

WORKSHOP PROGRAM

2026 IEEE INTERNATIONAL WORKSHOP ON

METROLOGY for SUSTAINABILITY

NAPLES, ITALY - NOVEMBER 23-25, 2026

METRO SUSTAINABILITY

NAPOLI 2026

IEEE

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IEEE MetroSustainability 2026 Keynote Speaker

Keynote Lecture - Tuesday, November 24 - H 09:30



Circular Strategies to Support Material Sourcing for the Digital Transition

Piero **Salatino**
University of Naples Federico II, Italy
MedITech Competence Center

ABSTRACT

The digital transition, which has been accelerated by artificial intelligence, relies heavily on increasing the amount of material used in computing hardware, communication networks, electricity infrastructure and energy storage. This talk briefly outlines the critical raw material requirements involved and evaluates circular strategies for reducing the demand for primary resources. The literature reveals two key challenges: the substantial infrastructure demand for copper, and the dependence on smaller quantities of specialty materials, including gallium, germanium, indium, tantalum, and rare earth elements. Vulnerabilities in the supply chain arise from the concentrated sourcing of raw and processed virgin materials, dependence on host metal production, and limited recovery of materials from complex electronic products.

Quantitative studies illustrate the scale and variability of these pressures. A Material Flow Analysis of the relevant raw materials highlights the 'hotspots' of dependable supply chains and the main sources of electronic waste. However, these estimates describe different system boundaries and cannot be combined into a single material demand forecast.

Circular strategies can substantially alter these trajectories. Modelled interventions across the digital equipment lifecycle could substantially reduce electronic waste, while longer device lifetimes and improved hardware utilisation would lower the required allocation of resources. Improvements in manufacturing yield and recovery of production scrap offer additional opportunities. However, end-of-life product collection does not guarantee functional recycling, and waste reduction does not automatically equate to equivalent reductions in primary extraction. The ability to 'close the loop' hinges on the rapidly expanding growth rate of critical raw material demand, driven by the exponential growth in demand for digital services and rapid technological shifts.

The effective implementation of the sustainable utilisation of material resources requires durable, repairable equipment; component reuse; economically viable recovery processes; and transparent material inventories. Future assessments should distinguish between annual flows and accumulated stocks, represent material purity and changing technologies, and account for equipment lifetimes and competing demands. Circularity must therefore become an integral design and planning principle for digital infrastructure, supported by coordinated policies for procurement, manufacturing and resource governance.

SPEAKER BIOGRAPHY

Piero Salatino is Professor of Chemical Engineering and faculty member of the Department of Chemical, Materials and Industrial Production Engineering of the University of Naples Federico II. Chairman of MedITech, Italian Competence Center on Industry 4.0 enabling technologies. Dean of the School of Polytechnic and Basic Sciences of the University of Naples Federico II (2013-2020); Dean of the Engineering Faculty of the University of Naples Federico II (2010-2013); Director of the Combustion Research Institute - National Research Council (2008-2010). President of GRICU (Gruppo di Ingegneria Chimica dell'Università), the Association of Italian University Chemical Engineering Faculties (2023-2025). Appointed by the Italian Ministry of University and Research as member of the Experts Committee for the establishment of the National Research Programme 2021-2027. Piero Salatino is an internationally recognized researcher and scholar in the fields of chemical reactor engineering, powder technology, thermochemical conversion of solid fuels, bioprocess engineering, with a scholarly record of more than 350 scientific articles in international archival journals and more than 400 articles in proceedings of international conferences. Member/past member of the editorial boards of Powder Technology, Fuel Processing Technology, Industrial & Engineering Chemistry Research, Combustion & Flame, Combustion Science and Technology, Scientific Reports, Frontiers in Energy Research. Former President of the Italian section of the Combustion Institute (1997-2005), he is member of the historical Accademia Pontaniana.

Tutorial - Monday, November 23 - H 16:00



Radioecology for Sustainable Management of Radioactive Materials: Using the ERICA Tool to Support Ecosystem Protection and Safe Resource Reuse

Chiara Imparato
University of Campania Luigi Vanvitelli, Italy

ABSTRACT

Sustainable development requires the ability to manage technological activities while ensuring the long-term integrity and resilience of ecosystems. The reuse, recycling, and repurposing of materials containing residual levels of radioactivity may contribute to waste minimization and resource efficiency but, in this context, also the long-term protection of ecosystems from potential radiological impacts must be addressed: protection of ecosystems from ionizing radiation represents an important component of sustainable environmental management.

While, traditionally, radiation protection frameworks focus mainly on human health, there is a growing need to evaluate potential impacts on non-human biota and to support decisions that protect biodiversity. Radioecology provides the scientific basis for evaluating how radionuclides behave in environmental systems, including their transport, accumulation, and potential effects on non-human biota. The ERICA Tool provides an integrated framework for applying practical environmental risk assessments, combining radionuclide-specific data with environmental exposure modelling. Integrating this information into environmental management frameworks represents an important step toward a sustainability-oriented approach to radiation protection.

