KES International

Smart Sustainable Technologies

Sustainable Design and Manufacturing (SDM-20)

Sustainability in Energy and Buildings (SEB-20)

Conference Programme

9-11 September 2020

KES Virtual Conference Centre

Contents

Chairs' Welcome

7th International Conference on Sustainable Design and Manufacturing SDM-20

Welcome to the 7th International Conference on Sustainable Design and Manufacturing (SDM-20) held online between 9-11 September 2020 using the new KES International Conference Centre platform and organised by KES International and Karlsruhe Institute of Technology, Germany.

The conference 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 their expertise: Prof. Massimiliano Annoni, Politecnico di Milano, Italy who gave a talk
Entitled 'Increasing the milling process sustainability through experiments, simulation and process planning supported by Industry 4.0 tools'. We are honoured with their presence and for sharing their knowledge with us at the Conference.

Conference submissions were subjected to a blind peer-review process using expert reviewers from the manufacturing community. Only the best of these 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
SDM20 Conference Chairs

12th International Conference on Sustainability in Energy and Buildings SEB-20

The 12th International Conference on Sustainability and Energy in Buildings 2020 (SEB20) is a major international conference, being held virtually through the KES Online Virtual Platform on the 9th to the 11th September 2020, because of the Covid19 pandemic. SEB20 is organised by KES International in partnership with Cardiff Metropolitan University, Wales, UK. SEB-20 invited contributions on a range of topics related to sustainable buildings and explored innovative themes regarding sustainable energy systems. The aim of the conference was to bring together researchers and government and industry professionals to discuss the future of energy 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. The conference featured General Tracks chaired by experts in the field, and in addition seven Invited Sessions were proposed by prominent researchers. SEB-20 featured two keynote speakers: Prof Steve Goodhew, the Associate Head of Research at the School of Art, Design and Architecture at the University of Plymouth, UK, who gave a talk entitled *'CobBauge: Natural, energy efficient, low carbon buildings'* and Associate Prof Umberto Berardi, Director of the BeTOP laboratory at Ryerson University in Toronto, Canada, who gave a talk entitled *'How Nanotechnologies can help in creating more Sustainable and Resilient Buildings and Communities'.*

The conference attracted submissions from around the world. Submissions for the Full-Paper Track were subjected to a blind peer-review process. Only the best of these were selected for presentation at the conference and publication in the proceedings in a volume in the KES-Springer 'Smart Innovation, Systems and Technologies' series. Submissions for the Short Paper Track were subjected to a 'lighter-touch' review and may be published in an online medium or we are considering an additional volume in the new KES-Springer series 'Advances in Sustainability Science and Technology' (speak to one of the SEB chairs for more information). Thanks are due to the very many people who have given their time and goodwill freely to make SEB-20 a success, particularly in a year where a global pandemic has affected the health and wellbeing of many people and organisations. We would like to thank the members of the International Programme Committee who were essential in providing their reviews of the conference papers. 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.

It is hoped that you find the conference an interesting, informative, and useful experience.

Dr John Littlewood, Cardiff Metropolitan University, Wales, UK
Prof Robert Howlett, 'Aurel Vlaicu' University of Arad, Romania and Bournemouth University, UK
SEB-20 Conference Chairs

SDM-20

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SEB-20

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Keynote Talks

Prof Massimiliano Annoni
Politecnico di Milano, Italy

Increasing the milling process sustainability through experiments, simulation and process planning supported by Industry 4.0 tools

Abstract: Milling is a well-known and versatile process that is spread in many industrial fields to manufacture parts of complex 3D shape made of advanced materials. Parts can be obtained through infinite combinations of process chains involving milling only or other processes depending on the target quality, times and costs. This talk deals with strategies that can be implemented when all of these constraints are pushed to the limit and the milling process must be optimized to achieve a sustainable and competitive performance.
Milling force modelling is a valuable way to have a clear representation of the tool effort and consequently select manufacturing strategies and parameters when parts are too complex or when the first-time-right approach has to be applied to satisfy constraints in customized and small batch productions.
A possible strategy to better calibrate a milling force model and minimise the number of experiments will be presented, then some examples will be made for demonstrating how milling force prediction allows a better milling process planning and a better usage of resources.
A framework can be set-up around milling and other processes for helping manufacturing companies to be competitive in this scenario by exploiting Industry 4.0 tools as digital twins, able to simulate the milling process and all related resources with a high level of accuracy by making use of both nominal data coming from their specs and real data coming from the field.
The role of machine data collection will also be discussed to support the decision-making process and facilitate flexible and zero defect manufacturing.
Some projects using this paradigm will be mentioned in this talk together with some industrial applications.

Biography: Massimiliano Annoni is Associate Professor in Technologies and Production Systems at the Department of Mechanical Engineering of Politecnico di Milano (PoliMi). He carries out research activities for developing and applying advanced manufacturing operations of milling, micromachining, high precision waterjet machining, extrusion-based additive manufacturing and their combinations in complex and hybrid process chains, with a specific attention to the application of I4.0 tools to manufacturing processes.

He is the coordinator of PoliMill, MI_crolab and WJ_Lab laboratories of the Department of Mechanical Engineering of Politecnico di Milano. He is scientific coordinator of WatAJet, a spin-off company of PoliMi dealing with high precision waterjet cutting. He has been the coordinator of various regional projects and he has participated into various European projects, including Marie Skłodowska-Curie Actions (Innovative Training Networks (ITN)). He is author of more than 120 publications on international journals and conference proceedings and he is Associate Editor of Manufacturing Letters and the Journal of Manufacturing Processes (SME).

