

## **Smart Sustainable Technologies**

**Sustainable Design and Manufacturing (SDM-23)**

**Sustainability in Energy and Buildings (SEB-23)**

# **Conference Programme**

**18-20 September 2023**  
**Bari, Italy**



# Contents

Chairs' Welcome .....	1
SDM-23.....	5
Organisation.....	5
International Programme Committee .....	6
SEB-23 .....	8
Organisation.....	8
International Programme Committee .....	9
Keynote Talks .....	11
Sustainable Manufacturing: past, present and future .....	11
Energy consumption for designing reliable and secure engineering systems.....	13
Fighting the Regional Climate Change- Development of Advanced Heat Mitigation Technologies .....	14
Managing a crisis: Extending a building's life and reducing negative environmental impact.....	16
Timetable – Monday 18 September .....	18
Timetable – Tuesday 19 September .....	21
Timetable – Wednesday 20 September .....	23
SDM Paper Presentations .....	24
SDM-01: IS04: Sustainability-oriented Industrial Technologies in the domain of Industry 4.0 & G02 Sustainable Manufacturing Processes and Technology.....	24
SDM-02: General Tracks GO1, GO3 and GO4 .....	25
SDM-03: IS04: Sustainability-oriented Industrial Technologies in the domain of Industry 4.0 & IS02: Managing the transition from Industry 4.0 to 5.0: opportunities and trends.....	26
SDM-04: IS03: Possibilities, Hopes, Barriers and Practices in Circular Economy transformations .....	27
SDM-05: IS01: Transforming Industries .....	28
SDM-06: IS05: Additive Manufacturing and Sustainability.....	29

SEB Paper Presentations.....	30
SEB-1: G01-A: Sustainable & Resilient Buildings .....	30
SEB-2: G02 - A: Sustainable Energy Technologies .....	31
SEB-3: G01-B: Sustainable & Resilient Buildings .....	32
SEB-4: G02 - B: Sustainable Energy Technologies .....	33
SEB-5: G01-C: Sustainable & Resilient Buildings.....	34
SEB-6: G01-D: Sustainable & Resilient Buildings .....	35
SEB-7: IS10 - A: Climate-resilient neighbourhoods: analysis and design .....	36
SEB-8: G01-E: Sustainable & Resilient Buildings.....	37
SEB-9: IS10 - B: Climate-resilient neighbourhoods: analysis and design .....	38
SEB-10: G01-F: Sustainable & Resilient Buildings.....	39
SEB-11: IS02: Advanced Assessment Methods, Tools and Design Solutions for users' Well-Being in Buildings.....	40
SEB-12: IS08: BIM, BEM and Digital twin implementations in Sustainable and Smart urban context.....	41
SEB-13: IS07: Resilient solutions for energy retrofitting of historic buildings and districts in Mediterranean climate & IS04: Innovative use of solar resources for the enhancement of the Building energy self- sufficiency.....	42
SEB-14: G01-G: Sustainable & Resilient Buildings .....	43

## Chairs' Welcome

### 10<sup>th</sup> International Conference on Sustainable Design and Manufacturing SDM-23

On behalf of the organizers of SDM-23 and the esteemed KES community, it is our distinct privilege to extend a heartfelt welcome to you all for the 10th International Conference on Sustainable Design and Manufacturing (SDM-23). This prestigious event will take place in Bari, Italy, from September 18th to 20th, 2023, and it will also be accessible online via the well-established KES Online platform, offered by KES International.

Throughout the past decade, 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-23 is exceptionally comprehensive, featuring a line-up of keynote presentations, 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 the distinguished Professor Mark Jolly from Cranfield University, UK, as our keynote speaker, professor and director of manufacturing and materials. He has over 40 years' experience in manufacturing. His talk entitled 'Sustainable Manufacturing: past, present and future' will be a highlight of SDM-23, and we deeply appreciate his scientific contribution and his willingness to share his profound 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-23.

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.

***Dr. Steffen G. Scholz, Karlsruhe Institute of Technology KIT, Germany***

***Prof. Robert Howlett, KES International, UK & 'Aurel Vlaicu' University of Arad, Romania***

***Prof. Rossi Setchi, Cardiff University, UK***  
***SDM-23 Conference Chairs***

## 15<sup>th</sup> International Conference on Sustainability in Energy and Buildings SEB-23

The 15th International Conference on Sustainability and Energy in Buildings 2023 (SEB23) is a significant international conference organised by a partnership made up of KES International, The Sustainable and Resilient Built Environment research group, Cardiff Metropolitan University, and the Polytechnic University of Bari, Italy.

SEB-23 invited contributions on a range of topics related to sustainable and resilient buildings and renewable energy and explored innovative themes regarding building adaptation responding to climate change mitigation and other local, national and global challenges.

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 but also 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 and practical developments on the subject with real world impact.

SEB23 will be held in a hybrid form with mainly physical and also virtual attendance, in response to agile work patterns following the global Covid-19 pandemic.

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

- Sustainable & Resilient Buildings
- Sustainable Energy Technologies

In addition, there were ten Invited Sessions proposed and organised by prominent researchers.

It is important that a conference provides high quality talks from leading-edge presenters. SEB-23 featured two keynote speakers: Professor M. Santamouris of the University of New South Wales, Australia; and Dr Geraldine Seguela, of NEOM, Royal Kingdom of Saudi Arabia.

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 conference, only the best of these papers were 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. Submissions for the Short Paper Track were subjected to a 'lighter-touch' review and published in an online medium, but not in the volume of the Springer book.

Thanks are due to the very many people who have given their time and goodwill freely to make SEB-23 a success. We would like to thank the Polytechnic University of Bari, Italy for hosting the conference, providing two local conference chairs, both of whom also co-chaired one of the general tracks with the conference general chair. 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 SEB23 conference an interesting, informative, and useful experience; and remain connected through the KES International Virtual Conference Experience.

***Dr John Littlewood, Cardiff Metropolitan University, Wales, UK***

***Prof Robert J. Howlett, KES International, UK & 'Aurel Vlaicu' University of Arad, Romania***

***Prof Francesco Fiorito, Polytechnic University of Bari, Italy***

***Prof Fabio Fatiguso, Polytechnic University of Bari, Italy***

***Associate Prof Alfonso Capozzoli, Politecnico di Torino, Italy***

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

***SEB-23 Conference Chairs***



## SDM-23

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#### *Executive Chair:*

**Jonathan Flearmoy**, KES International, UK

#### *General Chair:*

**Steffen G Scholz**, Karlsruhe Institute of Technology KIT, Germany

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**Ahmed Elkaseer**, Karlsruhe Institute of Technology, Germany

**Joanna Ejdys**, Bialystok University of Technology, Poland

**Michele Dassisti**, Polytechnical University of Bari, Italy

**Steffen G. Scholz**, Karlsruhe Institute of Technology, Germany

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<b>Dr. Paul Witherell</b>	NIST, USA
<b>Prof. Yuchun Xu</b>	Aston University, UK
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## SEB-23