This tutorial will introduce the principles underlying environmental radiation protection and demonstrate the application of the ERICA Tool for assessing risks from ionising radiation in terrestrial or aquatic ecosystems. Through practical examples, participants will explore the workflow of the tool, from data requirements to the interpretation of results for decision-making. The session will highlight how radioecological assessment approaches contribute to sustainability by supporting responsible management of radioactive contaminant and informed remediation strategies.

SPEAKER BIOGRAPHY

Chiara Imparato received her M.S. degree in Physics from the University of Naples Federico II, Italy, in 2024 and is currently a Ph.D. student in Environmental Radioactivity at the University of Campania Luigi Vanvitelli, where she investigates the distribution of radionuclides in natural environments and their relevance for environmental radiation protection. Her work combines experimental measurements and radioecological approaches to improve the understanding of background radioactivity and its role in assessing potential radiological impacts deriving from anthropogenic contributions. Her research focuses on the measurement, assessment, and interpretation of naturally occurring radionuclides in a volcanic environment, with the aim of establishing reliable baseline conditions for a complex geological area. Her main work involves the creation of a database of background dose-rate data for the biota in a volcanic ecosystem Her broader scientific interests include the integration of radioactivity data into risk assessment frameworks of nuclear power plant decommissioning, investigating how robust environmental characterization can support sustainable approaches to radiation protection which include the long-term management of affected ecosystems.



Carbon Footprint Assessment: a Metrological Approach to Reliable Environmental Impact Evaluation of Products and Services

Immacolata Esposito
University of Naples Federico II, Italy

ABSTRACT

Reliable quantification of the environmental impact of products and services is increasingly required to support sustainability claims, comparative assessments, design choices, and policy decisions. Among the indicators used for this purpose, the Carbon Footprint plays a central role, as it expresses the climate-change-related impact associated with a product, service, or process, usually in terms of kg CO_2-equivalent. Although Carbon Footprint results are commonly obtained through structured calculation procedures and dedicated Life Cycle Assessment tools, their value depends on several methodological and data-related choices, including the definition of the object under analysis, the adopted system boundaries, the quality and representativeness of input data, and the assumptions used to describe production, use, and end-of-life scenarios. As a consequence, the resulting value should not be interpreted only as the output of a calculation, but as the result of a process whose reliability, comparability, and transparency require a proper measurement perspective.

This tutorial aims to show how Carbon Footprint Assessment can be framed according to the main principles of metrology. Starting from the definition of the measurand, participants will be guided through the key steps required to obtain meaningful and comparable environmental impact results. Particular attention will be given to the specification of the object under analysis, including the functional unit, system boundaries, geographical and temporal context, production and transport assumptions, use scenario, end-of-life conditions, and available knowledge about the structure of the product or service.

Practical examples will show how Life Cycle Assessment tools, such as openLCA, can support the modelling of life-cycle impacts, while platforms such as Electricity Maps can help account for operational impacts related to electricity consumption and to the geographical and temporal variability of the energy mix. Beyond the use of existing tools and datasets, the tutorial will emphasize the role of input data, assumptions, models, uncertainty sources, traceability of information, and result reporting. The final objective is to provide participants with a structured framework for interpreting Carbon Footprint results as measurement results, supporting more reliable, transparent, and critically interpretable environmental assessments.

SPEAKER BIOGRAPHY

Immacolata Esposito received her M.S. degree cum laude in Biomedical Engineering from the University of Naples Federico II, Italy, in 2023. She is currently a third-year Ph.D. student in Information and Communication Technology for Health at the University of Naples Federico II, where she is part of the Electrical and Electronic Measurements research group. Her research activity focuses on measurements of sustainability and sustainability of measurement systems, to support the development of Industry 5.0 and Health 5.0 scenarios. Over the past three years, she has investigated how metrology can support sustainability by enhancing the reliability, transparency, and comparability of environmental impact assessments. Her research has focused on the measurement challenges associated with impact quantification, with particular attention to uncertainty evaluation and standardization issues. Her broader research interests lie at the intersection of metrology, sustainability, and emerging technologies, with applications ranging from Life Cycle Assessment and Carbon Footprint quantification to sustainable cyber-physical measurement systems. More recently, her work has also explored the environmental impact of artificial intelligence systems, with a particular focus on identifying and assessing trade-offs between system performance and environmental impact. Through her research, she aims to explore how metrology can strengthen sustainability assessments, making them more robust, interpretable, and suitable for supporting informed decisions.

IEEE MetroSustainability 2026 Venue



IEEE MetroSustainability 2026 will be held at the **Conference Center** of the University of Naples Federico II. The Congress Venue is located in the heart of Naples and overlooking the Gulf of Naples, near Castel dell'Ovo.

ADDRESS

Via Partenope, 36
Napoli
Use the QRCode to open the location on *Google Maps*







IEEE MetroSustainability 2026 Social Events

WELCOME PARTY

Monday November 23 - H 19:00

The MetroSustainability 2026 **Welcome Party** will be held at **"*Cantine Sociali*"** on **Monday, November 23 - 19:00**.