Dr Umberto Berardi
Ryerson University, Canada

How Nanotechnologies can help in creating more Sustainable and Resilient Buildings and Communities

Abstract: The focus of this seminar will be on innovative material and construction systems that incorporate new materials and nanotechnologies for improving their performance. Recent developments in the world of phase change materials, specifically on organic PCMs, such as paraffin and bio-PCM aerogel, will be presented. Then, the seminar will show recent advancements in super-insulating materials, specifically focusing on aerogel panels, developed at the BeTOP Center in Toronto. Finally, the seminar will explore the potentialities of including innovative nanotechnologies to the urban scale to show the possible contamination and benefits for more sustainable and resilient communities. The seminar, using Toronto as a test case, will aim to comprehensively show that nanotechnologies offer a paradigm shift at the different scales of the built environment.

Biography: Dr. Berardi is the Director of the BeTOP laboratory at Ryerson University in Toronto (Ontario, Canada) and has been selected for the Canada Research Chair in Building Science at Ryerson. His main research interests are related to the study of innovative solutions and new materials for improving the performance of the built environment. Dr. Berardi has an extensive publication record, including 100 peer-reviewed journals, 100 international conference papers, and five books. Notable highlights include 4 articles in Renewable & Sustainable Energy Reviews, 4 in Applied Energy, among many others. Dr. Berardi's publications have received over 6000 citations in Google Scholar (where he has an h-index of 34). He is the Editor-in-Chief of the Canadian Acoustics journal. He is also a member of the editorial board of the many journals, including Energy and Buildings, Sustainable Cities and Society, Journal of Building Performance Simulation, Building Simulation, Sustainable Development, and many others. Dr. Berardi has an actual body of funded research comprising over $1.5 M. In the last two years, he has been awarded several grants including a Canada Foundation for Innovation JELF, an NSERC Discovery Grant, and the Early Research Award from the Ontario MRI. Dr. Berardi is currently supervising 5 Ph.D. candidates.
More info at https://sites.google.com/site/umbertoberardihomepage/

Prof Steve Goodhew
University of Plymouth, UK

CobBauge: Natural, energy efficient, low carbon buildings

Abstract: The CobBauge project is part of the European Union's effort to reduce the energy consumed for the building sector that currently represents 40% of the total energy produced, 60% of which is used by occupants to heat buildings. We need to build in different ways to achieve this goal.
Cob houses (made from soil and fibre) are commonly found in the Channel Regions of France and Great Britain and are a vernacular form of architecture, familiar to those that live and work in these geographical areas. Whilst they have very little energy embodied in them, it is difficult to get permission to build due to current building regulations in France and the UK. Thus the objective of the CobBauge project is to create new techniques and methods to thermally optimise cob material whilst still keeping the cultural and design clues that are so important to their occupants.

Biography: Prof Goodhew is the Associate Head of Research at the School of Art, Design and Architecture at the University of Plymouth. He researches into the sustainability and building performance of buildings both new and listed properties as individual units and also as urban groupings. He is an expert in the use of thermography and its use in relation to improving the building performance of homes and commercial properties. He also works in the areas of sustainable construction materials, particularly cob. He specialises in undertaking a variety thermal measurements and wider issues in relation to the energy use in buildings. Prof Goodhew is a Fellow of the RICS, CIOB and RSA.

Timetable – Wednesday 9 September

	Room1	Room 2	Room 3
9.00-9.15 BST	**Opening Ceremony** Prof. Robert J Howlett, Bournemouth University, UK		
9.15 - 10:15 BST	**Keynote Speaker 1** Dr Umberto Berardi Ryerson University, Canada How Nanotechnologies can help in creating more Sustainable and Resilient Buildings and Communities		
10:30 - 12:30 BST	**SEB 1** G01A: Sustainable & Smart Buildings Chair: Dr John Littlewood	**SEB 2** G02: Sustainable Energy Technologies Chair: Prof Robert Howlett	**SDM 1** Sustainable Manufacturing Processes and Technology Chair: Dr Andrew Rees
14:00 - 16:00 BST	**SDM 2** Decision Support for Sustainability Co-Chairs: Dr Christian Wogerer/ Dr Mariusz Cholewa	**SDM 3** Systematic Innovation Tools for Eco-Design: Products, Processes and Assessment Methods Co-Chairs: Prof Davide Russo / Yuri Borgianni	**SEB 3** IS06: Towards Sustainable Solutions to increase Built Environment Resilience and Safety Chair: Dr. Alessandro D'Amico

Timetable – Thursday 10 September

	Room1	Room 2	Room 3
9.15 - 10:15 BST	**Keynote Speaker 2** Prof Steve Goodhew University of Plymouth, UK CobBauge: Natural, energy efficient, low carbon buildings		
10:30 - 12:30 BST	**SEB 4** G01B: Sustainable & Smart Buildings Chair: Dr John Littlewood	**SDM 4** Design and management of advanced production systems in the Industry 4.0 era Co-Chairs: Dr. Marco Bortolini / Dr. Lucia Botti	**SDM 5** Sustainable Technologies in Automotive and Transportation Chair: Dr Piotr Nikonczuk
14:00 - 16:00 BST	**SEB 5** IS04: Buildings in the Circular Economy Chair: Prof Brandon Ross	**SEB 6** IS14: Cross-scale adaptive design research for fragile built environment Chairs: Dr. Michele Morganti & Prof. Alessandro Rogora	**SDM 6** Sustainability-oriented Industrial Technologies in the domain of Industry 4.0 Co-Chairs: Prof. Steffen Scholz/ Dr. Ahmed Elkaseer

