Studi dell'Aquila, Politecnico di Bari, e-Campus, Department of Computer Science, Modelling, Electronics and Systems of the University of Calabria, Department of Civil Engineering of the University of Calabria, Department of Mathematics, Informatics, and Economy of the University of Potenza, Department of Nanomolecular Science and Nano systems of the Università Ca'Foscari di Venezia, Italian National Council of Research CNR-Nanotech, GMEE, GMMT, I-RIM, Engineering, and several international and national research institutes.

We want also to thank the sponsors that have financially supported the event: Department of Computer Science, Modelling, Electronics and Systems -DIMES of the University of Calabria, Alma Software, FLIR, Red Yard, SEBYONE.

The conference venue is the Scientific Campus of Ca' Foscari, dedicated to the scientific activities of the Department of Environmental Sciences, Informatics and Statistics (DAIS) and the Department of Molecular Sciences and Nanosystems (DSMN). Ca' Foscari University of Venice, founded in 1868 as Italy's first business school, is now a multidisciplinary institution offering





programs in economics, humanities, languages, and sciences. Mainly located in a historic Venetian Gothic palace on the Grand Canal (and other places disseminated in Venice Centre and Mestre), the university combines rich cultural heritage with modern academic excellence. With over 23,000 students and a strong international focus, Ca' Foscari provides numerous English-taught degrees and fosters global partnerships. In particular, the Scientific Campus of Ca' Foscari University of Venice, located in Mestre, is a modern hub for scientific research and education. Spanning over 27,500 square meters, it houses state-of-the-art laboratories, classrooms, and a library, supporting disciplines such as environmental sciences, molecular sciences, informatics, electronics, measurements and telecommunications. The campus emphasizes sustainability and offers a vibrant, multicultural environment for students and researchers.

The *MetroLivEnv* Technical Program consists of 96 oral presentations scheduled over three days. Presentations are organized in a General Session and 16 Special Sessions. Special Sessions aim to create a focus on specific topics, where researchers can make knowledge, familiarize, exchange ideas, and build cooperation.

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

Technically extended versions of presented papers can be submitted to:

- o Special Issue on International Journal of Masonry Research and Innovation (IJMRI).
- o Thematic Issue on ACTA IMEKO.

MetroLivEnv 2025 is honoured to have experts in smart structures and living environment as Invited Speakers.

- o Prof. Pietro Manzoni, *Universidad Politecnica de Valencia, Spain,* will open MetroLivEnv 2025 with a lecture on "Enhancing IoT-Based Monitoring Systems with TinyML".
- o Prof. Massimiliano Lo Turco, *Politecnico di Torino, Italy*, will open the second day of works with a talk about "Measurements and Information Models for Museum Heritage".
- o Prof. Leonardo Iannucci, *Politecnico di Torino, Italy*, will open the third day of works with a talk about "Non-invasive electrochemical techniques to monitor buildings and metallic structures exposed outdoors".

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

To recognize the most outstanding paper presented at the annual *IEEE International Workshop* on *Metrology for Living Environment*, the Best Conference Paper Award sponsored by Alma Software will be assigned. The Best Conference Paper Award is dedicated to the memory of Prof. Domenico Grimaldi, whose passion, enthusiasm, and commitment for science will be of inspiration for all the recipients of this prize.

Other awards will be assigned to the Best Paper presented by a Young Researcher, and to the Best Paper Presented by a Woman, to recognize the full engagement of women in all aspects of





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

The 2025 IEEE International Workshop on Metrology for Living Environment is about to begin. Metrologists, mathematicians, biologists, physics, chemistries, psychologists, and engineers, enjoy the Workshop!

June 2025

Peppino Fazio, Ca' Foscari University of Venice, Italy Francesco Lamonaca, University of Calabria, Italy Gabriele Milani, Politecnico di Milano, Italy MetroLivEnv 2025 General Chairs





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IEEE MetroLivEnv 2025 Keynote Speakers Plenary Session - Wednesday June 11 - H 11:00



Enhancing IoT-Based Monitoring Systems with TinyML

Pietro **Manzoni** Universitat Politècnica de València, Spain

ABSTRACT

The convergence of AI and the Internet of Things (IoT) is revolutionizing how we monitor and manage systems across diverse sectors, from agriculture and healthcare to smart cities. TinyML—deploying machine learning models on resource-constrained devices—enables the creation of more powerful sensors that process data locally at the edge, enhancing energy efficiency, privacy, and real-time decision-making.

This talk explores how TinyML empowers IoT-based monitoring systems by improving decisionmaking capabilities, reducing latency, and minimizing reliance on cloud infrastructure. Key topics include selecting lightweight machine learning algorithms, optimizing models for lowpower microcontrollers, and leveraging frameworks like TensorFlow Lite Micro and EdgeImpulse.

Real-world case studies will highlight how TinyML enhances system responsiveness and reliability while reducing costs and energy consumption.

SPEAKER BIOGRAPHY

Pietro Manzoni is a computer engineering professor at the "Universitat Politècnica de València," Spain. He received a master's degree in Computer Science from the "Università degli Studi" of Milan, Italy, in 1989 and a Ph.D. in Computer Science from the "Politecnico di Milano," Italy, in 1995. From November 1992 to February 1993, he was an intern at Bellcore Labs, Red Bank, New Jersey, USA. From February 1994 to November 1994, he was a visiting researcher at the ICSI (International Computer Science Institute) Berkeley, California, USA.

His research has always been focused on using Mobile Wireless Networks to create dynamic systems. Currently, he is developing solutions for the Internet of Things using LPWAN networks and Pub/Sub systems. These solutions have various applications, including environmental intelligence by integrating TinyML-based solutions, sustainable and green IoT, and Smart





Tourism. Additionally, he is interested in exploring ways to provide integrated connectivity in the edge-cloud continuum.

He is the coordinator of the Computer Networks Research Group (GRC), a senior member of the IEEE, and a member of the IEEE Technical Committee on Hyper-Intelligence, the IEEE SIG on Metaverse, and the ACM SIGCAS - Computers and Society.

Plenary Session - Thursday June 12 - H 11:00



Measurements and Information Models for Museum Heritage

Massimiliano Lo Turco Politecnico di Torino, Italy

ABSTRACT

The adoption of information models for museum heritage represents a turning point in the integration of technology and cultural management. The case of the Museo delle Antichità Egizie in Turin offers an emblematic example in the progressive adoption of the BIM -(Building Information Modeling) methodology, starting from the instrumental acquisition of the artefact to the realisation of digital information models that can be used for the planning of new interventions but also for management and maintenance purposes. The digital model of the container (museum) can efficiently dialogue with the content (collections), relating different information heritages. The interaction between these two levels of data, mainly measurements, allows for more effective heritage management, optimising processes of cataloguing, conservation and enhancement. Information management of collections can be implemented through the use of dynamic databases integrated with parametric systems and updatable through algorithmic procedures. In addition, the analysis of the visitor behaviour recorded by IoT sensors, combined with the definition of new algorithms, can create interoperable relationships with BIM-based models: this allows to validate established prefigurative models (i.e. drawn up on the basis of ethnographic investigations), offering curators and registrars innovative tools for the planning and the management of the exhibitions and, as a consequence, of the museal living environment.





SPEAKER BIOGRAPHY

Massimiliano Lo Turco is Full Professor in Drawing, Engineer, Architect and PhD in 'Drawing and Surveying for the Building and Territorial Heritage'. He currently carries out teaching and research activities at the Department of Architecture and Design of the Politecnico di Torino, with a focus on the survey and digital modelling of architecture. In recent years, his research has focused on the application of Building Information Modeling (BIM) for the documentation, conservation and management of Cultural Heritage, with particular attention to the development of integrated digital models for the enhancement and fruition of heritage. Furthermore, together with his research group, he has conducted research applying Visual Programming Language (VPL) for 3D modelling and critical data analysis. In this context, Drawing plays a fundamental role in the representation, simulation and the development of design solutions, contributing significantly to the advancement of practices and knowledge in the field of cultural heritage conservation and enhancement.

