



Smart Sustainable Technologies

Sustainable Design and Manufacturing (SDM-21)

Sustainability in Energy and Buildings (SEB-21)

Conference Programme

16-17 September 2021

KES Virtual Conference Centre

Contents

Chairs' Welcome.....	1
SDM-21.....	4
Organisation	4
International Programme Committee	5
SEB-21.....	7
Organisation	7
International Programme Committee	8
Keynote Talks.....	11
Leveraging Open Energy Data for Buildings - From the ASHRAE Great Energy Predictor III Competition to the Annex 81 Open Data Sandbox.....	11
Sustainability of building energy via digital intervention in distributed systems.....	13
Smart and Sustainable Manufacturing for Factories of the Future	14
Timetable – Thursday 16 September.....	15
Timetable – Friday 17 September	17
SDM Paper Presentations.....	19
SDM-1: G02-A: Sustainable Manufacturing Processes and Technology.....	19
SDM-2: G02: Sustainable Manufacturing Processes and Technology	20
SDM-3: G03: Sustainable Manufacturing Systems and Enterprises	21
SDM-4: IS04: Industry 4.0: strategies, models, tools and experiences for smart production system design, management, optimization and maintenance.....	22
SDM-5: IS05: Circular Economy and Sustainability: Digital Technologies and Business Model Innovation	23
SDM-6: G01: Sustainable Design, Innovation and Services	24
SDM-7: IS01 & IS02.....	25
SEB Paper Presentations.....	26
SEB-1: G01-A: Sustainable & Resilient Buildings.....	26
SEB-2: SEB6: IS08: Sustainable Solutions for Built Environment Resilience and Safety.....	27

SEB-3: G01-B: Sustainable & Resilient Buildings 28

SEB-4: IS12: Urban climate change adaptation by design of buildings and
urban spaces 29

SEB-5: IS13-A: Positive Energy Districts..... 30

SEB-6: Application of Building Physics & Engineering 31

SEB-7: IS13-B: Positive Energy Districts..... 32

SEB-8: IS06: Sustainable, affordable and smart renovation of existing and
historic buildings 33

Chairs' Welcome

8th International Conference on Sustainable Design and Manufacturing SDM-21

On behalf of the SDM-21 organizers and KES community, we are honoured and delighted to warmly welcome you to the 8th International Conference on Sustainable Design and Manufacturing (SDM-21), held online between 16-17 September 2021 using the well-established KES International Conference Centre platform and jointly organised by KES International and Karlsruhe Institute of Technology, Germany.

Over the last 7 years, SDM affiliates have made tremendous contributions in research and practice on a broad spectrum of sustainable design and manufacturing related subjects, resulting in impacts in many sectors of society. The SDM-21 technical program is rich and varied and consists of keynote talks, oral presentations and invited sessions. It covers the theory and applications of sustainable design and manufacturing, and related areas, while providing an excellent platform for the presentation and discussion of new data and concepts, leading to knowledge exchange and the generation of new ideas.

The conference includes a high-quality keynote speaker who is internationally renowned for his expertise: Prof. Lihui Wang, KTH Royal Institute of Technology, Sweden who gave a talk Entitled 'Smart and Sustainable Manufacturing for Factories of the Future'. We are honoured with his presence and for sharing his knowledge with us at the SDM-21 Conference.

Conference submissions were subjected to a blind peer-review process using expert reviewers from the manufacturing community. Only the best of these submissions were selected for presentation at the conference and publication in the proceedings in a volume in the KES-Springer series 'Smart Innovation, Systems and Technologies'.

We would like to thank our authors, reviewers, general track and invited session chairs, and all others involved in the conference, for their contributions ensuring a high-quality event.

We welcome you to the KES SDM community and hope that you enjoy the conference.

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

Prof. Robert Howlett, 'Aurel Vlaicu' University of Arad, Romania and Bournemouth University, UK

Prof. Rossi Setchi, Cardiff University, UK

SDM-21 Conference Chairs

13th International Conference on Sustainability in Energy and Buildings SEB-21

Welcome to the 13th International Conference on Sustainability and Energy in Buildings 2021 (SEB21), a major international conference organised by a partnership made up of KES International and The Sustainable and Resilient Built Environment group, Cardiff Metropolitan University.

SEB-21 invited contributions on a range of topics related to sustainable buildings and renewable energy and explored innovative themes regarding building adaptation responding to climate change.

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 and cities; from a theoretical, practical, implementation and simulation perspective. The conference formed an exciting chance to present, interact, and learn about the latest research and practical developments on the subject. This will be the second time that SEB-21 is held virtually, and this has been made necessary because of the ongoing Covid-19 pandemic which has swept the world.

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

- Sustainable and Resilient Buildings
- Sustainable Energy Technologies

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

It is important that a conference provides high quality talks from leading-edge presenters. SEB-21 featured two keynote speakers: Dr Clayton Miller, National University of Singapore, Singapore and Prof Liz Varga, University College London (UCL), UK.

The conference attracted submissions from around the world. Submissions for the Full-Paper Track were subjected to a two-stage blind peer-review process. With the objective of producing a high-quality conference, only the best of these were selected for presentation at the conference and publication as book chapters in a volume of proceedings in the Springer 'Smart Innovation Systems and Technologies' series. Submissions for the Short Paper Track were subjected to a 'lighter-touch' review and published in an online medium, but not in the Springer proceedings.

