



Smart Sustainable Technologies

Sustainable Design and Manufacturing (SDM-25)

Sustainability in Energy and Buildings (SEB-25)

Conference Programme



17-19 September 2025
Catania, Sicily, Italy

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Chairs' Welcome

12th International Conference on Sustainable Design and Manufacturing SDM-25

On behalf of the organizers of SDM-25 and the esteemed KES community, it is our distinct privilege to extend a heartfelt welcome to you all for the 12th International Conference on Sustainable Design and Manufacturing (SDM-25). This prestigious event will take place in the city of Catania, Sicily, Italy from September 17th to 19th, 2025, and it will also be accessible online via the well-established KES Online platform, offered by KES International.

The last dozen conferences since the first SDM conference in Cardiff in 2014 the world has changed dramatically in its understanding of the challenges of sustainability. A recent meme illustrated a graph showing by that by 2075 at the current rate of use of the word every word in every sentence would be “sustainable”! Clearly this is not tenable but illustrates the rapid acceptance that the world has to do something to change the status quo. The SDM community has consistently demonstrated its commitment to advancing research and practice in a wide spectrum of sustainable design and manufacturing domains. These endeavours have yielded a tremendous impact across diverse sectors of society. The technical program of SDM-25 is exceptionally comprehensive, featuring a line-up of a keynote presentation, oral sessions, and constructive invited discussions. Encompassing both the theoretical foundations and practical applications of sustainable design and manufacturing, this conference offers a superb forum for the dissemination and deliberation of novel insights and concepts. It serves as a fertile ground for the exchange of knowledge and the incubation of ground-breaking ideas.

We are honoured to have one distinguished keynote speaker this year: Professor Fiona Charnley. Professor Charnley is no stranger to SDM and has presented many papers in the past. Her talk “Towards a Sustainable Circular Economy: Reflections on the achievements, challenges, impact and legacy of the UK's Flagship Research Programme” will give her perspective on the United Kingdom Research and Innovation (UKRI) funded National Interdisciplinary Circular Economy Research Programme (NICER) was a four-year £30 million investment sponsored by the Department for Environment, Food and Rural Affairs (DEFRA) to move the UK towards a circular economy. Professor Charnley was the Lead investigator in the Circular Economy Hub based at the University of Exeter and coordinates the research coming from the 5 funded research centres in Textiles, Mineral-based construction materials, Chemicals, Technology metals and Bulk metals.

We deeply appreciate Fiona's thought leadership contribution and willingness to share her experiences and insights with our conference attendees.

The meticulous selection of conference submissions involved a rigorous blind peer-review process, drawing upon the expertise of esteemed reviewers within the manufacturing and design community. Only the most outstanding submissions have been chosen for presentation at the conference and inclusion in the proceedings, which will be published as a distinguished volume in the KES-Springer series 'Smart Innovation, Systems and Technologies.'

Our heartfelt gratitude goes out to our admired authors, diligent reviewers, and the rigorous efforts of our general track and invited session chairs, as well as all others who have played an integral role in shaping this esteemed event. Your contributions have been instrumental in ensuring the excellence of SDM-25.

We extend a warm welcome to the KES SDM community and sincerely hope that your participation in this conference proves to be both enriching and enjoyable.

Professor Mark Jolly, Professor of Sustainable Materials and Manufacturing, Cranfield University, UK

Prof. Robert Howlett, KES International Research & Cardiff Metropolitan University, Wales, UK

Prof. Rossi Setchi, Cardiff University, UK
SDM-25 Conference Chairs

17th International Conference on Sustainability in Energy and Buildings SEB-25

The 17th International Conference on Sustainability and Energy in Buildings 2025 (SEB-25) is a significant international conference organised by a partnership between KES International, and The Sustainable and Resilient Built Environment research group, Cardiff Metropolitan University.

SEB-25 invited contributions on a range of topics related to sustainable and resilient buildings and sustainable energy technologies. Latterly focused on renewable energy technologies and smart and micro grids. Contributions addressed building, or neighbourhood, or city and/or country scales, specific to local, national and global challenges. For the first year, SEB-25 included a workshop on Innovation in Sustainable Agriculture and Food Production.

The aim of the conference was to bring together University researchers, Government and Scientific experts and Industry professionals to discuss the minimisation of energy use and associated carbon emissions in buildings, neighbourhoods, cities in the urban context and rurally; from a theoretical, practical, implementation, modelling and simulation perspective. The conference formed an exciting chance to present, interact, and learn about the latest research, practical developments and knowledge transfer on the subjects with real world impact.

SEB-25 will be held in a hybrid form with mainly physical attendance, with a small number of delegates attending in hybrid mode in response to agile work patterns and an environmentally sustainable ethos.

The conference featured three General Tracks chaired by experts in the fields:

G01 Sustainable & Resilient Buildings

G02 Sustainable Energy Technologies

G03 Innovation in Sustainable Agriculture and Food Production

In addition, there were five Invited Tracks proposed, organised by prominent researchers and practitioners with papers presented.

IS02: Advanced Assessment Methods, Tools and Design Solutions for users' Well-Being in Buildings.

IS04: Building Retrofit: Transforming and Reusing Existing Buildings Toward Low Carbon Futures.

IS05: Intelligent and data-driven decision making in green urban mobility.

IS07: Advancements in renewable energy systems, innovative technologies and nature-based solutions for the built environment.

IS08: Avoiding the heat: different approaches to investigate overheating in buildings.

Furthermore on the final day a round table discussion will be chaired and moderated by Professors Antonio Gagliano, Gianpiero Evola, and Marco Tina on the Opportunities and Bottlenecks for Renewable Energies Uptake.

It is important that a conference provides high quality presentations from world leading impactful researchers and practitioners. SEB-25 featured two keynote speakers: Professor Maurizio Cellura from University of Palermo, Italy; and Professor Zita Vale from Polytechnic of Porto, Portugal.

The conference attracted submissions from around the world. Submissions for the Full-Paper Tracks were subjected to a two-stage blind peer-review process. With the objective of producing a high-quality impactful conference, only the best of these papers was selected for presentation at the conference and publication as book chapters in a volume of Springer's book series: The Smart Innovation, Systems and Technologies.