Plenary Session - Friday June 13 - H 10:45



Non-invasive electrochemical techniques to monitor buildings and metallic structures exposed outdoors

Leonardo **lannucci** *Politecnico di Torino, Italy*

ABSTRACT

The interaction between materials and the environment is a long-lasting process which leads to the progressive modification of materials' properties, appearance, and structural resistance. It is thus important to develop monitoring protocols able to assess the conservation status of metallic structures exposed outdoors, in order to prevent possible damages associated with materials degradation.

The talk will present case studies of measurement campaigns carried out on built heritage structures, demonstrating the potential of electrochemical measurements to assess their conservation state. The use of Electrochemical Impedance Spectroscopy to monitor the corrosion processes on metals will be examined, presenting also new solutions in portable





instrumentation. A specific focus will be dedicated to weathering steels, to review their use in art and architecture, and to delve into their natural patination process.

SPEAKER BIOGRAPHY

Leonardo lannucci is an Assistant Professor in Applied Physical Chemistry at the Department of Applied Science and Technology, Politecnico di Torino (Turin, Italy). He received the PhD in Metrology cum laude in 2019 from Politecnico di Torino, defending the thesis entitled 'Measurement techniques for microbial corrosion assessment'.

His main research fields are electrochemical measurements for materials characterisation, corrosion science, development of organic coatings for corrosion protection, conservation of cultural heritage, and electrochemical techniques for biomedical applications. Research interests also include the development of innovative and portable instrumentation for electrochemical measurements.

He is a member of IMEKO (International Measurement Confederation), and since November 2021 he has been the Scientific Secretary of IMEKO TC24 on Chemical Measurements. He is Associate Editor of the "Measurement" and the "Measurements Sensor" Journals, and a member of the Editorial Board of the ACTA IMEKO Journal.





IEEE MetroLivEnv 2025 Tutorials

Tutorial Session #1 - Wednesday June 11 - H 12:00



DaaS-IoT: an overlay mesh network technology for real-time distributed measurements using self-synchronizing nodes

Sebastiano Meduri, Lorenzo Grillo, Pierpaolo Sestito SEBYONE

ABSTRACT

The paradigm of DaaS (Device as a Service) redefines the role of communication infrastructures in the field of measurement and monitoring. In metrology, data must not only be acquired but also transported, interpreted, and utilized across diverse systems. DaaS addresses this need by enabling fully integrated environments where nodes are temporally synchronized and capable of dynamically selecting the most suitable communication channel and protocol. This approach simplifies the deployment of smart monitoring including Machine Learning solutions and Internet of Things paradigm by allowing developers to focus on application-level challenges, minimizing the traditional complexities of edge and fog computing. Unlike conventional architectures, DaaS nodes autonomously manage message storage and replication at communication level, ensuring scalable and resilient data flows without the need for centralized brokers. The benefits of this approach are validated through a heterogeneous deployment involving low-power embedded devices and high-performance computing nodes, demonstrating the feasibility of DaaS for the next generation of distributed measurement systems and showing how nodes synchronize to a common time reference, periodically interact among them, and adaptively optimize communication pathways.

SPEAKER BIOGRAPHY

Sebyone is an Italian start-up founded to develop the enabling technology called DaaS. DaaS is devoted to create overlay-mesh, self-organizing, data-oriented networks that overlap existing networks to create global connectivity and new services. The Research Team is supported by a technical committee made up of experts from multiple sectors. It is composed by:

Sebastiano Meduri is the founder and technical director. He coordinates research and development activities and develops prototypes for the use of DaaS technology in various application areas including the energy and renewable sectors.





Lorenzo Grillo is the DaaS project development manager. He contributes with important developments of the Protocol and routing algorithms as well as coordinating porting on the various platforms.

Pierpaolo Sestito is the external relations manager for research. He is responsible for the development of algorithms for no-flooding time synchronization.

Tutorial Session #2 - Thursday June 12 - H 14:10



Chitosan-based bioelectronic devices for health and environmental monitoring

Jacopo **Nicoletti** Ca' Foscari University of Venice, Italy

ABSTRACT

This tutorial presents advanced measurement techniques for the characterization of flexible biomaterials, with a focus on biocompatible, antibacterial, and biodegradable systems such as chitosan thin films. Key topics include a refined method for antibacterial testing, the use of advanced Piezoelectric Force Microscopy (PFM) to accurately measure the piezoelectric coefficient (d₃₃), and precise Radio-Frequency Identification (RFID) antenna characterization using Vector Network Analyzers (VNA) to minimize artifacts in electromagnetic performance. These methods aim to enhance the understanding of the mechanisms behind the development of next-generation wearable devices for environmental and health monitoring.

SPEAKER BIOGRAPHY

Jacopo Nicoletti graduated in Biomedical Engineering in 2020 from the University of Tor Vergata in Rome, with a thesis titled "Thermal Characterization of Nano-Fractured Gold Thin Films for Epidermal Devices". From January 2022 to December 2024, He pursued a PhD at Ca' Foscari University of Venice with focus on biocompatible and biodegradable electronic sensors, with emphasis on chitosan thin film piezoelectricity and skin-like antibacterial smart patches. Currently, Jacopo is a Research Fellow at Ca' Foscari University of Venice still working on sustainable materials and devices.





Tutorial Session #3 - Friday June 13 - H 11:20



Terahertz Waves for Metrology: from fundamentals to enhanced sensing

Riccardo **Piccoli** Ca' Foscari University of Venice, Italy

ABSTRACT

Terahertz (THz) radiation, located between the infrared and microwave regions of the electromagnetic spectrum (0.1–10 THz), possesses unique properties that make it a powerful tool for metrology, sensing, and spectroscopy. Its non-ionizing nature, low photon energy (millielectron-volts), and ability to penetrate a wide range of optically opaque materials enable non-contact and non-invasive inspection techniques, particularly valuable in biomedical, pharmaceutical, and security applications. Moreover, the THz region hosts many collective modes (e.g., phonons) and inter-molecular vibrations, which enable precise material characterization and chemical identification.

This tutorial will introduce the fundamental principles of THz technology, covering key aspects of THz wave generation and detection. Special emphasis will be placed on THz time-domain spectroscopy (THz-TDS), a technique that provides both amplitude and phase information of transmitted or reflected THz waves, facilitating spectral analysis of complex materials. Various device architectures, including photoconductive antennas, nonlinear crystals, and quantum cascade lasers, will be discussed in the context of their efficiency, spectral coverage, and application scope.

Furthermore, recent advances in THz metamaterials will be explored, highlighting their role in enhancing sensitivity and selectivity in spectroscopic applications. Engineered sub-wavelength structures can tailor THz wave interactions, leading to enhanced field confinement, strong resonance effects, and improved detection capabilities.

This tutorial will provide attendees with a comprehensive overview of THz metrology, equipping them with the knowledge to leverage THz waves for advanced scientific and industrial applications.

SPEAKER BIOGRAPHY

Dr. **Riccardo Piccoli** is currently Assistant Professor at Ca' Foscari University of Venice, specializing in terahertz (THz) technologies, ultrafast and nonlinear optics, and attosecond science. He obtained his Ph.D. in Engineering, in late 2014, from the University of Pavia (Italy), where he developed ultrafast fiber lasers and amplifiers. In 2015, Dr. Piccoli moved to Montreal





(Canada) to join INRS-EMT as a postdoctoral researcher, where he focused on terahertz technology, including time-domain spectroscopy, imaging, metamaterials, and devices. During this period, he also made significant contributions to the study of ultrafast optical phenomena in hollow-core fibers, pushing the frontiers of nonlinear optics and few-cycle pulse generation in waveguide structures. From late 2020 to mid 2022, Dr. Piccoli was a senior researcher and lecturer at the Weizmann Institute of Science in Rehovot (Israel), where he worked on high-harmonic generation in solid materials and terahertz technology. His ability to integrate diverse technologies to develop innovative tools for exploring ultrafast light-matter interactions has paved the way for novel methods to probe and control electronic and structural dynamics in condensed matter systems. He is the author of 30 peer-reviewed journal papers, more than 100 conference contributions, and 4 patents. Now at Ca' Foscari University of Venice, R. Piccoli continues to advance THz technology and nonlinear optics, contributing to both fundamental research and technological innovation.





