IEEE

TECHNICAL UNIVERSITY OF CRETE

2024 IEEE INTERNATIONAL WORKSHOP ON

Metrology for Living Environment

CHANIA, GREECE, JUNE 12-14, 2024

FINAL PROGRAM

ATHENA
BUSINESS AND TECHNOLOGY CONSULTING

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Welcome Message from the General Chairs

On behalf of the Organizing Committee, we cordially welcome you to the 2024 IEEE International Workshop on Metrology for Living Environment (*MetroLivEnv 2024*).

MetroLivEnv 2024 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, but not limited to, on 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 cutting-edge 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 third edition of *MetroLivEnv it is* hosted by the Technical University of Crete, Greece, with the support of the Polytechnic of Milan, Università della Calabria, Politecnico di Bari, Università degli Studi di Messina, Politecnico di Torino, Università Politecnica delle Marche, 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 Mathematics of the University of Salerno, Department of Architecture of the Alma Mater Studiorum Università di Bologna, Department of Nanomolecular Science and Nano systems of the Università Ca'Foscari di Venezia, Italian National Council of Research CNR-Nanotech, GMEE, GMMT, IRIS 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 of the University of Calabria, Alma Software, FLIR, Red Yard, Sensors, Sustainability.

The *MetroLivEnv* Technical Program consists of 106 oral presentations scheduled over three days. Presentations are organized in a General Session and 17 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:

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

MetroLivEnv 2024 is honoured to have experts in smart structures and living environment as Invited Speakers.

- Prof. Kacper Pluta, *Université Gustave Eiffel, France*, will open MetroLivEnv 2024 with a lecture on "Geometry processing in conception and construction of buildings".
- Prof. Giuseppe Carlo Marano, *Politecnico di Torino*, *Italy*, will open the second day of works with a talk about "Vibration-based structural health monitoring innovative solutions for smart buildings and cutting-edge infrastructures".
- Prof. Belén Riveiro, *University of Vigo*, *Spain*, will open the third day of works with a talk about "Accelerating the digitalization and safety assessment of built environment: the case of transport infrastructure".

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 sponsored by MDPI Sustainability Journal, 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 *2024 IEEE International Workshop on Metrology for Living Environment* is about to begin. Metrologists, mathematicians, biologists, physics, chemistries, psychologists, and engineers, enjoy the Workshop!

June 2024

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Georgios Stavroulakis, Technical University of Crete, Greece
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Geometry processing in conception and construction of buildings

Kacper **Pluta**

Université Gustave Eiffel, France

ABSTRACT

The talk will focus on the role of geometry processing in the conception and construction of buildings at different stages.

In the first part of the presentation, I will talk about the architectural conception stage of building design with some insights into the recent advancements in geometry processing focused on designing more cost-efficient structures with improved physical properties. Here, a crucial detail is the geometry of the underlying mesh-structure, which can impact the transfer of stresses acting within and on the structure, e.g., additional load from snow cover on a rooftop. In this context, I will discuss planar-hexagonal meshes, which, even if challenging to design, have many interesting properties that are sought after in architecture.

In the second part, I will discuss the role of 3D geometry processing in quality control and progress monitoring during the construction phase. Firstly, I will introduce H2020 BIM2TWIN Project, which aimed to providing a comprehensive platform for digital twin technology of buildings under construction. In this part of the talk, I will then focus on the problem of object detection in the 3D point cloud data with respect to the BIM, as well as on the problems related to 3D point clouds acquisition in the context of construction quality measurements. Finally, I will address the most important obstacles faces during the projects, such as the quality of BIM and lack of public data suitable for studying construction sites from the point of view of progress monitoring and quality control. I will finish the talk by describing the ConSLAM dataset created in order to fill in the public data gap.

SPEAKER BIOGRAPHY

Kacper Pluta obtained his Ph.D. in Computer Science from Université Paris-Est, France in 2017 after defending his dissertation entitled: Rigid Motions on Discrete Spaces. Since September

2023, Kacper is an Enseignant-Chercheur (Associate Professor) at ESIEE Paris, Université Gustave Eiffel, France. Priori to taking the position at Univeristé Gustave Eiffel he worked as a research engineer on H2020 BIM2TWIN Project at Inria, Sophia-AntiPolis, France, and after finishing his Ph.D. was a postdoctoral fellow at the Technion - Israel Institute of Technology. Kacper's work spans topics from theoretical discrete geometry to 3D geometry processing applies to architecture and civil engineering. He also participated in studies related to geoengineering with focus on natural hazards such as landslides.

Vibration-based structural health monitoring innovative solutions for smart buildings and cutting-edge infrastructures

Giuseppe Carlo **Marano**
Politecnico di Torino, Italy

ABSTRACT

Monitoring the health status of existing structures and infrastructures over time is an essential and extremely topical issue worldwide. Recent collapses have particularly shaken public opinion, rekindling the general interest in investing in the Structural Civil Engineering sector, especially for risk mitigation strategies and promoting smart and innovative solutions to ensure and preserve the safety levels of our existing heritage. Severe economic and life losses are usually associated with structural failures, especially when strategic constructions are involved. Nonetheless, they sadly represent a crucial opportunity to grow our engineering experience and improve our understanding in order to move toward a new mentality, focused on performance-based, risk-prevention solutions, increasing safety and reliability. The current historical period is represented by the overwhelming digital revolution which fosters innovative and original artificial intelligence-based (AI) solutions. The roles of smart cities are rapidly changing and drastically evolving due to the effective integration of Internet of Things (IoT) technologies and Machine Learning (ML) solutions. The digital revolution is rapidly affecting the Civil Engineering sector since new mobility technologies, increase public safety and quality of life, whilst accomplishing new requirements for environmental protection, and in the meanwhile still ensuring economic growth opportunities and contained cost of living. New and emerging InfraTech and digital technologies, such as digital twins, AI, ML, IoT, and UAVs among others, can revolutionize the way our structures and infrastructures are designed, built, and maintained. Novel AI-assisted Structural Health Monitoring (SHM) paradigm can be applied to all the different stages of structure and infrastructure life cycles, i.e. considering the construction phase, in-service and management conditions, maintenance, etc. heightening the infrastructures to new intelligent transportation systems (ITS).

SPEAKER BIOGRAPHY

Degree in Civil Engineering (five years courses) cum laude (awards) at the Technical University of Bari (1994); afterwards employed as Concrete young engineering in Calcestruzzi s.p.a - nowadays Italcementi group, Italian leader in concrete production - (1995/1996). PhD in Structural Engineering at the University of Florence (2000). Post-doctoral scholarship in “Civil Engineering Science” at Technical University of Bari in 2001 and Lecturer in structural engineering in the same university in 2001. Visiting assistant professor in Cambridge (2002), associate professor in 2011 at Politecnico di Bari and visiting Professor in Loughborough (2012) and at Hunan University, Changsha, Hunan Province (China) (2014), is research fellow at the SIBERC (Sustainable and Innovative Bridge Engineering Research Center), Fuzhou University, Fuzhou, Fujian Province, China and (2016/2018) full Professor in Structural Design, Faculty of Civil Engineering, Fuzhou University, Fuzhou, Fujian Province, China. From 2018 is full professor in structural Design at Politecnico di Torino, where he was also vice director of the Department of Structural, Environmental and Geotechnical Engineering. His research interests include structural identification and optimization, form finding and structural health monitoring. He is the author of four European patents and more than 300 papers published in international journals or presented at conferences.

Accelerating the digitalization and safety assessment of built environment: the case of transport infrastructure

Belén **Riveiro**
University of Vigo, Spain

ABSTRACT

There is an increasing concern about the exposure of ageing infrastructure assets to extreme events and their recovery capability. In parallel, digitalization is playing a key role as enabling technology to adopt innovative tools and methods that allow accessing information that optimize the decision-making processes in such a way maintenance expenditures are minimized for the life cycle and at the same time safety and serviceability are preserved. As a result, new techniques in data acquisition and monitoring (including data analysis) are being proposed to accurately assess the health condition of in-service infrastructures.

This talk will present some recent examples of the research where various NDT techniques combined with advanced computing methods have been demonstrated to be a suitable technology to assess the actual condition of various types of infrastructure assets, with the purpose of being used for the structural diagnosis. Automated data processing will be another key point in this talk, motivated by the Big Data nature of the datasets typically collected during the survey and monitoring of large infrastructure. A revision of methods successfully applied to the processing of the aforementioned data will be presented, complemented with real case studies where the different methodologies have been demonstrated. The collection of case studies comprise large infrastructure networks, that ranges from road to railways systems. Another assets where the talk will concentrate is the case of bridges, as these become one of the most vulnerable assets within the transportation network. For these structures, it will be shown how the combination of monitoring data and AI-based models is contributing to anticipate potential structural failures.

SPEAKER BIOGRAPHY

Belén Riveiro is an Associate Professor at the University of Vigo (UVigo). She started her independent postdoctoral career as Associate Professor at Newcastle University (UK) in 2011

and later as Assistant Professor at UVigo. Her research focuses on the field of infrastructure resilience, where she integrates different disciplines such as structural engineering, geomatics, artificial intelligence, and automation in construction. This combination of disciplines provides her a unique multidisciplinary research profile, leading to her work having an impact beyond the scientific community. Since 2012, she collaborates with some of the most recognized researchers in her field, thanks to stays she has carried out at universities such as the University of Minho, the University of Cambridge, and Delft University of Technology, among others. These collaborations led to her participation and leadership in national and international collaborative projects (with funding as the principal investigator exceeding €5 million). As a result of his experience in the field of structural monitoring, Riveiro coordinates the National Network in Monitoring and Inspection for the Evaluation of Structures (funded by the Ministry of Science and Innovation), which integrates the most recognized researchers in structural monitoring in Spain. Her academic trajectory has been recognized with the “National Research Award Matilde Ucelay 2022", delivered by TM the Kings of Spain, which represents the greatest recognition of research career in the field of Engineering and Architecture for young researchers in Spain.