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<b>Prof. Larisa IVAȘCU</b>	University of Timisoara, Romania
<b>Prof. Hong Jin</b>	Harbin Institute of Technology, China

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<b>Mrs Olga Palusci</b>	Università del Salento, Italy
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<b>Prof. Joao Ramos</b>	University of Coimbra, Portugal
<b>Prof. Fernanda Rodrigues</b>	University of Aveiro, Portugal
<b>Prof. Federica Rosso</b>	Sapienza University of Rome, Italy
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<b>Prof. Lloyd Scott</b>	Griffith College, Ireland
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<b>Prof. Ahmed Tahour</b>	School of Applied Sciences Tlemcen, Algeria
<b>Prof. Ali Tahri</b>	University of Science and Technology Mohamed Boudiaf, Algeria
<b>Prof. Horia-Nicolai Teodorescu</b>	Technical University of Iasi, Romania
<b>Prof. Wilfried van Sark</b>	Utrecht University, Netherlands
<b>Assoc. Prof. Romeu Vicente</b>	University of Aveiro, Portugal
<b>Dr. Simon Walters</b>	University of Brighton, UK

## Keynote Talks

Prof. Mark Jolly  
Cranfield University, UK

### Sustainable Manufacturing: past, present and future

**Abstract:** It can be argued that manufacturing has been the major reason for global warming and creating the climate challenges we now see. From Abraham Darby's invention of the cast iron cooking pot in 1707 stimulating his requirement to make more and cheaper iron, and thus his invention of the coke fired blast furnace, to the current moved toward EV batteries based on Li technologies, create a need for producing more and more materials with a concomitant increase in levels of CO<sub>2</sub> from the extraction, conversion and manufacturing stages. So, have we learned the lessons of the past as we go helter-skelter into a renewable electrified future? And what does the future look like if we make different decisions now? I will attempt to show what decisions we have to get right now if we want to achieve the net zero challenges laid down by our governments.



**Biography:** Mark is Professor and Director of Manufacturing and Materials. He has over 40 years' experience in manufacturing. He spent 13 years working in industry in automotive and tier 1&2 suppliers into manufacturing both in the UK and abroad before moving into academia in 1995. In 2012 he joined Cranfield after 17 years at the University of Birmingham. He has managed over £17.5 M of research projects since 1999 and has over 350 publications, technical reports, articles and books. He is Director of the recently announced UKRI Transforming the Foundation Industries Research and Innovation Hub (TransFIRE), co-Director of the Circular Economy Network plus in Transport Systems (CENTS), and co-Director of the Engineering and Physical sciences Research Council (EPSRC) Centre for Doctoral Training in Sustainable Materials and Manufacturing which offers a triple degree with the Universities of Warwick and Exeter. Mark has sat on the EPSRC Peer Review College since 2003 and sits on the council of the Cast Metals Federation, is a reviewer for the European Space Agency (ESA) and Enterprise Ireland. He is a Chartered Engineer and Chartered Environmentalist and sits on the Society for the Environment Honorary Fellows Panel. He is a Fellow of the Institute of Materials, Minerals and Mining (IOM3), and is the chair of the Materials Processing and Manufacturing leadership group. He also sits on the IOM3 Sustainable Development, Light Metals Groups. He is a Fellow of the Institute of Cast Metals Engineers (ICME). Mark was Chair of the Solidification Committee of The Minerals, Metals and Materials Society (TMS,

USA) for two years until 2018. He is a Liveryman of the Worshipful Company of Founders and Freeman of the City of London.

Mark was the recipient of the 2019 John Campbell Gold Medal awarded by ICME for “continual advancement in sustainable manufacturing and promotion of excellence in casting technologies”. He was the 2010 Winner of the University of Birmingham Josiah Mason Founder’s Award for Business Advancement and in 2008 was the recipient of the Oliver Stubbs Medal (ICME).

His main areas of current research are in circular economy and sustainability including resource efficient manufacturing, process modelling and novel casting processes. He has worked with many well-known names across a number of sectors including Rolls-Royce, Depuy-Synthes (Johnson & Johnson), Bentley, Aston Martin, BAES, Finmeccanica, GKN, EnCirc360, Kimberly-Clark Corporation, Hanson Cement, Constellium, Siemens, Vesuvius, St Gobain, Luxfer, Lucideon, Pilkington Glass, Trent Refractories, and Coca-Cola. He has also championed working with many small companies especially SMEs who supply to large companies.



Dr. Zhaojun Steven Li  
Western New England University, Springfield, MA, USA

### Energy consumption for designing reliable and secure engineering systems

**Abstract:** Reliability redundancy strategies such as hot and warm standby reliability redundancy and fault tolerant design are well-known engineering design techniques. However, the implications of energy consumption and the sustainability aspect of achieving higher reliability and security has not been well investigated and understood. This talk will present a literature survey about the existing measurement and methods on energy consumption of reliability redundancy and fault tolerant design principles as well as the implications of adopting such design principle in major industry sectors and applications.



**Biography:** Dr. Zhaojun Steven Li, Associate Professor with the Department of Industrial Engineering at Western New England University in Springfield, MA, USA. Dr. Li's research interests include data analytics, applied statistics, operations research, and reliability engineering. He received his Ph.D. in Industrial Engineering from the University of Washington. He is an ASQ Certified Reliability Engineer and Caterpillar Six Sigma Black Belt.

He is serving on editorial boards for IEEE Transactions on Reliability and IEEE Access Reliability Society Section. He is a senior member of IISE and IEEE. He has served as board member of IISE Quality Control and Reliability Engineering (QCRE) Division and IEEE Reliability Society. Since 2022, Dr. Li has been serving as the President of IEEE Reliability Society.

Prof. Mat Santamouris  
University New South Wales, Australia

## Fighting the Regional Climate Change- Development of Advanced Heat Mitigation Technologies

**Abstract:** Overheating of the Built Environment is the most documented phenomenon of climate change impacting the human life in many ways. This lecture will present the most recent developments on the magnitude and the characteristics of the urban overheating and the potential synergies with the global climatic change. It will analyse the latest qualitative and quantitative data on the impact of higher urban temperatures on the building's energy supply and demand, heat related mortality, morbidity and wellbeing, human productivity, survivability of low-income population and environmental quality of cities. It will present and describe the state of the art on the development of innovative mitigation materials, advanced urban greenery, heat dissipation and evaporative techniques, as the main mitigation and adaptation technologies to offset the impact of urban overheating. It will analyse and present the current knowledge on the impact of each mitigation technology on energy, health, environmental quality, urban economy and survivability. Finally, it will present the main future challenges related to urban overheating and proposes a specific research agenda to alleviate and counterbalance its impact on human life.