IEEE MetroLivEnv 2025 Venue

IEEE MetroLivEnv 2025 will be held at the Scientific Campus of Ca' Foscari University of Venice, situated in Mestre, at via Torino, 155.

Conference halls are located in the Alfa Building, which is the first building on the left upon entering the Scientific Campus, and Epsilon Building.

The Scientific Campus of Ca' Foscari University is a complex of recently renovated buildings that are innovative and designed for scientific studies, with lots of laboratories and study's centers. It is located in the Eastern part of Mestre, the city in the mainland of Venice near the Lagoon and well connected with the airport and the train and bus stations.

ADDRESS



Via Torino, 155 30170 Mestre

Use the QRCode to open the location on Google Maps







IEEE MetroLivEnv 2025 Social Events

WELCOME PARTY Wednesday June 11 - H 18:30

The Welcome Party will be held at Ca' Bolea - Via Torino 180, Mestre - on **Wednesday June 11 - 18.30**.

GALA DINNER Thursday June 12 - H 20:30

The MetroLivEnv 2025 Gala Dinner will be held at **Ristorante "San Trovaso"**, located in the charming *Dorsoduro* area, in Venice, on **Thursday June 12 - 20.30**.



ADDRESS Calle Larga Nani, 967 30100 Venezia







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Program Schedule - Wednesday, June 11

WEDNESDAY - JUNE 11 2025			
10:00 - 11:00	OPENING CEREMONY - WELCOME ADDRESSES		
11:00 - 11:40	PLENARY SESSION Keynote Speaker: Pietro Manzoni Enhancing IoT-Based Monitoring Systems with TinyML		
11:40 - 12:00		COFFEE BREAK	
12:00 - 12:40	DaaS-loT: an overlay mesh network tec	TUTORIAL - Sebyone hnology for real-time distributed measu	rements using self-synchronizing nodes
12:40 - 14:30		LUNCH	
	Auditorium Mainardi	Sala Zanetto	Room 1 - Epsilon Building
14:30 - 16:00	S1.1 - SS6 - BIM, building energy efficiency and remote sensing by UAV: an integrate approach for the development of innovative methodologies for the energy improvement of the built environment	S1.2 - SS8 - Advanced Mathematical and mechanical models, experimental approaches and data analysis for Structural Health Monitoring (SHM) and Environmental Monitoring Systems. PART B: ENGINEERING	S1.3 - SS14 - Energy Systems in the Built Environment. Assessing energy Performance in Buildings and Renewable Systems
16:00 - 16:30	COFFEE BREAK		
	Auditorium Mainardi	Sala Zanetto	Room 1 - Epsilon Building
16:30 - 17:30	S2.1 - SS10 - Progress and innovations in mitigating natural and human- induced risks for the preservation of masonry and cultural heritage structures - PART I	S2.2 - SS9 - Modernization of technologies and practices towards	S2.3 - SS13 - New non-intrusive IoT paradigms based on unconventional AI
17:30 - 18:15	S3.1 - SS16 - Virtual and Extended Environment: A possible future for STEM Didactical Living Environment	cities carbon neutrality (U_CAN Project)	approaches for and by measurement systems and methods
18:30		WELCOME PARTY	





Program Schedule - Thursday, June 12

THURSDAY - JUNE 12 2025			
	Auditorium Mainardi	Sala Zanetto	Room 1 - Epsilon Building
09:00 - 10:30	S4.1 - SS5 - Measurement systems and strategies for the assessment of personalized comfort in the built environment: towards human-centric and resilient building management solutions	S4.2 - SS15 - Innovative Measurement Methods and Systems for Robotics in Living Environments	S4.3 - SS10 - Progress and innovations in mitigating natural and human- induced risks for the preservation of masonry and cultural heritage structures - PART II
10:30 - 11:00		COFFEE BREAK	
11:00 - 11:40	Measurem	PLENARY SESSION Keynote Speaker: Massimiliano Lo Turcc ents and Information Models for Museu) m Heritage
11:45 - 13:00		S5.1 - General Session	
13:00 - 14:10		LUNCH	
14:10 - 14:50	Chitosan-based bio	TUTORIAL - Jacopo Nicoletti electronic devices for health and enviro	nmental monitoring
	Auditorium Mainardi	Sala Zanetto	Room 1 - Epsilon Building
14:50 - 16:05	S6.1 - SS2 - Application of Digital Services in the Built Environment: Empowering Innovation through High- Quality Data-Driven Measurement Processes to enhance Demand Response strategies - PART I	S6.2 - SS7 - Advanced Mathematical and mechanical models, experimental approaches and data analysis for Structural Health Monitoring (SHM) and Environmental Monitoring Systems. PART A: MATHEMATICS - PART I	S6.3 - SS3 - Sensors, Instrumentation, and Innovative Technologies to Improve People Wellbeing in the Built Environment: The Contribution of the Innovation Ecosystem Vitality - PART I
16:05 - 16:20		COFFEE BREAK	
16:20 - 17:50	S7.1 - SS2 - Application of Digital Services in the Built Environment: Empowering Innovation through High- Quality Data-Driven Measurement Processes to enhance Demand Response strategies - PART II	S7.2 - SS7 - Advanced Mathematical and mechanical models, experimental approaches and data analysis for Structural Health Monitoring (SHM) and Environmental Monitoring Systems. PART A: MATHEMATICS - PART I	S7.3 - SS3 - Sensors, Instrumentation, and Innovative Technologies to Improve People Wellbeing in the Built Environment: The Contribution of the Innovation Ecosystem Vitality - PART II
20:30		GALA DINNER	





Program Schedule - Friday, June 13

FRIDAY - JUNE 13 2025			
	Auditorium Mainardi	Sala Zanetto	Room 1 - Epsilon Building
09:00 - 10:15	S8.1 - SS1 - Metrology for Climate Resilient Living Environments	S8.2 - SS4 - Measurement of Well- Being and Comfort for Aging Populations: How Technology Can Foster Age-Friendly Environments	S8.3 - SS12 - Probability, Biostatistics, Machine Learning and Metrology for Healthcare Living Environments
10:15 - 10:45		COFFEE BREAK	
10:45 - 11:20	Non-invasive electrochemical te	PLENARY SESSION Keynote Speaker: Leonardo lannucci chniques to monitor buildings and meta	allic structures exposed outdoors
11:20 - 12:00	Terahertz Waves	TUTORIAL - Riccardo Piccoli for Metrology: from fundamentals to e	nhanced sensing
12:00 - 13:00		CLOSING AND AWARD CEREMONY	





Technical Program - Wednesday, June 11

09:30 - 18:00	Ca' Foscari University of Venice - Alfa Building REGISTRATIONS
10:00 - 11:00	Alfa Building - Auditorium Mainardi
	OPENING CEREMONY
11:00 - 11:40	Alfa Building - Auditorium Mainardi
	PLENARY SESSION - KEYNOTE SPEAKER
	Chair: Peppino Fazio, Ca' Foscari University of Venice, Italy

Enhancing IoT-Based Monitoring Systems with TinyML

Pietro Manzoni, Universitat Politècnica de València, Spain

11:40 - 12:00	Alfa Building COFFEE BREAK

12:00 - 12:40	Alfa Building - Auditorium Mainardi
	TUTORIAL SESSION
	Chair: Francesco Lamonaca, University of Calabria, Italy

DaaS-IoT: an overlay mesh network technology for real-time distributed measurements using self-synchronizing nodes