Timetable – Friday 11 September

	Room1	Room 2	Room 3
9.15 - 10:15 BST	**Keynote Speaker 3** Prof. Massimiliano Annoni Politecnico di Milano, Italy Increasing the milling process sustainability through experiments, simulation and process planning supported by Industry 4.0 tools		
10:30 - 12:30 BST	**SEB 7** IS01: Design and Assessment of the Built & Natural Environment for Societal Health & Well-being (Quality of Life) Chair: Dr John Littlewood	**SDM 8** Sustainable industrial metabolism and implementation technology in green manufacturing Chair: Prof. Gang Zhao & Prof. Hua Zhang	**SEB 9** IS07: Enhancements of traditional and sustainable thermal insulation materials for energy conservation in buildings & IS12: Smart Energy Storage Integration of Renewable Energy Resources in Buildings and Transportation Co- Chairs: Dr. Stefano Cascone & Dr. Sascha Stegen

	Room1	Room 2	Room 3
13:30 - 15:30 BST	**SDM 7** Additive Manufacturing and Sustainability Co-Chairs: Prof Quanquan Han & Prof. Qian Tang	**SEB 8** IS02: Smart Offsite Manufacturing for Nearly to Net-Zero Carbon Buildings Chair: Dr John Littlewood	
15:30- 15:45 BST	**Closing Ceremony**		

SDM Paper Presentations

Wednesday 9 September
10:30 - 12:30 BST, Room 3

SDM 1: Sustainable Manufacturing Processes and Technology
Chair: Dr Andrew Rees

PROSE Paper No	Paper Title / Authors
sdm20-022	**Additive manufacturing of continuous carbon fiber-reinforced plastic components** *Prof. Dr.-Ing. Stefan Junk, M.eng. Manuel Dorner, Prof. Dipl.-Ing. Claus Fleig*
sdm20-034	**Energy utilization analysis and optimization of Corrective Insoles manufactured by 3D Printing** *Dr Andrew Rees, Dr Christian Griffiths, Miss Rachel Johnson, Mr Matthew Kirby*
sdm20-037	**Computational Validation of Injection Molding Tooling by Additive Layer Manufacture to Produce EPDM Exterior Automotive Seals** *Dr Andrew Rees, Mr Iestyn Evans, Dr Christian Griffiths, Miss Rachel Johnson*
sdm20-051	**Effect of Build Bed Location on Density and Corrosion Properties of Selective Laser Melted 17-4PH Stainless Steel** *Miss Rachel Johnson*
sdm20-091	**On the mechanical performance of Polylactic Acid from sustainable screw-based 3D printing** *Prof. Paolo Minetola, Dr. Rossella Arrigo, Eng. Luca Fontana, Prof. Luca Iuliano, Prof. Giulio Malucelli*
sdm20-012	**Test stand for metamaterials dynamic properties examination** *Prof Pk Inz Tomasz Krolikowski, Dr Inz. Andrzej Blazejewski, Mgr Inz. Remigiusz Knitter, Mgr Inz. Piotr Zmuda Trzebiatowski*

Wednesday 9 September
14:00 - 16:00 BST, Room 1

SDM 2: Decision Support for Sustainability
Co-Chairs: Dr Christian Wogerer/ Dr Mariusz Cholewa

PROSE Paper No	Paper Title / Authors
sdm20-003	**The identification and selection of good quality data using Pedigree matrix** *Dr. Xiaobo Chen, Dr. Jacquetta Lee*
sdm20-007	**Understanding customer preference: outline of a new approach to prioritise sustainability product information** *Dr Sze Yin Kwok, Prof Veselka Boeva, Dr Sophie Hallstedt*
sdm20-044	**Sustainability assessment of rapid sand mould-making using multi-criteria decision making mapping** *Dr Emanuele Pagone, Prof Mark Jolly, Dr Michail Papanikolaou, Prof Konstantinos Salonitis, Dr Prateek Saxena*
sdm20-010	**Sustainable supply chain management in fast moving consumer goods organizations** *Dr Luisa Huaccho Huatuco, Ms Yang Chen*
sdm20-027	**Saving Lives and Saving the Planet: The Readiness of Ireland's Healthcare Manufacturing Sector for the Circular Economy** *Dr Sinéad Mitchell, Ms Audrey Fayne, Ms Carla Gabercik*
sdm20-019	**Analysis and assessment of bottom-up models developed in Central Europe for enhancing Open Innovation and technology transfer in advanced manufacturing** *Dr. Maria Rosienkiewicz, Dr. Mariusz Cholewa, Dr. Joanna Helman, Dr. Grit Krause-juettler, Dr. Mateusz Molasy*
sdm20-042	**An Empirical Study of Visual Comfort in Office Buildings** *Dr Isilay Tekce, Assoc.prof Deniz Artan, Assoc.prof Esin Ergen*