Monitoring insect pest populations in building environment: A challenge for metrology

Luca **Rossini**

Université Libre de Bruxelles, Belgium

ABSTRACT

Urban parks and green areas are an essential part of the building environment, and they contribute to define the architecture and landscape of cities and towns. Their presence provides a substantial contribution to increase the wellness of the city dwellers and provides incredible environmental benefits as they act as a shelter for many organisms, becoming an actual ecological niche that preserves the biodiversity. These areas are the perfect place to promote social events, sport and outdoor activities that engage the urban population of all the age ranges, with beneficial effects on the mental health of the citizens. Urban parks are natural regulators of temperature and humidity, besides contributing to reduce the pollution.

As all the natural environments, urban parks are continuously threatened by the action of insect pests and diseases, that seriously endanger the plant health. Additionally, the climate warming and the global stock exchanges are endorsing the introduction of alien species that can dangerously upset the balance of these ecological niches. Accordingly, green areas are continuously monitored to assess the population dynamics of insect pests and bioindicator species. This action is essential, given that pest management strategies based on the use of traditional agrochemicals seriously endangers the human and environmental health and are not allowed by restrictive laws. Alternative control strategies based on natural enemies such as entomopathogenic fungi/bacteria or useful insects (predators and parasitoids) are valuable candidates, but the knowledge of the pest population dynamics is fundamental for a prompt and punctual action.

Entomological monitoring is a complex operation that should be thoroughly analysed by entomologists and metrologists to boost the research in this field. This talk would give an overview on the measurement methods and on the instruments commonly used to carry out insect monitoring. In particular, the following questions will be addressed: which are the pros and cons of the existing tools? Do they give “measurements” or just an “estimation”?

SPEAKER BIOGRAPHY

Luca Rossini received his BSc. in “Physics and Astrophysics” from Sapienza Università di Roma (Rome, Italy), his MSc. in Agricultural and Environmental Sciences from Università degli Studi della Tuscia (Viterbo, Italy), and his Ph.D in Plant and Animal Science (major in Ecological Modelling, minor in Applied Entomology) from Università degli Studi della Tuscia. Luca is currently working as European Marie Curie Researcher (MSCA-2022-PF), in Ecological Modelling and Applied Entomology at Université Libre de Bruxelles (ULB), Service d'Automatique et d'Analyse des Systèmes. Luca is part of the editorial board of Acta IMEKO (International Measurement Confederation) and received the National Scientific Qualification (ASN) as Associate Professor in the Italian higher education system for the disciplinary field 07/D1 - Plant pathology and entomology (AGR/11). The main research topic of Luca is the development and validation of mathematical models to describe insect pests and diseases. This includes the integration of sparse field measurements to improve the accuracy of the predictions, pest monitoring, planning of measurement campaigns, field measurements protocols, mathematical and computational biology/ecology, high performance computing.

Building Smart Secure Living Environments: Harnessing Authentication and Protection Strategies for Intelligent Sensors in the IoT Ecosystem

Carmelo **Felicetti**
University of Calabria, Italy

ABSTRACT

In the rapidly evolving landscape of the Internet of Things (IoT), ensuring the authenticity and security of devices has become a paramount concern. Groundbreaking approaches centered on the development of Physically Unclonable Functions (PUFs) and Static Random Access Memory (SRAM) cell patterns are introducing robust techniques for preventing the substitution of physical and digital objects in distributed application scenarios especially measurements. Indeed, measurements play a pivotal role in the monitoring and protection of critical living environments, and the unauthorized substitution of physical sensors and measurement devices can lead to vulnerabilities.

The utilization of SRAM cells' unique power-up signatures, combined with machine learning techniques, forges a secure identity for IoT devices. This identity not only verifies the authenticity of devices but also thwarts potential hardware substitution with counterfeit devices exhibiting "similar" characteristics, a crucial aspect in smart living environments where device integrity impacts system security and efficiency. Furthermore, the importance of certifying the data origin from measurement sensors that are considered secure and tamper-proof is highlighted.

In an era where autonomous sensor networks are increasingly common, ensuring that each sensor in a network can identify, authenticate, and interact autonomously with its peers without the risk of counterfeit intrusion represents a significant advancement in IoT security.

Integrating PUF-based ID tags with IoT devices opens new avenues for secure, authenticated interactions within IoT ecosystems. Through smart living environments as an example, such approaches enhance energy conservation, bolster device security, and ensure the reliable certification of data origin from secure sensors.

The contributions to the field of IoT security, particularly regarding device authentication and identification, mark a significant leap forward in navigating the complexities of technological innovation securely and responsibly. The insights into overcoming the challenges presented by device authentication and hardware substitution in distributed measurement systems underscore the pivotal intersection of cybersecurity and technological advancement, propelling us toward a more secure and interconnected future.

These activities are part of the research results related to Project SERICS (PE00000014) under the MUR National Recovery and Resilience Plan funded by the European Union - NextGenerationEU.

SPEAKER BIOGRAPHY

Carmelo Felicetti is an Electronic Engineer and Researcher with a Ph.D. in Information and Communications Technology from the University of Calabria, Italy. His expertise spans a range of areas including academic research, cybersecurity, and technological innovation. He has worked on digital circuit reconfiguration for aerospace applications in collaboration with the Heinz Nixdorf Institute in Paderborn and the CITEC at the University of Bielefeld, Germany.
In his career, Carmelo has led research projects focused on the use of 2D materials in electronics and on improving cybersecurity protocols. His scientific contributions rely on smart home technologies, IoT device security, and energy efficiency, as evidenced by his publications and patents.
Currently, he holds a researcher position in Information Processing Systems at the University of Calabria. His current research interests include developing innovative telehealth systems, enhancing energy conservation through smart environments, and securing IoT devices with blockchain and Physical Unclonable Function technologies.
His involvement in organizing and participating in relevant conferences underscores his ongoing commitment to technological innovation and academic contribution, particularly in the area of cybersecurity.

IEEE MetroLivEnv 2024 Venue

IEEE MetroLivEnv 2024 will be held at **Cultural Center of Chania**.

The Cultural Center of Chania and is located in the center of the city of Chania. The Center extends in 4 different levels. The great amphitheater with capacity of 500 seats lies in the ground floor, the meeting room with capacity of 50 seats lies in the first floor, 2 more rooms of 150 people lies in the 2nd floor and another 2 rooms of 50 people or exhibition place in the 3rd floor. The center has many auxiliary rooms (cafeteria, registration desks, dressing rooms for actors) and plenty of indoor and outdoor spaces suitable for exhibitions, poster area and making it suitable for organizing any kind of event.

ADDRESS

Andrea Papandreou 74
Chania 731 34, Greece

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

IEEE MetroLivEnv 2024 Social Events

WELCOME PARTY
Wednesday June 12 - H 20:00

The Welcome Party will be held at the **Cultural Center of Chania** on **Wednesday June 12 - 20.00**.

GALA DINNER
Thursday June 13 - H 20:30

The Gala Dinner will be held at "**Fourogatos Retaurant**" on **Thursday June 13 - 20.30**.

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Program Schedule - Wednesday, June 12

WEDNESDAY, JUNE 12 2024			
14:00 - 14:30	OPENING CEREMONY		
14:30 - 15:45	SESSION 1.1 - Special Session #04: Measurement of physiological and environmental parameters: towards optimized personalized comfort and automated HVAC and light regulation in the built environment	SESSION 1.2 - Special Session #16: Measurements and monitoring of energy aspects in buildings and in renewable energy sources	SESSION 1.3 - Special Session #07: Measurement systems, models, tools, and innovative techniques for sustainable urban planning and regeneration - PART I
15:45 - 16:15	COFFEE BREAK		
16:15 - 17:00	KEYNOTE SESSION #1 - Kacper Pluta Geometry processing in conception and construction of buildings		
17:00 - 17:30	TUTORIAL SESSION #1 - Luca Rossini Monitoring insect pest populations in building environment: A challenge for metrology		
20:00	WELCOME PARTY - Cultural Center of Chania		