The Welcome Party venue is located just a 10-minute walk from the Congress Centre. Participants will reach it on foot together after the conclusion of the conference sessions.

ADDRESS
Cantine Sociali
Piazza Giulio Rodinò, 28 - Napoli

GALA DINNER

Tuesday November 24 - H 20:00

The MetroSustainability 2026 **Gala Dinner** will be held at **"*La Bersagliera*" Restaurant** on **Tuesday, November 24 - 20:00**.

ADDRESS
Ristorante La Bersagliera
Borgo Marinari, 10-11 - Napoli

IEEE MetroSustainability 2026 Patronages











Program Schedule - Monday, November 23

MONDAY, NOVEMBER 23, 2026	
14:30	Registration
16:00 - 17:00	Aula Magna - Tutorial - Chiara Imparato Radioecology for Sustainable Management of Radioactive Materials: Using the ERICA Tool to Support Ecosystem Protection and Safe Resource Reuse
17:15 - 18:15	Aula Magna - Tutorial - Immacolata Esposito Carbon Footprint Assessment: a Metrological Approach to Reliable Environmental Impact Evaluation of Products and Services
19:00	Welcome Party - Cantine Sociali

Program Schedule - Tuesday, November 24

TUESDAY, NOVEMBER 24, 2026		
08:00	Registration	
09:00 - 09:30	Aula Magna - Opening Ceremony - Welcome Addresses	
09:30 - 10.15	Aula Magna - Keynote Lecture - Piero Salatino, University of Naples Federico II, Italy Circular Strategies to Support Material Sourcing for the Digital Transition	
10:15 - 10:50	Coffee Break - Poster Session	
10:50 - 12:30	Aula Magna - S1 - General Session	
12:30 - 14:00	Lunch	
	AULA MAGNA	AULA B
14:00 - 15:40	S2.1 - Enabling Technologies and Intelligent Systems for Sustainable Industry and Health - PART I	S2.2 - Sustainable and Bioinspired Technologies: Sensing, Metrology and Robotics
15:40 - 16:00	Coffee Break - Poster Session	
16:00 - 17:20	S3.1 - Enabling Technologies and Intelligent Systems for Sustainable Industry and Health - PART II	S3.2 - Integrated Measurement Frameworks for Sustainable Land Systems
20:00	Gala Dinner - La Bersagliera Restaurant	

Program Schedule - Wednesday, November 25

WEDNESDAY, NOVEMBER 25, 2026		
08:30	Registration	
	AULA MAGNA	AULA B
09:00 - 10:40	S4.1 - Geomatics for sustainability: from remote sensing and survey techniques to maps and Geographical Information System (GIS)	S4.2 - Ionizing Radiation Metrology for Sustainable Environments and Responsible Technologies
10:40 - 11:10	Coffee Break - Poster Session	
11:10 - 12:30	S5.1 - Physical Techniques To Quantify Impacts	S5.2 - Sustainable Approaches in Healthcare: Optimization of Innovative Practices
12:30 - 13:00	Aula Magna - Closing and Award Ceremony	
13:00 - 14:30	Lunch	

Technical Program - Monday, November 23

14:00 - 18:15	*Conference Center - University of Naples Federico II - Ground Floor* **REGISTRATIONS**

16:00 - 17:00	*Aula Magna - First Floor* **TUTORIAL #1** **Chair:** Marina Poje Sovilj, *University Josip Juraj Strossmayer of Osijek*

Radioecology for Sustainable Management of Radioactive Materials: Using the ERICA Tool to Support Ecosystem Protection and Safe Resource Reuse

Chiara Imparato, *University of Campania Luigi Vanvitelli, Italy*

17:15 - 18:15	*Aula Magna - First Floor* **TUTORIAL #2** **Chair:** Luigi Duraccio, *University of Naples Federico II, Italy*

Carbon Footprint Assessment: a Metrological Approach to Reliable Environmental Impact Evaluation of Products and Services

Immacolata Esposito, *University of Naples Federico II, Italy*

19:00	*Cantine Sociali - Piazza Giulio Rodinò, 28 - Napoli* **WELCOME PARTY**

Technical Program - Tuesday, November 24

08:00 - 18:00	*Conference Center - University of Naples Federico II - Ground Floor* **REGISTRATIONS**

09:00 - 09:30	*Aula Magna - First Floor* **OPENING CEREMONY - WELCOME ADDRESSES**

09:30 - 10:15	*Aula Magna - First Floor* **KEYNOTE LECTURE** **Chairs:** Leopoldo Angrisani, *University of Naples Federico II* Marja Cundeva-Blaier, *Ss. Cyril and Methodius University in Skopje*

Circular Strategies to Support Material Sourcing for the Digital Transition

Piero Salatino, *University of Naples Federico II, Italy*

10:15 - 10:50	*Conference Center - First Floor* **COFFEE BREAK - POSTER SESSION**