Thanks are due to the very many people who have given their time and goodwill freely to make SEB-25 a success. We would like to thank the local chairs from the University of Catania, Sicily, Italy. Furthermore, we are grateful to the time of members of the International Programme Committee who were essential in providing their reviews of the conference papers, to ensure appropriate high quality of papers was maintained. We thank the high-profile keynote speakers for providing interesting talks to inform delegates and provoke discussion. Important contributors to the conference were made by the authors, presenters, and delegates without whom the conference could not have taken place, so we offer them our thanks. Finally, we would like to thank the administrative staff of KES International.

It is hoped that delegates find the SEB-25 conference an interesting, informative, and useful experience; and remain connected through the KES International Virtual Conference Experience.

Prof John Littlewood, Cardiff Metropolitan University, Wales, UK

Prof Robert J. Howlett, KES International Research & Cardiff Metropolitan University, Wales, UK

Prof Lakhmi Jain, University of Technology Sydney, Australia and Liverpool Hope University, UK

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Keynote Talks

Prof. Fiona Charnley

University of Exeter, UK

Towards a Sustainable Circular Economy: Reflections on the achievements, challenges, impact and legacy of the UK's Flagship Research Programme

Abstract: The UKRI-funded National Interdisciplinary Circular Economy Research (NICER) Programme was launched four years ago with an ambitious vision: to accelerate the transition to a circular economy in the UK through world-class, interdisciplinary research and innovation. As Director of the coordinating Circular Economy Hub, Fiona will reflect on the journey of the NICER Programme, highlighting the key achievements, challenges, and transformative impacts realized over its lifespan. In her talk, Fiona will explore how the programme fostered unprecedented collaboration across diverse disciplines - from materials science and engineering to social sciences and economics - to generate whole system solutions for critical resource challenges. The talk will delve into the strategic decisions and leadership approaches that enabled the programme to deliver impactful research, influence policy, and build a vibrant community of circular economy practitioners. Specific examples of breakthrough research and their tangible contributions to reducing waste, maximizing resource value, and creating new economic opportunities will be showcased. Furthermore, this reflection will candidly address the inherent complexities of leading a large-scale, multi-faceted research initiative, offering insights into navigating interdisciplinary dynamics, stakeholder engagement, and translating research into real-world application. Fiona will conclude by outlining the enduring legacy of the NICER Programme and highlight transferable lessons and best practices, offering valuable insights for other nations embarking on their own journeys towards a more sustainable and circular future.

Biography: Fiona Charnley is Professor of Circular Innovation at the University of Exeter, Co-Director of the Exeter Centre for the Circular Economy and Senior Associate of the University of Cambridge Institute for Sustainability Leadership. Fiona leads multiple government and industry-funded research projects covering topics such as the use of digital technology to accelerate the adoption of the circular economy, circular healthcare and remanufacturing in the high integrity sectors. For the last four years Fiona has led the UKRI National Interdisciplinary Circular Economy Hub and has extensive experience of working with organisations from across sectors to identify new approaches to design, innovation, manufacture and business modelling to transform resource use and value creation. She has also led numerous education and executive training programmes to support future leaders in developing the skills and capabilities

necessary to drive a circular transition. Fiona has also published a book on the Circular Economy: Handbook of the Circular Economy: Transitions and Transformation.

Prof. Maurizio Cellura

University of Palermo, Italy

Towards climate neutral districts through sustainable materials, systems and practices: the experiences of the IWG 5 of the Set Plan of the European Union and project NEST

Abstract: Achieving climate-neutral districts necessitates the integration of sustainable materials, systems, and practices. The Implementation Working Group 5 (IWG5) of the SET Plan focuses on energy efficiency in buildings, emphasizing innovative renewable technologies, resource efficiency, circularity, and the flexibility potential of buildings to align with energy systems. Complementing this, the NEST (Network for Energy Sustainable Transition) project, under Italy's National Recovery and Resilience Plan, unites universities, research centers, and industries to develop technologies for renewable energy conversion and use. NEST aims to build a competent Italian leadership in sustainable and decarbonized energy production and distribution, fostering interdisciplinary collaboration and innovation. This presentation will explore the synergies between IWG5's strategic objectives and NEST's practical implementations, highlighting pathways to accelerate the transition to climate-neutral districts.



Biography: Full professor of Building physics and energy systems since 2011 at the University of Palermo, his scientific activity is mainly oriented towards energy and environmental topics, with focus on energy efficiency in buildings, technologies powered by renewable energy and decarbonization strategies of systems and processes. He was member of the National Ecolabel Ecoaudit Committee from 2000 to 2004, coordinator of the national scientific committee EMAS schools (2004-2004), reviewer for the EU Commission under several funding programs, member of the workgroup for the definition of

ECOLABEL criteria on buildings, chair of the workgroup "Energy and sustainable Technologies" of the Italian LCA Network and coordinator of several national and EU projects in the field of environmental sustainability of processes, renewable energy technologies, eco-oriented design making, development of innovative tools and methodologies for the sustainability of products and services.

Members of many International Energy Agency work groups: SHC task 27 (Performance of Solar Facade Components), 38 (Solar air-conditioning and refrigeration), 48 (Quality Assurance & Support Measures for Solar Cooling Systems) and 40 (Towards Solar net zero energy buildings), EBC Annex 57 (Evaluation of embodied energy and CO₂eq for building construction) and 62 (Ventilative cooling), Annex 72 (Assessing Life Cycle

Related Environmental Impacts Caused by Buildings), Annex 83 (Positive Energy Districts). From 2013 to 2018 he was member of the Consultation Board of MIUR (Italian Ministry of Education and Research) for Horizon 2020, Challenge "Secure, clean, and efficient energy", since 2014 he is representative for the University of Palermo of the "Sustainable Solutions Development Network", agency of the United Nations Environment Program (UNEP), since 2012 he was vice-president of the Italian LCA Network Association, of which he became president in October 2015 until June 2019.

From June 2014 till December 2020 he was coordinator of the Ph.D. course in "Energy and information Technologies" at the University of Palermo and from December 2015 to 2018 he was member of the Scientific Council of the University of Palermo.

Director of the Centre for Sustainability and Ecological transition of the University of Palermo since march 2022, he is national representative of the SETPLAN Implementation Working Group 5 "Energy Efficiency in Buildings" (since 2019). Between 2019-2020 he was member of the Euro-Mediterranean Group of Senior Officials on Research and Innovation (GSO) for research and innovation (EEAS UNION FOR MEDITERRANEAN) and since July 2020 he is Italian representative within the Euro-Mediterranean Bureau of the Union for Mediterranean Regional (UFM) Platform on Research & Innovation.