Sebastiano Meduri, Lorenzo Grillo, Pierpaolo Sestito, Sebyone

12:40 - 14:30	Alfa Building
	LUNCH





14:30 - 1	6:00 Alfa Building - Auditorium Mainardi Session 1.1 - BIM, building energy efficiency and remote sensing by UAV: an integrate approach for the development of innovative methodologies for the energy improvement of the built environment Chairs: Marianna Rotilio, University of L'Aquila, Italy Pamela Maiezza, University of L'Aquila, Italy Maria Alicandro, University of L'Aquila, Italy	
14:30	Innovative Energy Retrofit Methodologies for the Existing Building Stock: an Integrated Approach Marianna Rotilio, Alessandro Marucci, Pamela Maiezza, Maria Alicandro and Chiara Marchionni (University of L'Aquila, Italy); Maurizio Pollino (ENEA, Italy)	
14:45	Building Envelope and Non-Destructive Techniques Marianna Rotilio and Chiara Marchionni (University of L'Aquila, Italy); Rossell Simonelli (Freelance, Italy)	
15:00	UAV Photogrammetry and OBIA Classification for Decay Mapping in Built Heritage Maria Alicandro, Sara Zollini, Nicole Pascucci and Donatella Dominici (University o L'Aquila, Italy)	
15:15	Adaptation to Climate Changes and Ecological Transition in Urban Contexts Chiara Di Dato, Lorena Fiorini and Alessandro Marucci (University of L'Aquila, Italy)	
15:30	Documenting the Existing Building Through BIM: a Structured Information Management System for Facility Management and Energy Efficiency Pamela Maiezza (University of L'Aquila, Italy)	
15:45	Integrated and Sustainable Urban Regeneration for Resilient University: a Case Study Eleonora Laurini and Chiara Marchionni (University of L'Aquila, Italy); Pierluigi De Berardinis (DICEAA)	
14:30 - 1	6:00 Alfa Building - Conference Room Zanetto Session 1.2 - Advanced Mathematical and mechanical models, experimental approaches and data analysis for Structural Health Monitoring (SHM) and Environmental Monitoring Systems - ENGINEERING Chairs: Michele Betti, University of Florence, Italy Francesco Clementi, Università Politecnica delle Marche, Italy Nataliia Pinchuk, University «Yuri Kondratyuk Poltava Polytechnic», Ukraine	

14:30 Automated Mapping and Characterization of Asbestos Cement Roofs with Al Techniques in Areas with Different Degrees of Anthropization

Antonietta Varasano (Polytechnic University of Bari, Italy); Aguinaldo Fraddosio and Gregorio Andria (Politecnico di Bari, Italy); Carmen Fattore and Paola D'antonio (University of Basilicata, Italy); Mario Daniele Piccioni (Politecnico di Bari, Italy)





14:45 Data Analysis for Structural Health Monitoring of a Steel Jacket Offshore Platform Giacomo Zini, Francesca Marafini and Ostilio Spadaccini (Università degli Studi di Firenze, Italy); Paolo Castelli (Energean Italy S.p.A., Italy); Michele Betti (Università degli Studi di Firenze, Italy)

15:00 Dynamic Identification of Milk Storage Tanks Under Different Filling Conditions Anna Castellano (Politecnico di Bari, Italy); Nataliia Pinchuk (Yuri Kondratyuk Poltava Polytechnic, Italy); Roberta Gattulli, Francesco Paparella, Mariella Diaferio and Aguinaldo Fraddosio (Politecnico di Bari, Italy)

15:15 A Comprehensive Experimental Method for Damage Evaluation of Reinforced Masonry Vaulted Structures

> Anna Castellano and Aguinaldo Fraddosio (Politecnico di Bari, Italy); Nataliia Pinchuk (Yuri Kondratyuk Poltava Polytechnic, Italy); Mario Daniele Piccioni (Politecnico di Bari, Italy)

15:30 Experimental Evaluation of the Impact Mechanics in the Rocking Dynamics of Rigid Blocks

Gianfranco Martellotta (University of Naples Federico II, Italy); Anna Castellano, Aguinaldo Fraddosio and Mario Daniele Piccioni (Polytechnic University of Bari, Italy)

15:45 Cost-Effective Vibration Monitoring for Anomaly Detection and Localization in Existing Structures

Gianluca Standoli, Francesca Bianconi, Mattia Schiavoni and Martina Di Giosaffatte (Università Politecnica delle Marche, Italy); Francesca Roscini (Niccolò Cusano University, Italy); Francesco Clementi (Università Politecnica Delle Marche, Italy)

 14:30 - 15:45
 Epsilon Building - Room #1

 Session 1.3 - Energy Systems in the Built Environment. Assessing energy

 Performance in Buildings and Renewable Systems

 Chairs: Piero Bevilacqua, University of Calabria, Italy

 Francesco Nicoletti, University of Calabria, Italy

14:30 Lumped Parameter Dynamic Thermal Model of a Building Integrated with a PID-Controlled HVAC System for Maintaining Indoor Comfort Under Variable Thermal Load

Francesco Nicoletti, Antonio Cristaudo, Vittorio Ferraro, Dimitrios Kaliakatsos, Piero Bevilacqua, Natale Arcuri and Giovanni Miracco (University of Calabria, Italy)

14:45 A Decarbonisation-as-a-Service Framework for Optimizing Renovations in the Building Sector

Symeon Chorozoglou (National Techical University of Athens, Greece); Alexis Lekidis (National Technical University of Athens, Greece & University of Thessaly, Greece); Elissaios Sarmas (EPU-NTUA, Greece)

15:00 U-Value Measurement in Buildings. is It an Accurate Estimate? Piero Bevilacqua, Natale Arcuri, Francesco Nicoletti, Daniela Cirone and Giovanni Miracco (University of Calabria, Italy)





15:15 Assessing Air Infiltration in Office Buildings Using the Blower Door Test Daniela Cirone, Piero Bevilacqua, Roberto Bruno, Natale Arcuri (University of Calabria, Italy)

15:30 Enhanced Building Electric Power Demand Forecasting Using IoT and Machine Learning

Thomas Bapaume, Negin Alisoltani, Elyes Nefzaoui, Latifa Oukhellou (Univiversité Gustave Eiffel, France)

16:00 - 16:30	Alfa Building
	COFFEE BREAK

 16:30 - 17:30
 Alfa Building - Auditorium Mainardi

 Session 2.1 - Progress and innovations in mitigating natural and humaninduced risks for the preservation of masonry and cultural heritage structures - PART I

 Chairs: Francesco Clementi, Università Politecnica delle Marche, Italy Francesco Monni, Università Politecnica delle Marche, Italy

16:30 Innovative Air Cleaning System for Healthy Indoor Environments: Characterization of a Novel System Combining MCM-41 Mesoporous Silica and Essential Oils Anna Laura Tassi and Vittoria Guglielmi (Università Degli Studi di Milano, Italy); Laura Santagostini and Alessia Santiglia (Dipartimento di Chimica, University of Milan, Italy)

16:45 Damping Analysis and Ongoing Kinetic Effects at the Castello Ursino Museum (Italy)

Claudia Pirrotta, Carlo Trigona, Anna M Gueli, Barbara Mancuso, Valter Pinto and Sebastiano Imposa (University of Catania, Italy)

17:00 Seismic Vulnerability Assessment and Structural Analysis of the Church of Santa Maria di Piazza (Ostra Vetere, Italy)

Francesco Monni and Francesco Clementi (Università Politecnica Delle Marche, Italy)

17:15 Decoding the Dynamic Behavior of Twin Church Bell Towers Through Ambient Vibration Analysis

> Gianluca Standoli, Francesca Bianconi and Mattia Schiavoni, Martina Di Giosaffatte and Francesco Monni (Università Politecnica Delle Marche, Italy); Francesca Roscini (Niccolò Cusano University, Italy); Francesco Clementi (Università Politecnica Delle Marche, Italy)