PS-01 **Metrological Validation of AI-Based Target Tracking in Helical Tomotherapy: Toward Sustainable Motion Management**
Ivona Zlatkova (Fondazione Muto ETS, Italy); Gaetano Gagliardo (Fondazione Muto ETS, Italy & Radiotherapy, Emicenter, Naples, Italy); Ferdinando Francomacaro, Caterina Muto, Vincenzo Iorio, Giulia Miranda and Paolo Muto (Fondazione Muto ETS, Italy)

PS-02 **Towards a Cybersecurity Risk Assessment for Sustainable Next-Generation Smart Grids**
Marco Centenaro, Lorenzo Vangelista, Alessandro Brighente and Mauro Conti (University of Padova, Italy)

PS-03 **Radon Measurement Accuracy in Well Water From the Campi Flegrei**
Sabrina Imparato (University of Naples Federico II, Italy); Chiara Imparato (University of Campania Luigi Vanvitelli, Italy); Stefano Albanese, Fabrizio Ambrosino, Alessio De Falco, Luca Dell'Anno, Annalise Guarino and Giuseppe La Verde (University of Naples Federico II, Italy); Carlo Sabbarese (University of Campania Luigi Vanvitelli, Italy); Mariagabriella Pugliese (University of Naples Federico II, Italy)

PS-04 **Evaluation of the Applicability of Consumer-Grade Electronic Detectors for 222Rn Exhalation Measurement**
Vladislav Todorov Todorov, Ivelina Stoyanova Dimitrova, Strahil Boychev Georgiev, Angelika Teodorova Popova and Krasimir Krumov Mitev (Sofia University St. Kliment Ohridski, Bulgaria)

PS-05 **A Multiscale Metrological Framework for Estimating the Health, Economic, and Social Burden of Antimicrobial Resistance: A Hospital Case Study from Campania**
Giuseppina Forgione (University of Naples Federico II, Italy); Daniela Sateriale (University of Sannio, Italy); Enza Mallardo (Marcianise Hospital, ASL Caserta, Italy); Mariateresa Vitiello, Roberta Colicchio and Paola Salvatore (University of Naples Federico II, Italy); Caterina Pagliarulo (University of Sannio, Italy)

PS-06 **Tree-Based Ensemble Methods for Power Grid Fault Classification**
Olli Väänänen (Jamk University of Applied Sciences, Finland); Pasi Puttonen (JAMK University of Applied Sciences, Finland); Teppo Flyktman (JAMK University of Applied Sciencess, Finland)

PS-07 **A Three-State Repairable Markov Model for Availability Analysis of Power Network Components**
Chiara Foglietta (San Raffaele Roma Open University, Italy); Valeria Bonagura and Federica Pascucci (Università Degli Studi Roma Tre, Italy); Marco Centenaro (University of Padova, Italy); Leonardo Badia (Università degli Studi di Padova, Italy)

PS-08 **A Markov Chain Framework for Resilience Analysis of Teleoperated Sustainable Infrastructures**
Sezen Çetinkaya (Izmir Economy University, Turkey); Manuele Favero (Università Degli Studi di Padova, Italy); Leonardo Badia (Università degli Studi di Padova, Italy); Marco Centenaro (University of Padova, Italy)

PS-09 **Environmental Sustainability in Proximity Care: A Preliminary Case Study with EMG Measurements**
Francesco Amato, Luigi Duraccio and Immacolata Esposito (University of Naples Federico II, Italy); Annarita Tedesco (University of Naples, Federico II, Italy)

PS-10 **UAV-Based Air Quality Monitoring and Data Assimilation for Sustainable Urban Environmental Assessment**
Marianna Savva (Moldova State University, Moldova); Adrian Paladi (ePhysMCS Lab, USA); Serghei Pascari (Moldova State University, Moldova); Florentin Paladi (Moldova State University & ePhysMCS Research Laboratory, Moldova); Veaceslav Sprincean (Moldova State University, Moldova)

PS-11 **A Safety Boundary Governor for Teleoperated Robotic Haircutting**
Zhendai Huang (University of Oulu, Finland); Ameer Tamoor Khan (University of Copenhagen, Denmark); Aquil Mirza Mohammed (The Hong Kong Polytechnic University (PolyU), Hong Kong); Fabrizio Lo Regio (University of Naples Federico II, Italy); Jyri-Jussi Torvinen (Oulu University of Applied Sciences, Finland); Leopoldo Angrisani (University of Naples Federico II, Italy); Shuai Li (University of Oulu, Finland)

PS-12 **Integrating Socio-Economic Indicators and Renewable Energy Development to Assess Municipal Readiness for Sustainable Land Systems**
Shiva Rahmani (IMM-CNR, Italy); Marj Tonini (University of Lausanne, Switzerland); Michele Galella (University of Bergamo, Italy); Beniamino Murgante (University of Basilicata, Italy)

PS-13 **A Deformable Monopole Antenna Pressure Sensor for Integrated Sensing and Communication**
Kam Weng Tam (University of Macau, Macao); Zhuowei Zhang (University of Macao, Macao); Ngai Kong (Crosstech Innovation Group Limited, China); Chi-Hou Chio (University of Macau, Macao); Cheng Teng (Laxcen Technology (Zhuhai) Limited, China & Laxcen Technology Limited, USA)