**Biography:** M. Santamouris is a Scientia, Distinguished, Professor of High Performance Architecture at UNSW, and past Professor in the University of Athens, Greece. Visiting Professor : Cyprus Institute, Metropolitan University London, Tokyo Polytechnic University, Bolzano University, Brunel University, Seoul University National University of Singapore, and UITM Univ Malaysia. Past President of the National Center of Renewable and Energy Savings of Greece. Editor in Chief of the Energy and Buildings Journal, Past Editor in Chief of

the Advances Building Energy Research, Associate Editor of the Solar Energy Journal, E- Prime, Journal of Low Carbon and Sustainable Energy, and Member of the Editorial Board of 24 Journals. Editor of the Series of Book on Buildings, published by Earthscan Science Publishers. Editor and author of 20 international books published by Elsevier, Earthscan, Springer, etc. Author of 412 scientific articles published in journals. Reviewer of research projects in 29 countries including USA, UK, France, Germany, Canada, Sweden, etc. Ranked as the top world cited researcher in the field of Building and Construction by the Stanford University ranking system, for 2019-2022. Highly Cited Researcher in the Clarivate ranking for 4 continuous years. Ranked as no 538

researcher in the world in all scientific disciplines in the list prepared by Stanford University in 2021.

Prof. Chris Gorse  
Loughborough University, UK

## Managing a crisis: Extending a building's life and reducing negative environmental impact

**Abstract:** We now live in a period of catastrophic climate change, change that is having the most devastating impact on the natural resources on which we rely. As we become acutely aware of the anthropogenic disasters occurring around, pressure is upon us all to reduce the negative environmental impact and slowing down the change. The challenge of transforming the way we interact with our built environment to reduce negative impact must be accelerated. Over the years much has been written regarding how to make the built environment more sustainable, reducing impact on biodiversity, environment and people. However, there are few meaningful studies that have properly mapped out how this can be achieved. Moreover, in recent years, it has become clear that new build continues to increase as does the negative impact of the built environment on the natural environment. In this keynote presentation, the negative impact of the construction industry is explored together with the materials it demands and the consequences of continually extracting resources from limited supplies. Recent studies have shown that in many cases extending the life of buildings can reduce both operational and embedded carbon. Picking up on the dilemma of crumbling buildings and using the recent cases of failing Reinforced Autoclaved Aerated Concrete (RAAC) buildings, we will explore how, even when faced with such challenges, the life of buildings can be extended and impact reduced. Such challenges need to be met head on, if we are to delay the impact of the built environment and create safe, comfortable spaces for people to live and work.



**Biography:** Chris is Professor of Construction Engineering and Management at Loughborough University with considerable experience in building and civil engineering. Over the years, Chris has been recognised for his expertise in managing industry problems that are technically complex and require practical solutions. He has undertaken research, engaged in consultancy and written extensively in the areas of energy, sustainability,

infrastructure, technology and refurbishment. The nature of projects that Chris has been involved with is particularly broad. To provide some context to this, recent projects cut across topics such as modelling the performance of renewable energy systems, improving response time of safety systems in nuclear reactors, evaluating building energy performance to the testing and assessing of buildings made from RAAC concrete. Chris's multidisciplinary background has established him as a leading authority on building quality, systems, standardisation, performance and how this impacts on sustainability.

Chris also holds Visiting Professor positions at the University of Suffolk and Central University of Technology in South Africa, engaging internationally on sustainability and lean construction. Chris is the founding Chair of the International Conference for Sustainable Ecological Engineering Design for Society (SEEDS) and past Chair of the Association of Researchers in Construction Management (ARCOM). He recently served on the 2021-2022 (UKRI) Research Excellence Framework 2021 exercise for Sub-Panel 13 Architecture, Built Environment and Planning. He has contributed and led a number of projects for the Department for Business, Energy & Industrial Strategy, Department for Energy Security and Net Zero, Office for Product Safety and Standards and other UK Government offices. Such experience has given Chris good oversight of the quality, excellence and depth of construction, building and infrastructure in the UK and overseas.

Chris also has a keen interest in digital technologies and their impact on key assets in the built environment and systems control. He has worked on and directed major UK and international research projects exploring the potential of smart digital monitoring and management tools, evaluating the use of smart meters and their role for in-use measurement of building system performance, he has also contributed to systems engineering projects - integrating smart asset management tools at scale, including application to health care environments. Chris is also the Co-author of the CIOB Guide to Sustainability in the Built Environment - due for imminent release.

## Timetable – Monday 18 September

	Plenary Room / Room 1	Room 2	Room 3	Room 4
09:00 - 09:15 CEST	<p>Opening Ceremony</p> <p>Prof. Robert J Howlett, KES International, UK &amp; 'Aurel Vlaicu' University of Arad, Romania            Prof. John Littlewood, Cardiff Metropolitan University, UK            Dr. Steffen G Scholz, Karlsruhe Institute of Technology KIT, Germany</p>			
09:15 - 10:15 CEST	<p>Keynote Speaker 1</p> <p>Prof. Mark Jolly            Cranfield University, UK</p> <p>Talk Title: Sustainable Manufacturing: past, present and future</p>			
10:15 - 10:45 CEST	Networking Break			

	Plenary Room / Room 1	Room 2	Room 3	Room 4
10:45 - 12:45 CEST	SEB-1 G01-A: Sustainable & Resilient Buildings Prof. John Littlewood	SEB-2 G02 - A: Sustainable Energy Technologies Prof. R J. Howlett / S.D.Walters	SDM-1 IS04: Sustainability- oriented Industrial Technologies in the domain of Industry 4.0 & G02 Sustainable Manufacturing Processes and Technology Dr. Ahmed Elkaseer	SDM-06 IS05: Additive Manufacturing and Sustainability Prof. Rossi Setchi
12:45 - 13:45 CEST	Lunch			
13:45 - 14:45 CEST	<p>Keynote Speaker 2 Dr. Zhaojun Steven Li Western New England University, Springfield, MA, USA Talk Title: Energy consumption for designing reliable and secure engineering systems</p>			
14:45 - 15:15 CEST	Networking Break			

	Plenary Room / Room 1	Room 2	Room 3	Room 4
15:15 - 17:15 CEST	SEB-3 G01-B: Sustainable & Resilient Buildings Prof. Francesco Fiorito	SEB-7 IS10 - A: Climate- resilient neighbourhoods: analysis and design Prof Michele Morganti	SEB11 IS02: Advanced Assessment Methods, Tools and Design Solutions for users' Well-Being in Buildings Prof. Elisa Di Giuseppe	SDM-5 IS01: Transforming Industries Prof. Rossi Setchi



**Timetable – Tuesday 19 September**

	Plenary Room / Room 1	Room 2	Room 3	Room 4
09:30 - 10:30 CEST	<p>Keynote Speaker 3            Prof. Mat Santamouris            University New South Wales, Australia            Talk Title: Sustainable Manufacturing: past, present and future</p>			
10:30 - 11:00 CEST	Networking Break			
11:00 - 13:00 CEST	SEB-5 G01-C: Sustainable & Resilient Buildings Prof. John Littlewood	SDM-2 General Tracks GO1, GO3 and GO4 Michael Packianather, Joanna Ejdys & Michele Dassisti	SEB-4 G02-B: Sustainable Energy Technologies Prof. R J. Howlett / S.D.Walters	SDM- 4 IS03: Possibilities, Hopes, Barriers and Practices in Circular Economy transformations Dr Katie Leggett
13:00 - 14:00 CEST	Lunch Break			

