WELCOME to the 4th quarter newsletter

This newsletter spans the publication of two Editions, the 62.6 and a future Special Edition in Design Computing from Dr A. Benjamin Spaeth, Welsh School of Architecture, Cardiff University. This Special Edition as with many in ASR originated in connection with the 5th eCAADe Regional International Symposium 2017, Cardiff, Wales, UK, http://sites.cardiff.ac.uk/architecture/ecaade-ris2017 (eCAADe), Education and Research in Computer-Aided Architectural Design in Europe (eCAADe); www.ecaade.org is a peak body in the Design Computing area. We would like to thank Benjamin and the current president: Tadeja Zupancic tadeja.zupancic@fa.uni-lj.si for there support.

A number of featured papers have been selected. First ‘Solar shading devices integrating smart materials: an overview of projects, prototypes and products for advanced façade design’ Contact author Alessandro Premier, School of Architecture and Planning, Faculty of Creative Arts and Industries, The University of Auckland, Auckland Central, Continued on page 2...

IN 2017 the 5th eCAADe I Regional International Symposium (RIS) took place at the Welsh School of Architecture at Cardiff University. During this symposium, which was titled ‘The virtual and the physical’ - homonymous to this special issue - European researchers and academics came together to present their latest research discussing issues ‘between the representation of space and the making of space’. As the symposium title suggests the contributions at the symposium explored a wide territory spanning from investigations of virtual spaces and their theoretical reflection over performance-based approaches to building design to the “Whether robotic fabrication will be an alternative way for mass customising building elements in a cost-effective way outside the high-glossy architecture and academia will be revealed by time.”

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production of space and materialisation of architecture by robotic fabrication methods.

The increasing merge of the virtual and physical world and its impact to the design of architecture, the production of buildings and the role of the architect was a major motivation for the symposium.

This special issue is a collection of selected papers from the eCAADe RIS 2017 complemented by invited papers from the larger academic community working in the realm of computational methods in architecture. This collection of academic work illustrates the breath of how computation is used to guide, enhance and enable design. But also, it demonstrates the depth of investigation that is needed to make computation useful for design endeavours. The special issue is evidence that designers are on the search for and in continuous development of design tools integrating the uncountable and various aspects of design ranging from technical aspects, over materialisation up to socio-spatial qualities.

Apparently, these inquiries exist in academia, but they are increasingly infiltrating architectural practice. The question of what and how and who is influencing and controlling the design process is increasingly pressurising the practicing architect. The question whether the academic promise of computationally driven design is viable in wider architectural practice at all, is still to be answered.

Whether robotic fabrication will be an alternative way for mass customising building elements in a cost-effective way outside the high-glossy architecture and academia will be revealed by time. We are witnessing an increase in virtual reality technologies being used by architectural practices supporting mainly the client architect communication. How will virtual reality be supportive in the daily design routine of architectural practices? What are some of the viable procedures to transform the virtual representation of space into the physical space of a building? What material properties impact the fabrication process and become manifest in the design system? These are questions and issues which are not yet finally answered but the special issue attempts to contribute to their advancement.

Biography

Dr A. Benjamin Spaeth is an architect and Senior Lecturer at the Welsh School of Architecture at Cardiff University. His research is concerned with parametric design principles and computational methods in architecture. He publishes in international journals and contributes to the academic debate in some of the major CAD conferences including eCAADe, SIGRADI and CAADRIA.

In 2017 he hosted the Regional International Symposium of eCAADe at Cardiff University. Dr Spaeth leads a design studio unit on parametric design as well as the module Design for Performance in the MSc Computational Methods in Architecture.

Dr Spaeth aspires to cross-fertilise academic and practical work. He presented a virtual reality installation ‘raum.art a virtual museum’ at the ars electronica festival in Linz, as well as VR prototypes for Mercedes Benz and the “New Concert Hall Reutlingen” which combined high-quality visual representation with a real-time acoustics simulation innovatively. At Stuttgart University in collaboration with the RWTH Aachen and the High-performance Computing Centre he established a virtual space and experimentation lab to foster computational experimentation in architecture. He advises architectural practice in computational approaches to representation and fabrication of architecture and worked with award winning practices in Germany, France, Switzerland and China.

Before joining Cardiff University, Dr Spaeth was a lecturer and Programme Director of the BSc Architecture at Xi’an Jiaotong Liverpool University a RIBA accredited sino-british university in Suzhou, China as well as a research associate at the department of architecture at Stuttgart University. Dr Spaeth studied architecture at Stuttgart University and the ecole d'architecture Paris-Belleville. He received his doctoral degree from Stuttgart University for his dissertation “Architectural form finding of acoustical spaces using evolutionary algorithms.” supervised by Prof Achim Menges at the Institute of Computational Design and Construction.
BIM for Sustainable Project Delivery: review paper and future development areas

Rana Ayman, Zaid Alwan and Lesley McIntyre
Architecture and Built Environment, Northumbria University, Newcastle upon Tyne, UK

This review paper is a portion of ongoing PhD research in Northumbria University, Department of Architecture and Built Environment, supervised by Zaid Alwan and Lesley McIntyre.

Over the last decade, delivering sustainable projects has become a high priority along with the recognition of the role that BIM plays to improve efficiency.