Wednesday 9 September
14:00 - 16:00 BST, Room 2

SDM 3: Systematic Innovation Tools for Eco-Design: Products, Processes and Assessment Methods
Co-Chairs: Prof Davide Russo / Yuri Borgianni

PROSE Paper No	Paper Title / Authors
sdm20-002	**Bringing success and value in sustainable product development: the eco-design guidelines** *Dr. Lorenzo Maccioni, Dr. Ing. Yuri Borgianni*
sdm20-018	**Development of a Robotic System with Stand-alone Monocular Vision System for Eco Friendly Defect Detection in Oil Transportation Pipelines** *Mr. Amith Mudugamuwa, Dr. Ranjith Amarasinghe, Professor Baokun Han, Mr. Chathura Jayasundara*
sdm20-020	**A simplified TRIZ approach involving Technology transfer for reducing product energy consumption** *Prof Davide Russo, Phd Christian Spreafico, Ing Matteo Spreafico*
sdm20-021	**Calculating domestic environmental impacts: challenging and solutions for an interactive configurator** *Dr Christian Spreafico, Prof Davide Russo*
sdm20-045	**NeoPalea: compostable composite material for packaging applications** *Prof. Federico Rotini, Prof. Matteo Barbari, Prof. Leonardo Conti, Dr. Giuseppe Rossi, Prof. Marco Togni*
sdm20-081	**Control Systems Architecture with a Predictive Identification Model in Digital Ecosystems** *Professor Natalia Bakhtadze, Alexander Suleykin*

Thursday 10 September
10:30 - 12:30 BST, Room 2

SDM 4: Design and management of advanced production systems in the Industry 4.0 era
Co-Chairs: Dr. Marco Bortolini/ Dr. Lucia Botti

PROSE Paper No	Paper Title / Authors
sdm20-014	**An Association Rule-based approach for storing items in an AS/RS** *Ms Sara Antomarioni, Prof. Maurizio Bevilacqua, Prof. Filippo Emanuele Ciarapica*
sdm20-040	**Stakeholder-driven Conceptualization of Open Innovation Approaches in the SYNERGY Project** *Ms. Janin Fauth, Ms. Giulia Di Bari, Dr. Clarissa Marquardt, Mr. Nicola Raule, Ms. Johanna Lisa Ronco, Dr. Steffen Scholz*
sdm20-025	**Including ergonomic principles in the design and management of reconfigurable manufacturing systems** *Dr. Francesco Gabriele Galizia, Dr. Marco Bortolini, Dr. Lucia Botti, Professor Emilio Ferrari, Professor Cristina Mora*
sdm20-026	**Non-conventional warehouses: comparison of the handling performances** *Mr. Francesco Gualano, Dr. Marco Bortolini, Dr. Francesco Gabriele Galizia, Professor Mauro Gamberi, Mrs. Ludovica Diletta Naldi*
sdm20-049	**Blockchain-enabled ESG reporting framework for sustainable supply chain** *Mr. Xinlai Liu, Dr. Yelin Fu, Prof. George Q. Huang, Mr. Haoye Wu, Mr. Wei Wu*
sdm20-015	**Infrastructure Sharing model as a support for sustainable manufacturing** *Dr. Joanna Helman, Dr. Mariusz Cholewa, Dr. Mateusz Molasy, Dr. Maria Rosienkiewicz*

Thursday 10 September
10:30 - 12:30 BST, Room 3

SDM 5: Sustainable Technologies in Automotive and Transportation
Chair: Dr Piotr Nikonczuk

PROSE Paper No	Paper Title / Authors
sdm20-016	**The correlation study between the weather conditions and the control strategy of the Solar Water Heating System** *Mgr Inz Pawel Znaczko, Dr Inz. Kazimierz Kaminski*
sdm20-047	**Polish Public Transport Fire Safety Study** *Dr Renata Dobrzynska*
sdm20-050	**Low sulphur marine fuels panacea or a new threat?** *Dr Habilit. Eng. Agnieszka Ubowska, Dr Renata Dobrzynska*
sdm20-090	**Integrated electronic systems for acquisition of customers for transport and logistics services** *Dr Ludmila Filina-dawidowicz, Msc Deniss Bickovs, Msc Anna Cernova-bickova, Msc Daria Możdrzeń, Phd Anna Wiktorowska-jasik*
sdm20-092	**Organization and implementation of intermodal transport of perishable goods: contemporary problems of forwarders** *Dr Ludmila Filina-dawidowicz, Ing. Sara Stankiewicz*
sdm20-093	**Analysis of electric power consumption by the heat pump used in the spray booth** *Prof Piotr Nikonczuk, Dr Wojciech Tuchowski*

Thursday 10 September
14:00 - 16:00 BST, Room 2

SDM 6: Sustainability-oriented Industrial Technologies in the domain of Industry 4.0
Co-Chairs: Prof. Steffen Scholz/ Dr. Ahmed Elkaseer