Program Schedule - Thursday, June 13

THURSDAY, JUNE 13 2024			
09:00 - 10:15	SESSION 2.1 - Special Session #15: Cultural Heritage Building and AI: Opportunities and Challenges (CHBAI)	SESSION 2.2 - Special Session #10 - Innovations for Sustainable Living and Working Environments: insights from the Vitality project - PART I	SESSION 2.3 - Special Session #14: Mathematical models, advanced mechanical modeling, new experimental approaches and data analysis methods for Structural Health Monitoring (SHM) of structures
10:15 - 10:45	COFFEE BREAK		
10:45 - 11:30	KEYNOTE SESSION #2 - Giuseppe Carlo Marano Vibration-based structural health monitoring innovative solutions for smart buildings and cutting-edge infrastructures		
11:30 - 12:45	SESSION 3.1 - Special Session #08: Measurement techniques and procedures for buildings and facilities diagnostics, and public safety applications	SESSION 3.2 - Special Session #10 - Innovations for Sustainable Living and Working Environments: insights from the Vitality project - PART II	SESSION 3.3 - Special Session #07: Measurement systems, models, tools, and innovative techniques for sustainable urban planning and regeneration - PART II
12:45 - 14:00	LUNCH		
14:00 - 15:15	SESSION 4.1 - Special Session #13: Historical constructions subjected to degradation and extreme loads: Advanced experimental and numerical assessment - PART I	SESSION 4.2 - Special Session #06: Application of Digital Services in the Built Environment: Empowering Innovation through High-Quality Data-Driven Measurement Processes - PART I	SESSION 4.3 - Special Session #18: Natural radioactivity in living environment - PART I
15:15 - 15:45	COFFEE BREAK		
15:45 - 16:15	TUTORIAL SESSION #2 - Carmelo Felicetti Building Smart Secure Living Environments: Harnessing Authentication and Protection Strategies for Intelligent Sensors in the IoT Ecosystem		
16:15 - 17:15	SESSION 5.1 - Special Session #13: Historical constructions subjected to degradation and extreme loads: Advanced experimental and numerical assessment - PART II	SESSION 5.2 - Special Session #06: Application of Digital Services in the Built Environment: Empowering Innovation through High-Quality Data-Driven Measurement Processes - PART II	SESSION 5.3 - Special Session #17: Advancements in Technology and Digital Innovation for Structural Health Monitoring of Civil Engineering Structures and Infrastructures
20:30	GALA DINNER - Fourogatos Retaurant		

Program Schedule - Friday, June 14

FRIDAY, JUNE 14 2024			
09:30 - 10:45	SESSION 6.1 - Special Session #01: New non-intrusive IoT paradigms based on unconventional AI approaches for and by measurement systems and methods	SESSION 6.2 - Special Session #02: Probability and Mathematical Statistics for Living Environment and Metrology	SESSION 6.3 - Special Session #03: Building Information Modelling, sensors, and digital technologies: towards the development of multidomain platforms to monitor the built environment
10:45 - 11:15	COFFEE BREAK		
11:15 - 12:00	KEYNOTE SESSION #3 - Belén Riveiro Accelerating the digitalization and safety assessment of built environment: the case of transport infrastructure		
12:00 - 13:00	POSTER SESSION		
13:00 - 14:00	LUNCH		
14:00 - 15:00	SESSION 7.1 - Special Session #11: Sensors and Systems for Environmental and Marine Monitoring	SESSION 7.2 - Special Session #12: Measurements for enhancing sustainability and circularity of the construction sector: how to valorize construction and demolition wastes and optimize buildings life cycle?	SESSION 7.3 - Special Session #18: Natural radioactivity in living environment - PART II
15:00 - 15:30	COFFEE BREAK		
15:30 - 16:00	CLOSING AND AWARD CEREMONY		

13:00 - 18:00	*Cultural Center of Chania* **REGISTRATIONS**

14:00 - 14:30	*Main Hall* **OPENING CEREMONY**

14:30 - 15:45	*Main Hall* **Session 1.1 - Measurement of physiological and environmental parameters: towards optimized personalized comfort and automated HVAC and light regulation in the built environment** **Chairs:** Gloria Cosoli, *Università eCampus, Italy* Marco Arnesano, *Università eCampus, Italy*

14:30 **Definition of the Acclimatation Time in Test Room Experiments Through Objective Physiological Indicators**
Veronica Martins Gnecco, Università Degli Studi di Perugia, Italy
Agnese Chiucchiù, Università Degli Studi di Perugia, Italy
Ilaria Pigliautile, Università Degli Studi di Perugia, Italy
Silvia Angela Mansi, Università eCampus, Italy
Gloria Cosoli, Università eCampus, Italy
Marco Arnesano, Università eCampus, Italy
Anna Laura Pisello, Università Degli Studi di Perugia, Italy

14:45 **Preliminary Analisys on the Effect of Skin Temperature on Photoplethysmographic Signal**
Francesco Scardulla, University of Palermo, Italy
Clarissa Riggi, University of Palermo, Italy
Gianluca Diana, University of Palermo, Italy
Leonardo D'Acquisto, University of Palermo, Italy

15:00 **Development and Application of EEG Signal Pattern Analysis and Artificial Neural Network for Indoor Comfort Measurement**
Marco Arnesano, Università eCampus, Italy

15:15 **A Non-Intrusive Ultrasound-Based Sensing Technique for Activity Detection: Proof of Concept Towards Optimized Personalized Comfort**
Ilaria Ciuffreda, Università Politecnica delle Marche, Italy
Gloria Cosoli, Università eCampus, Italy
Marco Arnesano, Università eCampus, Italy
Sara Casaccia, Università Politecnica delle Marche, Italy
Gian Marco Revel, Università Politecnica delle Marche, Italy

15:30 **Effective Sensor Selection for Human Activity Recognition via Shapley Value**
Elisa Borella, University of Padova, Italy
Umutberk Cakmakci, University of Padova, Italy
Enrico Gottardis, University of Padova, Italy
Alessandro Buratto, University of Padova, Italy
Thomas Marchioro, University of Padova, Italy
Leonardo Badia, University of Padova, Italy

14:30 - 15:30 *Room A*
Session 1.2 - Measurements and monitoring of energy aspects in buildings and in renewable energy sources
Chairs: Piero Bevilacqua, *University of Calabria, Italy*
Roberto Bruno, *University of Calabria, Italy*

14:30 **Analysis of Energy Performances of Trombe Walls Varying the Main Construction Parameters**
Antonio Cristaudo, University of Calabria, Italy
Vittorio Ferraro, University of Calabria, Italy
Francesco Nicoletti, University of Calabria, Italy
Giulia Palermo, University of Calabria, Italy
Dimitrios Kaliakatsos, University of Calabria, Italy

14:45 **Effects of Lockdown on Electricity Demand Patterns of Institutional Buildings**
Negin Alisoltani, Université Gustave Eiffel, France
Elyes Nefzaoui, Université Gustave Eiffel, France
Latifa Oukhellou, Université Gustave Eiffel, France

15:00 **IoT Measurement System for Monitoring the Energy Exchanges in Renewable Energy Communities**
Annalisa Liccardo, University of Naples Federico II, Italy
Francesco Bonavolontà, University of Naples Federico II, Italy
Fabio Mottola, University of Naples Federico II, Italy
Daniela Proto, University of Naples Federico II, Italy

15:15 **GESE: Granular Electric Sub-Metering Economics in the Context of Automated Demand Response**
James Coleman, Princeton University, USA
Forrest Meggers, Princeton University, USA

14:30 - 15:30 *Room B*
Session 1.3 - Measurement systems, models, tools, and innovative techniques for sustainable urban planning and regeneration - PART I
Chairs: Simona Tondelli, *University of Bologna, Italy*
Francesco Lamonaca, *University of Calabria, Italy*

14:30 **Geomatic Techniques and CIM (City Information Modeling) to Enhance Smart Cities Management**
Nicole Pascucci, University of L'Aquila, Italy
Maria Alicandro, University of L'Aquila, Italy
Sara Zollini, University of L'Aquila, Italy
Donatella Dominici, University of L'Aquila, Italy

14:45 **A Novel Geospatial Methodology for Measuring and Mapping Spatiotemporal Built-Up Dynamics Based on Google Earth Engine and Unsupervised K-Means Clustering of Multispectral Satellite Imagery**
Alessandro Vitale, University of Calabria, Italy
Carolina Salvo, University of Calabria, Italy
Francesco Lamonaca, University of Calabria, Italy

15:00 **Measuring the Potential for Sustainable Densification at the Urban Scale: An Application in the Emilia-Romagna Region**
Carolina Salvo, University of Calabria, Italy
Mauro Francini, University of Calabria, Italy
Elisa Conticelli, University of Bologna, Italy
Simona Tondelli, University of Bologna, Italy

15:15 **Territorial Human Well-Being Matrix: A Geospatial Tool for the Calabria Region in Italy**
Luis Valenzuela Blejer, Universidad Adolfo Ibañez, Chile
Paola Cannavò, University of Calabria, Italy
Rafaella María Monsalve Tapia, Universidad Adolfo Ibañez, Chile
Pierfrancesco Celani, University of Calabria, Italy
Antonella Pelaggi, University of Calabria, Italy

15:45 - 16:15	*Cultural Center of Chania* **COFFEE BREAK**

16:15 - 17:00	*Main Hall* **PLENARY SESSION - KEYNOTE SPEAKER** **Chairs**: Gian Marco Revel, *Università Politecnica delle Marche, Italy* Georgios Stavroulakis*, Technical University of Crete, Greece*

Geometry processing in conception and construction of buildings

Kacper Pluta, *Université Gustave Eiffel, France*

17:00 - 17:30	*Main Hall* **TUTORIAL SESSION** **Chairs**: Francesco Lamonaca, *University of Calabria, Italy* Gabriele Milani, *Politecnico di Milano, Italy*

Monitoring insect pest populations in building environment: A challenge for metrology

Luca Rossini, *Université Libre de Bruxelles, Belgium*

20:00 - 22:00	*Cultural Center of Chania* **WELCOME PARTY**

Technical Program - Thursday, June 13

09:00 - 17:00	*Cultural Center of Chania* **REGISTRATIONS**

09:00 - 10:15	*Main Hall* **Session 2.1 - Cultural Heritage Building and AI: Opportunities and Challenges (CHBAI)** **Chairs:** Eugenio Vocaturo, *Nanotec, National Research Council, Italy* Tommaso Ruga, *University of Calabria, Italy*