Thanks are due to the very many people who have given their time and goodwill freely to make SEB-21 a success. We would like to thank the members of the International

Programme Committee who were essential in providing their reviews of the conference papers, ensuring appropriate quality. 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 you find the 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, 'Aurel Vlaicu' University of Arad, Romania and Bournemouth University, UK

Dr Alfonso Capozzoli, Politecnico di Torino, Italy

Prof Lakhmi Jain, KES International and Liverpool Hope University, UK
SEB-21 Conference Chairs

SDM-21

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Track 2:

Dr Ahmed Elkaseer, Karlsruhe Institute of Technology, Germany

Track 3:

Dr Marco Bortolini, University of Bologna, Italy

Track 4:

Prof Yuchun Xu, Aston University, UK

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SEB-21

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Dr. Simon Walters	University of Brighton, UK
Dr. Clara Watkins	Cardiff Metropolitan University, UK
Prof. Sara Wilkinson	University of Technology Sydney, Australia
Prof. Smail Zouggar	Mohammed Premier University, Morocco

Keynote Talks

Dr Clayton Miller

National University of Singapore, Singapore

Leveraging Open Energy Data for Buildings - From the ASHRAE Great Energy Predictor III Competition to the Annex 81 Open Data Sandbox

Abstract: A surge in data-driven methods for building energy analysis is occurring due to the increase in publicly-available open data sets from the industry and research communities. Dr. Miller will discuss a recent and prominent example of utilising such resources in the context of the Great Energy Predictor III Kaggle Competition (<https://www.kaggle.com/c/ashrae-energy-prediction>) held in Oct-Dec. 2019 that was hosted by the ASHRAE organization. Over 3,600 teams from around the world competed for US\$25k in prize money to create the most accurate data-driven hourly building energy models for over 2,300 energy meters collected from 1,448 buildings. Dr. Miller will cover the process of crowdsourcing and capturing open and closed data sets from across the world for the competition. He will also overview the potential applications of these winning solutions and discuss their common attributes, such as the use of large ensembles of various types of gradient boosting trees. He will discuss how and where the top five winning models and two-thirds of the competition data set have been released as new open data sets for building energy research and industry professionals to use. Dr. Miller will then cover the initial stages for a large data sandbox environment being driven by the Annex 81 Data-driven Smart Buildings (<https://annex81.iea-ebc.org/>) community that is collecting open data sets from numerous applications and organise them in the Kaggle platform with code examples and documentation. This sandbox will enhance the accessibility and ease-of-use for researchers seeking open data or sharing their own data online as well as a library of tutorials for those who want to learn data science.



Biography: Dr. Clayton Miller is an Assistant Professor at the National University of Singapore (NUS) as the leader of the Building and Urban Data Science (BUDS) Lab. He is the Co-Leader of Theme D - Data Analytics at the UC Berkeley SinBerBEST2 Lab and Subtask 4 of the IEA Annex 79 Occupant-Centric Building Design and Operation. He was recently a Fellow at the Institute of Technology in Architecture (ITA) at the ETH Zürich (Swiss Federal Institute of Technology - Zurich). His research focuses on performance data analytics using thousands of real-world case study buildings collected from facilities around the world. He was formerly the CTO of a Singaporean startup company, Optiras Pte Ltd. that developed monitoring technologies for

buildings. Clayton holds a Doctorate of Sciences (Dr. sc. ETH Zurich) from the ETH Zürich, a MSc. (Building) from the National University of Singapore (NUS), and a Master of Architectural Engineering (MAE) and BSc. from the University of Nebraska. He is a former U.S. Fulbright Student Scholar to Singapore at NUS and a Walter Scott Jr. Scholar in Nebraska.

Prof Liz Varga
University College London (UCL), UK

Sustainability of building energy via digital intervention in distributed systems

Abstract: Digital technologies are unlocking new data streams for renewable distributed energy resources (DERs) creating the potential to provide not only capacity or wholesale products, but also new flexibility and demand side response services. Due to the small scale of individual buildings, aggregation is needed whereby a digital system can mediate the availability, and rewards, for acting together in the energy market. Such opportunities are especially important in constrained areas of the distribution network. This work examines the considerations of such an integrated solution and presents results from a simulated network based on real DER data.



Biography: LIZ VARGA is Professor of Complex Systems at University College London (UCL), London, U.K. and section head for Infrastructure and Cities in the Civil, Environmental, and Geomatics Engineering Department. She leads the Infrastructure Systems Institute, UCL, which is spearheading innovative research, including automation and digital twins, into infrastructure resilience, sustainability, and effectiveness using complexity appropriate methods for evaluation and assessment, particularly agent based modeling. She has published more than 60 journal articles on infrastructure systems: energy, transport, water, waste, and telecommunications. She is a Fellow of the Chartered Association of Building Engineers, and a Fellow of the Higher Education Academy.