	Plenary Room / Room 1	Room 2	Room 3	Room 4
14:00 - 15:00 CEST	<p>Keynote Speaker 4            Prof. Chris Gorse            Loughborough University, UK            Talk Title: Managing a crisis: Extending a building's life and reducing negative environmental impact</p>			
15:00 - 17:00 CEST	<p>SDM-3            IS04: Sustainability-oriented Industrial Technologies in the domain of Industry 4.0 &amp; IS02: Managing the transition from Industry 4.0 to 5.0: opportunities and trends            Prof. Steffen G. Scholz &amp; Prof. Marco Bortolini</p>	<p>SEB -6            G01-D: Sustainable &amp; Resilient Buildings            Prof. Francesco Fiorito</p>	<p>SEB-8            G01-E: Sustainable &amp; Resilient Buildings            Prof. John Littlewood</p>	<p>SEB-9            IS10-B: Climate-resilient neighbourhoods: analysis and design            Prof Michele Morganti</p>
19:00 CEST	Gala Dinner			

## Timetable – Wednesday 20 September

	Plenary Room / Room 1	Room 2	Room 3	Room 4
10:00 - 10:30 CEST	Networking Break			
10:30 - 12:30 CEST	SEB- 10 G01-F: Sustainable & Resilient Buildings Prof. Fabio Fatiguso	SEB- 12 IS08: BIM, BEM and Digital twin implementations in Sustainable and Smart urban context Dr. Laura Pompei	SEB-13 IS07: Resilient solutions for energy retrofiting of historic buildings and districts in Mediterranean climate & IS04: Innovative use of solar resources for the enhancement of the Building energy self- sufficiency Dr. Elena Cantatore & Prof. Antonio Gagliano	
12:30 - 12:45 CEST	Closing Ceremony			
12:45 - 13:45 CEST	Lunch Break			

## SDM Paper Presentations

Room 3 - 18th September 10:45-12:45

### SDM-01: IS04: Sustainability-oriented Industrial Technologies in the domain of Industry 4.0 & G02 Sustainable Manufacturing Processes and Technology

Chair: Dr. Ahmed Elkaseer

PROSE Paper No	Paper Title / Authors
<b>sdm23-038</b>	Intelligent Collaborative Robots Augmented with Vision Perception for Flexible Manufacturing System Mr. Mahmoud Salem, Dr. Ahmed Elkaseer, Dr. Steffen Scholz, Dr.-ing. Tobias Mueller
<b>sdm23-033</b>	Digital Twins as a Catalyst for Sustainability and Resilience in Manufacturing Systems: A Review from the Supply Chain perspective Ms Yujia Luo Prof. Ball Peter
<b>sdm23-011</b>	Automated 2D-3D-Mapping and Assessment of Defects Obtained from 2D Image Detection on a 3D Model for Efficient Repair of Industrial Turbine Blades M.Sc. Robert Joost B.Sc. Lukas Engeländer, Dr. Kai Lindow, M.Eng. Stephan Mönchinger
<b>sdm23-035</b>	Reliable communication on advanced materials - the impact of science communication on society Dr Katja Nau, Dr Dana Kuehnel*
<b>sdm23-017</b>	Multimodal Data Analysis for Superposition Defect Classification: Case Study of Semiconductor Defect Patterns Student Takumi Maeda Assistant Professor Sumika Arima, Student Hiroki Ito, Student Sota Kimpara, Student Daisuke Takada*
<b>sdm23-024</b>	Finding a greener, cost-effective and colour-based partial or complete replacement to White Portland Cement for cast stone production using TOPSIS Mr Devanshu Mudgal Dr Emanuele Pagone, Konstantinos Professor Salonitis*

\*Online session

Room 2 19 September 11:00 - 13:00

## SDM-02: General Tracks GO1, GO3 and GO4

Chairs: Michael Packianather, Joanna Ejdys & Michele Dassisti

PROSE Paper No	Paper Title / Authors
<b>sdm23-001</b>	A simple method for implementation of a solar oven for lumber drying Phd. Pedro Escudero-Villa Msc. Jessica Nuñez, Ing. Alfredo Pachacama, Msc. Liliana Topón
<b>sdm23-019</b>	The Production Capacities of Cannabis sativa and Its Growth Possibilities Arch Maria Chiara Capasso Eng Rose Mankaa, Arch Donatella Radogna, Eng Marzia Traverso*
<b>sdm23-002</b>	Supporting the transformation of sustainable business models and ecosystems progress and opportunities Ms Cadence Hsien Prof Steve Evans
<b>sdm23-006</b>	Managing circular electric vehicle battery lifecycles using standards Dr Raul Carlsson Dr Tatiana Nevzorova
<b>sdm23-013</b>	The Environmental Impacts of Cultured Meat Production: A Systematic Literature Review Dr Luisa Huaccho Huatuco Dr Alison Dyke, Dr Jonathan Green, Ms Katie Noble
<b>sdm23-005</b>	Digitalization strategy for sustainable transport in the construction sector Dr Raul Carlsson Dr Tatiana Nevzorova

\*Online session

Room 1 19 September 15:00 - 17:00

**SDM-03: IS04: Sustainability-oriented Industrial Technologies in the domain of Industry 4.0 & IS02: Managing the transition from Industry 4.0 to 5.0: opportunities and trends**

Chairs: Prof. Steffen G. Scholz & Prof. Marco Bortolini

<b>PROSE Paper No</b>	<b>Paper Title / Authors</b>
<b>sdm23-034</b>	Experimental investigation and parametric optimization of taper angle in 3D inkjet printing without support material / Ms. Karin Chen, Dr. Ahmed Elkaseer, Dr. Steffen Scholz Ms. Karin Chen Dr. Ahmed Elkaseer, Dr. Steffen Scholz
<b>sdm23-018</b>	Additive manufacturing of pressure resistant vessels for underwater environmental monitoring ? Investigation of printing parameters in fused filament fabrication Dr.-ing. Tobias Mueller Ms Laura L'hermitte, Dr. Steffen Scholz
<b>sdm23-029</b>	A heuristic approach to design a crowd-based last-mile delivery network Professor Marco Bortolini Dr. Francesca Calabrese, Professor Emilio Ferrari, Dr. Francesco Gabriele Galizia, Ms. Ludovica Diletta Naldi
<b>sdm23-030</b>	A data-driven approach to predict supply chain risk due to suppliers? partial shipments Mr Matteo Gabellini Mrs Francesca Calabrese, Mr Lorenzo Civolani, Mrs Cristina Mora, Mr Alberto Regattieri
<b>sdm23-031</b>	Energy Network Optimization Model for supporting Generation Expansion Planning and Grid Design Mr Matteo Gabellini Mr Marco Bortolini, Mr Cristian Cafarella, Mr Francesco Gabriele Galizia, Mrs Valentina Ventura
<b>sdm23-032</b>	A clustering-based algorithm for product platform design in the mass customization era Professor Marco Bortolini Mr. Cristian Cafarella, Dr. Francesco Gabriele Galizia, Professor Mauro Gamberi, Miss Ludovica Diletta Naldi