PS-14 **AI Wifi-Photovoltaic Based Integrated Sensing and Communication Node Spatial Design**
Oi-Tai Tai (Universidade de Aveiro, Portugal); Kam Weng Tam (University of Macau, Macao)

PS-15 **Supporting Sustainable Territorial Planning Through Long-Term Monitoring of Agricultural Abandonment and Forest Expansion in Mediterranean Inland Areas: The Basilicata Region Case Study**
Gabriele Nolè, Antonio Lanorte and Giuseppe Cillis (CNR, Italy)

10:50 - 12:30 *Aula Magna - First Floor*
S1 - General Session
Chairs: Kostas Karatzas, *Aristotle University, Greece*
Marj Tonini, *University of Lausanne, Switzerland*

10:50 **Advancing Sustainable Development: Embedding ESG Metrics Across Metrology and Quality Infrastructure**
Marija Cundeva-Blajer (Ss. Cyril and Methodius University in Skopje, North Macedonia)

11:10 **A Theoretical Framework for Improved Low Cost Air Quality Sensor Network Calibration and Modelling with Machine Learning**
Kostas Karatzas (Aristotle University, Greece & Environmental Informatics Research Group, Greece); Evangelos Bagkis and Theodosios Kassandros (Aristotle University of Thessaloniki & Environmental Informatics Research Group, Greece)

11:30 **Improving the Size Resolution and Accuracy of Particle Number Concentration Estimates Using Low-Cost PM Sensors, an Impactor System, and Machine Learning**
Doheon Kim, Gihyeon Yu, Jeong Rae Kim, Jiwoo Jung and Jungho Hwang (Yonsei University, Korea (South))

11:50 **A Data-Driven Approach to Fine-Scale Territorial Typologies and Their Thermal Response**
Marj Tonini, Jacques Soutter and Christian Kaiser (University of Lausanne, Switzerland)

12:10 **When Climate Strikes: Is Extreme Weather Pushing the European Union Towards Clean Energy?**
Sulaman Muhammad (Brandenburg University of Technology, Germany); Christin Hoffmann (Brandenburg University of Technology Cottbus-Senftenberg, Germany)

12:30 - 14:00 *Conference Center - First Floor*
LUNCH

14:00 - 15:40 *Aula Magna - First Floor*
S2.1 - Enabling Technologies and Intelligent Systems for Sustainable Industry and Health - PART I
Chairs: Luigi Duraccio, *University of Naples Federico II, Italy*
Immacolata Esposito, *University of Naples Federico II, Italy*

14:00 **A Virtual Metrology Framework for Sustainable Prognostics: Physics-Informed Multivariate Anomaly Detection**
Alessandro Del Prete (University of Naples Federico II, Italy); Zahida Mashaallah (University of Naples Frederico II, Italy); Flora Amato (Università degli Studi di Napoli Federico II, Italy)

14:20 **Explainable Machine Learning for the Data-Driven Assessment of Sustainable Feeding Strategies in Poultry Production**
Michele Magarelli (Università Degli Studi di Bari, Italy); Claudia Carbonara (Università degli Studi di Foggia, Italy); Donato Romano (Istituto Nazionale di Fisica Nucleare, Italy); Pierfrancesco Novielli (Università Degli Studi di Bari Aldo Moro and INFN-BA, Italy); Maria Antonietta Colonna, Simona Tarricone and Marco Ragni (Università degli Studi di Bari Aldo Moro, Italy); Sabina Tangaro (Università Degli Studi di Bari Aldo Moro and INFN, Italy)

14:40 **Environmental Sustainability of Quantum Computing: A Discussion on Benefits and Current Challenges**
Leopoldo Angrisani, Mauro D'Arco, Egidio De Benedetto, Matteo D'Iorio, Luigi Duraccio and Immacolata Esposito (University of Naples Federico II, Italy); Zhendai Huang and Shuai Li (University of Oulu, Finland); Fabrizio Lo Regio (University of Naples Federico II, Italy)

15:00 **RGB-D-Based Leaf Damage Quantification Toward Sustainable Plant Health Monitoring**
Ruiming Zou, Zeyu Lu and Marc Josep Montagut Marques (Waseda University, Japan); Kayo Hirose (The University of Tokyo Hospital, Japan); Shinjiro Umezu (Waseda University, Japan)

15:20 **Measuring the Affective Dimension of Chronic Pain: A Multimodal Approach from Biosignals and Facial Video**
Vittorio Santoriello (University of Naples Federico II, Italy); Maria Pia Bruno (University of Salerno, Italy); Ilaria Trapanese (University of Napples Federico II, Italy); Sergio

Micalizzi (Teoresi Group, Italy); Marco Bazzani (Teoresi S.p.A, Italy); Giuseppe Polese (Università di Salerno, Italy); Stefano Cirillo (University of Salerno, Italy); Maria Romano (University of Naples "Federico II", Italy); Alfonso M Ponsiglione (University of Naples Federico II, Italy); Ornella Piazza and Marco Cascella (University of Salerno, Italy)