Prof Lihui Wang
KTH Royal Institute of Technology, Sweden

Smart and Sustainable Manufacturing for Factories of the Future

Abstract: Smart manufacturing depends on the timely acquisition, distribution, and utilisation of information from machines and processes from manufacturing shop floors and across product lifecycles. This is especially true for factories of the future. Effective information sharing can improve production quality, reliability, resource efficiency and the recyclability of end-of-life products. Smart manufacturing built on digitalisation also aims for better sustainability. As emerging infrastructures, cyber-physical systems and cloud manufacturing provide new opportunities to achieve the goals of smart manufacturing, where digital twin and human-robot collaboration add values to manufacturing operations. For the sake of the audience with diverse background, the following topics will be covered in this talk:

- A brief overview of manufacturing and AI history
- Current status and movements towards smart manufacturing
- Latest advancement and future opportunities in smart and sustainable manufacturing
- Showcases of remote monitoring and control, and human-robot collaboration

While advanced technologies show great promise, challenges towards better sustainability and future trends remain to be identified and will be highlighted in this keynote presentation.



Biography: Lihui Wang is a Professor and Chair of Sustainable Manufacturing at KTH Royal Institute of Technology, Sweden. His research interests are presently focused on human-robot collaborations, brain robotics, cyber-physical production systems, real-time monitoring and control, predictive maintenance, and adaptive manufacturing systems. Professor Wang is actively engaged in various professional activities. He is the Editor-in-Chief of International Journal of Manufacturing Research, Editor-in-Chief of Journal of Manufacturing Systems, and Editor-in-Chief of Robotics and

Computer-Integrated Manufacturing. He has published 10 books and authored in excess of 500 publications. Professor Wang is a Fellow of Canadian Academy of Engineering, CIRP, SME and ASME. He is also a Professional Engineer in Canada, the President of North American Manufacturing Research Institution of SME, and the Past Chairman of Swedish Production Academy (2018-2020).

Timetable – Thursday 16 September

	Room1	Room 2	Room 3	Room 4
9.00-9.15 BST	<p>Opening Ceremony Prof. Robert J Howlett, Bournemouth University, UK Dr John Littlewood, Cardiff Metropolitan University, UK Dr. Steffen G Scholz, Karlsruhe Institute of Technology KIT, Germany</p>			
9.15 - 10:15 BST	<p>Keynote Speaker 1 Prof. Liz Varga University College London (UCL), London Sustainability of building energy via digital intervention in distributed systems</p>			
	<p>10:30 - 12:50 BST SEB 1 G01-A: Sustainable & Resilient Buildings Chair: Dr John Littlewood</p>	<p>10:30 - 12:50 BST SEB 2 IS08: Sustainable Solutions for Built Environment Resilience and Safety Chair: Dr. Gabriele Bernardini</p>	<p>10:30 - 12:30 BST SDM 5 IS05: Circular Economy and Sustainability: Digital Technologies and Business Model Innovation Chair: Dr Miying Yang</p>	<p>10:30 - 12:30 BST SDM 3 G03: Sustainable Manufacturing Systems and Enterprises Chair: Dr Marco Bortolini</p>

	Room1	Room 2	Room 3	Room 4
13:15 - 14:15 BST	Keynote Speaker 2 Prof. Lihui Wang KTH Royal Institute of Technology, Sweden Smart and Sustainable Manufacturing for Factories of the Future			
	14:30 - 17.10 BST SEB 3 G01-B: Sustainable & Resilient Buildings Chair: Dr John Littlewood	14:30 - 17.10 BST SEB 4 IS12: Urban climate change adaptation by design of buildings and urban spaces Chair: Dr Michele Morganti	14:30 - 16:30 BST SDM 2 G02: Sustainable Manufacturing Processes and Technology Chair: Dr Ahmed Elkaseer	14:30 - 16:30 BST SDM 4 IS04: Industry 4.0: strategies, models, tools and experiences for smart production system design, management, optimization and maintenance Chair: Dr Marco Bortolini

Timetable – Friday 17 September

	Room 1	Room 2	Room 3	Room 4
9.15 - 10:15 BST	<p align="center">Keynote Speaker 3 Dr. Clayton Miller National University of Singapore, Singapore Leveraging Open Energy Data for Buildings - From the ASHRAE Great Energy Predictor III Competition to the Annex 81 Open Data Sandbox</p>			
	<p>10:30 - 12:50 BST SEB 5 IS13-A: Positive Energy Districts Chairs: Dr. F. Reda / Dr. M.B. Andreucci</p>	<p>10:30 - 12:50 BST SEB 6 Application of Building Physics & Engineering Chair: Associate Prof. Alfonso Capozzoli</p>	<p>10:30 - 12:30 BST SDM 1 G02: Sustainable Manufacturing Processes and Technology Chair: Dr Ahmed Elkaseer</p>	<p>10:30 - 12:30 BST SDM 6 G01: Sustainable Design, Innovation and Services Chair: Dr Yuri Borgianni</p>

	Room1	Room 2	Room 3	Room 4
	13:30 - 15:30 BST SEB 7 IS13-B: Positive Energy Districts Chairs: Dr. M.B. Andreucci / Dr. F. Reda	13:30 - 15:30 BST SEB 8 IS06: Sustainable, affordable and smart renovation of existing and historic buildings Dr. Gianluca Maracchini	13:30 - 15:30 BST SDM 7 IS01 & IS02 Co-Chairs: Prof Davide Russo & Dr Steffen Scholz	
15:45 - 16:00 BST	Closing Ceremony			