16:30	18:00	Alfa Building - Conference Room Zanetto Session 2.2 - Modernization of technologies and practices towards cities carbon neutrality (U_CAN Project) Chairs: Chiara Marchionni, University of L'Aquila, Italy Marianna Rotilio, University of L'Aquila, Italy
16:30	The Prop Processe Danilo [Italy)	motion of the Carbon Neutrality of Ukrainian Cities Through Participatory es Di Donato, Marianna Rotilio and Alessandra Tosone (University of L'Aquila,
16:45	Cities Tr Chiara N	ansition Towards Carbon Neutrality: a Review 1archionni and Marianna Rotilio (University of L'Aquila, Italy)
17:00	Current and Con Yevhen	Decarbonization Technologies in Ukrainian Cities in the Energy Production sumption Sector Using Solar Energy Terekhov (Joanneum Research Forschungsgesellschaft mbH, Austria)
17:15	Fosterin of Ukrai Alessand	g Climate Neutrality: the Role of the U CAN Project in Sustainable Planning nian Territories dro Marucci and Federico Falasca (University of L'Aquila, Italy)
17:30	Sustaina Alessia N	ble Regeneration of Urban Centers: Strategic Guidelines of Intervention Massari and Chiara Marchionni (University of L'Aquila, Italy)
17:45	End-of-L Letizia G Pierluigi of South	ife of Photovoltaic Used as Building Material: from Waste to Resource Siusti, Marianna Rotilio and Gianni Di Giovanni (University of L'Aquila, Italy); Bonomo and Leidy Guante Henriquez (University of Applied Sciences and Arts Jern Switzerland (SUPSI), Switzerland)
16:30	17:15	Epsilon Building - Room #1 Session 2.3 - New non-intrusive IoT paradigms based on unconventional AI approaches for and by measurement systems and methods Chairs: Peppino Fazio, <i>Ca' Foscari University of Venice, Italy</i> Francesco Lamonaca, <i>University of Calabria, Italy</i>
16:30	Improve System Rocío A Ramiro	ed Design of a Low-Cost, Mobile and Modular Air Pollution Monitoring Guerrón, Domenico Luca Carnì, Marco Lanuzza, Francesco Lamonaca and Faco (University of Calabria, Italy)
16:45	Smart T	elemedicine: Leveraging IoT to Transform Remote Healthcare Monitoring

and Access

Fabio Arena, Giovanni Pau, Valerio Mario Salerno, Marianna Ruggieri, Angela Ricciardello, Carmelo Scuro and Mario Collotta (Kore University of Enna, Italy)

17:00 Dynamic Structural Identification Using an Embedded System with MEMS Sensors Mounted on a Moving Vehicle





Giorgio de Alteriis, Giulio Mariniello, Lorenzo Coppola, Antonio Bilotta, Domenico Asprone and Rosario Schiano Lo Moriello (University of Naples Federico II, Italy)

17:30 -	18:00	Alfa Building - Auditorium Mainardi Session 3.1 - Virtual and Extended Environment: A possible future for STEM Didactical Living Environment Chairs: Annalisa Liccardo, University of Naples Federico II, Italy Francesco Lamonaca, University of Calabria, Italy
17:30	An MQT Experien Annalisa (Universi Italy)	T-Based Interface for Remote Control of GPIB Instruments: Ensuring User ce in Augmented Reality and Metaverse Laboratories Liccardo (University of Naples Federico II, Italy); Francesco Lamonaca ty of Calabria, Italy); Francesco Bonavolontà (Università di Napoli Federico II,
17:45	Digital T y for Medi Maria Sin Italy); Fr Bilotta an	wins of Historical Psychotechnical Instruments: IoT-Driven Measurements cal Diagnostics, Research, and Education natra (Istituite of Design Matera, Italy); Lucia Monacis (University of Foggia, ancesca Bertacchini, Francesco Demarco, Francesco Lamonaca, Eleonora nd Pietro Pantano (University of Calabria, Italy)

18:30	Ca' Bolea - Via Torino 180 - Mestre
	WELCOME PARTY





Technical Program - Thursday, June 12

08:30 - 17:00 Ca' Foscari University of Venice - Alfa Building REGISTRATIONS 09:00 - 10:30 Alfa Building - Auditorium Mainardi Session 4.1 - Measurement systems and strategies for the assessment of personalized comfort in the built environment: towards human-centric and resilient building management solutions Chairs: Sara Casaccia, Università Politecnica delle Marche, Italy Gloria Cosoli, Università eCampus, Italy 09:00 Development and Outdoor Testing Based on Monitoring Data and Finite Volume Models of Cool Asphalt Prototypes in HE MULTICLIMACT Diego Zamora-Sánchez and Beñat Arregi (TECNALIA, Basque Research and Technology Alliance (BRTA), Spain); Mireia Fernandez (COMSA SA, Spain); Alberto Armijo, Iñigo Lopez-Villamor and Jorge Torres (TECNALIA, Basque Research and Technology Alliance (BRTA), Spain) 09:15 Experimental Analysis on the Effect of Contact Pressure, Activity Level, and Skin Tone as Influencing Factors in PPG Sensors Performance Francesco Scardulla (University of Palermo, Italy); Gloria Cosoli (Università eCampus, Italy); Luca Antognoli (Università Politecnica Delle Marche, Italy); Gianluca Diana and Francesco Bongiorno (University of Palermo, Italy); Lorenzo Scalise (Università Politecnica delle Marche, Italy); Marco Arnesano (Università eCampus, Italy); Leonardo D'Acquisto (University of Palermo, Italy) 09:30 Experimental Campaigns for the Assessment of Indoor Personalized Comfort Based on a Multidomain Platform Gloria Cosoli (Università eCampus, Italy); Ilaria Ciuffreda (UNIVPM, Italy); Dianel Ago (Callisia & eCampus University, Italy); Ilaria Pigliautile (eCampus University, Italy); Puneet Tomar (EAPLAB at CIRIAF, University of Perugia, Italy); Veronica Martins Gnecco (Università Degli Studi di Perugia, Italy); Agnese Chiucchiù (EAPLAB at CIRIAF, University of Perugia, Italy); Anna Laura Pisello (Università degli Studi di Perugia, Italy); Sara Casaccia and Gian Marco Revel (Università Politecnica delle Marche, Italy); Marco Arnesano (Università eCampus, Italy)





09:45 Enhancing the Built Environment Resilience: Integrating the MULTICLIMACT CREMA Tool, Sensing and Digital Solutions for Building Protection and Occupants' Well-Being Assessment

Florencia Victoria De Maio, Celina Solari, Cristina Attanasio and Clemente Fuggini (RINA-C, Italy); Gloria Cosoli (Università eCampus, Italy); Rifat Seferi (LIS Live Information System, Italy); Gian Marco Revel (Università Politecnica delle Marche, Italy)

10:00 Development of a BIM-Based Platform for the Assessment of Indoor Multidomain Comfort

Gloria Cosoli (Università eCampus, Italy); Rifat Seferi (LIS Live Information System, Italy); Ilaria Ciuffreda (Università Politecnica delle Marche, Italy); Orazio Colaneri (Live Information System, Italy); Rania Christoforou (Medical Faculty, RWTH Aachen University, Germany); Mina Moayyedi and Marcel Schweiker (RWTH Aachen University, Germany); Marco Arnesano (Università eCampus, Italy); Gian Marco Revel (Università Politecnica delle Marche, Italy)

10:15 Measurement of Office Activities Using Non-Contact Ultrasonic Sensors and Accelerometer: Accuracy Comparison and Optimal Use Cases

Ilaria Ciuffreda, Gianluca Sartini and Sara Casaccia (Università Politecnica delle Marche, Italy); Gloria Cosoli and Marco Arnesano (Università eCampus, Italy); Gian Marco Revel (Università Politecnica delle Marche, Italy)

09:15 - 1	0:30 Alfa Building - Conference Room Zanetto Session 4.2 - Innovative Measurement Methods and Systems for Robotics in Living Environments Chairs: Domenico Luca Carnì, University of Calabria, Italy Luigi D'Alfonso, University of Calabria, Italy
09:15	Advanced Matching Algorithms in Multi-Agent Systems for Industry 5.0 Luigi D'Alfonso and Giuseppe Fedele (University of Calabria, Italy)
09:30	Advances in Measurement Methods and Techniques for Positioning of Anthropomorphic Robots: a Review Domenico Luca Carnì (University of Calabria, Italy); Luigi Longo (Robinia Srls, Italy); Francesco Lamonaca (University of Calabria, Italy)
09:45	Decentralized Coordination in Robotic Swarms: an Adaptive Strategy for Shared Resource Management Giuseppe Fedele and Luigi D'Alfonso (University of Calabria, Italy)
10:00	IoT-Driven Healthcare Monitoring with Edge Device: Enhancing Sustainability, and Efficiency Giuseppe Agapito (University of Catanzaro, Italy)
10:15	Social Value Orientation and Steady-State Configurations in Swarms with Coordinate-Coupling Matrices Alp Merzi (University of Calabria, Italy); Veysel Gazi (Yildiz Technical University, Turkey)





09:15 - 10:30	Epsilon Building - Room #1
	Session 4.3 - Progress and innovations in mitigating natural and human-
	induced risks for the preservation of masonry and cultural heritage
	structures - PART II
	Chair: Gabriele Milani, <i>Politecnico di Milano, Italy</i>