Since July 2023, he is the coordinator of the Associated Research Doctorate between the University of Palermo and the University of Messina in Ecological Transition. From November 2023 he is member of Scientific Committee of "Ricerca Sistema Energetico (RSE)", Italian scientific public company in the energy field. From december 2024 was elected member of the national committee Italian network of Universities for the Sustainable Development (RUS, 2025-2027). He participated as Lead Author in the MedECC Special Report on interlinking climate change with the Water-Energy-Food-Ecosystems (WEFE). He is author of more than 400 national and international publications in the fields of LCA, multicriteria decision making, industrial ecology, energy efficiency in buildings and thermal building simulations.

Prof. Zita Vale

Polytechnic of Porto, Portugal

Artificial Intelligence-based Models and Applications for Efficient and Sustainable Energy Management in Buildings

Abstract: The energy industry is undergoing a transition towards a more sustainable energy future. Buildings represent a very significant share of the overall energy consumption and must play a very important role in this energy transition. Buildings already have a significant role in the use of renewable energy sources, but are also increasing their electrical energy demand due to climatization needs and electric mobility. Promoting active roles for building occupants is an opportunity that cannot be missed, as it represents a high potential for gathering the flexibility that power and energy systems urgently needed.

Artificial Intelligence models are needed to enable buildings to have a relevant positive contribution to the energy transition process, ensuring not only adequate approaches for efficient energy use but also bringing a human centric paradigm to the energy business. Artificial Intelligence concepts and methods have a huge potential to bring effective solutions ensuring efficient and sustainable solutions as well as the fair and efficient participation of all the involved actors, including small consumers and energy communities.

Data driven and knowledge-based approaches can ensure the required distributed decision support, planning, and management of the energy resources in the frame of competitive electricity markets. The new approaches must be trusted by their users making explainability and semantics key aspects of Artificial Intelligence-based models and applications to ensure a sustainable and efficient energy future.



Biography: Zita Vale, IEEE Senior Member, graduated in Electrical Engineering in 1986, received the PhD degree in Electrical and Computer Engineering in 1993, and the Agregação title (Habilitation) in 2003 from the University of Porto, Portugal.

She is Full Professor in the School of Engineering, Polytechnic of Porto. She is a member of the Coordination Board of LASI - The Associated Lab on Intelligent System and leads the research activities

on Intelligent Power and Energy Systems at GECAD - Research Group on Intelligent Engineering and Computing for Advanced Innovation and Development.

She has been involved in more than 60 R&D projects and published more than 200 papers in international scientific journals. Her scientific research activities mainly focus on Power and Energy Systems Operation, Electricity Markets, Energy Communities, Demand Response, Renewables, Electric Vehicles, and Distributed Generation and Storage. She has been developing Artificial Intelligence-based models, methods and applications for Power and Energy, using Agents and Multi-Agent systems, Knowledge-

Based systems, Semantics, Machine Learning, Data Mining, and Evolutionary Computation.

Zita Vale actively participates in several technical working groups and committees. She is the IEEE PES (Power and Energy Society) Technical Committee Program Chair (TCPC) for Analytic Methods for Power Systems (AMPS) Committee, Chair of the IEEE PES Intelligent Data Analysis and Mining (IDMA) Working Group and of the Open Data Sets (ODS) Task Force. She is the Chair of the Board of Directors of ISAP - Intelligent Systems Application to Power Systems.

She is Editor-in-Chief of Applied Energy journal (Elsevier) and is involved in edition activities for different journals and books. She has regular activity as reviewer and evaluator for papers and for project proposals and monitoring, from different funding agencies around the world.

Timetable – Wednesday 17 September

	Plenary Room / Room 1	Room 2	Room 3	Room 4
09:00 - 10:15 CEST	<p>Opening Ceremony</p> <p>Prof. Robert J Howlett, KES International, UK & Cardiff Metropolitan University, UK</p> <p>Prof. John Littlewood, Cardiff Metropolitan University, UK</p> <p>Prof. Mark Jolly, Cranfield University, UK</p>			
	<p>Keynote Speaker 1</p> <p>Professor Maurizio Cellura</p> <p>University of Palermo</p> <p>Title of talk : Towards climate neutral districts through sustainable materials, systems and practices: the experiences of the IWG 5 of the Set Plan of the European Union and project NEST</p>			
10:15 - 10:45 CEST	Networking Break			

	Plenary Room / Room 1	Room 2	Room 3	Room 4
10:45-12:45 CEST	SEB-G01-A General Track - Sustainable and Resilient Buildings Prof. John Littlewood and Prof. Francesco Fiorito	SDM-G02 General Track - Sustainable Manufacturing and Systems Dr Emanuele Pagone	SDM-IS02 Engineering design for AM in a product life cycle perspective Prof. Marco Marconi, Prof. Claudio Favi and Prof. Marco Mandolini	SDM-IS04 Systems approaches to advance the transition to net zero Prof. Jill MacBryde, Prof. Linda Newnes and Prof. Susan Lattanzio
12:45 - 13:45 CEST	Lunch			
13:45 - 15:45 CEST	SEB-G01-B General Track - Sustainable and Resilient Buildings Prof. John Littlewood and Prof. Francesco Fiorito	SEB-G02 General track - Sustainable Energy Technologies Dr. Simon Walters	SEB-IS07 A Advancements in renewable energy systems, innovative technologies and nature-based solutions for the built environment Prof. Aneli Stefano and Prof. Costanzo Vincenzo	SDM - IS08 The role of innovation in Sustainable and Circular Economy transformations Prof Minna Lammi, Dr Maria Holgado and Dr Katie L. Leggett