SDM Paper Presentations

Friday 17th Sept 2021

10:30 - 12:30 BST, Room 3

SDM-1: G02-A: Sustainable Manufacturing Processes and Technology

Chair: Dr Ahmed Elkaseer

PROSE Paper No	Paper Title / Authors
sdm21-009	Hemp-block panel design and life-cycle assessment Dot.ssa Maria Chiara Capasso
sdm21-021	Sustainable Purchasing Practices: A study of Fresh Food SMEs in Yorkshire Dr Luisa Huaccho Huatuco, Ms Keyou Feng
sdm21-023	Outlining the limits of Friction Stir Consolidation as used as an Aluminum Alloys Recycling approach Dr. Abdul Latif, Professor Livan Fratini, Dr. Marco Gucciardi, Associate Professor Giuseppe Ingarao
sdm21-026	Environmental and economic assessment of the PET bottles manufacturing process: a case study Prof Emmanuel Adamides, Dr Yannis Mouzakitis, Mr Athanasios Zygouris

Thursday 16th Sept 2021
14:30 - 16:30 BST, Room 3

SDM-2: G02: Sustainable Manufacturing Processes and Technology

Chair: Dr Ahmed Elkaseer

PROSE Paper No	Paper Title / Authors
sdm21-028	Fabrication, and Experimental Evaluation of Shape Memory Alloy based Spring Actuators for Laparoscopic Grippers Mr. Uditha Roshan, Prof. Ranjith Amarasinghe, Dr. Nuwan Dayananda, Mr. Lakmal Perera
sdm21-029	3D Printed Multi-channel Peristaltic Pump with Active Droplet Generator for Lab-on-a-Chip Devices Mr Samith Hettiarachchi, Prof. Ranjith Amarasinghe, Mr. Gehan Melroy, Mr. Amith Mudugamuwa, Mr. Nisal Perera, Mr. Peshan Sampath
sdm21-031	Life Cycle Assessment of metal additive manufacturing: a systematic literature review Mrs Valentina Pusateri, Mr Michael Zwicky Hauschild, Mr Sami Kara, Mr Stig Irving Olsen
sdm21-036	PZT Based Active Microfluidic Droplet Generator for Lab-on-a-Chip Devices Mr. Gehan Melroy, Prof. Ranjith Amarasinghe, Mr. Samith Hettiarachchi, Mr. Amith Mudugamuwa

Thursday 16th Sept 2021
10:30 - 12:30 BST, Room 4

SDM-3: G03: Sustainable Manufacturing Systems and Enterprises

Chair: Dr Marco Bortolini

PROSE Paper No	Paper Title / Authors
sdm21-005	Prevention of failures in the footwear production process by applying machine learning. Engineer Jose Tierra, Doctor Manuel Ayala, Engineer Albert De La Fuente, Engineer Carmen Nacevilla
sdm21-006	Achieving responsive and sustainable manufacturing through a brokered agent-based production paradigm Dr James Gopsill, Dr Mark Goudswaard, Prof. Ben Hicks, Dr Jennifer Johns, Dr Chris Snider
sdm21-007	Corporate strategy based quantitative assessment of sustainability indicators at the example of a Laser Powder Bed Fusion Process M.sc. Johanna Wurst; M.sc. Tobias Ehlers, Prof. Dr.-ing. Roland Lachmayer, Dr. Iryna Mozgova, M.sc. Jannik Schneider
sdm21-027	Green Supply Chain Management in the Greek Market: Practices and Attitudes in Environmental Assessment and Selection of Suppliers Prof Emmanuel Adamides, Dr Yannis Mouzakis, Mr Athanasios Zygouris

Thursday 16th Sept 2021
14:30 - 16:30 BST, Room 4

SDM-4: IS04: Industry 4.0: strategies, models, tools and experiences for smart production system design, management, optimization and maintenance

Chair: Dr Marco Bortolini

PROSE Paper No	Paper Title / Authors
sdm21-017	Data-driven predictive maintenance in evolving environments: a comparison between machine learning and deep learning for novelty detection Ms Francesca Calabrese, Mr Andrea Baraldi, Mr Francesco Del Buono, Mr Matteo Paganelli, Professor Alberto Regattieri
sdm21-019	Reconfigurable manufacturing system design using a genetic algorithm Dr. Francesco Gabriele Galizia, Dr. Marco Bortolini, Mr. Cristian Cafarella, Professor Emilio Ferrari, Professor Mauro Gamberi
sdm21-020	Industry 4.0 technologies: a cross-sector industry-based analysis Dr. Francesco Gabriele Galizia, Dr. Marco Bortolini, Dr. Francesca Calabrese, Professor Cristina Mora, Mr. Valentina Ventura
sdm21-033	Fault diagnosis in industries: how to improve the health assessment of rotating machinery Ms. Francesca Calabrese, Phd Marco Bortolini, Phd Francesco Gabriele Galizia, Professor Alberto Regattieri
sdm21-041	An Integrated Framework for Reactive Production Scheduling and Inventory Management Dr Rodolfo Garcia-flores, Dr Andreas Schutt, Mr Jason Suhartanto