09:15 Sustainable Restoration of Traditional Rural Buildings: the Role of Natural Materials for Enhanced Comfort Monica Parlato (University of Padua, Italy); Simona Maria Porto (University of Catania,

Monica Parlato (University of Padua, Italy); Simona Maria Porto (University of Catania, Italy); Andrea Pezzuolo (University of Padova, Italy)

09:30 Evaluating the Use of NORM Residues in Building Restoration: a Risk Assessment Approach Using ERICA and NORMALYSA

Chiara Imparato (University of Campania Luigi Vanvitelli, Italy); Fabrizio Ambrosino (University of Naples Federico II, Italy); Giuseppe La Verde (UNINA, Italy); Carlo Sabbarese (University of Campania Luigi Vanvitelli, Italy); Marina Poje Sovilj (University Josip Juraj Strossmayer of Osijek, Croatia); Mariagabriella Pugliese (University of Naples Federico II, Italy)

09:45 A Novel Numerical Protocol to Assess Possible Strengthening Interventions on Already Damaged Curved Masonry Structures Natalia Pingaro, Martina Buzzetti and Gabriele Milani (Politecnico di Milano, Italy)

10:00 FE Upper Bound Limit Analysis for Automatic Detection of Collapse Mechanisms in

Masonry Buildings

Martina Buzzetti, Natalia Pingaro and Gabriele Milani (Politecnico di Milano, Italy)

10:15 Conformity Assessment of a Multi-Sensor Device for Indoor Environmental Quality Monitoring

Virginia Isabella Fissore, Davide Sgro, Reyhaneh Khosravi, Manuela Baracani, Alberto Barbaro, Pietro Chiavassa, Marina Clerico, Stefano Fantucci, Fabio Favoino, Franco Fiori, Davide Gallione, Alice Lorenzati, Nicole Mastromatteo, Bartolomeo Montrucchio, Giuseppina Emma Puglisi, Erica Raviola, Gabriele Piccablotto, Anna Pellegrino, Antonio Servetti, Louena Shtrepi, Alessio Carullo, Arianna Astolfi (Politecnico di Torino, Italy)

10:30 - 11:00	Alfa Building
	COFFEE BREAK





 11:00 - 11:40
 Alfa Building - Auditorium Mainardi

 PLENARY SESSION - KEYNOTE SPEAKER

 Chair: Francesco Lamonaca, University of Calabria, Italy

Measurements and Information Models for Museum Heritage

Massimiliano Lo Turco, Politecnico di Torino, Italy

11:45 - 13:00	Alfa Building - Auditorium Mainardi	
	Session 5.1 - General Session	
	Chairs: Francesco Lamonaca, University of Calabria, Italy	
	Peppino Fazio, Ca' Foscari University of Venice, Italy	

- 11:45
 A LoRa-Based Energy-Harvesting Sensing System for Living Environment

 Aitian Ma, Jean Tonday Rodriguez and Mo Sha (Florida International University, USA)
- 12:00 An Approach to the Design of Telemetry Applications in Future Railway Communications

Dragomira Dimitrova (Todor Kableshkov University of Transport, Bulgaria); Ivaylo Atanasov (Technical University of Sofia, Bulgaria); Evelina Pencheva (Todor Kableshkov University of Transport, Bulgaria)

12:15 Reconstructing Agricultural Environments: Smart Farm Development Through Metrology, AI and Remote Sensing

Marco Gagliardi (University of Calabria and NANOTEC National Research Council, Italy); Francesco Lamonaca (University of Calabria, Italy); Danilo Maurmo (University of Calabria and CNR-Nanotec, Italy); Tommaso Ruga (University of Calabria, Italy); Eugenio Vocaturo (CNR- Nanotec, Italy & University of Calabria, Italy); Ester Zumpano (University of Calabria, Italy)

12:30 Safe IoT-Based Cultivation of Trametes Versicolor

Higor V Rosse (Collaborative Laboratory Mountains of Research, Portugal); Carla Pereira, Ana Saldanha and Maria Inês Dias (Instituto Politécnico de Bragança, Campus de Sta Apolónia, Portugal); Elisabete Freitas and Estefânia Gonçalves (Collaborative Laboratory Mountains of Research, Portugal)

12:45 MQTT Anomalous Behavior Detection in IP Sensor Networks Through Convolutional Neural Networks and Traffic to Image Encoding

Antonio Francesco Gentile (ICAR-CNR, Italy); Peppino Fazio (University Ca' Foscari of Venice - DSMN, Italy); Davide Macrì (ICAR CNR, Italy); Emilio Greco (ICAR-CNR, Italy); Miroslav Voznak (VSB - Technical University of Ostrava, Czech Republic)

13:00 - 14:10 Alfa Building LUNCH





14:10 - 14:50 Alfa Building - Auditorium Mainardi TUTORIAL SESSION Chairs: Peppino Fazio, Ca' Foscari University of Venice, Italy

Chitosan-based bioelectronic devices for health and environmental monitoring

Jacopo Nicoletti, Ca' Foscari University of Venice, Italy

14:50 - 16:05	Alfa Building - Auditorium Mainardi
	Session 6.1 - Application of Digital Services in the Built Environment:
	Empowering Innovation through High-Quality Data-Driven Measurement
	Processes to enhance Demand Response strategies - PART I
	Chairs: Serena Serroni, Università Politecnica delle Marche, Italy
	Diego Arnone, Engineering
	Gian Marco Revel, Università Politecnica delle Marche, Italy

14:50 Optimizing Appliances Usage for Apartment Buildings Participation in Demand Response Programs

Cristina Pop, Zoltan Varga, Viorica Chifu, Tudor Cioara and Ionut Anghel (Technical University of Cluj-Napoca, Romania)

15:05 Integrating Predictive Power Market Modelling with Automated Demand-Side Management of Residential Heat Pumps

Dimitris Bibikas, Thanos Ntrachas, George Sidiras, Christos Roumkos and Ilias Marneris (Zenith Gas & Light SA, Greece); Alexis Lekidis (National Technical University of Athens, Greece & University of Thessaly, Greece); Vangelis Marinakis (National Technical University of Athens, Greece); Athanasios Gousios (Zenith Gas & Light SA, Greece)

15:20 Cloud-Edge Continuum Orchestration for Containerized Workloads Vasile Ofrim, Costel Beniamin Frandes, Tudor Cioara and Ionut Anghel (Technical University of Cluj-Napoca, Romania)

15:35 Decentralized IoT Data Marketplaces: Enabling Peer-to-Peer Exchange with Edge Computing

Filippos Serepas (Holistic sa, Greece); Ioannis Papias, Konstantinos Christakis and Nikos Dimitropoulos (NTUA, Greece); Vangelis Marinakis (National Technical University of Athens, Greece)

15:50 User-Centric Comfort Measurement and Energy Optimization: a Pareto-Efficient Approach for a Personalized Recommendation Strategy

Vittoria Cipollone, Serena Serroni, Nicole Morresi, Sara Casaccia and Fabrizio Marinelli (Università Politecnica delle Marche, Italy); Petteri Rekomaa (Data Team, Finland);





Diego Arnone (Engineering SPA, Italy); Gian Marco Revel (Università Politecnica delle Marche, Italy)