14:00 - 15:20 *Aula B - Ground Floor*

S2.2 - Sustainable and Bioinspired Technologies: Sensing, Metrology and Robotics

Chairs: Jungho Hwang, *Yonsei University, Korea*
Tomasz Blaszczyk, *Zealand-University of Applied Sciences, Denmark*

14:00 **Improving Rainfall Monitoring Reliability Through an Autonomous Self-Cleaning Rain Gauge**
Patrycja Mendera, Konrad Fedorowicz, Kinga Pliszke, Nagib Emrulahi and Eryka Wacięga (Silesian University of Technology, Poland); Lea Mette Jacobsen and Tomasz Blaszczyk (Zealand-University of Applied Sciences, Denmark); Anna Korczak and Jozef Herbert Wiora (Silesian University of Technology, Poland)

14:20 **Experimental Evaluation of a Vision-Assisted Self-Cleaning System for Sustainable Photovoltaic Energy Harvesting**
Andrzej Szydłowski, Julia Urbanek, Patryk Łochyński, Kamil Faron and Jakub Słonina (Silesian University of Technology, Poland); Mikkel Bidstrup Bentsen-Petersen and Tomasz Blaszczyk (Zealand-University of Applied Sciences, Denmark); Anna Korczak and Jozef Herbert Wiora (Silesian University of Technology, Poland)

14:40 **Autonomous Measurement Platform with a Star-Shaped SOI-AlN MEMS Sensor for Vibration and Thermal Gradient Monitoring**
Suhail Ahmed, Sa and Carlo Trigona (University of Catania, Italy); Achraf Derbel (University of Catania & Dipartimento di Ingegneria, Elettrica, Elettronica e Informatica, Italy); Bruno Ando, Mattia Manenti, Sara Sadat Hosseini, Salvatore Baglio, Salvatore Graziani and Danilo Greco (University of Catania, Italy); Giovanna Di Pasquale (Università degli Studi di Catania, Italy); Antonino Pollicino (University of Catania, Italy)

15:00 **Preliminary Evaluation of Microstructured Capacitive Force Sensors for Soft Fingers Contact Pressure Estimation**
Tiziano Fapanni and Michela Borghetti (University of Brescia, Italy); Stanislao Grazioso (University of Naples Federico II, Italy); Nicola Francesco Lopomo (Politecnico di Milano, Italy); Francesco Alberti (Camozzi Group, Italy); Raphael Palucci Rosa (University of Bergamo, Italy); Emilio Sardini (University of Brescia, Italy)

15:40 - 16:00 *Conference Center - First Floor*

COFFEE BREAK - POSTER SESSION

16:00 - 17:20 *Aula Magna - First Floor*

S3.1 - Enabling Technologies and Intelligent Systems for Sustainable Industry and Health - PART II

Chairs: Luigi Duraccio, *University of Naples Federico II, Italy*
Immacolata Esposito, *University of Naples Federico II, Italy*

16:00 **Dimensionality Reduction and Pattern Discovery in Spatio-Temporal RF-EMF Exposure Data**
Nunzia Solmonte and Assia Solmonte (University of Naples Federico II, Italy); Nikola Djuric (University of Novi Sad, Serbia); Darko Suka (University of East Sarajevo, Bosnia and Herzegovina); Nicola Pasquino (University of Naples Federico II, Italy)

16:20 **Uncovering the Role of Definitional Uncertainty in Carbon Footprint Measurement**
Leopoldo Angrisani, Egidio De Benedetto, Luigi Duraccio and Immacolata Esposito (University of Naples Federico II, Italy)

16:40 **MOOCs for Sustainable Development: Traceability, Calibration and Future Prospects**
Evelina Bruno and Maddalena Molaro (University of Naples Federico II, Italy)

17:00 **Green by AI: Physics-Based Models and Retrieval-Augmented Generation for Battery Disposal Management in Aerospace Systems**
Chaitanya Kumar Mankala (Villanova University, USA & Engineering, USA)

16:00 - 17:00 *Aula B - Ground Floor*

S3.2 - Integrated Measurement Frameworks for Sustainable Land Systems

Chairs: Vito Imbrenda, *National Research Council, Italy*
Rosa Coluzzi, *National Research Council, Italy*

16:00 **Statistical Distribution Analysis of Electric Field Measurements in the Urban Area of Potenza**
Francesca Salerno, Luca Pallotta, Antonella Iuliano and Vincenzo Fiumara (University of Basilicata, Italy)

16:20 **A Combined Approach Using Remote Sensing and near Surface Data to Assess the Influence of Different Emission Sources on Air Quality in an Urban Environment: The APINA Campaign**
Matteo Manzo (University of Naples Federico II, Italy); Salvatore Spinosa (Università "Federico II", Italy); Francesco Esposito (Università della Basilicata, Italy); Mariarosaria Calvello (Istituto di Metodologie Integrate per l'Osservazione della Terra (IMIOT), Italy); Aldo Giunta and Antonella Boselli (Istituto di Metodologie Integrate per l'Osservazione della Terra- CNR IMIOT, Italy); Mariagrazia D'Emilio (National Research Council, Italy); Francesca Picca (Università "Federico II", Italy); Salvatore Amoruso (University of Naples Federico II, Italy); Giulia Pavese (Istituto di Metodologie Integrate per l'Osservazione della Terra- CNR IMIOT, Italy)