Thursday 16th Sept 2021
10:30-12:30 BST, Room 3

SDM-5: IS05: Circular Economy and Sustainability: Digital Technologies and Business Model Innovation

Chair: Dr Miying Yang

PROSE Paper No	Paper Title / Authors
sdm21-003	Sustainability driven Product-Service Systems development: A case study in a capital goods manufacturing company Mr. David Sarancic, Professor Tim McAloone, Associate Professor Daniela Pigosso
sdm21-018	Visualising sustainability-related information: A review of visualisation for sustainability in manufacturing industry Mr. Duanyang Geng, Prof. Steve Evans, Dr. Yusuke Kishita
sdm21-022	Sustainable manufacturing digital twins: a review of development and application Prof Peter Ball, Dr Ehsan Badakhshan
sdm21-024	Sustainable Design of Takeout Product Service System of Milk Tea Drinks in Chinese University Campus Based on KANO Model Mrs Kaiqiao Rong, Dr Shaohua Han
sdm21-032	Barriers to Transitioning Towards Smart Circular Economy: A Systematic Literature Review Miss Ana Lobo, Miss Qinglan Liu, Mrs Janaina Mascarenhas, Miss Adriana Trevisan, Mrs Miying Yang
sdm21-034	Designing a Research Tool for Sustainable Aquaculture Project Dr Miying Yang, Dr Sonal Choudhary, Dr Lely Herlina, Mr Dodi Hermawan, Dr Martino Luis, Mr Rakesh Nayak
sdm21-038	Exploring the Risks of Blockchain and Circular Economy Initiatives in Food Supply Chains: A Hybrid Model Practice Framework Dr Okechukwu Okorie, Dr Jennifer Russell

Friday 17th Sept 2021
10:30-12:30 BST, Room 4

SDM-6: G01: Sustainable Design, Innovation and Services

Chair: Dr Yuri Borgianni

PROSE Paper No	Paper Title / Authors
sdm21-010	Development of a Steering System for Parasport Sleds Using Lightweight Design and Additive Manufacturing of Fibre-Reinforced Polymers Prof. Dr. Stefan Junk, B.eng. Florian Jäger, M.eng. Benjamin Klerch, Prof. Dr. Steffen Wolf
sdm21-011	An open-source bioreactor enhancing microbial cellulose production and novel biodegradable substances Prof. Nitzan Cohen, M.a. Ignacio Merino, B.a. Emma Sicher, Dr. Seçil Ugur Yavuz
sdm21-014	Biodegradable fiber-based composites as alternative materials for sustainable packaging Design Mr. Vishal Srivastava, Prof. Dipayan Das, Dr. Sumer Singh
sdm21-025	Research and enterprise for sustainable hemp products and buildings Prof Donatella Radogna, Dr Luciana Mastrodonardo

Friday 17th Sept 2021

13:30-15:30 BST, Room 3

SDM-7: IS01 & IS02

Co-Chairs: Prof Davide Russo & Dr Steffen Scholz

PROSE Paper No	Paper Title / Authors
sdm21-008	Pathway for designing with new DIY, circular and biobased materials: insights from three case studies Asst. Phd Student Bert Vuylsteke, Prof. Dr. Ing. Jan Detand, Dr. Asst. Francesca Ostuzzi, Prof. Dr. Ing. Jelle Saldien
sdm21-016	Lay the foundations for building a Robust eco-design methodology Dr Christian Spreafico
sdm21-039	Human Activity Recognition Using K-Nearest Neighbor Machine Learning Algorithm Dr. Saeed Mohsen; Dr. Ahmed Elkaseer, Dr. Steffen Scholz
sdm21-040	Development of correction factors for FDM 3D printers: experimental investigation and ANN modelling Dr.-ing. Tobias Müller; Dr. Ahmed Elkaseer, Msc Mahmoud Salem, Dr. Steffen Scholz, Msc Janik Wadlinger
sdm21-043	Additive Manufacturing in the automotive industry and the potential for driving the green and electric transition M.sc Amal Charles; Dr. Ahmed Elkaseer, Dipl. -ing Aileen Hofer, Dr. Steffen Scholz

SEB Paper Presentations

Thursday 16th Sept 2021

10:30 - 12:50 BST, Room 1

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

Chair: Dr John Littlewood

PROSE Paper No	Paper Title
seb21f-010	Towards a self-learning thermostat controller Mr Rubén Mulero; Mr Jan Löber, Phd Sarah Noyé, Mr Alexander Palm
seb21f-011	Assessing the impact of lockdown due to COVID-19 on the electricity consumption of a housing development in the UK Dr Renata Tubelo; Prof Mark Gillott, Dr Eldar Naghiyev, Prof Lucelia Rodrigues, Dr Rob Shipman
seb21f-012	Embodied energy and global warming potential of radon preventive measures applied in new family houses Msc Licia Felicioni; Csc Martin Jiránek, Phd Antonín Lupíšek
seb21f-016	Evaluation of Circular Construction Works During Design Phase: An Overview of Valuation Tools Dr. Cihan Kayaçetin; Ir. Arch. Lode Leferve, Ir. Stijn Verdoodt, Arch. Alexis Versele
seb21f-028	Impact of occupants' behavior uncertainty on building energy consumption through the Karhunen-Loève Expansion technique: a case study in Italy Dr. Gianluca Maracchini; Prof. Elisa Di Giuseppe, Prof. Marco D'Orazio
seb21f-035	Design Patterns for Low-Carbon Buildings Dr Simon Tucker; Dr Clarice Bleil De Souza
seb21s-005	Development of a new parallel roof testing-rooms facility Dr. Stefano Fantucci; Prof. Marco Perino, Ms. Emanuela Sassaroli