14:50 - 1	6:05 Alfa Building - Conference Room Zanetto Session 6.2 - Advanced Mathematical and mechanical models, experimental approaches and data analysis for Structural Health Monitoring (SHM) and Environmental Monitoring Systems - MATHEMATICS - PART I Chair: Marianna Ruggieri, Kore University of Enna, Italy	
14:50	A Novel Method for Fuel Maps in Urban-Rural Interface Zones Giuseppe Alì, Francesco Demarco, Pierpaolo Antonio Fusaro, Salvatore Nisticò and Pietro Pantano (University of Calabria, Italy)	
15:05	Solving PDEs in Monitoring Systems Using Neural Networks Riccardo Scida and Giovanni Mascali (University of Calabria, Italy); Carmelo Scuro (Kore University of Enna, Italy); Pietro Pantano (University of Calabria, Italy)	
15:20	Detailed FEM Micro-Modeling for Masonry Building: a Case Study Federico De Francesca, Francesco Demarco and Pierpaolo Antonio Fusaro (University of Calabria, Italy); Carmelo Scuro (Kore University of Enna, Italy)	
15:35	Geospatial Methods in Fire Hazard Assessment Pierpaolo Antonio Fusaro, Pietro Pantano and Giuseppe Alì (University of Calabria, Italy); Raffaele Mangiardi (Regione Calabria, Italy)	
15:50	Federated Learning and Network Slicing-Based Resource Optimization for Secure Healthcare Communications Ayushi Shah, Keertan Amit Parikh and Nikunjkumar Mahida (Nirma University, India); Ancy Patel (Indus Institute of Technology, Engineering Indius University, India); Rajesh Gupta (Nirma University, India); Sudeep Tanwar (Nirma University & Institute of Technology, India); Giovanni Pau, Mario Collotta, Valerio Mario Salerno and Fabio Arena (Kore University of Enna, Italy)	
14:50 - 1	5:50 Epsilon Building - Room #1 Session 6.3 - Sensors, Instrumentation, and Innovative Technologies to Improve People Wellbeing in the Built Environment: The Contribution of the Innovation Ecosystem Vitality - PART I Chairs: Gian Marco Revel, Università Politecnica delle Marche, Italy Nicole Morresi, Università Politecnica delle Marche, Italy	

14:50 Ladder Walking Detection via Action Recognition for Enhancing Worker Safety in Construction

Eftichia Badeka (Centre for Research and Technology Hellas, Greece & CERTH, Greece); Agata Muchla (Mostostal Warszawa SA, Poland); Ilias Koulalis and Konstantinos Ioannidis (Information Technologies Institute-CERTH, Greece); Piotr Dymarski





(Mostostal Warszawa S.A., Poland); Stefanos Vrochidis (Information Technologies Institute (ITI), Greece)

- 15:05 A First Evaluation of the Audio Augmented Reality Seamless Navigation Assistant Based on Computer Vision for Blind and Visually Impaired People Leonardo Messi, Massimo Vaccarini, Francesco Spegni, Rocco Davide D'aparo and Leonardo Binni (Università Politecnica Delle Marche, Italy)
- 15:20 Intelligent Coordination System for Autonomous Domestic Heating: an Al-Driven Test-Bench

Alberto Petrucci, Daniele Masti, Kiran Prestia and Francesco Basciani (Gran Sasso Science Institute, Italy)

15:35 Interactive Wayfinding Systems in Emergency and Evacuation Conditions: Design of an Integrated Building Component and CAVE-Based Assessment

Francesco Monni, Marco D'Orazio, Gabriele Bernardini and Luigi Chierico (Università Politecnica delle Marche, Italy); Ruggero Lovreglio (Massey University, New Zealand); Enrico Quagliarini (Università Politecnica delle Marche, Italy)

16:05 - 16:20 Alfa Building COFFEE BREAK

16:20 - 17:50 Alfa Building - Auditorium Mainardi Session 7.1 - Application of Digital Services in the Built Environment: Empowering Innovation through High-Quality Data-Driven Measurement Processes to enhance Demand Response strategies - PART II Chairs: Vittoria Cipollone, Università Politecnica delle Marche, Italy Diego Arnone, Engineering Gian Marco Revel, Università Politecnica delle Marche, Italy

16:20 Optimizing Electricity Sharing from Generation and Storage Within District-Based Renewable Energy Communities

Marc Girona-Badia (Centre Internacional de Mètodes Numèrics en Enginyeria (CIMNE), Spain); Jaume Asensio and Pablo A Moreno (Technical University of Catalunya, Spain); Gerard Laguna (Centre Internacional de Mètodes Numèrics en Enginyeria (CIMNE), Spain); Jordi Cipriano (CIMNE, Spain); Alvaro Luna (Technical University of Catalonia, Spain)

- 16:35 Digital and Maintenance Revolution: Digital Twin and AI the Future of Construction Enrico Pasquale Zitiello, Francesca Porcellini, Antonio Salzano and Maurizio Nicolella (University of Naples Federico II, Italy)
- 16:50 How Naples is Redesigning Urban Life Through Analytics to Improve the Comfort and Well-Being of Citizens

Francesca D'Agresti (Engineering Ingegneria Informatica SpA, Italy); Francesca Pignataro (Comune di Napoli, Italy); Antonio Filograna and Rosaria Daniela Scattarella (Engineering Ingegneria Informatica, Italy); Giovanni Giacco (Latitudo 40, Italy)





17:05 Denoising Autoencoder for Appliance-Specific Energy Disaggregation in Residential Settings

Ioannis Papias and Loukas Papapetrou (NTUA, Greece); Vasilis Michalakopoulos (National Technical University of Athens, Greece); Elissaios Sarmas (EPU-NTUA, Greece); Vangelis Marinakis (National Technical University of Athens, Greece); Zoi Mylona and Costas Baslis (HERON Energy SA, Greece)

17:20 Demand Response Scheduling for Residential Energy Flexibility: a Day-Ahead Renewable-Driven Approach

Zoi Mylona (HERON Energy SA, Greece); Athanasios Papakonstantinou (HERON Energy S.A., Greece); Dimitrios Chatzigiannis and Marion Paraschi (HERON Energy SA, Greece); Vasilis Michalakopoulos (National Technical University of Athens, Greece); Elissaios Sarmas (EPU-NTUA, Greece)

17:35 Toward a Human-Centric Demand Response Framework: Optimizing Energy Efficiency and Comfort for Aging People in the Built Environment Richard Kaculi, Vittoria Cipollone, Nibras Abo Alzahab, Serena Serroni and Sara Casaccia (Università Politecnica delle Marche, Italy); Silvia Palma (Istituto per Servizi di Ricovero e Assistenza agli Anziani, Italy); Diego Arnone (Engineering SPA, Italy); Gian Marco Revel (Università Politecnica delle Marche, Italy)

16:20 - 17:35 Alfa Building - Conference Room Zanetto Session 7.2 - Advanced Mathematical and mechanical models, experimental approaches and data analysis for Structural Health Monitoring (SHM) and Environmental Monitoring Systems -MATHEMATICS - PART II Chair: Marianna Ruggieri, Kore University of Enna, Italy

16:20 Deep Learning-Based 5G Network Slice Allocation Framework for Telesurgery Systems

Jetani Harshil, Mili Virani, Drashti Kansara, Lakshit Pathak and Rajesh Gupta (Nirma University, India); Sudeep Tanwar (Nirma University & Institute of Technology, India); Giovanni Pau, Mario Collotta, Valerio Mario Salerno and Fabio Arena (Kore University of Enna, Italy)

16:35 Leveraging Data Science and Artificial Intelligence for Enhanced Monitoring Systems

Fabio Arena, Mario Collotta, Giovanni Pau, Angela Ricciardello, Marianna Ruggieri, Valerio Mario Salerno and Carmelo Scuro (Kore University of Enna, Italy)

16:50 Optimized Model for Water Monitoring System Marianna Ruggieri, Fabio Arena, Mario Collotta, Giovanni Pau, Angela Ricciardello, Valerio Mario Salerno and Carmelo Scuro (Kore University of Enna, Italy)

17:05 Mathematical Model for Identifying and Locating External Solid Contaminants in Tanks





Giuseppe Alì (University of Calabria, Italy); Angela Ricciardello, Marianna Ruggieri, Carmelo Scuro (Kore University of Enna, Italy)