09:00 **A Multi-Disciplinary Study Based on Archaeometry and Artificial Intelligence: A New Approach for the Investigation of Hearths at the Riparo Mochi Paleolithic Site**
Vittoria Guglielmi, Università Degli Studi di Milano, Italy
Simone Corbellini, Politecnico di Torino, Italy
Stefano Grimaldi, Università di Trento, Italy
Luca Lombardo, Politecnico di Torino, Italy
Fabio Santaniello, Università di Trento, Italy
Alessia Santiglia, Università Degli Studi di Milano, Italy
Anna Laura Tassi, Università Degli Studi di Milano, Italy
Marco Sento, Politecnico di Torino, Italy
Alessio Carullo, Politecnico di Torino, Italy

09:15 **Innovative Applications of Deep Learning in Cultural Heritage Development and Preservation: A Customization Perspective**
Naman Bhatia, Manipal University Jaipur, India
Geeta Rani, Manipal University Jaipur, India
Vijaypal Dhaka, Manipal University, India

09:30 **Feasibility Analysis of an AI-Based Classification System for Cultural Heritage Building**
Tommaso Ruga, University of Calabria, Italy
Luciano Caroprese, University G. D'Annunzio, Italy
Eugenio Vocaturo, CNR-Nanotec, University of Calabria, Italy
Ester Zumpano, University of Calabria, Italy

09:45 **A Deep Learning-Powered Intelligent System for Crowd Management and Seamless Navigation for Cultural Heritage Exploration**
Sonam Sonam, Manipal University Jaipur, India
Geeta Rani, Manipal University Jaipur, India
Vijaypal Dhaka, Manipal University Jaipur, India

10:00 **Towards Geometric Digital Twins, Including Damage Detection, From Photos of Residential Buildings Facades**
Nikolaos Schetakis, Technical University of Crete, Greece
Vassilios Koutmos, Technical University of Crete, Greece
Napoleon Papoutsakis, Alma Sistemi Srl, Italy
Konstantinos Stavrakakis, Quantum Innovation IKE, Greece
Georgios E. Stavroulakis, Technical University of Crete, Greece
George Stavrakakis, Technical University of Crete, Greece

09:00 - 10:00 *Room A*
Session 2.2 - Innovations for Sustainable Living and Working Environments: insights from the Vitality project - PART I
Chairs: Gian Marco Revel, *Università Politecnica delle Marche, Italy*
Nicole Morresi, *Università Politecnica delle Marche, Italy*

09:00 **Implementing Data-Driven Environmental Dialogues to Enhance Well-Being of Aging People at Home With the e-VITA Virtual Coaching System**
Riccardo Naccarelli, Università Politecnica delle Marche, Italy
Mossaab Hariz, Télécom SudParis, France
Francesca D'Agresti, Engineering Ingegneria Informatica SpA, Italy
Sara Casaccia, Università Politecnica delle Marche, Italy
Jérôme Boudy, Institut Polytechnique de Paris, Italy
Gian Marco Revel, Università Politecnica delle Marche, Italy

09:15 **Infrastructure-Free Localization System for Augmented Reality Registration in Indoor Environments: A First Accuracy Assessment**
Leonardo Messi, Università Politecnica delle Marche, Italy
Francesco Spegni, Università Politecnica delle Marche, Italy
Massimo Vaccarini, Università Politecnica delle Marche, Italy
Alessandra Corneli, Università Politecnica delle Marche, Italy
Leonardo Binni, Università Politecnica delle Marche, Italy

09:30 **Optimizing Building Occupants' Energy-Related Behaviour: Development of a Training Activity in a Cave Automatic Virtual Environment**
Elisa Di Giuseppe, Università Politecnica delle Marche, Italy
Arianna Latini, Università Politecnica delle Marche, Italy
Ludovica Marcelli, Università Politecnica delle Marche, Italy
Francesco Monni, Università Politecnica delle Marche, Italy
Marco D'Orazio, Università Politecnica delle Marche, Italy

09:45 **Sustainable Domestic Vertical Farming: Energy Consumption of an Indoor Farming Appliance**
Gianluca Brunetti, Università Politecnica delle Marche, Italy, University of South Australia, Australia
Daniele Duca, Università Politecnica delle Marche, Italy
Kofi A. Boakye-Yiadom, Università Politecnica delle Marche, Italy
Paola A. Deligios, Università Politecnica delle Marche, Italy
Marco Appicciutoli, Università Politecnica delle Marche, Italy

Costantino Vischetti, Università Politecnica delle Marche, Italy
Cristiana Garofalo, Università Politecnica delle Marche, Italy
Paola Riolo, Università Politecnica delle Marche, Italy
Arianna De Bernardi, Università Politecnica delle Marche, Italy
Enrica Marini, Università Politecnica delle Marche, Italy
Vesna Milanovic, Università Politecnica delle Marche, Italy
Abulebda Abdalhadi M A, Università Politecnica delle Marche, Italy
Alessio Ilari, Università Politecnica delle Marche, Italy
Matteo Francioni, Università Politecnica delle Marche, Italy
Cristiano Casucci, Università Politecnica delle Marche, Italy
Ester Foppa Pedretti, Università Politecnica delle Marche, Italy
Luigi Ledda, Università Politecnica delle Marche, Italy
Deborah Pacetti, Università Politecnica delle Marche, Italy

09:00 - 10:15 *Room B*

Session 2.3 - Mathematical models, advanced mechanical modeling, new experimental approaches and data analysis methods for Structural Health Monitoring (SHM) of structures

Chairs: Francesco Clementi, *Università Politecnica delle Marche, Italy*
Domenico Camassa, *Politecnico di Bari, Italy*
Nataliia Pinchuk, *National University "Yuri Kondratyuk Poltava Polytechnic", Ukraine*

09:00 **Dynamic Identification of the Collapse Mechanisms of a Masonry Arch**
Nataliia Pinchuk, Yuri Kondratyuk Poltava Polytechnic, Ukraine
Anna Castellano, Politecnico di Bari, Italy
Daniele Micello, Politecnico di Bari, Italy
Domenico Camassa, Politecnico di Bari, Italy
Mariella Diaferio, Politecnico di Bari, Italy
Aguinaldo Fraddosio, Politecnico di Bari, Italy

09:15 **Dynamic Parameters Identification of a Truss Pipeline Pedestrian Bridge**
Salvador Ivorra Chorro, University of Alicante, Spain
Domenico Camassa, Politecnico di Bari, Italy
Aguinaldo Fraddosio, Politecnico di Bari, Italy
Mario Daniele Piccioni, Politecnico di Bari, Italy
Benjamín Torres, University of Alicante, Spain

09:30 **Non-Linear Ultrasonic Approach for the Characterization of Mode II Debonding Behavior of FRCM Reinforcements for Masonry Constructions**
Anna Castellano, Politecnico di Bari, Italy
Aguinaldo Fraddosio, Politecnico di Bari, Italy
Gianfranco Martellotta, Politecnico di Bari, Italy
Francesco Paparella, Politecnico di Bari, Italy
Mario Daniele Piccioni, Politecnico di Bari, Italy
Tribikram Kundu, University of Arizona, USA

09:45 **Automatic Identification of Modal Parameters From Continuous Long-Term Monitoring of the Civic Clock Tower of Matelica, Central Italy**
Gianluca Standoli, Università Politecnica Delle Marche, Italy
Mattia Schiavoni, Università Politecnica Delle Marche, Italy
Francesca Bianconi, Università Politecnica Delle Marche, Italy
Francesco Clementi, Università Politecnica Delle Marche, Italy

10:00 **Machine Learning Techniques for Analysing the Seismic Response in Multistorey Steel Structures**
Jurad Sukhnandan, University of Kwazulu-Natal, South Africa
Georgios Drosopoulos, University of Central Lancashire, United Kingdom, University of Kwazulu-Natal, South Africa

10:15 - 10:45	*Cultural Center of Chania* **COFFEE BREAK**

10:45 - 11:30	*Main Hall* **PLENARY SESSION - KEYNOTE SPEAKER** **Chairs**: Francesco Lamonaca, *University of Calabria, Italy* Georgios Stavroulakis*, Technical University of Crete, Greece*

Vibration-based structural health monitoring innovative solutions for smart buildings and cutting-edge infrastructures

Giuseppe Carlo Marano, *Politecnico di Torino, Italy*

11:30 - 12:45	*Main Hall* **Session 3.1 - Measurement techniques and procedures for buildings and facilities diagnostics, and public safety applications** **Chair:** Emanuela Natale, *University of L'Aquila, Italy*

11:30 **Point Cloud Processing Methods for Slope Analysis: Uncertainty Evaluation**
Luciano Chiominto, University of L'Aquila, Italy
Giulio D'Emilia, University of L'Aquila, Italy
Stefano Marsella, Ministry of Internal Affairs - National Fire Corps, Italy
Marcello Marzoli, Ministry of Internal Affairs - National Fire Corps, Italy
Emanuela Natale, University of L'Aquila, Italy

11:45 **Use of Terrestrial Laser Scanners to Increase the Safety of the Papal Basilica of Saint Peter in the Vatican**
Stefano Marsella, Ministry of Internal Affairs - National Fire Corps, Italy
Davide Pozzi, Ministry of Internal Affairs - National Fire Corps, Italy
Marcello Marzoli, Ministry of Internal Affairs - National Fire Corps, Italy

Danilo Anastasi, Ministry of Internal Affairs, Italy
Ottavio Anastasi, Ministry of Internal Affairs, Italy

12:00 **Investigation of the Acoustic Comfort of an Academic Library: Case Study at the Technical University of Crete**
Nikolaos Papadakis, Technical University of Crete, Greece
George Stavroulakis, Technical University of Crete, Greece