Timetable – Thursday 18 September

	Plenary Room / Room 1	Room 2	Room 3	Room 4
09:30 - 10:30 CEST	<p>Keynote Speaker 2 Prof. Fiona Charnley University of Exeter, UK</p> <p>Title of Talk: Towards a Sustainable Circular Economy: Reflections on the achievements, challenges, impact and legacy of the UK's Flagship Research Programme</p>			
10:30 - 11:00 CEST	Networking Break			
11:00 - 13:00 CEST	SEB-G01-C General Track - Sustainable and Resilient Buildings Prof. John Littlewood and Prof. Francesco Fiorito	SDM-G01 General Track - Sustainable Design, Innovation and Services Prof. Fiona Charnley and Dr. Adriana Encinas-Oropesa	SEB - G03 General Track - Workshop on Innovation in Sustainable Agriculture and Food Production Prof. Robert J. Howlett Prof. Giacomo Scarascia Mugnozza	SEB-IS08 Avoiding the heat: different approaches to investigate overheating in buildings Dr Linda Toledo
13:00 - 14:00 CEST	Lunch Break			

	Plenary Room / Room 1	Room 2	Room 3	Room 4
PM	Technical Visit Information on the website. Limited spaces available			
19:00 CEST	Gala Dinner			

Timetable – Friday 19 September

	Plenary Room / Room 1	Room 2	Room 3	Room 4
09:00 - 10:00 CEST	<p>Keynote Speaker 3 Prof. Zita Vale Polytechnic of Porto, Portugal</p> <p>Title of Talk: Artificial Intelligence-based Models and Applications for Efficient and Sustainable Energy Management in Buildings</p>			
10:00 - 10:30 CEST	Networking Break			
10:30 - 12:30 CEST	<p>SEB-G01-D General Track - Sustainable and Resilient Buildings Prof. John Littlewood and Prof. Francesco Fiorito</p>	<p>SDM-IS03 Artificial Intelligence to support Sustainable Product and Process Design Assoc. Prof. Christian Spreafico, Assoc. Prof. Daniele Landi and Prof. Davide Russo</p>	<p>SEB-IS04 - A Building Retrofit: Transforming and Reusing Existing Buildings Toward Low Carbon Futures Prof. Hasim Altan and Dr. Bertug Ozarisoy</p>	<p>SDM-IS06 & IS07 Resilience paradigms to promote 5.0 sustainable transition & Circularity of critical raw materials (CRMs) as means for resilience and sustainability Prof. Marco Bortolini and Dr. Francesco Gabriele Galizia & Assoc. Prof. Anna Aminoff and Katri Valkokari</p>
12:30 - 13:30 CEST	Lunch Break			

	Plenary Room / Room 1	Room 2	Room 3	Room 4
13:30 - 15:30 CEST		SEB-IS05 & IS02 Advancing Smart Building Energy Management: Practical AI and ML Solutions for Real-World Applications and Advanced Assessment Methods, Tools and Design Solutions for users' Well-Being in Buildings Asst. Professor Marco Savino Piscitelli, Prof. Alfonso Capozzoli, Senior Researcher Cristian Pozza and Senior Researcher Daniele Antonucci and Dr. Arianna Latini and Prof. Elisa Di Giuseppe	SEB-IS07 B & IS04 B Advancements in renewable energy systems, innovative technologies and nature-based solutions for the built environment and Building Retrofit: Transforming and Reusing Existing Buildings Toward Low Carbon Futures Prof. Aneli Stefano and Prof. Costanzo Vincenzo and Prof. Hasim Altan and Dr. Bertug Ozarisoy	SDM G02-B & G03 & G04 General Track - Sustainable Manufacturing and Systems & Materials challenges for sustainability & Digitalisation for sustainability Dr Emanuele Pagone & George Karadimas & Maria Holgado
15:30 - 16:00 CEST	Networking Break			
16:00 - 17:00 CEST	Round table session			
17:00 - 17:30 CEST	Closing Ceremony			

SDM Paper Presentations

G01: General Track - Sustainable Design, Innovation and Services

Chair: Fiona Charnley and Adriana Encinas-Oropesa

Thursday 18 September: 11:00 - 13:00

Room 2

Paper No	Paper Title / Authors
5	Advanced System Engineering Approaches to Emerging Challenges in Planetary and Deep-Space Exploration J. de Curtò, Cristina Licalzi, Julien Tubiana Warin, Jack Gehlert, Brian Langbein, Alexandre Gamboa, Chris Sixbey, William Maguire, Santiago Fernández, Álvaro Maestroarena, Alex Brenchley, Logan Maroclo, Philemon Mercado, Joshua DeJohn, Cesar Velez, Ethan Dahmus, Taylor Steinys, David Fritz and I. de Zarzà
10	The utopian biodesigner: a profile as a reference point for sustainable biodesign practices Bert Vuylsteke, Jan Detand and Francesca Ostuzzi
11	Key competencies for design transition: A model for characterizing ingenuity of Low-Tech designers Ulysse Girard and Tatiana Reyes
17	Design for Measurement: Advancing Productivity and Sustainability in Aerospace Manufacturing Oliver Simpson and Peter Scully
52	Comparative Analysis of Dental Implant Designs Based on the Bone-Implant Contact Surface Area Abdulrhman Atef and Ahmed Elkaseer

G02-A: General Track - Sustainable Manufacturing and Systems

Chair: Dr Emanuele Pagone

Wednesday 17 September: 10:45-12:45

Room 2

Paper No	Paper Title / Authors
7	Environmental impact saving in a symbiosis case study: from chips to WAAM feedstock Maria Gloria Trapani, Simone Amantia, Livan Fratini and Giuseppe Ingarao
12	Additive printing for temporary construction site modules: from energy analysis to structural checks. Eleonora Laurini, Giovanni Migliaccio, Marianna Rotilio, Francesco D'Annibale and Vincenzo Stornelli
15	Development of aggregated circular economy target value by applying ISO standards Raul Carlsson and Tatiana Nevzorova
20	Automated Scan-based Remanufacturing Process Chain for High-Precision Milling of Turbine Blades Robert Joost, Benjamin Hein, Benedikt Neumann, Daniel Vöhringer, Heiko Lammers and Kai Lindow
26	Multiscale Pathways for Achieving Carbon Neutrality through Industrial Decarbonization Jun-Ki Choi
33	Sustainable Prosthetic Manufacturing: A Comparative Life Cycle Assessment of Centralized and Decentralized Additive Manufacturing Supply Chains in Europe Jiarui Feng, Amirmohammad Daareyni, Iñigo Flores and Emanuele Pagone