Room 4 19 September 11:00 - 13:00

### SDM-04: IS03: Possibilities, Hopes, Barriers and Practices in Circular Economy transformations

Chair: Dr Katie Leggett

PROSE Paper No	Paper Title / Authors
<b>sdm23-003</b>	Sustainability assessment in product design - Perspectives from Finnish manufacturing companies Mr Jyri Hanski Mr Jukka Hemilä, Ms Tuija Rantala, Mr Teuvo Uusitalo
<b>sdm23-004</b>	Measuring sustainability in wood fibre-based production chain Mrs Tuija Rantala Miss Annette Korin, Dr. Nina Wessberg
<b>sdm23-014</b>	Exploring crowdfunding and the circular economy via practical and theoretical linkages Dr Davies William
<b>sdm23-016</b>	<b>The Gamification of Circular Practices using the SDGs</b> <b>Miss Alessia Mevoli Dr. William Davies, Dr. Katie Leggett*</b>
<b>sdm23-022</b>	The most appealing steps towards decarbonisation for SMEs in the UK Miss Elisha Rasif Professor Chris Ivory, Dr. Katie Louise Leggett
<b>sdm23-027</b>	Rethinking Consumer Acceptance of Circular Services and Circular-PSS Dr Minna Lammi Dr Maria Antikainen, Dr Maria Holgado
<b>sdm23-037</b>	Circular economy business solutions at Sandvik Dr Maria Antikainen

\*Online session

Room 4 - 18th September 15:15 - 17:15

**SDM-05: IS01: Transforming Industries**

Chair: Prof. Rossi Setchi

<b>PROSE Paper No</b>	<b>Paper Title / Authors</b>
<b>sdm23-010</b>	A Comprehensive Analysis of Fuel Mix and Waste Heat Recovery in the UK's Foundation Industries Dr Natanael Bolson Professor Jonathan Cullen
<b>sdm23-026</b>	Examining “the jungle” of metrics available to improve sustainability performance of energy intensive industries Mr Juan Ramon Candia Jorquera Prof Peter Ball
<b>sdm23-036</b>	Transforming E-Waste into Value: A Circular Economy Approach to PCB Recycling Dr Masoud Ahmadinia Dr Tony Baker, Mr Julian Cox, Prof. Sam Evans, Mr Steve Gregory, Prof. Rossi Setchi



Room 4 - 18th September 10:45-12:45

### SDM-06: IS05: Additive Manufacturing and Sustainability

Chair: Prof. Rossi Setchi

PROSE Paper No	Paper Title / Authors
<b>sdm23-023</b>	Fabrication of Porous Soft Magnets via Laser Powder Bed Fusion In-situ Alloying Mr Mumin Biyiklioglu Dr. Philip Anderson, Dr. Carolina Guerra, Dr. Michael Ryan, Prof. Dr. Rossi Setchi
<b>sdm23-025</b>	Influence of laser speed and power on the magnetic properties of Fe-50 wt%Ni alloy manufactured by LPBF Dr. Carolina Guerra Dr. Philip Anderson, Ph.d (c) Mumin Biyiklioglu, Ph.d (c) Iván La Fé- Perdomo, Professor Jorge Ramos-grez, Professor Rossi Setchi
<b>sdm23-015</b>	Finite element analysis of the mechanical properties of laser powder bed fusion-produced Ti6Al4V sheet- and skeleton-gyroid structures Ph.d. Student Zhichao Luo Ph.d Qixiang Feng, Ph.d Shuai Ma, Prof. Rossitza Setchi, Ph.d Jun Song, Prof. Qian Tang*
<b>sdm23-028</b>	Microstructure and mechanical properties of IN738C superalloy fabricated by laser powder bed fusion Master Han Zhang Professor Quanquan Han, Master Zhongyi Liu, Master Zhongyang Sui, Doctor Liqiao Wang, Doctor Zhenhua Zhang*

\*Online session

## SEB Paper Presentations

Room 1 18th September - 10:45 - 12:45

### SEB-1: G01-A: Sustainable & Resilient Buildings

Chair: Prof. John Littlewood

<b>PROSE Paper No</b>	<b>Paper Title / Authors</b>
<b>seb23f-004</b>	Environment Performance Criteria as Means for Green Public Procurement Associate Prof. Dr. Qi Han Msc Sytske Blaauwbroek, Msc Pei-hsuan Lee
<b>seb23f-005</b>	A Conceptual Framework for a Sustainable Building Rating System Ms. Pei-hsuan Lee Prof. Bauke De Vries, Dr. Qi Han
<b>seb23f-012</b>	Assessment of the current state of building data collection tools from a characterization, data fields and functionalities, BIM, and LCA perspective. Mr Markel Rueda-esteban Mr Markel Arbulu, Dr Rufijo J. Hernández Minguillón, Dr Xabat Oregi
<b>seb23f-013</b>	Digital twin for the energy transition in built environment: keyword co-occurrence analysis Msc Hua Du Prof. De Vries Bauke, Dr. Qi Han
<b>seb23f-015</b>	Optimization of residential buildings' electricity management system considering economic and environmental benefits in the hourly dynamic energy price market: A case study in the Netherlands Dr. Dujian Yang Msc Bei Wang
<b>seb23f-018</b>	Measuring Cradle-To-Gate Embodied-Carbon Life Cycle Assessment of a conventional three-story residential building: A Case Study Phd Student Samir Idrissi Kaitouni Professor Lahcen Balli, Phd Student Meriem Benelhachmi, Phd student Er-ratbi Houda, Phd student Mghazli Mohamed Oualid, Phd student Es-sakali Niima

Room 2 18th September - 10:45 - 12:45

## SEB-2: G02 - A: Sustainable Energy Technologies

Chairs: Prof. R J. Howlett/S.D.Walters

PROSE Paper No	Paper Title / Authors
<b>seb23f-003</b>	Vacuum Insulation Panels for Domestic New Builds and Refurbishment in Scotland Ms Nicolle Mitchell Dr Seyed Masoud Sajjadian*
<b>seb23f-007</b>	A Technical Review on Blue and Blue-Green Roofs Mr Ryan Smith Mr Seyed Masoud Sajjadian*
<b>seb23f-011</b>	A Review on Blue Roofs in new UK Constructions Ms Jade Jack Dr Seyed Masoud Sajjadian*
<b>seb23f-046</b>	A comparison of different rear irradiation modeling methods in a bifacial PV system Phd Rania Benbba Pr Jordi Badosa, Pr Philippe Drobinski, Pr Hicham Mastouri, Pr Abdelkader Outzourhit, Pr Hassan Radoine*