12:15 **Low-Cost Marked Tracking Monitoring System for 3D-Scaled Masonry Models**
Pasquale Daponte, University of Sannio, Italy
Luca De Vito, University of Sannio, Italy
Antonino Iannuzzo, University of Sannio, Italy
Michelina Monaco, University of Sannio, Italy
Arman Neyestani, University of Sannio, Italy
Francesco Picariello, University of Sannio, Italy

12:30 **Distributed Monitoring System for Dynamic Identification Based on MEMS Sensors**
Giorgio de Alteriis, University of Naples Federico II, Italy
Giusiana Testa, University of Naples Federico II, Italy
Giulio Mariniello, University of Naples Federico II, Italy
Tommaso Pastore, University of Naples Federico II, Italy
Enzo Caputo, University of Naples Federico II, Italy
Federico Gargiulo, University of Naples Federico II, Italy
Giuseppe Augugliaro, INAIL, Italy
Canio Mennuti, INAIL, Italy
Antonio Bilotta, University of Naples Federico II, Italy
Domenico Asprone, University of Naples Federico II, Italy
Rosario Schiano Lo Moriello, University of Naples Federico II, Italy

11:30 - 12:45 *Room A*
Session 3.2 - Innovations for Sustainable Living and Working Environments: insights from the Vitality project - PART II
Chairs: Gian Marco Revel, *Università Politecnica delle Marche, Italy*
Nicole Morresi, *Università Politecnica delle Marche, Italy*

11:30 **Ageing in Urban Areas: Urban Agriculture and Senior Co-Housing as Tools for Sustainable Cities**
Pamela Lattanzi, University of Macerata, Italy
Serena Mariani, University of Macerata, Italy
Tanya Tiberi, University of Macerata, Italy
Laura Vagni, University of Macerata, Italy
Maria Carolina Vesce, University of Macerata, Italy

11:45 **An Overview on Current Technologies for Assisted Living**
Grazia Iadarola, Università Politecnica Delle Marche, Italy
Cecilia Scoccia, Università Politecnica Delle Marche, Italy
Susanna Spinsante, Università Politecnica Delle Marche, Italy
Lorena Rossi, INRCA, Italy
Andrea Monteriù, Università Politecnica Delle Marche, Italy

12:00 **Towards a Smart Extractor Hood to Improve Indoor Air Quality in Home Living Environments**
Gianluca Ciattaglia, Università Politecnica Delle Marche, Italy
Grazia Iadarola, Università Politecnica Delle Marche, Italy
Susanna Spinsante, Università Politecnica Delle Marche, Italy

12:15 **Copper-Layered Double Hydroxide for Methanol Electrooxidation: A Combined DFT and Experimental Characterization**
Cristina Minnelli, Università Politecnica Delle Marche, Italy
Davide Gramigni, University of Bologna, Italy
Eleonora Pavoni, Università Politecnica Delle Marche, Italy
Lorenzo Ripani, University of Bologna, Italy
Emiliano Laudadio, Università Politecnica Delle Marche, Italy
Giovanna Mobbili, Università Politecnica Delle Marche, Italy
Gianni Barucca, Università Politecnica Delle Marche, Italy
Pierluigi Stipa, Università Politecnica Delle Marche, Italy
Roberta Galeazzi, Università Politecnica Delle Marche, Italy
Paolo Mengucci, Università Politecnica Delle Marche, Italy
Elaheh Mohebbi, Università Politecnica Delle Marche, Italy
Elena Romagnoli, Università Politecnica Delle Marche, Italy
Massimo Marcaccio, University of Bologna, Italy

12:30 **Comparison of Exoskeleton Evaluation Methods in the Laboratory and in Field: A Review**
Cecilia Scoccia, Università Politecnica Delle Marche, Italy
Serenella Terlizzi, Università Politecnica Delle Marche, Italy
Samuele Tonelli, Università Politecnica Delle Marche, Italy
Marianna Ciccarelli, Università Politecnica Delle Marche, Italy
Giacomo Palmieri, Università Politecnica Delle Marche, Italy
Alessandra Papetti, Università Politecnica Delle Marche, Italy

11:30 - 12:30 *Room B*
Session 3.3 - Measurement systems, models, tools, and innovative techniques for sustainable urban planning and regeneration - PART II
Chairs: Gabriele Bitelli, *University of Bologna, Italy*
Angela Santangelo, *University of Bologna, Italy*

11:30 **A Multi-Scale Method to Drive Sustainable Urban Densification Processes: A Case Study in Italy**
Elisa Conticelli, University of Bologna, Italy
Simona Tondelli, University of Bologna, Italy
Carolina Salvo, University of Calabria, Italy
Mauro Francini, University of Calabria, Italy

11:45 **Mapping Carbon Dynamics: Remote Sensing Insights Into Calabria's Landscapes (Southern Italy)**
Yasir Hassan Khachoo, University of Naples Parthenope, Italy
Matteo Cutugno, University of Benevento Giustino Fortunato, Italy

Umberto Robustelli, University of Naples Parthenope, Italy
Giovanni Pugliano, University of Naples Federico II, Italy

12:00 **Venice: A Test Field for Urban Historical Centers Surveying With SLAM**
Caterina Balletti, Università Iuav di Venezia, Italy
Enrico Breggion, Università Iuav di Venezia, Italy
Federica Gerla, Università Iuav di Venezia, Italy
Francesco Guerra, Università Iuav di Venezia, Italy
Andrea Martino, Università Iuav di Venezia, Italy

12:15 **GIS-Based Urban Heat Island Mapping and Analysis: Experiences in the City of Bologna**
Reyhaneh Zeynali, University of Bologna, Italy
Emanuele Mandanici, University of Bologna, Italy
Amir Hossein Sohrabi, University of Bologna, Italy
Francesca Trevisiol, University of Bologna, Italy
Gabriele Bitelli, University of Bologna, Italy

12:45 - 14:00 *Cultural Center of Chania*
LUNCH

14:00 - 15:15 *Main Hall*
Session 4.1 - Historical constructions subjected to degradation and extreme loads: Advanced experimental and numerical assessment - PART I
Chair: Gabriele Milani, *Politecnico di Milano, Italy*

14:00 **Preliminary Assessment of a Composite Historical Masonry Column Subjected to Concentrated Loads**
Natalia Pingaro, Politecnico di Milano, Italy
Alessandro Gandolfi, Politecnico di Milano, Italy
Gabriele Milani, Politecnico di Milano, Italy
Siddhartha Ghosh, Indian Institute of Technology Bombay, India
Bhumik Halani, Indian Institute of Technology Bombay, India

14:15 **Nonlinear Static Analysis of Global Vipassana Pagoda by Means of a Novel FE-Based Method: Modelling Strategy**
Alessandro Gandolfi, Politecnico di Milano, Italy
Natalia Pingaro, Politecnico di Milano, Italy
Gabriele Milani, Politecnico di Milano, Italy
Siddhartha Ghosh, Indian Institute of Technology Bombay, India
Bhumik Halani, Indian Institute of Technology Bombay, India

14:30 **Nonlinear Static Analysis of Global Vipassana Pagoda by Means of a Novel FE-Based Method: Results**
Alessandro Gandolfi, Politecnico di Milano, Italy
Natalia Pingaro, Politecnico di Milano, Italy

Gabriele Milani, Politecnico di Milano, Italy
Siddhartha Ghosh, Indian Institute of Technology Bombay, India
Bhumik Halani, Indian Institute of Technology Bombay, India

14:45 **Modeling Seismic Vulnerability of Heritage Church Structure Using Terrestrial Lidar Data: A Case Study**
Samarjeet Salunke, Indian Institute of Technology Bombay, India
Shivraj Patil, Indian Institute of Technology Bombay, India
RAAJ Ramsankaran, Indian Institute of Technology Bombay, India
Venkata Santosh Kumar Delhi, Indian Institute of Technology Bombay, India

15:00 **Seismic Fragility Analysis of Precast Concrete Sandwich Wall Panel Structure**
Jiaxuan He, Southeast University, China
Gabriele Milani, Politecnico di Milano, Italy
Yaorong Dong, Xi'an University of Architecture and Technology, China

14:00 - 15:15 *Room A*
Session 4.2 - Application of Digital Services in the Built Environment: Empowering Innovation through High-Quality Data-Driven Measurement Processes - PART I
Chairs: Gian Marco Revel, *Università Politecnica delle Marche, Italy*
Diego Arnone, *Engineering Ingegneria Informatica Spa, Italy*
Serena Serroni, *Università Politecnica delle Marche, Italy*

14:00 **Connection of Dynamic and Static Data: A Data Lake for Building Digitalisation**
José L. Hernández, CARTIF, Spain
David Arévalo, CARTIF, Spain
Susana Martín, CARTIF, Spain
Kyriakos Katsigarakis, University College London, United Kingdom
Georgios N Lilis, University College London, United Kingdom
Dimitrios Rovas, University College London, United Kingdom
Ignacio de Miguel, Universidad de Valladolid, Spain

14:15 **Readiness to Adopt the Smart Readiness Indicator Scheme Across Europe: A Multi-Criteria Decision Analysis Approach**
Panagiotis Samaras, National Technical University of Athens, Greece
Efstathios Stamatopoulos, National Technical University of Athens, Greece
Apostolos Arsenopoulos, National Technical University of Athens, Greece
Elissaios Sarmas, National Technical University of Athens, Greece
Vangelis Marinakis, National Technical University of Athens, Greece