16:40 **Research Infrastructures as Enablers of Data-Driven Urban and Climate Planning: The ITINERIS Experience in the Italian Context**
Lucia Saganeiti (National Research Council (CNR), Italy); Carmela Cornacchia (Consiglio Nazionale delle Ricerche (CNR), Italy); Giuseppe Gargano (Consiglio Nazionale delle Ricerche (CNR) Italy, Italy)

20:00	*La Bersagliera Restaurant - Borgo Marinari, 10-11 - Napoli* **GALA DINNER**

Technical Program - Wednesday, November 25

08:30 - 13:00	*Conference Center - University of Naples Federico II - Ground Floor* **REGISTRATIONS**

09:00 - 10:40	*Aula Magna - First Floor* **S4.1 - Geomatics for sustainability: from remote sensing and survey techniques to maps and Geographical Information System** **Chair:** Claudio Parente, *Parthenope University of Naples, Italy*

09:00 **Predictive Geomorphology-Driven Artificial Intelligence Mapping of Coastal Area Sensitivity Using Multi-Source Earth Observation: PRED-GEO SEA-EU Seed Project**
Gaia Mattei (Università Degli Studi di Napoli Parthenope, Italy); Giorgio Anfuso (Cadiz University, Spain)

09:20 **From Multi-Sensor Geomatics to Europeana: A Sustainable Workflow for Archaeological 3D Heritage**
Massimiliano Pepe (Università Degli Studi di Chieti e Pescara, Italy); Vincenzo Saverio Alfio (University of Salento, Italy); Domenica Costantino (Politecnico di bari, Italy); Donato Palumbo (University of Chieti Pescara, Italy); Emmanuel Maravelakis (Hellenic Mediterranean University, Greece); Sorin Herban (Romania)

09:40 **Purpose-Oriented Scan-to-HBIM for Architectural Heritage: A Sustainability Framework and Geometric Consistency Assessment in Anversa Degli Abruzzi**
Massimiliano Pepe (Università Degli Studi di Chieti e Pescara, Italy); Donato Palumbo (University of Chieti Pescara, Italy); Andrei Crisan (Universitatea Politehnica Timisoara, Romania)

10:00 **Evaluating Geostatistical and Deterministic Methods for Bathymetric Grid Spatial Resolution Enhancement: A Case Study in Punta Licosa (Italy)**
Pietro P. C. Aucelli (University of Naples Parthenope, Italy); Pasquale Maglione (Parthenope University of Naples, Italy); Gaia Mattei (Università Degli Studi di Napoli Parthenope, Italy); Claudio Parente (University of Studies of Naples Parthenope, Italy); Andrea Vallario and Vincenzo Verde (Parthenope University of Naples, Italy)

10:20 **Integrating Permanent GNSS Network Products and Landsat 8 Imagery for Refined Land Surface Temperature Mapping: The Case Study of Benevento**
Giuseppina Costanzo, Ugo Falchi and Gianluigi Ferrara (Parthenope University of Naples, Italy); Claudio Parente (University of Studies of Naples Parthenope, Italy); Umberto Robustelli (University of Naples Parthenope, Italy)

09:00 - 10:40	*Aula B - Ground Floor* **S4.2 - Ionizing Radiation Metrology for Sustainable Environments and Responsible Technologies** **Chairs:** Michele Colucci, *Laboratoire National Henri Becquerel, France* Benoit Sabot, *Université Paris-Saclay, France*

09:00 **Intercomparisons as a Means of Quality Assurance for Calibration Procedures of Detectors Used for the Measurement of Radon-222 Activity Concentration in Air**
Valentina Giannelli (University of Milan, Italy); Michele Colucci (CEA, LIST, Laboratoire National Henri Becquerel, France); Simone Manenti and Flavia Groppi (University of Milan, Italy)

09:20 **Realization of an Active Detector Network for Real-Time Monitoring of Radon and Indoor Air Quality at CEA**
Michele Colucci (CEA, LIST, Laboratoire National Henri Becquerel, France); Benoit Sabot (Université Paris-Saclay, CEA, LIST, Laboratoire National Henri Becquerel, France); Bruno Boyer (Université Paris-Saclay, CEA, France); Sylvie Pierre (Université paris Saclay, CEA, France)

09:40 **Improvement of Exposure Procedures for Metrological Assurance and Time-Response Studies of Consumer-Grade Electronic Radon Monitors**
Strahil Boychev Georgiev, Vladislav Todorov Todorov, Ivelina Stoyanova Dimitrova, Bozhidar Antonov Krastev and Krasimir Krumov Mitev (Sofia University St. Kliment Ohridski, Bulgaria)