G02-B: General Track - Sustainable Manufacturing and Systems

Chair: Dr Emanuele Pagone

Friday 19 September: 13:45 - 15:45

Room 4

Paper No	Paper Title / Authors
34	Eco-Industrial Parks and Their Applications to the Secondary Aluminum Manufacturing Bert Bras and Brooke Peterman
51	Assessment of Cold Plasma Nitriding Post-Processing for Defect Mitigation and Property Optimization of LPBF Martensitic Stainless Steel Yasmine El-Taybany, Mohammed Fawey, Fayez El-Hossary, Mohamed Abo El-Kassem and Ahmed Elkaseer

G03: General track - Materials challenges for sustainability

Chair: George Karadimas

Friday 19 September: 13:45 - 15:45
Room 4

Paper No	Paper Title / Authors
13	Potential of wood and biocomposites in construction Arianna Lo Re, Gianluca Rodonò and Vincenzo Sapienza
21	Beyond GRP: Exploring Sustainable Transitions in Marine Manufacturing Jonathan Burgess, Asha Ward and Christian McLening
36	Advancements in Sustainable Absorbent Technologies: Addressing the Environmental Impact of Disposable Hygiene Products Dr. Leo Kasehagen

IS02: Engineering design for AM in a product life cycle perspective

Chair: Prof. Marco Marconi, Prof. Claudio Favi and Prof. Marco Mandolini

Wednesday 17 September: 10:45 -12:45

Room 3

Paper No Paper Title / Authors

28	Life cycle engineering tool preliminary test: An environmental and economic comparison of a brake caliper Cesare Chiacchietta, Marco Marconi, Claudio Favi, Marco Mandolini, Francesco Sidoli and Simone Gallozzi
32	Decision support framework for sustainable and high-performance metal additive manufacturing Ons Mrabet, Raoudha Gaha, Julie Marteau, Hans Bounghomba, Jean-Dominique Guerin, Yicha Zhang and Benoît Eynard
39	Using a multi criteria tool to guide the decisionmaking in eco-design for additive manufacturing Cesare Chiacchietta, Simone Gallozzi, Marco Marconi, Marco Mandolini and Claudio Favi
42	A method to optimize the part build orientation in Additive Manufacturing Marco Mandolini, Cesare Chiacchietta, Marco Marconi, Claudio Favi, Francesco Sidoli, Simone Gallozzi and Mikhailo Sartini
43	Additive-Manufactured Reinforcements for Composite-Metal Joints: A Life Cycle Engineering Approach Alejandra Costantino, Alessandro Pironi and Claudio Favi
45	A Feasibility Study on Adhesively Bonded Joints with Additively Manufactured Adherends and Structured Interface Michele Gulino, Francesco Musiari and Alejandra Costantino

IS03: Artificial Intelligence to support Sustainable Product and Process Design

Chair: Assoc. Prof. Christian Spreafico, Assoc. Prof. Daniele Landi and
Prof. Davide Russo

Friday 19 September: 10:30 - 12:30

Room 2

Paper No	Paper Title / Authors
1	FMEA-TRIZ analysis of Selective Laser Melting with a Focus on Powder Reuse Christian Spreafico, Baris Ordek and Davide Russo
2	Prospective LCA of patented Selective Laser Melting and Direct Energy Deposition technologies working with steel and titanium powder Baris Ordek, Daniele Landi, Davide Gotti and Christian Spreafico
3	Failure Investigation of Reused Metal Powder in Additive Manufacturing: An FMEA Approach and the Role of AI-Based Support Tools Hemanth Kollipara, Baris Ördek, Francesca Campana, Daniele Landi, Paolo Cicconi and Christian Spreafico
4	Prospective Life Cycle Assessment of Future Patented Li-Ion Batteries Luca Alghisi, Gianluca Evangelista Ceglia, Nils Thonemann and Christian Spreafico
8	Part Geometry and Parameter-based Anticipatory Failure Investigation in Rotational Molding: A Hybrid Machine Learning Algorithm Baris Ordek and Christian Spreafico
18	A Sustainability Decision Assistant for Industrial Net Zero Pathways: Application at Unipart Manufacturing Masoud Ahmadinia, Stephen Spooner, Darbaz Khasraw, Marcos Kauffman, Graham Giles and Bhavik Shah
19	Predictive Maintenance for a Bearing Grinding Machine: A Data-Driven Approach Giovanni Pascoschi, Pietro Andrea Miciaccia, Antonio Decataldo, Domenico Monopoli and Michele Dassisti

IS04: Systems approaches to advance the transition to net zero

Chair: Prof. Jill MacBryde, Prof. Linda Newnes and Prof. Susan Lattanzio

Wednesday 17 September: 10:45 - 12:45

Room 4

Paper No	Paper Title / Authors
37	Heating energy savings achieved with an Earth-to-Air Heat Exchanger designed for a near Zero Energy Building Ana Tejero-González, Asmae Boubkari, Hugo Calleja-Pastor and Sergio L. González-González
46	A Circular Economy for Electrical and Electronic Equipment: Insights from UK Stakeholders Across the Value Chain Aya Abdelmeguid and Lucia Corsini
47	Filling the Gaps in a Socio-technical Systems Approach to Net Zero Hui Zhang, Carolyn Axtell and Nicola Lawrence-Thomas
48	What is Holding Back the Circular Transition in High-Integrity Sectors? Stephen Fitzpatrick, Andreas Reimer, Calum Hicks and Syed Munawar
50	Systems Approaches to Net Zero Jill MacBryde, Susan Lattanzio, Linda Newnes and Matthew Hannon
53	ReMake Skills: A Whole Systems Perspective on Enabling the Net Zero Transition Jennifer Griffith

IS06: Resilience paradigms to promote 5.0 sustainable transition

Chair: Prof. Marco Bortolini and Dr. Francesco Gabriele Galizia

Friday 19 September: 10:30 - 12:30

Room 4

Paper No	Paper Title / Authors
6	AI-aided STPA-Sec for managing cyber security in industrial plants – an ontological approach Francesco Simone, Andrea Montaruli, Giulio Di Gravio and Riccardo Patriarca
9	A Dual-Layer Digital Twin Approach for Anomaly Detection in the Oil and Gas Sector Lodovico Basilici Menini, Giovanni Mazzuto and Ilaria Pietrangeli
31	The RESIST project (RESilience management to Industrial Systems Threats): quantifying resilience in industrial plants exposed to cyber attacks Marco Bortolini, Giulio Di Gravio, Emilio Ferrari, Francesco Gabriele Galizia, Mauro Gamberi, Enrico Giannone, Giovanni Mazzuto, Riccardo Patriarca and Francesco Simone