14:30 **A Neural Network-Based Approach for Hierarchical Electricity Consumption Forecasting in Buildings**
Daniela Stoian, National Technical University of Athens, Greece
Evangelos Spiliotis, National Technical University of Athens, Greece
Efstathios Stamatopoulos, National Technical University of Athens, Greece
Elissaios Sarmas, EPU-NTUA, Greece
Petteri Rekomaa, Forum Virium Helsinki, Finland
Vangelis Marinakis, National Technical University of Athens, Greece

14:45 **Empowering Built Environment Innovation Through Data-Driven Digital Services: A Methodological Framework for Impact Measurement**
Serena Serroni, Università Politecnica Delle Marche, Italy
Nicole Morresi, Università Politecnica Delle Marche, Italy
Vittoria Cipollone, Università Politecnica Delle Marche, Italy
Sara Casaccia, Università Politecnica Delle Marche, Italy
José L. Hernández CARTIF, Spain
Gian Marco Revel, Università Politecnica Delle Marche, Italy

15:00 **AI-Based Methodology for Thermal Comfort Measurement: Application of a Simplified Comfort Model on a Real-Life Case Study**
Vittoria Cipollone, Università Politecnica Delle Marche, Italy
Nicole Morresi, Università Politecnica Delle Marche, Italy
Serena Serroni, Università Politecnica Delle Marche, Italy
Sara Casaccia, Università Politecnica Delle Marche, Italy
Matteo Giovanardi, Focchi Spa, Italy
Alessandro Pracucci, Focchi Spa, Italy
Diego Arnone, Engineering SPA, Italy
Gian Marco Revel, Università Politecnica Delle Marche, Italy

14:00 - 15:15 *Room B*
Session 4.3 - Natural radioactivity in living environment - PART I
Chairs: Mariagabriella Pugliese, *University of Naples Federico II, Italy*
Giuseppe La Verde, *University of Naples Federico II, Italy*

14:00 **Zebra Project: Zeolite for 222Rn and 220Rn Removal by Zeolite Material**
Fabrizio Ambrosino, University of Naples Federico II, Italy
Nicola Gargiulo, University of Naples Federico II, Italy
Carlo Gravino, University of Naples Federico II, Italy
Giuseppe Della Peruta, University of Naples Federico II, Italy
Rocco Mottareale, University of Naples Federico II, Italy
Domenico Caputo, University of Naples Federico II, Italy

14:15 **Correlation Between Geology and Radioactivity in Water**
Marina Poje Sovilj, University Josip Juraj Strossmayer of Osijek, Croatia
Igor Miklavčić, University Josip Juraj Strossmayer of Osijek, Croatia
Goran Šmit, University Josip Juraj Strossmayer of Osijek, Croatia
Denis Stanić, University Josip Juraj Strossmayer of Osijek, Croatia
Vanja Radolić, University Josip Juraj Strossmayer of Osijek, Croatia

14:30 **Preliminary Spectrometric Analysis Measurements of the Sant'Agata De' Goti Tuff in the Framework of the National Radon Action Plan**
Mariagabriella Pugliese, University of Naples Federico II, Italy
Gaetano Gagliardo, University of Naples Federico II, Italy
Chiara Imparato, University of Naples Federico II, Italy
Andrea D'Elia, University of Naples Federico II, Italy
Giuseppe La Verde, University of Naples Federico II, Italy

14:45 **Italian National Radon Action Plan: The State of the Art in Campania Region**
Fabrizio Ambrosino, University of Naples Federico II, Italy

Giuseppe La Verde, University of Naples Federico II, Italy
Giuseppe Della Peruta, University of Naples Federico II, Italy
Rocco Mottareale, University of Naples Federico II, Italy
Mariagabriella Pugliese, University of Naples Federico II, Italy

15:00 **Seasonal Variations in Indoor Radon Concentration and Comparison Between the Energy-Efficient/ Passive House and Traditional House**
Vanja Radolić, University Josip Juraj Strossmayer of Osijek, Croatia
Igor Miklavčić, University Josip Juraj Strossmayer of Osijek, Croatia
Goran Šmit, University Josip Juraj Strossmayer of Osijek, Croatia
Denis Stanić, University Josip Juraj Strossmayer of Osijek, Croatia
Marina Poje Sovilj, University Josip Juraj Strossmayer of Osijek, Croatia

15:15 - 15:45	*Cultural Center of Chania* **COFFEE BREAK**

15:45 - 16:15	*Main Hall* **TUTORIAL SESSION** **Chairs**: Marco Arnesano, *Università eCampus, Italy* Georgios Stavroulakis*, Technical University of Crete, Greece*

Building Smart Secure Living Environments: Harnessing Authentication and Protection Strategies for Intelligent Sensors in the IoT Ecosystem

Carmelo Felicetti, *University of Calabria, Italy*

16:15 - 17:15	*Main Hall* **Session 5.1 - Historical constructions subjected to degradation and extreme loads: Advanced experimental and numerical assessment - PART II** **Chair:** Gabriele Milani, *Politecnico di Milano, Italy*

16:15 **New Preventive Approach for the Sefaguard of Historical Buildings Under Multiple Seismic Events**
Martina Buzzetti, Politecnico di Milano, Italy
Maurizio Acito, Politecnico di Milano, Italy

16:30 **Advanced Numerical Insights of an Historical Masonry Aggregate**
Mattia Schiavoni, Università Politecnica Delle Marche, Italy
Gianluca Standoli, Università Politecnica Delle Marche, Italy
Francesca Bianconi, Università Politecnica Delle Marche, Italy
Francesco Clementi, Università Politecnica Delle Marche, Italy

16:45 **Seismic Vulnerability Assessment of Churches Affected by the 2012 Emilia - Romagna Earthquake: Comparison Among Different Approaches**
Giovanna Longobardi, University of Naples Federico II, Italy
Gabriele Milani, Politecnico di Milano, Italy
Antonio Formisano, University of Naples Federico II, Italy

17:00 **Hardness Tests on New and Existing Steel Structures**
Emilia Meglio, University of Naples Federico II, Italy
Antonio Davino, University of Naples Federico II, Italy
Antonio Formisano, University of Naples Federico II, Italy

16:15 - 17:15 *Room A*

Session 5.2 - Application of Digital Services in the Built Environment: Empowering Innovation through High-Quality Data-Driven Measurement Processes - PART II

Chairs: Gian Marco Revel, *Università Politecnica delle Marche, Italy*
Diego Arnone, *Engineering Ingegneria Informatica Spa, Italy*
Serena Serroni, *Università Politecnica delle Marche, Italy*

16:15 **An Energy Consumption Forecasting Tool for Buildings Based on Multivariate Deep Neural Network Model**
Gabriel Antonesi, Technical University of Cluj-Napoca, Romania
Tudor Cioara, Technical University of Cluj-Napoca, Romania
Ionut Anghel, Technical University of Cluj-Napoca, Romania
Ioan Salomie, Technical University of Cluj-Napoca, Romania
Massimo Bertoncini, Engineering Ingegneria Informatica, Italy

16:30 **Implementing Digital Twins for Enhanced Energy Management in Three Case Studies**
Tancredi Testasecca, Università Degli Studi di Palermo, Italy
Efstathios Stamatopoulos, National Technical University of Athens, Greece
Andrea Natalini, Engineering Ingegneria Informatica, Italy
Marilena Lazzaro, Engineering Ingegneria Informatica, Italy
Chiara Maria Capizzi, Engineering Ingegneria Informatica, Italy
Elissaios Sarmas, EPU-NTUA, Greece
Diego Arnone, Engineering Ingegneria Informatica, Italy

16:45 **Digitalizing Pipeline Network for Hydrogen-Blended Natural Gas Distribution Assessments**
Ben Alex Baby, University of Palermo, Italy
Filippo Luca Alberto Munafò, University of Palermo, Italy
Tancredi Testasecca, University of Palermo, Italy
Marco Beccali, University of Palermo, Italy
Marco Ferraro, National Council of Research, Italy
Germana Poma, AMG Energia SpA, Italy

17:00 **Efficiency Management of Built Environment: The Digitalization of Energy and Service Grids**

Marianna Rotilio, University of L'Aquila, Italy
Chiara Marchionni, University of L'Aquila, Italy
Alessia Massari, University of L'Aquila, Italy
Gianni Di Giovanni, University of L'Aquila, Italy
Davide Simeone, University of Brescia, Italy

16:15 - 17:15	*Room B* **Session 5.3 - Advancements in Technology and Digital Innovation for Structural Health Monitoring of Civil Engineering Structures and Infrastructures** **Chairs:** Giuseppe Carlo Marano, *Politecnico di Torino, Italy* Marco Martino Rosso, *Politecnico di Torino, Italy*

16:15 **Evaluation of Varying Noise Levels' Effects on Damage Detection in Structural Health Monitoring**
Marco Martino Rosso, Politecnico di Torino, Italy
Angelo Aloisio, University of L'Aquila, Italy
Giansalvo Cirrincione, University of Picardie Jules Verne, France
Giuseppe Carlo Marano, Politecnico di Torino, Italy

16:30 **Deep-Learning-Based Onset Time Precision in Acoustic Emission Non-Destructive Testing**
Joanthan Melchiorre, Politecnico di Torino, Italy
Leo D'Amato, Politecnico di Torino, Italy
Federico Agostini, University of Padua, Italy
Amedeo Manuello, Politecnico di Torino, Italy

16:45 **Computational Design Methods Comparison for the Optimization of Variable Section Continuous Beams**
Laura Sardone, Politecnico di Torino, Italy
Stefanos Sotiropoulos, Politecnico di Torino, Italy