10:00 **From Geogenic Source to Exposure: A Physics-Based Comparison of Istria and Osijek-Baranja Counties**
Marina Poje Sovilj, Vanja Radolić, Igor Miklavčić and Denis Stanić (University Josip Juraj Strossmayer of Osijek, Croatia)

10:20 **Enhanced Low-Energy Non-Proportionality Measurements for Scintillator Characterization**
Alice Perret (Université Paris-Saclay, CEA, LIST, Laboratoire National Henri Becquerel, France); Marcell P. Takács (Physikalisch-Technische Bundesanstal, Germany); Christophe Dujardin (Univ Lyon, UCBL1, CNRS, Institut Lumière Matière, France); Benoit Sabot (Université Paris-Saclay, CEA, LIST, Laboratoire National Henri Becquerel, France)

10:40 - 11:10	*Conference Center - First Floor* **COFFEE BREAK - POSTER SESSION**

11:10 - 12:10 *Aula Magna - First Floor*
S5.1 - Physical Techniques to Quantify Impacts
Chairs: Carlo Sabbarese, *University of Campania L. Vanvitelli, Italy*
Mauro Rubino, *University of Campania L. Vanvitelli, Italy*

11:10 **A Methodological Framework for Monitoring the Sustainability of Agrivoltaic Systems**
Iolanda Galante (University of Campania Luigi Vanvitelli, Italy); Carmine Lubritto (University of Campania "Luigi Vanvitelli", Italy)

11:30 **Impact of the Major Sources of Uncertainty Associated with the Quantification of Biogenic Carbon in a Waste-to-Energy Plant CO2 Emissions**
Luigi Sabino (Università Vanvitelli, Italy); Beatrice Papa (A2A life company, Italy); Lorenzo Rambaldo (A2A lkife company, Italy); Carolina Allocca and Fabio Marzaioli (Università Vanvitelli, Italy); Poorna Gadkar (University of Campania, Italy); Anna Di Palma (National Research Council (CNR), Italy); Mauro Rubino (Università Vanvitelli, Italy)

11:50 **Comparison of Complementary Techniques for Radon Measurement in Groundwater**
Misbah Javed (University of Campania L. Vanvitelli, Italy); Chiara Imparato (University of Campania Luigi Vanvitelli, Italy); Sabrina Imparato, Giuseppe La Verde and Mariagabriella Pugliese (University of Naples Federico II, Italy); Carlo Sabbarese (University of Campania Luigi Vanvitelli, Italy)

11:10 - 12:30 *Aula B - Ground Floor*
S5.2 - Sustainable Approaches in Healthcare: Optimization of Innovative Practices
Chairs: Gaetano Gagliardo, *University of Naples Federico II, Italy*
Rocco Mottareale, *IRCCS National Cancer Institute "Fondazione G. Pascale", Italy*

11:10 **A New Method Using SRS MapCHECK for Light-Radiation Field Coincidence in Stereotactic Treatments**
Alessandra Costanzo (University of Naples Federico II, Italy); Cecilia Arrichiello (Istituto Nazionale Tumori IRCCS Fondazione G. Pascale, Italy); Marcello Serra and Gianluca Ametrano (National Cancer Institute IRCCS G. Pascale Foundation, Italy); Rocco Mottareale (National Cancer Institute - IRCCS - G. Pascale Foundation, Italy); Francesca Buonanno, Valentina d'Alesio and Vincenzo Ravo (National Cancer Institute IRCCS G. Pascale Foundation, Italy)

11:30 **Sustainability in Dual-Energy CT: A Multidimensional Framework Based on Current Literature Evidence**
Dalila De Santis (University of Naples Federico II, Italy); Stefano Giusto Picchi (ASL Napoli 1 centro, Italy); Stefania Tamburrini (Ospedale San Giovanni Bosco - ASL Napoli

1 centro, Italy); Rocco Mottareale and Giulia Lassandro (University of Naples Federico II, Italy)

11:50 **Finite Element-Based Technical Assessment of a Patient-Specific 3D-Printable Head-and-Neck Immobilization Device for Radiotherapy**
Angelica De Michele (Emicenter srl, Italy); Riccardo Spena (Emicenter, Italy); Giuseppe Cesarelli (University of Naples Parthenope, Italy); Danilo Calderone (Emicenter, Italy); Gaetano Gagliardo (Fondazione Muto ETS, Italy & Radiotherapy, Emicenter, Naples, Italy)

12:10 **Quantitative CT-Based Assessment of Bolus Conformity on Complex Anatomical Surfaces: Comparison of Conventional, Patient-Specific PLA and Silicone Boluses**
Teresa Beneduce, Debora Galdi and Attilio De Francesco (Emicenter, Italy); Giuseppe Cesarelli (University of Naples Parthenope, Italy); Vincenzo Iorio (Fondazione Muto ETS, Italy); Gaetano Gagliardo (Fondazione Muto ETS, Italy & Radiotherapy, Emicenter, Naples, Italy); Danilo Calderone (Emicenter, Italy)

12:30 - 13:00	*Aula Magna - First Floor* **CLOSING AND AWARD CEREMONY**

13:00 - 14:30	*Conference Center - First Floor* **LUNCH**