PROSE Paper No	Paper Title / Authors
sdm20-036	**Event-Driven Knowledge Engineering as enabling Technology towards Configuration of Assistance Systems in Industrial Assembly** *Di Matthias Plasch, Di Sharath Chandra Akkaladevi, Di Michael Hofmann, Dr Andreas Pichler, Di Christian Wögerer*
sdm20-038	**Impact of Non-Planar 3D Printing on Surface Roughness and Build Time in Fused Filament Fabrication** *Dr Ahmed Elkaseer, Dr Tobias Müller, Mr Dominik Rabsch, Dr Steffen Scholz*
sdm20-039	**In-process Digital Monitoring of Additive Manufacturing: Proposed Machine Learning Approach and Potential Implications on Sustainability** *M.sc Amal Charles, Dr. Ahmed Elkaseer, M.sc Mandaná Moshiri, Mr. Mahmoud Salem, Dr. Steffen Scholz*
sdm20-017	**Industry 4.0 - supporting industry in design solutions - all-in-one computer cover** *Prof Pk Inz Tomasz Krolikowski, Mgr Inz Aleksander Bak, Mgr Inz. Remigiusz Knitter, Mgr Inz. Piotr Zmuda Trzebiatowski, Mgr Inz. Jerzy Zuchniewicz*
sdm20-043	**Heterogeneous Dual-frequency IoT Network for Vital Data Acquisition** *Mr. Mahmoud Salem, Dr. Ahmed Elkaseer, Dr. Islam El-Maddah, Professor Hoda Mohamed, Dr. Steffen Scholz, Dr. Khaled Youssef*
sdm20-023	**Scalability analysis in Industry 4.0 manufacturing** *Dr. Francesco Gabriele Galizia, Dr. Riccardo Accorsi, Dr. Marco Bortolini, Mr. Francesco Gualano, Mrs. Marcella Oliani*

Friday 11 September
13:30 -15:30 BST, Room 1

SDM 7: Additive Manufacturing and Sustainability
Co-Chairs: Prof Quanquan Han/ Prof. Qian Tang

PROSE Paper No	Paper Title / Authors
sdm20-024	**An Investigation of the Porosity Effects on the Mechanical Properties and the Failure Modes of Ti-6Al-4V Schwarz Primitive Structures** *Mr Shuai Ma, Dr Qixiang Feng, Dr Ying Liu, Prof Rossitza Setchi, Mr Jun Song, Prof Qian Tang*
sdm20-028	**Effect of Milling Speed and Time on Graphene Reinforced AA2024 Powder** *Mr Mulla Pekok, Prof Quanquan Han, Dr Ryan Michael, Prof Rossitza Setchi*
sdm20-029	**Mechanical behavior of NiTi-based circular tube chiral structure manufactured by selective laser melting** *Mr. Chenglong Ma, Mr. Wei Chen, Mr. Jie Gao, Prof.dr. Dongdong Gu, Prof.dr. Rossitza Setchi, Miss. Yingjie Song*
sdm20-035	**Effect of remelting process on surface quality and tensile behaviour of a maraging steel manufactured by selective laser melting** *Mr Jun Song, Dr Qixiang Feng, Dr Quanquan Han, Mr Shuai Ma, Professor Rossitza Setchi, Professor Qian Tang*
sdm20-046	**Using FFF and topology optimisation to increase crushing strength in equestrian helmets** *Dr Shwe Soe, Mr Rhosslyn Adams, Dr Khaled Giasin, Mr Tony Palkowski, Dr Michael Robinson, Dr Peter Theobald*
sdm20-048	**The effect of heat treatment of AlSi10Mg on the energy absorption performance of surface-based structures** *Dr Michael Robinson, Dr Heng Gu, Dr Quanquan Han, Prof Rossi Setchi, Dr Shwe Soe*

Friday 11 September
10:30 - 12:30 BST, Room 2

SDM 8: Sustainable industrial metabolism and implementation technology in green manufacturing
Chairs: Prof. Gang Zhao/ Prof. Hua Zhang

PROSE Paper No	Paper Title / Authors
sdm20-083	**Research on the green evaluation system of manufacturing process** *Bachelor Pengcheng Yan, Engineer Xin Huang, Engineer Xiaolong Luo, Professor Shujun Yu, Engineer Na Zhang, Professor Gang Zhao*
sdm20-084	**A Life Cycle Comprehensive Cost based Method for Active Remanufacturing Time Prediction** *Bachelor Xin Yao, Professor Zhi Jiang, Associate Professor Wei Yan, Professor Hua Zhang*
sdm20-086	**Analysis of coal gas resource utilization and energy flow view model in iron and steel enterprises** *Bachelor Xiao Li, Bachelor Xiong Liu, Bachelor Pengcheng Yan, Professor Shujun Yu, Professor Gang Zhao, Bachelor Qi Zhou*
sdm20-087	**Lightweight Design of Valve Body Structure Based on Numerical Simulation** *Bachelor Qi Zhou, Engineer Xin Huang, Engineer Xiaolong Luo, Engineer Na Zhang, Professor Gang Zhao*
sdm20-088	**Research on quantitative evaluation of green property of iron and steel enterprises based on BP neural network** *Bachelor Junsong Xiao, Bachelor Pengcheng Yan, Professor Gang Zhao*
sdm20-089	**Research on green design of valve products based on response surface method** *Bachelor Xiong Liu, Engineer Xin Huang, Engineer Xiaolong Luo, Engineer Na Zhang, Professor Gang Zhao*