- 17:20 Predictive Maintenance for Water Supply Networks: Advanced Expert System Models for Enhanced Water Resource Management and Monitoring Yuri Amorelli, Francesco Gaetano Termine, Giovanni Pau, Fabio Arena, Valerio Mario Salerno and Mario Collotta (Kore University of Enna, Italy)
- 16:20 17:20 Epsilon Building Room #1 Session 7.3 - Sensors, Instrumentation, and Innovative Technologies to Improve People Wellbeing in the Built Environment: The Contribution of the Innovation Ecosystem Vitality - PART II Chairs: Gian Marco Revel, Università Politecnica delle Marche, Italy Nicole Morresi, Università Politecnica delle Marche, Italy
- 16:20 Development of an Experimental Set-Up for Evaluating the Performance of Carbon **Dioxide Sensors in a Controlled Environment** Gianluca Sartini, Nicole Morresi, Sara Casaccia and Gian Marco Revel (Università Politecnica delle Marche, Italy) 16:35 Immersive Acoustic Stimulation for Remote Assisted Living: Feedback from Skin Conductance Stefania Cecchi, Valeria Bruschi, Alessandro Terenzi, Leonardo Isidori, Grazia Iadarola and Susanna Spinsante (Università Politecnica Delle Marche, Italy) 16:50 Throughput of Myopic Policy in Energy Harvesting Sensor Network for **Environmental Monitoring** Omer M Gul (Istanbul Technical University, Turkey) 17:05 Exploring the Feasibility of AI-Enhanced Biophilic Design for Educational Spaces: a Preliminary Study

Haixia Liu (University of the West of England, United Kingdom (Great Britain))

20:30	Ristorante "San Trovaso"
	GALA DINNER





Technical Program - Friday, June 13

08:30 - 12:00 Ca' Foscari University of Venice - Alfa Building REGISTRATIONS

09:00 - 10:15 Alfa Building - Auditorium Mainardi Session 8.1 - Metrology for Climate Resilient Living Environments Chairs: Sotirios Aspragkathos, SingularLogic S.A. Serena Serroni, Università Politecnica delle Marche, Italy Gian Marco Revel, Università Politecnica delle Marche, Italy

09:00 An Extended Reality-Based Framework for User Risk Training in Urban Built Environment

Sotirios Konstantakos (MOBICS, Greece); Sotirios Aspragkathos (SingularLogic SA, Greece); Moatasim Mahmoud (Aristotle University of Thessaloniki, Greece & Singular Logic, Greece); Stamatia Rizou (Singular Logic, Greece); Eugenio Quagliarini and Gabriele Bernardini (Università Politecnica delle Marche, Italy)

09:15 Integrating Socio-Economic Dimensions into Climate-Resilience Assessment of Building Stock: a Case on Marginalized Groups in Athens

Iason C. Dimitriou, Apostolos Arsenopoulos and Alexandros Xenakis (National Technical University of Athens, Greece); Panos Kouloukakis (NTUA, Greece); Vangelis Marinakis (National Technical University of Athens, Greece)

09:30 Developing a Climate Vulnerability Index for High-Density Urban Areas: Innovative Data-Driven Solutions for Barcelona

Maria Teresa Sellart Garcia and Jose Manuel Broto (Centre Internacional de Mètodes Numèrics en Enginyeria, Spain); Gerard Mor (CIMNE, Spain); Andreu Marí Bernaus and Jordi Cipriano (Centre Internacional de Mètodes Numèrics en Enginyeria, Spain)

09:45 From Flood Risk Assessment to Blue-Green Infrastructure Evaluation in Urban Built Environments: a Holistic Workflow Definition Petra Pergar (University of Ljubljana); Nataša Sirnik and Kristina Klemen (IMZI, Slovonia): Tiis Mage (Nazka Magne Belgium): Gabriele Bergardini and Eugonia

Slovenia); Tijs Maes (Nazka Mapps, Belgium); Gabriele Bernardini and Eugenio Quagliarini (Università Politecnica delle Marche, Italy)

10:00 A Data-Driven Decision Support System for Urban Heat Resilience: Comfort Optimization During Extreme Events

Serena Serroni, Vittoria Cipollone and Gian Marco Revel (Università Politecnica delle Marche, Italy); Gerard Mor (CIMNE, Spain); Carla Rodriguez Alonso (Centro





Tecnologico CARTIF, Italy); Clemente Fuggini and Dena Farhang (RINA Consulting S.p.A., Italy)

09:00 - 1	D:15 Alfa Building - Conference Room Zanetto Session 8.2 - Measurement of Well-Being and Comfort for Aging Populations: How Technology Can Foster Age-Friendly Environments Chairs: Sara Casaccia, Università Politecnica Delle Marche, Italy Riccardo Caponetto, University of Messina, Italy Gian Marco Revel, Università Politecnica Delle Marche, Italy	
09:00	RGBD Indoor Localization with YOLO Pose Estimation During Activity Antonio Nocera, Maria Gardano, Michela Raimondi and Gianluca Ciattaglia (Università Politecnica delle Marche, Italy); Linda Senigagliesi (ETIS UMR 8051, CYU, ENSEA, CNRS, France); Ennio Gambi (Universita' Politecnica Delle Marche, Italy)	
09:15	Edge AI for Object Recognition in Digital Twins: Enhancing Indoor Navigation and BIM Systems for Living Environments Karameldeen Ibrahim Mohamed Omer (Politecnica Delle Marche, Italy & University of Khartoum, Sudan); Andrea Monteriù (Università Politecnica Delle Marche, Italy)	
09:30	Wearable System for Elderly People Monitoring in Multi-Resident Scenario Graziella Scandurra, Marica Amadeo, Filippo Battaglia, Giuseppe Campobello, Riccardo Caponetto and Carmime Ciofi (University of Messina, Italy)	
09:45	Development of a Sensor-Based Ecosystem for Measuring Comfort and Activities in a Multi-Resident Context: the Age-SenseAl Project Sara Casaccia, Ilaria Ciuffreda and Sara Meletani (Università Politecnica Delle Marche, Italy); Riccardo Caponetto (University of Messina, Italy); Andrea Monteriù, Ennio Gambi, Laura Burattini, Luca Marinelli and Gian Marco Revel (Università Politecnica delle Marche, Italy)	
10:00	Safety and Well-Being Monitoring System for Multi Residential Scenarios Mariorosario Prist, Lorenzo Longarini and Andrea Bonci (Università Politecnica delle Marche, Italy); Roberto Frusciante (San Marino Hospital, San Marino); Alessandro Freddi, Gian Marco Revel and Sara Casaccia and Andrea Monteriù (Università Politecnica delle Marche, Italy)	
09:00 - 1	0:00 Epsilon Building - Room #1 Session 8.3 - Probability, Biostatistics, Machine Learning and Metrology for Healthcare Living Environments Chair: Antonella Iuliano, University of Basilicata, Italy	

09:00 New Methodology for the Identification of Nitrate Contamination from Agricultural Sources

Angelantonio Calabrese (National Research Council, Italy); Mariavirginia Campanale (Minds Institute srl, Italy)





- 09:15 Denoising Probabilistic Diffusion Models, ResNet, and Class Activation Maps for Healthcare Imaging Annamaria Defilippo (Magna Graecia University of Catanzaro, Italy & University of Cambridge, United Kingdom); Cristian Cosentino (University of Calabria, Italy); Antonella Iuliano (University of Basilicata, Italy); Pietro Hiram Guzzi (University of Catanzaro, Italy); Pietro Lio (University of Cambridge, United Kingdom)
- 09:30 Fractional Advection-Diffusion Equation for Water Distribution Systems Angela Ricciardello and Marianna Ruggieri (University of Enna Kore, Italy)
- 09:45 Transformative Role of Machine Learning in Precision Medicine for Enhanced Healthcare Environments

Fabio Arena, Mario Collotta, Giovanni Pau, Angela Ricciardello and Marianna Ruggieri, Valerio Mario Salerno and Carmelo Scuro (Kore University of Enna, Italy)

10:15 - 10:45	Alfa Building COFFEE BREAK		
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10:45 - 11:20	Alfa Building - Auditorium Mainardi
	PLENARY SESSION - KEYNOTE SPEAKER
	Chair: Francesco Lamonaca, University of Calabria, Italy

Non-invasive electrochemical techniques to monitor buildings and metallic structures exposed outdoors

Leonardo Iannucci, Politecnico di Torino, Italy

11:20 - 12:00	Alfa Building - Auditorium Mainardi
	TUTORIAL SESSION
	Chair: Peppino Fazio, Ca' Foscari University of Venice, Italy

Terahertz Waves for Metrology: from fundamentals to enhanced sensing

Riccardo Piccoli, Ca' Foscari University of Venice, Italy

12:00 - 13:00	Alfa Building - Auditorium Mainardi
	CLOSING AND AWARD CEREMONY