IS07: Circularity of critical raw materials (CRMs) as means for resilience and sustainability

Chair: Assoc. Prof. Anna Aminoff and Katri Valkokari

Friday 19 September: 10:30 - 12:30

Room 4

Paper No Paper Title / Authors

16	From compliance-driven approaches to value-driven innovation - case urban e-micromobility Mona Arnold and Timo Kaivonen
27	Towards resilient material system modelling Seppo Lähdesmäki and Jyri Hanski
30	Circular business strategies for increasing the resilience of critical raw materials Anna Aminoff, Katri Valkokari and Helleke Heikkinen
40	Toward resilient circular economy amid volatility: conceptualizing a zero-leakage framework for critical raw materials Mohammad Ayati and Kenneth Ekman
44	Sustainability of e-micromobility Jaana Sorvari and Susanna Horn

IS08: The role of innovation in Sustainable and Circular Economy transformations

Chairs: Prof Minna Lammi, Dr Maria Holgado and Dr Katie L. Leggett

Wednesday 17 September: 13:35 - 15:35

Room 4

Paper No	Paper Title / Authors
14	#fluffycowarrior, #carbonpawprint, #savetheplanet: Bug-based dog food SMEs participate in online sustainability discourse using hashtags. Katie Leggett, Henna Syrjälä and William Davies
22	Driving the Green Transition: The Role of Public Procurement in Service Innovation Ruusa Ligthart, Minna Lammi and Jukka Ojasalo
23	Contextualizing Leadership in the Circular Economy: A Systematic Literature Review Andrea Di Vetta and Alessia Mevoli
24	The False Generational Driver to Sustainable Transformation within the Financial Sector Alessia Mevoli, Katie Louise Leggett and Andrea Di Vetta
25	BrewAI™: A Digital Solution for Enhancing Sustainability in Small and Medium-Sized Breweries Lewis Walsh, Tom Stacey and Franziska Sohns
38	Leveraging Active and Static Sustainability Data for Managerial Decisions Tuija Rantala, Laura Kojo, Ella Hatara and Mikko Heiskanen

SEB Paper Presentations

G01-A: General Track - Sustainable and Resilient Buildings

Chairs: John Littlewood and Francesco Fiorito

Wednesday 17 September: 10:45 - 12:45

Room 1

Paper No	Paper Title / Authors
4	Investigating the predictors of air conditioning use in residential buildings by comparing Single- and Multi-Domain GLMM approaches Arianna Latini, Elisa Di Giuseppe, Gabriele Bernardini, Andrea Gianangeli and Marco D'Orazio
5	Parametric Energy Analysis of Green roofs and Green Walls across European Climates with a Life-Cycle Cost Assessment in the Bolzano Case Study Marzieh Zarei, Riccardo Pinotti and Stefano Avesani
7	Customizing UBEM Archetypes with Smart Meter Data in Milan, Italy Martina Ferrando, Alessia Banfi and Francesco Causone
9	Bridging Theory and Practice in Battery Value Stacking Optimization: Lessons from a Real-World Case Study in Northern Norway. Silvia Anna Cordieri, Chiara Bordin, Sambeet Mishra and Julien Mosain
10	In-situ tests of thermal conductance on quartz-sandstone historical walls in Sicily Erica La Placa, Enrico Genova and Calogero Vinci
12	Life cycle environmental performance assessment of prefabricated buildings in the early design stage: A literature review Qiyin Qiao, Monica Lavagna and Gabriele Masera

G01-B: General Track - Sustainable and Resilient Buildings

Chairs: John Littlewood and Francesco Fiorito

Wednesday 17 September - 13:45 - 15:45

Room 1

Paper No	Paper Title / Authors
19	Digital Workflows for Sustainable Envelope Retrofits: A BIM-Based Approach Stefano Cascone, Vincenzo Sapienza and Rosa Caponetto
22	Window-Opening Behaviours in Irish Primary Schools: Insights from a Pilot Teacher Survey David Honan, John Littlewood, John Garvey and John Gallagher
23	Enhancing IAQ in Naturally Ventilated Irish Primary Schools: Research Design and Methodology David Honan, John Littlewood, John Garvey and John Gallagher
24	Urban Air Quality in a Changing Climate: A Critical Review of Emerging Challenges and Responses Hajar Morchid, Hicham Mastouri and Chouaib Ennawaoui
30	Review of indicators and methodologies for evaluating energy resilience in buildings under climate change Daniele Borraccino, Stefania Losito, Ludovica Maria Campagna, Francesco Carlucci and Francesco Fiorito
31	Cost assessment of waste reduction measures in the construction of two sports halls in Norway Lilo Henke and Selamawit Mamo Fufa

G01-C: General Track - Sustainable and Resilient Buildings

Chairs: John Littlewood and Francesco Fiorito

Thursday 18 September: 11:00 - 13:00

Room 1

Paper No	Paper Title / Authors
34	Empirical Analysis on the Barriers of Building Energy Modelling Usage in the Nigerian Construction Industry David Ebiloma, Omobolanle Olawale and Clinton Aigbavboa
35	Stranding Risk of the Italian Building Stock: A Case Study in Florence Gianluca Maracchini, Giacomo Sarti, Rocco di Filippo, Rossano Albatici, Rosa Di Maggio and Oreste Bursi
37	Integrating BIM and Environmental Analysis in the Early Design Phase in Evaluating Window-to-Wall Ratio Impacts on Energy Charles Nshimiyimana and Işıl Tekçe
40	Energy Performance of Buildings in the Context of Urban Densification: A Literature Review Oumaima Diani, Hicham Mastouri and Chouaib Ennawaoui
44	Waste and GHG emission benchmarks for Norwegian construction sites Selamawit Mamo Fufa and Lilo Henke
45	Evaluating Internet of Things Operational Performance Monitoring Systems for Landlord Managed Accommodation, in Wales UK John Littlewood, Matthew Thomas, Phil Grant, Shreya Macherla and Reuben Mifsud