SEB Paper Presentations

Wednesday 9 September
10:30 - 12:30 BST, Room 1

SEB 1: G01: Sustainable & Smart Buildings
Chair: Dr John Littlewood

PROSE Paper No	Paper Title / Authors
seb20f-003	**Thermal Comfort Assessment in an Administrative Area of an Industrial Building in Spain** *Doctor Inigo Rodriguez Vidal Doctor Xabat Oregi, Architect Jorge Otaegi*
seb20f-008	**Energy Efficiency in school buildings: The need for a tailor-made business model.** *Prof.dr. Dirk Franco Ms Evelien Cruyplandt, Prof.dr. Janiana Macke, Prof. Marijke Maes, Ir. Marleen Schepers, Prof.dr. Jean-pierre Segers*
seb20f-013	**Building Energy Simulation of 19th C Listed Dwellings in the UK: A strategy to propose and assess suitable retrofit interventions** *Mrs Michela Menconi Mr Noel Painting, Dr Poorang Piroozfar*
seb20f-016	**Rapid Identification and Evaluation of Interventions for Improved Water Performance at South Africa Schools** *Dr Jeremy Gibberd*

Wednesday 9 September
10:30 - 12:30 BST, Room 2

SEB 2: G02: Sustainable Energy Technologies
Chair: Prof Robert Howlett

PROSE Paper No	Paper Title / Authors
seb20f-004	**The Performance Potential of Domestic Heat Pumps in a Temperate Oceanic Climate** *Dr Richard O'hegarty*
seb20f-010	**CFD Based Analysis of Heat Exchanging Performance of Rotary Thermal Wheels** *Mr Dinuka Herath*
seb20f-023	**Grid export reduction based on time-scheduled charging of residential Battery Energy Storage Systems - A case study in Cyprus** *Mr Nikolas Chatzigeorgiou*
seb20f-041	**A Proposed Method to Pre-qualify Sustainable Energy-Saving LED Luminaires for Outdoor Urban Lighting Applications** *Mr. Uthayan Thurairajah*
seb20f-064	**Earth Tubes - Clean Tech Method for Improving Occupant Health and Comfort** *Mr Trevor Butler*

Wednesday 9 September
14:00 - 16:00 BST, Room 3

SEB 3: IS06: Towards Sustainable Solutions to increase Built Environment Resilience and Safety
Chair: Dr. Alessandro D'Amico

PROSE Paper No	Paper Title / Authors
seb20f-021	**Energy Efficiency Improvement of social housing in Paraguay** *Dr Fabiana Silvero Ms Micaela Goiris, Professor Sergio Montelpare, Professor Fernanda Rodrigues*
seb20f-032	**Sensitivity analysis for resilient safety design: application to a bottleneck scenario** *Phd Valentina Kurtc Phd Rainer Fischer, Phd Gerta Koster*
seb20f-034	**Collaborative Approach for Community Resilience to Natural Disaster: Perspectives on Flood Risk Management in Jakarta, Indonesia** *Dr Tri Mulyani Sunarharum Ms Mellini Sloan, Dr Connie Susilawati*
seb20f-036	**Understanding human behaviors in earthquakes to improve safety in Built Environment: a state of the art on sustainable and validated investigation tools** *Prof. Enrico Quagliarini Dr. Gabriele Bernardini, Dr. Michele Lucesoli*
seb20f-037	**Resilient and user-centered solutions for a safer Built Environment against sudden and slow onset disasters: the BE S2ECURe project** *Prof. Enrico Quagliarini Prof. Edoardo Currà, Prof. Fabio Fatiguso, Prof. Giovanni Mochi, Prof. Graziano Salvalai*
seb20f-038	**Morphological systems of open spaces in built environment prone to Sudden-onset disasters** *Phd Martina Russo Eng. Marco Angelosanti, Phd Gabriele Bernardini, Phd Elena Cantatore, Phd Edoardo Currà, Phd Alessandro D'amico*
seb20f-039	**SLow Onset Disaster events factors in Italian built environment archetypes** *Associate Professor Graziano Salvalai PhD Juan Diego Blanco Cadena, PhD Nicola Moretti, Full Professor Enrico Quagliarini*

Thursday 10 September
10:30 - 12:30 BST, Room 1

SEB 4: G01: Sustainable & Smart Buildings
Chair: Dr John Littlewood

PROSE Paper No	Paper Title / Authors
seb20f-043	**A conceptual methodology for estimating stored sequestered carbon in the built environment** *Dr Morwenna Spear Prof Callum Hill, Prof Colin Price*
seb20f-050	**Can Architectural Delight Improve Concept Design and Human Sensory Response in Schools** *Mr Philip Grant Dr John Littlewood, Professor Robert Pepperell*
seb20f-063	**Are we ready to evaluate the smart readiness of Australian buildings?** *Prof. Sanja Lazarova-Molnar Dr Nebojsa Jakica, Dr Sanja Lazarova-molnar, Dr Subbu Sethuvenkatraman*
seb20f-019	**Occupants' behavioral analysis for the optimization of Building Operation and Maintenance: a case study to improve the use of elevators in a university building** *Dr. Gabriele Bernardini Prof. Elisa Di Giuseppe, Prof. Marco D'orazio, Prof. Enrico Quagliarini*