17:00 **Workability and Mechanical Properties of Structural Foamed Concretes With Different Dry Densities, and Fine Sand Grain Sizes: Preliminary Study**
Shi Peng, Politecnico di Torino, Italy
Devid Falliano, Politecnico di Torino, Italy
Adriana Bravo Celi, Politecnico di Torino, Italy
Zhengxian Yang, Fuzhou University, China
Giuseppe Carlo Marano, Politecnico di Torino, Italy
Bruno Briseghella, Fuzhou University, China

20:30 - 23:00	*Fourogatos Retaurant* **GALA DINNER**

Technical Program - Friday, June 14

09:00 - 13:00	*Cultural Center of Chania* **REGISTRATIONS**

09:30 - 10:45	*Main Hall* **Session 6.1 - New non-intrusive IoT paradigms based on unconventional AI approaches for and by measurement systems and methods** **Chair:** Peppino Fazio, *Ca' Foscari University of Venice, Italy*

09:30 **Design of an Air Pollution Monitoring System Based on a Low-Cost Sensor Node**
Rocío A Guerrón, University of Calabria, Italy
Domenico Luca Carnì, University of Calabria, Italy
Francesco Lamonaca, University of Calabria, Italy
Marco Lanuzza, University of Calabria, Italy
Ramiro Taco, University of Calabria, Italy
Francesco D'Amore, National Research Council, Italy
Mariantonia Bencardino, National Research Council, Italy

09:45 **Safeguarding Sensitive Data in the Era of IoT: A Study on Security Protocols for Distributed Measurement Systems**
Antonio Gentile, National Research Council, Italy
Davide Macrì, National Research Council, Italy
Francesco Lamonaca, University of Calabria, Italy

10:00 **A Real Network Performance Analysis Testbed for Encrypted MQTT in DMS**
Antonio Gentile, National Research Council, Italy
Emilio Greco, National Research Council, Italy
Domenico Luca Carnì, University of Calabria, Italy

10:15 **Network of Extended Reality-Enabled Laboratories for Remote Practical Training: Didactic in Between Virtual and Real Living Environment**
Francesco Lamonaca, University of Calabria, Italy
Annalisa Liccardo, University of Naples Federico II, Italy
Domenico Luca Carnì, University of Calabria, Italy
Eleonora Bilotta, University of Calabria, Italy
Anna Maria Palermo, University of Calabria, Italy
Giuseppe Spadafora, University of Calabria, Italy

10:30 **Enhancing Privacy in Real-Time Stream Processing: Federated Transfer Learning Approaches**
Shwetha Jog, Marwadi University, India

Damodharan Palaniappan, Marwadi University, India
Jabbar MA, Vardhaman College of Engineering, India

09:30 - 10:45	*Room A* **Session 6.2 - Probability and Mathematical Statistics for Living Environment and Metrology** **Chairs:** Antonella Iuliano, *University of Basilicata, Italy* Pietro Liò, *University of Cambridge, UK*

09:30 **[INVITED] Artificial Intelligence Methodology for the Environment**
Pietro Liò, University of Cambridge, United Kingdom

09:45 **Denoising Probabilistic Diffusion Models for Synthetic Healthcare Image Generation**
Antonella Iuliano, University of Basilicata, Italy
Pietro Liò, University of Cambridge, United Kingdom
Federico Romaniello, University of Basilicata, Italy

10:00 **Urban Air Pollution Forecasting: A Machine Learning Approach Leveraging Satellite Observations and Meteorological Forecasts**
Giacomo Blanco, LINKS Foundation, Italy
Luca Barco, LINKS Foundation, Italy
Lorenzo Innocenti, LINKS Foundation, Italy
Claudio Rossi, LINKS Foundation, Italy

10:15 **Maximum Temperature Prediction Using Remote Sensing Data via Convolutional Neural Network**
Lorenzo Innocenti, LINKS Foundation, Italy
Giacomo Blanco, LINKS Foundation, Italy
Luca Barco, LINKS Foundation, Italy
Claudio Rossi, LINKS Foundation, Italy

10:30 **A Contribution to the Spatial Analysis of Territorial Systems Based on Graph-Structured Data**
Simone Corrado, University of Basilicata, Italy
Federico Romaniello, University of Basilicata, Italy
Francesco Scorza, University of Basilicata, Italy

09:30 - 10:45	*Room B* **Session 6.3 - Building Information Modelling, sensors, and digital technologies: towards the development of multidomain platforms to monitor the built environment** **Chairs:** Gian Marco Revel, *Università Politecnica delle Marche, Italy* Gloria Cosoli, *Università eCampus, Italy* Marco Arnesano, *Università eCampus, Italy*

09:30 **Automatic Modellica BEM Generation From IFC BIM**
Hasan Sayegh, EDF, France
Georgios N Lilis, University College London, United Kingdom
Mathias Bouquerel, EDF, France
Thierry Duforestel, EDF, France
Kyriakos Katsigarakis, University College London, United Kingdom
Dimitrios Rovas, University College London, United Kingdom

09:45 **Modular Real-Time Monitoring System Architecture for Materials and Technologies to Improve Urban Heat-Island Effect and Water Runoff in HE MULTICLIMACT**
Diego Zamora-Sánchez, TECNALIA, Basque Research and Technology Alliance, Spain
Alberto Armijo, TECNALIA, Basque Research and Technology Alliance, Spain
Mireia Fernandez, COMSA SA, Spain
Adrian Lochner, NATURALEA, Spain
Jose Carlos Jimenez, TECNALIA, Basque Research and Technology Alliance, Spain
Beñat Arregi, TECNALIA, Basque Research and Technology Alliance, Spain

10:00 **3D Structure Estimation of Room Environment Using Semantic Segmentation and Model Fitting**
Junya Morioka, Meiji University, Japan
Ryusuke Miyamoto, Meiji University, Japan

10:15 **Measuring the Occupants' Well-Being in the Built Environment: Towards the Integration of Physiological and Environmental Parameters in a Multidomain BIM-Based Platform**
Gloria Cosoli, Università eCampus, Italy
Rifat Seferi, LIS Live Information System, Italy
Dianel Ago, Callisia, eCampus University, Italy
Marco Arnesano, Università eCampus, Italy
Marcel Schweiker, RWTH Aachen University, Germany
Rania Christoforou, RWTH Aachen University, Germany
Mina Moayyedi, RWTH Aachen University, Germany
Gian Marco Revel, Università Politecnica delle Marche, Italy

10:30 **Advancing Resilience of the Built Environment by Digital and Measurement Technologies**
Camilla Lanfranconi, RINA-C, Italy
Clemente Fuggini, RINA-C, Italy
Gloria Cosoli, Università eCampus, Italy
Gian Marco Revel, Università Politecnica delle Marche, Italy
Rita Chirico, RINA-C, Italy
Miltiadis Kontogeorgos, RINA-C, Italy

10:45 - 11:15 *Cultural Center of Chania*
COFFEE BREAK

11:15 - 12:00	*Main Hall* **PLENARY SESSION - KEYNOTE SPEAKER** **Chairs**: Gabriele Milani, *Politenico di Milano, Italy* Georgios Stavroulakis, *Technical University of Crete, Greece*

Accelerating the digitalization and safety assessment of built environment: the case of transport infrastructure

Belén Riveiro, *University of Vigo, Spain*

12:00 - 13:00	*Cultural Center of Chania* **POSTER SESSION** **Chair:** Grazia Iadarola, *Università Politecnica delle Marche, Italy*

PS01 **An Overview of a New Statistical Non-Intrusive Load Monitoring (NILM) Analysis and Recognition Approach for Domestic Environments: DENARDO**
Peppino Fazio, University Ca' Foscari of Venice - DSMN, Italy
Miralem Mehic, University of Sarajevo, Bosnia and Herzegovina
Maria Caterina Mannone, Ca' Foscari University of Venice, Italy
Flavio Astorino, PowerMeter Srls, Italy
Miroslav Voznak, VSB - Technical University of Ostrava, Czech Republic

PS02 **Networking Solutions for the Evaluation of Nature Based Interventions in Cities**
Stelios Kalogridis, Plegma Labs, Greece
Emmanuel S. Sardis, National Technical University of Athens, Greece
Eftychios Protopapadakis, University of Macedonia, Greece
Anastasios D Doulamis, National Technical University of Athens, Greece
Ioannis Kavouras, National Technical University of Athens, Greece
Nikolaos Ipiotis, Plegma Labs, Greece

PS03 **Induction Cooker Acoustic Assessment: Sound Quality Analysis and Correlation With Jury Test Results**
Valentina Pasquinelli, Università Politecnica delle Marche, Italy
Adriano Scaburri, Faber Spa, Italy
Anna Annoscia, Faber Spa, Italy
Leonardo Boccardo, Faber Spa, Italy
Paolo Castellini, Università Politecnica delle Marche, Italy
Milena Martarelli, Università Politecnica delle Marche, Italy

PS04 **Procedures and IT Infrastructures to Manage Nation-Wide Terrestrial Laser Scanners' Massive Data**
Marcello Marzoli, Ministry of Internal Affairs - National Fire Corps, Italy
Stefano Marsella, Ministry of Internal Affairs - National Fire Corps, Italy
Davide Pozzi, Ministry of Internal Affairs - National Fire Corps, Italy
Emanuela Natale, University of L'Aquila, Italy
Giulio D'Emilia, University of L'Aquila, Italy