G01-D: General Track - Sustainable and Resilient Buildings

Chairs: John Littlewood and Francesco Fiorito

Friday 19 September - 10:30 - 12:30

Room 1

Paper No	Paper Title / Authors
46	Retrofitting Earth to Air Heat Exchangers to existing dwellings for hybrid cooling and enhanced ventilation Trevor Butler and John Littlewood
48	Application of SRI advanced evaluation on Auto-DAN Case study Paolo Finocchi, Diego Rattazzi, Celina Solari, Clemente Fuggini and Fabrizio Tavaroli
51	Impact of design assumptions on HVAC system sizing using “right-sizing” strategies Riya Sivaguru, Claudia Eckert, Darren Jones and Khadija Tahera
59	Exploring the Acceptability of Compact Housing as a Sustainable Strategy to Enhance Housing Affordability in Saudi Arabia Yazan Al-Kofahi and Omar Asfour
66	Passive Infrared Thermography for Quality Assurance in Masonry Building Envelopes Rahma Hagi Adan, John Littlewood and Fausto Sanna

G02: General track - Sustainable Energy Technologies

Chair: Simon Walters

Wednesday 17 September: 13:45 - 15:45

Room 2

Paper No	Paper Title / Authors
11	New Measures for Daylight Quality and Classroom Design - Impacts on Visual Comfort and Performance in Hot Climates Ahmed Freewan
28	Database on Mine Tailings for Sustainable Building Practices in SE Asia Amitha Varghese, David Goodfield, Martin Anda, Biji Kurup and Shri Rai
32	Short-Term AC Power Forecasting for Floating Bifacial Photovoltaic Systems Using LSTM Networks Cristina Ventura, Giuseppe Marco Tina, Giovanni Bellitto, Concetto Spampinato, Sergio Ferlito and Girolamo Di Francia
38	A for Agri, B for Building: the photovoltaics integration alphabet Wilfried Van Sark
39	AI-Enhanced Voltage Control for Islanded DC Microgrids: A Comparative Study Abd Alelah Derbas, Chiara Bordin and Sambeet Mishra
62	Enhancing Lithium-Ion Battery Cooling Efficiency: A Dual Approach of Internal Electrode Optimization and External Hybrid Battery Thermal Management System Md Faizan and Obaidallah Munteshari
63	Local environmental heat source potentials for decentral heat pumps: A GIS-based analysis for cost of heat in Germany Sirin Alibas

GO3: General Track - Workshop on Innovation in Sustainable Agriculture and Food Production

Chair: Robert J. Howlett

Thursday 18 September: 11:00 - 13:00
Room 3

Paper No	Paper Title / Authors
17	Emerging research trends in nature-based solutions for food systems Elaheh Jalilzadehazhari
20	Investigating indoor vertical greening through an experimental prototype Fabiana Convertino, Giacomo Scarascia-Mugnozza and Giuliano Vox
52	Product environmental footprint applied to the food sector in Sicily: a case study of pasta production Maurizio Cellura, Marta Bonura, Sonia Longo and Francesco Guarino
53	An Integrated Multi-Scale Phenotyping Research Infrastructure: From plant imaging to metabolomics Andre Pierre Marie Fabbri, Sabrina Mazzoni, Valentina Lazazzara, Francesca Alderotti, Maddalena Grieco and Adriano Conte
57	Design and Implementation of an Integrated Microclimate Monitoring and Irrigation System for a Pilot Greenhouse in the REGACE Project Gianluigi Bovesecchi, Luca Rosati, Franceosco Biso, Marco Berardo Di Stefano, Fabio Cervone, Ibrahim Yehia and Cristina Cornaro

IS02: Advanced Assessment Methods, Tools and Design Solutions for users’ Well-Being in Buildings

Chair: Dr. Arianna Latini and Prof. Elisa Di Giuseppe

Friday 19 September: 13:30-15:30

Room 2

Paper No	Paper Title / Authors
27	Parametric Optimization of Façade Design and Thermal Setpoints for Carbon Reduction and Thermal Comfort in Residential Buildings in Türkiye Beyza Yazici and Yasemin Afacan
43	Definition and Virtual-Reality-based Performance Assessment of a Dynamic Emergency Wayfinding System Francesco Monni, Gabriele Bernardini, Luigi Chierico, Enrico Quagliarini, Ruggero Lovreglio and Marco D'Orazio

IS04-A: Building Retrofit: Transforming and Reusing Existing Buildings Toward Low Carbon Future

Chair: Prof. Hasim Altan and Dr. Bertug Ozarisoy

Friday 19 September: 10:30 - 12:30
Room 3

Paper No	Paper Title / Authors
2	Life Cycle Assessment of Post-Conflict Construction in Syria: Towards a Low-Carbon and Resource-Efficient Reconstruction Ola Alhaj Hasan and Samir Hamodah
8	EPCs for traditional listed dwellings: a UK perspective Michela Menconi, Noel Painting and Poorang Piroozfar
14	Bio-Based Insulation Systems for the Decarbonization of the Building Refurbishment Sector: A Case Study from the SUSMAT Project Dario Bottino Leone, Elena Poma and Dagmar Exner
15	Unlocking Retrofit: A Theory of Change Analysis of Housing Retrofit Grants in England Chamara Panakaduwa, Paul Coates and Dinusha Wilegoda
16	Combined deep energy retrofit and embodied carbon of residential detached building: an early-stage assessment in Mediterranean climate Luca Caruso
36	Overview of Domestic Hot Water heat pump systems and their optimization Michele Torrisi, Gianpiero Evola and Antonio Gagliano

IS04-B: Building Retrofit: Transforming and Reusing Existing Buildings Toward Low Carbon Futures

Chair: Prof. Hasim Altan and Dr. Bertug Ozarisoy

Friday 19 September: 13:30 - 15:30

Room 3

Paper No	Paper Title / Authors
41	Lessons Learned from Retrofitting a 10-Story Apartment Building into an Energy-Plus Structure - A Data-Driven Approach Simone Coccato, Eelke Bontekoe, Ioannis Lampropoulos and Wilfried Van Sark
54	Are Solar Green Roofs a Key to Carbon-Neutral Buildings in Mediterranean Climates? Mohanad Ibrahim, Micheal William, Ahmed Hanafy, Mona Moussa and María Jose Suarez-Lopez

IS05: Advancing Smart Building Energy Management: Practical AI and ML Solutions for Real-World Applications