Thursday 10 September
14:00 - 16:00 BST, Room 1

SEB 5: IS04: Buildings in the Circular Economy
Chair: Prof Brandon Ross

PROSE Paper No	Paper Title / Authors
seb20f-005	**An analysis of design support tools for circular building practice** *Ir. Arch. Charlotte Cambier Prof. Dr. Ir. Arch. Niels De Temmerman, Prof. Dr. Ir. Arch. Waldo Galle, Ir. Arch. Ineke Tavernier, Ir. Arch. Camille Vandervaeren*
seb20f-007	**Quantifying Adaptability of College Campus Buildings** *Miss Delaney Mcfarland Mr. Dustin Albright, Mr. Brandon Ross*
seb20f-012	**A conceptual framework for interpretations of modularity in architectural projects** *Ir. Arch. Ineke Tavernier Ir. Arch. Charlotte Cambier, Prof. Dr. Ir. Arch. Niels De Temmerman, Prof. Dr. Ir. Arch. Waldo Galle*
seb20f-014	**Can circularity make housing affordable again - preliminary lessons about a practical construction experiment in Flanders taking a systems perspective** *Prof. Dr. Ir. Arch. Waldo Galle Prof. Dr. Ir. Arch. Niels De Temmerman, Dr. Yves De Weerdt, Dr. Ir. Arch. Wim Debacker, Arch. Jeroen Poppe*
seb20f-015	**Challenging architectural design choices with quantified evaluations of the generality and adaptability of plan layouts** *Ir. Arch. Camille Vandervaeren Prof. Niels De Temmerman, Ir. Arch. François Denis, Dr. Waldo Galle*
seb20f-030	**Cross-fertilization between Architecture and Agricultural: a circular supply chain** *Prof. Roberto Giordano Dott. Jacopo Andreotti, Dott. Denis Faruku*

Thursday 10 September
14:00 - 16:00 BST, Room 2

SEB 6: IS14: Cross-scale adaptive design research for fragile built environment
Chairs: Dr. Michele Morganti & Prof. Alessandro Rogora

PROSE Paper No	Paper Title / Authors
seb20f-044	**Fragility of urban systems facing flooding: Evaluation of environmental and social risk in Antofagasta, Chile** *Dr Massimo Palme Eng Paola Bravo, Dr Gabriella De Angelis*
seb20f-049	**Evaluation of three lighting software in the use of different light intensity spaces** *PhD Candidate Eduardo Espinoza PhD Helena Coch, PhD Isabel Crespo, PhD Antonio Isalgué, PhD Judit Lopez-Besora*
seb20f-052	**An Urban Strategy for Adaptive Reuse: Learning from Industrial Heritage in Barcelona** *Mss Catalina Valderrama Barrero Mr Carlos Alonso-montolio, Mrs Helena Coch-roura, Mss Gloria Serra-coch*
seb20f-054	**Phytoremediation as adaptive design strategy to improve indoor air quality. Experimental results relating to the application of a vertical hydroponic biofilter** *Associate Professor Tae-han Kim Assistant Professor Byung-ryul An, Assistant Professor Matteo Clementi*
seb20f-056	**Heat flux balance in Mediterranean Climates: thermal insulation location in building enclosures** *Mss Natalia Ruiz-llaneza Mr Carlos Alonso-montolio, Ms Helena Coch, Mr Antonio Isalgue*
seb20f-061	**New proposals for sustainable design: The imitation Game as an experience of shared co-design** *Prof. Alessandro Rogora*
seb20f-062	**The role of vegetation in urban comfort: surface temperature assessment at street level** *Mrs Judit Lopez-besora Mr Carlos Alonso-montolio, Mrs Sayonara Benitez, Mr Antonio Isalgue*

Friday 11 September
10:30 - 12:30 BST, Room 1

SEB 7: IS01: Design and Assessment of the Built & Natural Environment for Societal Health & Well-being (Quality of Life)
Chair: Dr John Littlewood

PROSE Paper No	Paper Title / Authors
seb20f-002	**Analysis of the spatial morphology facing wind environment in Harbin central area** *Phd Candidate Di Song Associate Professor Ming Lu, Associate Professor Jun Xing*
seb20f-006	**Alternative municipal solid waste management systems in Morocco: Energy savings and GHG emission reduction** Phd Student Mohamed Maaouane Professor Slaven Dobrovic, Professor Goran Krajacic, Professor Smail Zouggar
seb20f-040	**Biodiversity, enabling technologies and resilient tactics for urban and rural scenarios in transition in the Inner Areas of Calabria** *Researcher Consuelo Nava Arch. Phd Giuseppe Mangano*
seb20f-042	**A Novel Approach to Controlling Outdoor Light Pollution by Adopting Smart Science and Technology to Improve Residents Quality of Life in the Built Environment** *Mr. Uthayan Thurairajah Dr. George Karani, Dr. John Littlewood*
seb20f-053	**Piloting a management and evaluation protocol for occupant quality of life in Welsh dwelling retrofits** *Mr Denis Jahic, Prof. George Karani, Dr John Littlewood*
seb20f-059	**UK Care Facilities: Is climate change contributing to overheating in dwellings and a cause of con-cern in the health of vulnerable adults** *Mr Martin Adlington, Dr Boris Ceranic*
seb20f-067	**Study on the Top Interface Optimal Design of Landscape Architecture：Case study of Cold Region Museum Regeneration Design** *Prof. Ligang Shi, Ms. Xinyu Cheng, Mr. Hongzhe Yan, Ms. Yuanxue Zhang*