PS05 **Sensing, Digital, and Management Strategies to Enhance the Built Environment Resilience in Cities**
Gloria Cosoli, Università eCampus, Italy
Alessandra Mobili, Università Politecnica Delle Marche, Italy
Francesca Tittarelli, Università Politecnica Delle Marche, Italy
Adriano Mancini, Università Politecnica Delle Marche, Italy
Alessandro Galdelli, Università Politecnica Delle Marche, Italy
Mosé Rossi, Università Politecnica Delle Marche, Italy
Gabriele Comodi, Università Politecnica Delle Marche, Italy
Giuseppe Scarpelli, Università Politecnica Delle Marche, Italy
Antonio Ferretti, Geotechnical Engineering Services Ltd., Italy
Giovanni Marinelli, Università Politecnica Delle Marche, Italy
Luca Domenella, Università Politecnica Delle Marche, Italy
Monica Pantaloni, Università Politecnica Delle Marche, Italy
Gian Marco Revel, Università Politecnica Delle Marche, Italy

PS06 **Visualizing Tourism's Future: The Impact of Image-Based AI on Destination Development**
Fiorella Folino, University of Calabria, Italy
Tommaso Ruga, University of Calabria, Italy
Ester Zumpano, University of Calabria, Italy
Eugenio Vocaturo, CNR-Nanotec, University of Calabria, Italy

PS07 **Revolutionizing Structural Health Monitoring and Preserving Cultural Heritage via Digital Twins**
Danilo Maurmo, University of Calabria, Italy
Tommaso Ruga, University of Calabria, Italy
Ester Zumpano, University of Calabria, Italy
Eugenio Vocaturo, CNR-Nanotec, University of Calabria, Italy

PS08 **Fast Earthquake Damage Assessment System**
Antonino D'Alessandro, Istituto Nazionale di Geofisica e Vulcanologia, Italy
Salvatore Scudero, Istituto Nazionale di Geofisica e Vulcanologia, Italy
Giovanni Vitale, Istituto Nazionale di Geofisica e Vulcanologia, Italy

PS09 **A Takagi-Sugeno Fuzzy Logic Motor Control for Robot for Assistance to Individuals With Impairments**
Enrico Petritoli, Roma Tre University, Italy
Fabio Leccese, Roma Tre University, Italy

PS10 **Structural- Material Investigations on the Monumental Complex of San Domenico in Cosenza**
Claudia Dichiera, NoDo Servizi srl, Italy
Claudia Guzzo, NoDo Servizi srl, Italy
Renato Sante Olivito, University of Calabria, Italy
Alessio Capilupi, University of Calabria, Italy

13:00 - 14:00 *Cultural Center of Chania*
LUNCH

14:00 - 15:00 *Main Hall*

Session 7.1 - Sensors and Systems for Environmental and Marine Monitoring

Chair: Antonio Cannuli, *University of Messina, Italy*

14:00 **TETI Project - a Multiparameter Modular Buoy for a Comprehensive and Cost Effective Sea Water Monitoring**

Simone Panfiglio, University of Messina, Italy
Valentina Trovato, University of Bergamo, Italy
Maria Rosaria Plutino, National Council of Research, Italy
Silvia Sfameni, National Council of Research, Italy
Luca De Santis, NET7, Italy
Gianluca Insolvibile, Nextworks Srl, Italy
Leonardo Iannucci, Politecnico di Torino, Italy
Luca Lombardo, Politecnico di Torino, Italy
Sabrina Grassini, Politecnico di Torino, Italy
Roberto Montanini, University of Messina, Italy
Antonino Quattrocchi, University of Messina, Italy
Antonio Cannuli, University of Messina, Italy

14:15 **H2 Sensing Performances of Ag2O/Co3O4 Composites**

Madiha Khan, University of Messina, Italy
Simona Crispi, National Council of Research, Italy
Angelo Ferlazzo, University of Catania, Italy
Mozaffar Hussain, Air University, Pakistan
Antonio Cannuli, University of Messina, Italy
Giovanni Neri, University of Messina, Italy

14:30 **NiO-Promoted Metal Oxides/SPCE Electrochemical Sensors for Glucose Monitoring in Environmental Applications**

Zahra Akbari, University of Messina, Italy
Mokhtar Hjiri, Imam Mohammad Ibn Saud Islamic University, Saudi Arabia
Norah Hamad Alonizan, Imam Abdulrahman Bin Faisal University, Saudi Arabia
Giovanni Neri, University of Messina, Italy

14:45 **Fluorimetric and Ratiometric Probes Based on Carbon Nanomaterials Derived From the Brewing Industry Waste for Iron(III) Ion Detection in Aqueous Environments**

Viviana Bressi, University of Mediterranea of Reggio Calabria, Italy
Angelo Ferlazzo, University of Catania, Italy
Claudia Espro, University of Messina, Italy
Giovanni Neri, University of Messina, Italy

14:00 - 15:00 *Room A*

Session 7.2 - Measurements for enhancing sustainability and circularity of the construction sector: how to valorize construction and demolition wastes and optimize buildings life cycle?

Chairs: Gian Marco Revel, *Università Politecnica delle Marche, Italy*
Gloria Cosoli, *Università eCampus, Italy*
Chiara Marchionni, *University of L'Aquila, Italy*
Alessandra Mobili, *Università Politecnica delle Marche, Italy*

14:00 **Circular Economy in the Built Environment Management Supported by Digital Twin. A Review**
Chiara Marchionni, University of L'Aquila, Italy
Alessandra Corneli, Università Politecnica Delle Marche, Italy

14:15 **How to Valorize Construction and Demolition Wastes? Beyond the State of the Art Through Vision Systems and Artificial Intelligence Tools**
Gloria Cosoli, Università eCampus, Italy
Giovanni Salerno, Università Politecnica Delle Marche, Italy
Maria Teresa Calcagni, Università Politecnica Delle Marche, Italy
Giuseppe Pandarese, Università Politecnica Delle Marche, Italy
Luca Violini, Università Politecnica Delle Marche, Italy
Henrique de Melo Ribeiro, Brunel Innovation Centre, United Kingdom
Evelyne ElMasri, Brunel University London, United Kingdom
Mohmmad Ali Asgar Abbas, Brunel University London, United Kingdom
Gian Marco Revel, Università Politecnica Delle Marche, Italy

14:30 **How to Quickly Characterize Construction and Demolition Wastes? Traditional and Advanced Portable Solutions in Comparison**
Alessandra Mobili, Università Politecnica Delle Marche, Italy
Gloria Cosoli, Università eCampus, Italy
Giovanni Salerno, Università Politecnica Delle Marche, Italy
Maria Teresa Calcagni, Università Politecnica Delle Marche, Italy
Simona Sabbatini, Università Politecnica Delle Marche, Italy
Elena Leoni, Università Politecnica Delle Marche, Italy
Gian Marco Revel, Università Politecnica Delle Marche, Italy
Francesca Tittarelli, Università Politecnica Delle Marche, Italy
Valeria Corinaldesi, Università Politecnica Delle Marche, Italy
Jacopo Donnini, Università Politecnica Delle Marche, Italy

14:45 **A Territorial Construction System for a Circular Low-Carbon Built Environment - RECONSTRUCT Project**
Jose Lucas Masero, The Catalonia Institute of Construction Technology, Spain
Kathleen Blanco, The Catalonia Institute of Construction Technology, Spain
Laura Silva Gandola, The Catalonia Institute of Construction Technology, Spain

14:00 - 15:00	*Room B* **Session 7.3 - Natural radioactivity in living environment - PART II** **Chairs:** Marina Poje Sovilj, *University of Osijek, Croatia* Mariagabriella Pugliese, *University of Naples Federico II, Italy*

14:00 **RESRAD Biota Vs ERICA Tool: Challenges and Opportunities for Holistic Radiation Protection**
Giuseppe La Verde, University of Naples Federico II, Italy
Mariagabriella Pugliese, University of Naples Federico II, Italy
Chiara Imparato, University of Naples Federico II, Italy
Gaetano Gagliardo, University of Naples Federico II, Italy
Antonio Sarno, University of Naples Federico II, Italy

14:15 **Space Environmental Health: Non-Invasive Holographic Imaging Flow Cytometry for Astronauts Biodosimetry**
Rocco Mottareale, University of Naples Federico II, Italy
Daniele Pirone, CNR-ISASI, Italy
Lisa Miccio, CNR-ISASI, Italy
Vittorio Bianco, CNR-ISASI, Italy
Pasquale Memmolo, CNR-ISASI, Italy
Marco Durante, GSI, Germany
Mariagabriella Pugliese, University of Naples Federico II, Italy
Pietro Ferraro, CNR-ISASI, Italy

14:30 **The Reinvention of 226Ra in an Industrial Area With the Application of a Preventive Radiometric Risk Management Procedure Without the Use of Radiometric Portals or Judicial Collaborators**
Rosaria Ippolito, Studio I M, Energy and Environmental Assessments, Italy
Filomena Casaburi, ARPACAL, Italy
Rosario Aloisio, ARPACAL, Italy
Caterina Francesca Dardano, ARPACAL, Italy
Salvatore Procopio, ARPACAL, Italy

14:45 **Enhancement of the Radon Activity Concentration in Crotone Indoor Environments Due to the Employment of TENORM as Inert Material**
Antonella Nicolino, University of Calabria, Italy
Mattia Rocco Ligato, University of Messina, Italy
Federica De Luca, University of Messina, Italy
Mario Ferraro, University of Rome Sapienza, Italy
Salvatore Procopio, ARPACAL, Italy

15:00 - 15:30	*Cultural Center of Chania* **COFFEE BREAK**

15:30 - 16:00	*Main Hall*

CLOSING AND AWARD CEREMONY