Thursday 16th Sept 2021
10:30 - 12:50 BST, Room 2

SEB-2: SEB6: IS08: Sustainable Solutions for Built Environment Resilience and Safety

Chair: Dr. Gabriele Bernardini

PROSE Paper No	Paper Title
seb21f-041	Merging heat stress hazard and crowding features to frame risk scenarios within the urban built environment Dr. Juan Diego Blanco Cadena; Professor Gabriele Bernardini, Professor Enrico Quagliarini, Professor Graziano Salvalai
seb21f-015	The response of the Italian healthcare facilities to the COVID-19 pandemic: analysis of national and regional legislation Ph.d. Rossella Marmo; Prof. Pierfrancesco Fiore, Ph.d. Federica Pascale, Prof. Francesco Polverino, Prof. Enrico Sicignano
seb21f-020	Leaving or sheltering? A simulation-based comparison of flood evacuation strategies in urban built environments Prof. Enrico Quagliarini; Dr. Gabriele Bernardini, Prof. Marco D'orazio, Dr. Guido Romano
seb21f-025	Flood risk of Open Spaces: from microscale factors of Built Environment to risk reduction strategies Ir. Simona Mannucci; Dr.ir. Gabriele Bernardini, Dr.ir. Alessandro D'Amico, Dr.ir. Michele Morganti, Dr.ir. Federica Rosso
seb21f-029	Towards a multi-risk assessment of Open Spaces and its users: a rapid survey form to collect and manage risk factors Mr. Marco Angelosanti; Ms. Letizia Bernabei, Dr. Gabriele Bernardini, Dr. Edoardo Currà, Dr. Alessandro D'amico, Dr. Martina Russo
seb21f-036	Transport Systems for Smarter Cities, A Practical Case Applied to Traffic Management in the City of Montreal Pr Abdellah Chehri; Mr Benoit Debaque, Mr Nicholas Duclos, Pr Paul Fortier, Ms Teena Sharma
seb21f-046	Urban floods management: the integrated approach of the city of Rome (Italy) Architect Alessandra Valentinelli; Project Coordinator Fabiana Cambiaso

Thursday 16th Sept 2021
14:30 - 17.10 BST, Room 1

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

Chair: Dr John Littlewood

PROSE Paper No	Paper Title
seb21f-037	Neighbourhood Digital Modelling for carbon footprint assessment Sr Raimon Calabuig-Moreno; Sr Javier Orozco-messana, Sr Rafael Temes-cordovez
seb21s-010	Carbon Neutral Buildings in Canada A Holistic Case Study Mr. Trevor Butler; Dr. Douglas Macleod, Ms. Veronica Madonna, Dr. Henry Tsang
seb21f-054	An Exploration of the Relationships Between Architectural Delight and Human Senses Mr Phil Grant; Dr John Littlewood, Professor Robert Pepperell
seb21f-056	A methodology for assessing the impact of enhanced energy performance standards on the thermal performance of masonry construction dwellings, in the United Arab Emirates Rahma Hagi - Adan; Dr John Littlewood, Dr Fausto Sanna
seb21f-068	Demonstration of upgrading the Park and Ride parking area to sustainable modern parking complex in Warsaw Prof Dorota Chwieduk; Msc Jacek Bogusz, Prof. Wojciech Bujalski
seb21f-038	Vortex optimization of a low-head gravity hydroelectric power plant Doctor Manuel Ayala-chauvin; Engineer Jaime Ramón-Campoverde, Engineer Genís Riba-sanmartí, Engineer Henry Rojas-asuero
seb21f-014	Automatic Architectural Drawing Labelling using Deep Convolutional Neural Network Dr Seyed Masoud Sajjadian; Dr Xin Chen, Ms Mina Jafari
seb21s-006	Microstructure of EPS and aerogel-based mortars Dr Inês Flores-colen; Ms Maria Júlio, Dr Marco Pedroso

Thursday 16th Sept 2021
14:30 - 17.10 BST, Room 2

SEB-4: IS12: Urban climate change adaptation by design of buildings and urban spaces