Friday 11 September
13:30 -15:30 BST, Room 2

SEB 8: IS02: Smart Offsite Manufacturing for Nearly to Net-Zero Carbon Buildings
Chair: Dr John Littlewood

PROSE Paper No	Paper Title / Authors
seb20f-017	**Four Angles of Using Timber in Tall Buildings** *Dr Seyed Masoud Sajjadian, Professor Chris Barlow, Dr Laura Tupenaite*
seb20f-051	**Thermal Bridge Analysis for Offsite Manufactured Closed Timber Frame Walls** *Mr. Francesco Zaccaro, Dr. Carolyn Hayles, Dr. John Richard Littlewood*
seb20f-057	**A Pilot Study to Evaluate Smart Offsite Manufacturing of External Timber Frame Panels Using Lean Manufacturing Principles for Nearly Zero Energy Dwellings** *Miss Verity Moorhouse, Miss Elizabeth Hale, Dr John Littlewood*
seb20s-013	**A review of the context of Low-Carbon Construction in Wales and the presentation of a Research Project: a Technical Design Guide for Welsh Zero-Carbon Housing** *Miss Tansy Duncan, Dr Carolyn Hayles, Dr John Littlewood*
seb20s-005	**Comparison of two approaches for evaluating a floorplan?s ability to change: SAGA and AOM** *Ms. Makenzie Wilson, Dr. Pieter Herthogs, Lecturer Zoraya Rockow, Dr. Brandon Ross*
seb20s-006	**Hiroshima-Motomachi Housing Project - Study on Re-generation of a mass-housing** *Dr, Architect Seiji Sawada, Ma, Daisuke Hara, Ma, Architect Tetsuji Saito*

Friday 11 September
10:30 - 12:30 BST, Room 3

SEB 9: IS07: Enhancements of traditional and sustainable thermal insulation materials for energy conservation in buildings & IS12: Smart Energy Storage Integration of Renewable Energy Resources in Buildings and Transportation
Co- Chairs: Dr. Stefano Cascone & Dr. Sascha Stegen

PROSE Paper No	Paper Title / Authors
seb20f-020	**A sustainable production process for the formulation of natural historical mortars. Case study: Palazzo Ciampoli in Taormina (ME)** *Eng. Nicoletta Tomasello, Prof. Santi Maria Cascone, Arch. Giuseppe Antonio Longhitano, Dott. Lucrezia Longhitano*
seb20f-035	**Smart materials for Adaptive facde systems. The case study of SELFIE components** *Arch. Rosa Romano, Ing. Alessandra Donato, Prof. Paola Gallo*
seb20f-018	**A review of V2-X solutions by investigating different Vehicle Energy Storage Solutions for Nearly Zero Energy Buildings** *Ms Yasaman Balali, Dr Sascha Stegen*
seb20f-033	**Concept Design of a Solar Wind Turbine Blade** *Ms Kathrin Schulte, Assoc Prof Prasad Kaparaju, Dr Sascha Stegen*
seb20f-046	**Sustainable housing units for emergency: Innovative materials and construction techniques** *Renata Rapisarda, Stefano Cascone, Antonio Gagliano, Francesco Nocera, Gaetano Sciuto*
seb20s-008	**Energy Monitoring Solution for SMEs** *Mrs Ruth Ande, Prof Bamidele Adebisi, Dr Mohammad Hammoudeh, Dr Augustine Ikpehai*

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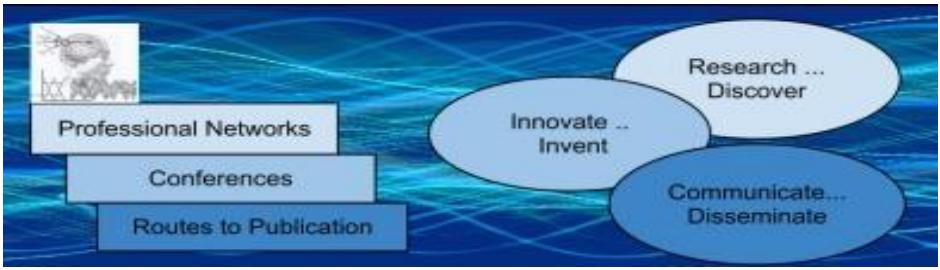

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SDF-21: 14-16 June 2021

Smart Digital Futures 2019 brings you six of our most popular conferences on various aspects of intelligent systems (Innovation in Medicine & Healthcare, Intelligent Decision Technologies, Human Centered Intelligent Systems, Agent & Multi-agent Systems, Smart Education & E-Learning and Smart Transport Systems) in the stunning city of **Rome**. It will feature a unique and exciting social programme.

KES-2021: 8-10 September 2021

We are delighted to announce that this is the 25th International Conference on Knowledge Based and Intelligent information and Engineering Systems! Celebrate with us in **Szczecin, Poland** at the **Radisson Blu Hotel** and on social events throughout this incredible and historic city.

SST-21: 15-17 September 2021

Smart Sustainable Technologies 2021 is KES's duel themed conference incorporating: Sustainability in Energy and Buildings (SEB-21) & Sustainable Design and Manufacturing (SDM-21)
It will be held at the beautiful **Hotel President**, which sits in the centre of the lively city of **Split, Croatia**. Split lies on the eastern shore of the Adriatic Sea and is Croatia's second largest city.




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