\*Online session

Room 1 18th September - 15:15 - 17:15

### SEB-3: G01-B: Sustainable & Resilient Buildings

Chair: Prof. Francesco Fiorito

PROSE Paper No	Paper Title / Authors
<b>seb23f-019</b>	Enhancing Fault Detection and Diagnosis in AHU using Explainable AI Mr. Prasad Devkar Dr. Venkatarathnam G.
<b>seb23f-020</b>	The effects of a green façade on the indoor thermal conditions of a lightweight building. An experimental and numerical investigation Phd Vincenzo Costanzo Phd Maurizio Detommaso, Phd Alessandro Lo Faro, Prof Grazia Lombardo, Prof Prof. Nocera, Prof Gaetano Sciuto
<b>seb23f-023</b>	Multi-Criteria Decision-Making for Thermal Insulation of an Existing Office Building Considering Environmental, Energy and Economic Performance M.Sc. Federico Minelli Ph.D. Diana D'agostino, M.Sc. Marianna D'Auria, Professor Ph.D. Francesco Minichiello
<b>seb23f-025</b>	The impact of Malta's cultural specificities as a Small Island State on Regenerative Sustainability principles in the built environment Dr Wendy Jo Mifsud Mr Luca Caruso
<b>seb23f-027</b>	The impact of bio-sourced materials on the building's energy performance in a semi-arid climate Student Researcher Yamna Soussi Research Director Mohamed El Mankibi, Researcher Houda Er-retby, Research And Educati Hicham Mastouri, Full Professor Abdelkader Outzourhit, Full Professor/Direc Hassan Radoine

Room 3 19th September 11:00 - 13:00

#### SEB-4: G02 - B: Sustainable Energy Technologies

Chairs: Prof. R J. Howlett/S.D.Walters

PROSE Paper No	Paper Title / Authors
<b>seb23f-026</b>	Lot Sizing Problem with Fuzzy Capacitated Energy Sources Ms. Esra Çakir Ms Ayse Akbalik*
<b>seb23f-060</b>	A review on the utilisation of phase changing materials in passively designed buildings: a comparison with com-mon thermal mass Dr Milad Moradibistouni Miss Rachel Beaton
<b>seb23f-078</b>	Overview on fault detection and diagnosis methods in building HVAC systems: towards a hybrid approach PhD Marco Savino Piscitelli Prof. Alfonso Capozzoli, Eng. Armin Hooman, Prof. Antonio Rosato
<b>seb23f-083</b>	Concepts and Representations to Analyse the Grid Services Provided by Electrical Systems and Buildings Prof. Gianfranco Chicco Dr. Diana Enescu, Dr. Andrea Mazza
<b>seb23s-003</b>	Possibility for integration of small-scale Solar Thermal installation to DH System Phd Radmilo Savic, Mr Vanja Vukic

Room 1 19th September - 11:00 - 13:00

## SEB-5: G01-C: Sustainable & Resilient Buildings

Chair: Prof. John Littlewood

PROSE Paper No	Paper Title / Authors
<b>seb23f-052</b>	Experimental analysis of air-handling unit fans failure on particulate matter concentrations due to incense burning in the south of Italy Phd Student Mohammad El Youssef Associate Professor Cataldo De Blasio, Full Professor Luigi Maffei, Associate Professor Massimiliano Masullo, Student Rita Mercuri, Full Professor Antonio Rosato
<b>seb23f-039</b>	Building systems optimization and strategy assessment for an energy-efficient model of buildings: a case study of a residential building in Benguerir city in Morocco. Ph.d Student Safae Oulmouden Prof. Dr. Brahim Benhamou, Dr. Hicham Mastouri, Prof. Dr. Hassan Radoine
<b>seb23f-040</b>	Characterization and evaluation of southwest Tunisian clays for the development of new clay-based building materials Phd Student Najah Majouri Research Director Mohamed Elmankibi, Professor Jalila Sghaier
<b>seb23s-001</b>	Energy Compensation Model between a Net Zero Energy Building and a School Building Ph.D. Diana D'agostino, Eng. Ilaria Ciriello, Eng. Federico Minelli, Professor Francesco Minichiello
<b>seb23s-006</b>	The role of cultural heritage in climate resilience in mountainous regions: cross-sectoral solutions for historic buildings in Valle dei Laghi, Italy Dr Daniel Herrera-avellanosa, Dr Fabio Carnelli, Ms Silvia Cocuccioni, Dr Valentina D'Alonzo, Ms Petra Pagliughi, Mr Matteo Rizzari
<b>seb23s-004</b>	Life Cycle Assessment (LCA) for Sustainable Construction: A Case Study of a Mass Timber Primary School Prototype Building in Canada Ms Veronica Madonna

Room 2 19th September 15:00 - 17:00

## SEB-6: G01-D: Sustainable & Resilient Buildings

Chair: Prof. Francesco Fiorito

PROSE Paper No	Paper Title / Authors
<b>seb23f-043</b>	Fluorocarbons in Buildings: A Comparative LCA Study for Alternative Environmental Retrofit Solutions Prof. Gianluca Maracchini Prof. Rossano Albatici, Dr. Rocco Di Filippo, Prof. Di Maggio Di Maggio
<b>seb23f-044</b>	Integrating a people- and environment-friendly process approach in circular, constructive, co-creative renovation projects. Arch. Alexis Versele Arch. Cihan Kayaceti, Prof.Dr. Chiara Piccardo, Ing. Lore Pillen, Arch. Tine Van De Kerckhove
<b>seb23f-031</b>	Which matters most? The role of actual occupancy patterns and automatic model calibration in reducing the building energy performance gap Prof. Gianluca Maracchini Prof. Elisa Di Giuseppe, Prof. Marco D'orazio, Dott. Andrea Gianangeli, Dott. Arianna Latini
<b>seb23f-056</b>	Risk management in designing and developing innovative, sustainable buildings Phd Eng. Maria Krechowicz Phd Eng. Adam Krechowicz
<b>seb23f-058</b>	Moisture-related problems in historical city centers: a GIS-based workflow for decay assessment and treatment Prof. Mariella De Fino Prof. Fabio Fatiguso, Dr. Teresa Fortunato, Dr. Margherita Lasorella
<b>seb23f-009</b>	Identifying the Importance Level: Green Retrofit Features in Existing University Science Laboratories Master's Student Gulcin Aydingun Associate Professor Yasemin Afacan, P.h.d. Student Irem Caglayan

Room 2 18th September 15:15 - 17:15

**SEB-7: IS10 - A: Climate-resilient neighbourhoods: analysis and design**

Chair: Prof Michele Morganti

<b>PROSE Paper No</b>	<b>Paper Title / Authors</b>
<b>seb23f-048</b>	Energy performance of ventilated façades; assessment of the steady-state and transient calculation approaches Mr. Oriol Roig Mr. Antonio Isalgue, Ms. Cristina Parda, Mr. Ignacio Paricio
<b>seb23f-053</b>	Simulating Localized Delta Temperatures: A Methodology Workflow for Addressing the Hyper-Local Impacts of Climate Change Dr Emanuele Naboni Dr. Barbara Gherri, Ms.arch Marcello Turrini
<b>seb23f-054</b>	Urban Green Spaces and Their Role in Responding to the Heat Island Effect in Historical Urban Context Dr Barbara Gherri
<b>seb23f-055</b>	Land use and energy demand of low-rise residential neighborhoods in Oklahoma City, USA Dr. Francesco Cianfarani Arch. Mohamed Abdelkarim, Arch. Pradipta Kumar Ghosh
<b>seb23f-057</b>	IMM Urban diagnostic: a decision support tool for the sustainable urban development of Dakar region Dr. Carlo Biraghi Prof. Massimo Tadi, Mr. Solomon Tesfaye
<b>seb23f-061</b>	Assessing the vehicular occupation of urban space in compact cities. Some urban fabrics of Barcelona Dr. Judit Lopez-Besora Dr. Carlos Alonso-Montolio, Dr. Helena Coch, Mr Sebastian Ugás