Chair: Dr Michele Morganti

PROSE Paper No	Paper Title
seb21f-002	Impact of Climate Zone and Orientation Angle on the Recurring Massing School Typologies in Turkey Assoc. Prof. Dr. Yasemin Afacan
seb21f-009	Analysis of the influence of aerodynamic Roughness on Urban Vertical Space form: an example of Shenzhen central area Phd Candidate Di Song; Professor Jing Liu, Associate Professor Ming Lu, Phd Candidate Lu Wang, Associate Professor Jun Xing
seb21f-022	Numerical assessment of the impact of roof albedo and thermal resistance on urban overheating: A case study in southern Italy Phd Student Fatemeh Salehipour Bavarsad; Assistant Professor Elisa Di Giuseppe, Professor Marco D'orazio
seb21f-026	Low-cost architectural strategies to reduce heat stress in social housing for hot desert climates Dr. Carlos Lopez-Ordenez; Dr. Helena Coch Roura, Dr. Isabel Crespo Cabillo, Dr. Jaume Roset Calzada
seb21f-033	Energy improvement and tax credits: an opportunity for sustainable re-inhabit of Italian traditional buildings Eng.arch. Valentina Cinieri; Arch. Andrea Garzulino
seb21f-049	Open-source Integrated Mapping of Urban Form and Solar Radiation for Environmental Design Prof. Michele Morganti; Prof. Matteo Clementi, Prof. Alessandro Rogora
seb21f-051	A Multi-Functional Design Approach to Deal with New Urban Challenges Dr Mariana Pereira Guimaraes; Prof. Valentina Dessi
seb21f-044	Energy Management of a Residential Heating System through Deep Reinforcement Learning Mr. Silvio Brandi; Mr. Davide Borello, Prof. Alfonso Capozzoli, Mr. Davide Coraci

Friday 17th Sept 2021

10:30 - 12:50 BST, Room 1

SEB-5: IS13-A: Positive Energy Districts

Chairs: Dr. F. Reda / Dr. M.B. Andreucci

PROSE Paper No	Paper Title
seb21f-053	A preliminary analysis of the characterizations of positive energy districts Dr. Xingxing Zhang; Dr. Paolo Civiero, Ms. Samhita Giriraj, Mr. Santhan Reddy Penaka, Ms. Maria Nuria Sánchez
seb21f-057	Fundamentals of energy modelling for positive energy districts Mr Luigi Bottecchia; Mr Tony Castillo, Mrs Ursula Eicker, Mrs Andrea Gabaldón, Mr Saeed Ranjbar, Mrs Silvia Soutullo
seb21f-058	A systematic approach towards mapping stakeholders in different phases of PED development - Extending the PED toolbox Dr Caroline Cheng; Dr Vicky Albert-seifried, Dr Laura Aelenei, Dr Han Vandevyvere, Dr Oscar Seco, Dr M. Nuria Sánchez, Dr Mari Hukkalainen
seb21f-059	Reviewing challenges and limitations of energy modelling software in the assessment of PEDs using case studies Msc Alberto Belda; Msc Sanam Dabirian, Phd Emanuela Giancola, Phd Muhyiddine Jradi, Phd Rosaria Volpe, Meng Karen Williams
seb21f-060	Challenges for a Positive Energy District Framework Professor Koen Steemers; Dr Touraj Ashrafian, Dr Emanuela Giancola, Dr Savis Gohari Krangsas, Dr Ing Thaleia Konstantinou, Dr Mingming Liu
seb21f-027	Field performance of HVAC system under healthy and faulty conditions during the summer: preliminary development of a simulation model based on artificial neural networks PhD Student Francesco Guarino; PhD Student Mohammad El Youssef, Professor Evgueniy Entchev, Professor Luigi Maffei, Professor Antonio Rosato, Professor Sergio Sibilio
seb21s-007	The financial impact of policy schemes on PV+Battery systems in residential buildings: A case study in Cyprus Mr Nikolas Chatzigeorgiou; Mr Michalis Florides, Prof. George Georghiou

Friday 17th Sept 2021

10:30 - 12:50 BST, Room 2

SEB-6: Application of Building Physics & Engineering

Chair: Dr. John Littlewood

PROSE Paper No	Paper Title
seb21f-023	The value of the colour temperature in a low light intensity design Phd Candidate Eduardo Espinoza; Phd Carlos Alonso-montolio, Phd Helena Coch, Phd Isabel Crespo, Phd Judit Lopez-besora
seb21f-034	A Panelization Design Tool to inform decisions about façade geometry and environmental performances Eng. Marco Cucuzza; Eng. Andrea Giuseppe Di Stefano, Prof.arch. Giuliana Iannaccone, Eng. Andrea Giovanni Mainini, Prof.eng. Gabriele Masera
seb21f-042	A Numerical Investigation of Repeating Thermal Bridges from Metal Fasteners in Offsite Manufactured Timber Frame Closed Panels for Exterior Walls Mr. Francesco Zaccaro; Dr. John Littlewood
seb21f-040	A Simple Trombe Wall Enhanced with a Phase Change Material: Building Performance Study Dr. Jakub Curpek; Dr. Miroslav Cekon
seb21f-045	Daylighting design for refurbishment of built heritage: a case study Eng Alessandro Lo Faro; Prof Francesco Nocera
seb21f-048	A Proposed Method to Pre-qualify a Wireless Monitoring And Control System for Outdoor Lighting to Reduce Energy Use, Light Pollution, and Carbon Emissions Mr. Uthayan Thurairajah; Dr. George Karani, Dr. John Littlewood
seb21f-043	Smart Grid for Sustainable Cities: Strategies and Pathways for Energy Efficiency Solutions Pr Abdellah Chehri; Pr Issouf Fofana, Pr Gwanggil Jeon, Pr Saadane Rachid