Chair: Asst. Professor Marco Savino Piscitelli, Prof. Alfonso Capozzoli, Senior Researcher Cristian Pozza and Senior Researcher Daniele Antonucci

Friday 19 September: 13:30-15:30
Room 2

Paper No Paper Title / Authors

26	AI-Enhanced Sustainability Assessment of an Existing Educational Building through Integrated Simulation Kartal Turhan and Isilay Tekce
29	Comparing Ventilation System Topology and Control Strategies through Optimisation using Mixed-Integer Programming Julius Hp. Breuer and Peter F. Pelz
33	Experimental Assessment of Valves’ Fault Severities in an Air-Handling Unit: Energy, Environmental, and Economic Impacts Under Italian Conditions Antonio Rosato, Mohammad El Youssef, Rita Mercuri, Massimiliano Masullo, Michelangelo Scorpio, Marco Savino Piscitelli and Alfonso Capozzoli
42	Cost-sensitive bayesian networks for FDD in HVAC systems: a fault impact-driven approach Marco Paolini, Marco Savino Piscitelli, Antonio Rosato and Alfonso Capozzoli

*Online

IS07-A: Advancements in renewable energy systems, innovative technologies and nature-based solutions for the built environment

Chair: Prof. Aneli Stefano and Prof. Costanzo Vincenzo

Wednesday 17 September: 13:30 - 15:30

Room 3

Paper No	Paper Title / Authors
1	Experimental Validation and TRNSYS Modeling of a Modular Hydroponic Roof System for Thermal Performance Assessment Francesco Nocera, Vincenzo Costanzo, Gianpiero Evola, Maurizio Detommaso, Maurizio Cellura, Marina Mistretta and Sonia Longo
6	A Catalogue of Renewable Energy Community Archetypes Rosaria Volpe, Leandro Augusto Gomes, Arturo Pagano and Alberto Fichera
18	Enhancing sustainable latent thermal energy storage for renewable solar energy integration Alaa Nasir, Miroslav Cekon, Richard Slavik and Ondrej Sikula
21	Innovation on agrivoltaics plants: the LIFE AGRO-PV project Stefano Aneli, Giovanni Arcidiacono, Vincenzo Costanzo, Gianpiero Evola, Alberto Fichera, Antonio Gagliano, Francesco Nocera, Arturo Pagano, Giuseppe Marco Tina, Rosaria Volpe, Antonio Carlo Barbera and Riccardo Caponetto
49	ENERGY AND ENVIRONMENTAL IMPACTS OF HYDROPONIC GREEN ROOF SYSTEMS: A CASE STUDY Sonia Longo, Riccardo Tarantino, Maurizio Cellura, Francesco Guarino, Marina Mistretta and Francesco Nocera
58	Implementation of Energy Efficiency Measures for the Building Envelope and HVAC System in Historic Buildings – a Fuzzy Approach Diana D'Agostino, Federico Minelli, Francesco Minichiello and Claudia Pagano

IS07-B: Advancements in renewable energy systems, innovative technologies and nature-based solutions for the built environment

Chair: Prof. Aneli Stefano and Prof. Costanzo Vincenzo

Friday 19 September: 13:30 - 15:30
Room 3

Paper No	Paper Title / Authors
56	Fluid dynamic simulation of a building integrated photo-voltaic ventilated façade in Lugano Roberta Arena, Stefano Aneli, Pierluigi Bonomo, Giuseppe Tina and Antonio Gagliano
60	ECONOMIC AND SOCIAL IMPACTS OF HYDROPONIC GREEN ROOF SYSTEMS: A CASE STUDY Giacomo Falcone, Marina Mistretta, Sonia Longo and Francesco Nocera
68	Performance Analysis of Maisotsenko Cycle Evaporative Cooling for School Buildings in Different Italian Climates Gianmarco Sciurti, Michele Cossu and Alberto Muscio

IS08: Avoiding the heat: different approaches to investigate overheating in buildings

Chair: Dr Linda Toledo

Thursday 18 September: 11:00 - 13:00

Room 4

Paper No	Paper Title / Authors
25	Assessing Indoor Overheating in Residential Villas in Riyadh Using Dynamic Thermal Simulation Shatha Medabesh, Steven Firth and Sura Almaiyah
47	Evaluating Overheating in the Urban Microclimate: A Comparative Study of Air Temperature and Thermal Comfort Indexes for the Coastal City of Valparaíso Pamela Muñoz Ossandón and Massimo Palme
50	Bridging the Gap: Co-Designing Passive Cooling Futures with UK Households Barah Rababa, Stuart Cockbill and Ben Roberts
55	Mitigating current and future summertime overheating in UK apartments Kevin Lomas, Kostas Mourkos and Matthew Li
61	Avoiding the Heat: Different Approaches to Prevent Overheating in Buildings while Lowering Energy Demand Maryam Mohamed, Hanan Al-Khatri, Fatema Al-Akhzami, Hafsa Al-Balushi, Samiya Al-Ismaily, Zainab Al-Abri and Saleh Al-Saadi
64	The effect of occupant behaviour on overheating: results from controlled experiments in a synthetically-occupied test house Ben Roberts, David Allinson and Kevin Lomas
65	Evaluating Indoor Environmental Quality in Office Buildings in Hot Humid Climate Fatema Al-Akhzami, Hanan Al-Khatri and Saleh Al-Saadi

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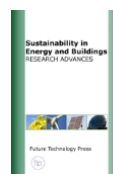
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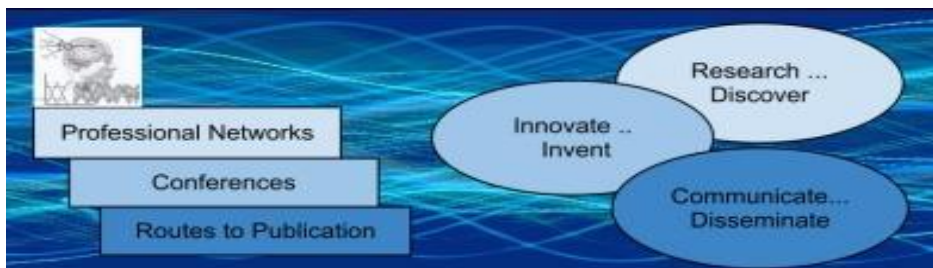
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