Through interrogating existing research via a systematic literature review, this paper takes the original approach of constructing an ‘analysis map’ to ‘bridge the gap’ and highlight current limitations and successes between BIM and sustainability practices.

The findings are formulated through two parallel investigation tracks: the first is design task/ BIM capability analysis, and the second is green project delivery problem/BIM enabled sustainability application.

For the first time, this paper highlights future potential investigation areas, which are argued to be categorized into six clusters: representation; performance simulation; transaction and exchange; documentation; automation; and standardization and guidance.

Figure 1: Conceptual model for literature recommendation to future research contribution.
Solar shading devices integrating smart materials: an overview of projects, prototypes and products for advanced façade design

Alessandro Premier

School of Architecture and Planning, Faculty of Creative Arts and Industries, The University of Auckland, Auckland Central, New Zealand

Abstract

A smart material is able to provide a unique response when a particular change occurs in its surrounding environment.

In the last years, several experiments and prototypes of shading devices exploiting the potentialities of smart materials have been developed. For certain reasons, only a few materials and technologies appear to have been introduced in the building and construction market in the form of products. The aim of this research was to give an overview of projects, prototypes and products of solar shading devices integrating smart materials for advanced façade design. The article provides an overview of the topic through a literature review and a sample of 51 case studies. Such knowledge is valuable for researchers to better understand what the materials are that need further research. The results showed that colour-changing materials and photovoltaic technologies have been implemented in products while shape-memory materials are still at the testing stage.

Biography

Dr Alessandro Premier is an architect registered in Italy and PhD in Architectural Technology. He is senior lecturer at the School of Architecture and Planning of the University of Auckland, New Zealand, where he is teaching architectural and sustainable design. He taught architectural technology at IUAV University of Venice, the University of Udine and the Polytechnic University of Milan, Italy, and was visiting professor at the RheinMain University of Applied Sciences in Wiesbaden, Germany. He is a founding member of the Eterotopie Colour and Light in Architecture Research Centre, Italy, and member of the Future Cities Research Hub at the School of Architecture and Planning of the University of Auckland.

He carries out research projects and experimentations in the field of advanced technologies for the architectural envelope. His research is focused on the architectural integration of materials, products and technologies to improve the environmental quality of man-made spaces with interests in advanced façade design, building retrofit, urban regeneration, colour and light in architecture. He contributes to local and international research projects, he participates in international conferences and has authored more than 100 publications including books, essays and articles. He is also reviewer of academic journals.
Featured book

Housing Fit for Purpose

Performance, Feedback and Learning
1st Edition
By: Fionn Stevenson
RIBA Publishing
225 pages

Housing Fit for Purpose sets out a research-focused approach to looking at the challenges facing the built environment in approaching the design, construction and management of housing.

This book uses original research by the author on housing performance evaluation and distils it for built environment professionals, arguing that learning from feedback should be taking place at every stage of the housing project lifecycle, improving outcomes for end users. Drawing on active research, this book shows why and how the design, construction and management of housing can be linked to feedback and actual evidence of how people choose, and learn, to use their homes. It examines the key concepts, which underlie participatory design, occupancy feedback and learning, and includes a practical primer on how to undertake housing occupancy feedback.

Biography

Professor Fionn Stevenson holds a Chair in Sustainable Design at the University of Sheffield School of Architecture, with the role of developing cross-faculty interdisciplinary research and teaching. She has previously held academic positions in five other UK Universities and was in practice for eight years as a qualified architect prior to this. Her research and consultancy work focuses on developing innovative methods of building performance evaluation in relation to occupancy feedback in order to improve building design and develop new policy and practice in the built environment. She has held a visiting professorship at the University of British Columbia in Canada, and has worked on POE projects in the UK, Mexico and Brazil.

She is particularly interested in the control interfaces between housing and people from a holistic perspective that includes resource use in its widest dimension. She is co-director the Royal Academy of Engineering’s Centre for Excellence in Sustainable Building Design (Sheffield) and a member of the ‘Design, Engagement and Practice’ research group. As a principal and co-applicant, she has obtained and managed £1.53 million in research funding to date, derived primarily from government agencies and the EU. She has 119 publications including her seminal book: Stevenson, F. (2019) Housing Fit For Purpose: performance, feedback and learning. RIBA Publishing, London pp.1-225.

Conference Index

KEM - 2020 The 4th International Conference on Civil and Building Materials (ICCBM 2020)
17th January 2020
Okinawa, Japan

2020 The 10th International Conference on Key Engineering Materials (ICKEM 2020)
25th to 28th March 2020
Madrid, Spain
Website: http://www.ickem.org/

International Conference on Recent Engineering and Technology 2020
3rd May 2020
Bangalore, Karnataka, India
Website: http://icret.in/

ISES 6th Arts and Humanities Conference, Rome
1st to 4th June 2020
Rome, Italy
Website: https://www.ises.net/current-conferences/arts-and-humanities/6th-arts-humanities-conference-rome

CONNECTIONS: Exploring heritage, architecture, cities, art, media Conference
29th to 30th June 2020
Canterbury, United Kingdom
Website: https://architecturemps.com/canterbury-conference/

International Conference on Climate Resilient Built Environment - iCRBE2020
21st to 23rd September 2020
Bali, Indonesia
Website: https://www.weentech.co.uk/1st-icrbe/