Room 3 19th September 15:00 - 17:00

## SEB-8: G01-E: Sustainable & Resilient Buildings

Chair: Prof. John Littlewood

<b>PROSE Paper No</b>	<b>Paper Title / Authors</b>
<b>seb23f-038</b>	The Suitability of Adapting Certification Tools For The Moroccan Context Ph.d Student Noussaiba Rharbi Prof. Dr. Manuel Carlos Gameiro, Prof. Dr. Abdelghani El Asli, Ph.d Hicham Mastouri, Prof. Dr. Hassan Radoine
<b>seb23f-065</b>	A data-driven approach to evaluate the Smart Readiness Indicator for the functionality "Respond to users' needs" Arch Martina Maggiulli Prof Alfonso Capozzoli, Phd Marco Savino Piscitelli
<b>seb23f-066</b>	Developing Building Code Compliance in the Eastern Caribbean with Local Traditional Techniques to Enable Climate Change Resilience Mr Evan Owen-powell Prof John Littlewood, Dr Fausto Sanna
<b>seb23f-068</b>	Applying Regenerative Design Principals to a Case Study in Canada Dr Trevor Butler Ms. Veronica Madonna
<b>seb23f-069</b>	14 kW air-to-water vapor-compression electric heat pump and refrigerating system operating in southern Italy: field vs. rated performance Phd Student Mohammad El Youssef Assistant Professor Hussein Daoud, Student Rita Mercuri, Student Bashir Mirco, Full Professor Antonio Rosato
<b>seb23f-070</b>	Faults Effects in Air-Handling Units: A Comprehensive Analysis of Numerical Studies Phd Student Mohammad El Youssef Phd Student Francesco Guarino, Student Rita Mercuri, Full Professor Antonio Rosato

Room 4 19th September 15:00 - 17:00

**SEB-9: IS10 - B: Climate-resilient neighbourhoods: analysis and design**

Chair: Prof Michele Morganti

<b>PROSE Paper No</b>	<b>Paper Title / Authors</b>
<b>seb23f-062</b>	Urban quality at the pedestrian level in Barcelona: ground floor uses Dr. Isabel Crespo-cabillo Dr. Antonio Isalgue, Dr. Judit Lopez-besora, Dr. Carlos Lopez-ordóñez
<b>seb23f-064</b>	The application of IMM methodology and SMART model to climate vulnerable secondary cities in SSA, the case of Quelimane, Mozambique. Research Fellow Solomon Tesfaye Ph.d, research Fellow Carlo Andrea Biraghi, Associate Professor Massimo Tadi
<b>seb23f-071</b>	A review of climate and resident-oriented renovation processes: a framework for just decision support systems PhD. Student Diletta Ricci Prof. Dr. Ing. Thaleia Konstantinou, Prof.dr.ir. Henk Visscher
<b>seb23f-075</b>	Quantifying input parameters influence in UBEM simulation results: the window-to-wall ratio case. Msc Patricia Borges Phd Anna Pages-ramon, Phd Oriol Travesset-baro
<b>seb23f-077</b>	An agent-based model for greening the city of Ravenna and reducing flooding at a cultural heritage site Mrs. Eleonora Melandri Dr. Santangelo Angela, Dr. Aitziber Egusquiza, Mr. Rembrandt Koppelaar2, Mrs. Emily West
<b>seb23f-082</b>	<b>Sick House Syndrome and psychophysical well-being in the context of climate change</b> <b>Professor Fabio Minutoli Doctor Isabella Blanco, Professor Maria Muscatello, Engineer Giuseppina Salvo*</b>

\*Online session

Room 1 20th September 10:30 - 12:30

## SEB-10: G01-F: Sustainable & Resilient Buildings

Chair: Prof. Fabio Fatiguso

PROSE Paper No	Paper Title / Authors
<b>seb23f-072</b>	Qualitative Tools in Residential Building Energy Standards Evaluation in UAE Eng. Rahma Hagi Prof. John Littlewood, Dr. Fausto Sanna
<b>seb23f-073</b>	Free running mode adaptive thermal comfort in low energy houses in Poland - the impact of room location and orientation on overheating severity Prof. Magdalena Baborska-Narożny Dr. Karol Bandurski, Prof. Magdalena Grudzińska, Dr. Maria Kostka
<b>seb23f-074</b>	Heating control in low energy houses in Poland: thermal comfort, solar radiation intensity and energy consumption Associate Prof. Magdalena Baborska-Narożny Dr Karol Bandurski, Associate Prof. Magdalena Grudzińska, Dr Maria Kostka
<b>seb23f-076</b>	Strategies to tackle energy poverty in post-conflict setting: the case study of rural Damascus MSc Annalisa Barbolini Prof. Kindah Mousli, Dr. Angela Santangelo, Prof. Giovanni Semprini
<b>seb23f-079</b>	Automatic optimization-based calibration using genetic algorithms: a case study of a school energy model Eng Ludovica Maria Campagna Eng Francesco Carlucci, Prof Eng Salvatore Carlucci, Prof Eng Francesco Fiorito
<b>seb23f-080</b>	Performance of Offsite Manufactured Bio-Insulated Timber-Frame Construction Systems for Nearly-Zero Carbon Dwellings in Wales, UK Professor John Littlewood Mr Nick Evans, Ms Charlotte Hale, Mr Richard Hawkins
<b>seb23f-081</b>	A Novel Case Study Methodology for Affordable Housing In-Depth Post-Occupancy Evaluation in Wales, UK Ms Tansy Duncan Prof Carolyn Hayles, Prof John Littlewood