Friday 17th Sept 2021

Time: 13:30 - 15:30 BST, Room 1

SEB-7: IS13-B: Positive Energy Districts

Chairs: Dr. M.B. Andreucci / Dr. F. Reda

PROSE Paper No	Paper Title
seb21f-061	State of the art on sustainability assessment of Positive Energy Districts: methodologies, indicators and future perspectives Dr Francesco Guarino; Dr Joana Bastos, Dr Adriano Bisello, Mr Alberto Brunetti, Dr Dorian Frieden, Prof Cellura Maurizio
seb21f-062	Definitions of Positive Energy Districts: A Review of the Status Quo and Challenges Dr Vicky Albert-seifried
seb21f-063	Multi-level data access control in Positive energy districts Ms Sidra Aslam; Mr Viktor Bukovszki, Dr Michael Mrissa
seb21f-066	Qualitative Assessment Methodology for Positive Energy District Planning Guidelines Mr. Hans-Martin Neumann; Dr. Laura Aelenei, Ms. Judith Borsboom, Prof. Niki Gaitani, Dr. Sergio Sergio Díaz Garayo, Dr. Daniele Vettorato
seb21f-067	Sustainable Development Goals and performance measurement of Positive Energy District: A methodological approach Assistant Professor Rosaria Volpe; Full Professor Maurizio Cellura, Full Professor Alberto Fichera, Assistant Professor Francesco Guarino
seb21f-019	Landscape Integrated Photovoltaic System for a Solar Island in the Venetian Lagoon Prof. Elena Lucchi; Arch. Antonello Durante, Ing. Sofia Tiozzo Pezzoli

Friday 17th Sept 2020

13:30 - 15:30 BST, Room 2

SEB-8: IS06: Sustainable, affordable and smart renovation of existing and historic buildings

Chair: Dr. Gianluca Maracchini

PROSE Paper No	Paper Title
seb21f-001	Examining the Deviation in Energy Saving Estimations Due to the Use of the Degree Days Method Dr. Ahmed Mokhtar
seb21f-024	A methodology for fast simulation of energy retrofiting scenarios of social building stock Research Fellow Vincenzo Vodola; Professor Ernesto Antonini, Professor Jacopo Gaspari, Research Fellow Lia Marchi
seb21f-030	Impact of climate and economic scenarios on the Global Costs of nearly Zero Energy Buildings renovations. A stochastic LCC on a reference multi-story building Dr. Gianluca Maracchini; Prof. Elisa Di Giuseppe, Prof. Marco D'orazio
seb21f-031	Retrofit strategies optimization based on indoor comfort analysis under real conditions: the case study of the secondary school ITC Carrara Prof. Rosa Romano; Ph.d, Ing. Alessandra Donato, Prof. Paola Gallo
seb21s-009	Using local and traditional building techniques to develop, implement and test a new Building Code protocol for the Caribbean, enabling resilience from the challenges of climate change reality Mr Evan Owen-Powell; Dr John Littlewood, Dr Fausto Sanna
seb21s-008	Designing and Implementing a Joined-Up, Transparent and Workable Sustainability Strategy for a Welsh Housing Association: An Introduction to the Research Mr Adam West; Prof Robert Howlett, Dr John Littlewood

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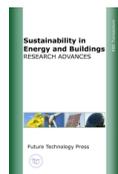
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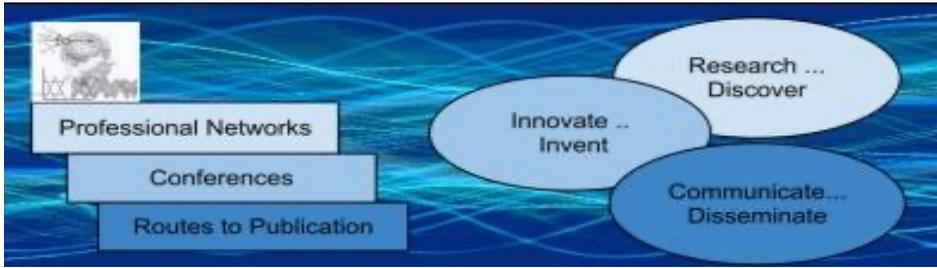
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PO Box 243
Selby
YO8 1DS
United Kingdom

Web Site: <http://www.kesinternational.org>

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KES International

2022 Calendar

SDF-2022: 20th - 22nd June



Rhodes, Greece

Smart Digital Futures 2022 brings you six of our most popular conferences: (Innovation in Medicine & Healthcare, Intelligent Decision Technologies, Human Centred Intelligent Systems, Agent & Multi-agent Systems, Smart Education & E-Learning and Smart Transportation Systems).

KES-2022: 7th - 9th September



Verona, Italy

The 26th annual **KES conference** encompasses a broad spectrum of intelligent systems related subjects, including but not limited to: automation, neural networks, fuzzy techniques and systems, machine learning, computational neuroscience, and many more!

SST-2022: 14th - 16th September



Split, Croatia

Smart Sustainable Technologies 2022 is KES's dual themed conference incorporating: Sustainability in Energy and Buildings (SEB-22) & Sustainable Design and Manufacturing (SDM-22).

All conferences in 2022 will offer a hybrid attendance option (subject to travel restrictions).



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