Room 3 18th September 15:15 - 17:15

## **SEB-11: IS02: Advanced Assessment Methods, Tools and Design Solutions for users' Well-Being in Buildings**

Chair: Prof. Elisa Di Giuseppe

<b>PROSE Paper No</b>	<b>Paper Title / Authors</b>
<b>seb23f-006</b>	Experimental comparison between a diffuse insulation masonry and a traditional lightweight insulated wall Phd, Research Fellow Serena Summa Full Professor, Phd Costanzo Di Perna, Phd Student Giada Remia, Full Professor, Phd Francesca Stazi
<b>seb23f-008</b>	Developing a motivation-driven framework to understand energy-related occupant behavior in office buildings Ph.D. Candidate Irem Caglayan Assoc. Prof. Dr. Yasemin Afacan, M.F.A. Student Gulcin Aydingun
<b>seb23f-014</b>	Educational buildings: analysis of IAQ as a function of occupant behavior and mechanical ventilation systems Phd Student Giada Remia Full Professor, Phd Costanzo Di Perna, Full Professor, Phd Francesca Stazi, Research Fellow, Phd Serena Summa, Phd Student Luca Tarabelli
<b>seb23f-022</b>	Energy optimization and environmental comfort: software analysis and evidence-based retrofitting solution for office buildings in Sicily Dottorando Giovanni Francesco Russo Dottoranda Ludovica Maria Sofia Savoca
<b>seb23f-032</b>	Indoor Environment's Quality IEQ Forecasting for a Residential Building Using Machine Learning Models Phd Student Houda Er-retby Research Director Mostafa Benzaazoua, Research Director Mohamed Elmankibi, Researcher Engineer Samir Idrissi Kaitouni, Researcher Engineer Mohamed Ouaild Mghazli, Research Engineer Zineb Zoubir
<b>seb23f-041</b>	Potential of Biophilic Design in workplaces: a pilot study with Eye Tracking in Immersive Virtual Environments Dott. Arianna Latini Prof. Elisa Di Giuseppe, Prof. Marco D'orazio, Dott. Ludovica Marcelli
<b>seb23f-030</b>	Building Management System and Data Sharing Platform for passive cooling strategies assessment and users' awareness increase: design and application to a social housing context in Italy Prof Elisa Di Giuseppe Prof. Gabriele Bernardini, Prof. Marco D'orazio, Dott. Arianna Latini, Prof. Gianluca Maracchini

Room 2 20th September - 10:30 - 12:30

**SEB-12: IS08: BIM, BEM and Digital twin implementations in Sustainable and Smart urban context**

Chair: Dr. Laura Pompei

<b>PROSE Paper No</b>	<b>Paper Title / Authors</b>
<b>seb23f-028</b>	Neutrosophic Fuzzy Selected Element Reduction Approach (NF-SERA) : Assessment of E-scooter Parking Area Ms. Esra Çakir Dr. Emre Demircioglu
<b>seb23f-067</b>	Digital management methodology for building process optimization through BIM and Machine Learning integration Dr. Francesco Muzi Phd Costanza Vittoria Fiorini, Prof. Giuseppe Piras, Prof. Andrea Vallati
<b>seb23f-084</b>	A critical overview of BIM (Building Information Modeling) and DT (Digital Twin): challenges and potentialities in energy and sustainability of buildings Phd Student Miriam Di Matteo Phd Student Lorenzo Pastore, Phd Laura Pompei
<b>seb23f-085</b>	Energy efficiency strategies for a major office building: low environmental impact redevelopment through the BEM model Dr. Francesco Muzi Dr. Filippo Beretta, Phd Costanza Vittoria Fiorini, Dr. Riccardo Marzo, Prof. Giuseppe Piras, Prof. Andrea Vallati

Room 3 20th September - 10:30 - 12:30

**SEB-13: IS07: Resilient solutions for energy retrofitting of historic buildings and districts in Mediterranean climate & IS04: Innovative use of solar resources for the enhancement of the Building energy self-sufficiency**

Chairs: Dr. Elena Cantatore & Prof. Antonio Gagliano

<b>PROSE Paper No</b>	<b>Paper Title / Authors</b>
<b>seb23f-024</b>	Cluster analysis of masonry types to analyze the energy performance of historic buildings: preliminary results Dr. Eng. Enrico Genova Eng. Erica La Placa, Prof. Eng. Calogero Vinci
<b>seb23f-033</b>	Preventive conservation of heritage buildings: The case study of Palazzo Gioia in Corato (Italy) Researcher Stefania Liuzzi Researcher Alessandro Cannavale, Professor Ida Fato, Full Professor Francesco Martellotta, Researcher Chiara Rubino
<b>seb23f-042</b>	<b>Criticality mapping and integration quantity evaluation of solar installations in Mediterranean heritage territories</b> <b>Dr. Giada Romano Prof. Paola Altamura, Prof. Serena Baiani, Prof. Elena Lucchi*</b>
<b>seb23f-034</b>	Self-sufficiency in mid- to high-rise buildings with photovoltaic façades Prof.dr. Wilfried Van Sark
<b>seb23f-059</b>	Monitoring of the electrical performance of a ventilated bifacial photovoltaic facade Phd Stefano Aneli Prof Antonio Gagliano, Phd Gabino Jimenez-castillo, Prof Giuseppe Tina
<b>seb23s-010</b>	Best practice from the Historic Building Energy Retrofit Atlas to exemplify the BiPV meets history guidelines Phd Daniel Herrera, Dr. Ing Alexandra Troi, Dott.ing. Dario Bottino Leone

\*Online session

Online Room 4 20th September - 10:30 - 12:30

## SEB-14: G01-G: Sustainable & Resilient Buildings

Chair: Prof. John Littlewood

PROSE Paper No	Paper Title / Authors
<b>seb23f-035</b>	Inferential monitoring-based study of indoor air quality assessment for biobased heating system in mountainous cold climate Student Wissal Herra Full Professor Claudio Del Pero, Full Professor Abdelghani El Asli, Full Professor Manuel Carlos Gameiro Da Silva, Assistant Professor Hicham Mastouri, Full Professor Hassan Radoine*
<b>seb23f-036</b>	Towards net-zero construction: integrating renewable energy sources and energy-efficient design strategies for sustainable buildings Student Loubna Laghrouch Professor Abdelghani El Asli, Professor Hicham Mastouri, Director Hassan Radoine, Co-founder Wiam Samir*
<b>seb23f-037</b>	Building Sustainability: Achieving LEED Certification for a Hotel in Rabat, Morocco. Student Alaa Elouazani Dahak Professor Abdelghani El Asli, Research And Educati Hicham Mastouri, Director Of The Scho Hassan Radoine, Business And Develop Taha Yassine Samir*
<b>seb23f-063</b>	Stakeholder Perspectives on Sustainability in Social Housing: Insights from Wales Mr Adam West Dr Katie Beverley, Professor John Littlewood*

\*Online session

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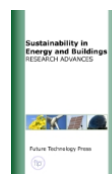
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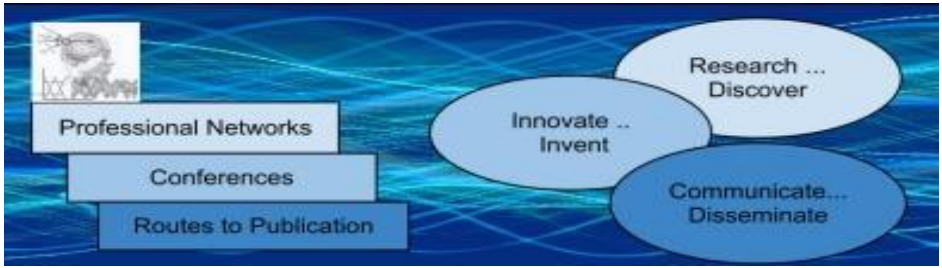
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