

Third International RILEM Conference on Bio-based Building Materials

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3rd International Conference on Bio-Based
Building Materials
ICBBM2019

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Belfast, United Kingdom

Edited by
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Mohammed Sonebi and Sofiane Amziane

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Preface

The first International Conference on Bio-based Building Materials (3BM) ICBBM2015 was held in Clermont-Ferrand, 22-24 June 2015. More than 150 participants from 32 countries attended the conference. Approximately 120 papers were selected for publications in the proceedings. In 2017 a significant progress has been made in the research, development and implementation of 3BM, and the second International Conference on Bio-Based Building Materials ICBBM-EcoGrafi 2017 was held in the same city from 21-23 June 2017. More than 230 participants from a wide range of academics, researchers, students, designers and policy makers and end-users from 40 countries and 130 papers were presented at the conference.

The ICBBM2019 is an international forum for information dissemination and exchange, discussions and debates on research and practice related to innovative bio-construction materials and technologies with objectives for sustainable development. To dynamically address these, and to capitalise real opportunities which they present for the future, Queen's University Belfast and University Auvergne bring together leading building and civil engineering sector players and international experts, and other key stakeholders for what promises to be a landmark event in 2019's professional and business calendar. Working together in an international context is nowadays a basic condition for progress. The considerable developments and challenges in a rapidly changing world ask for grouping of forces and a common approach.

The conference attracted 150 people a wide range of academics, scientists, researchers, students, designers, policy makers and other industrialists from a wide variety of backgrounds, including fields of engineering, materials, sustainable, architecture, and ecological technologies, biomaterials, materials sciences, environmental engineering and government agencies, end-users, etc. Participants have the opportunity to share ideas on the state-of-the-art innovations, state-of-the-practice and future trends of bio-based building materials and sustainable materials used in construction.

The ICBBM2019 proceedings include the keynote lectures and papers presented at ICBBM2019 conference. It consists of a book of full texts of papers and extended abstracts: 4 plenary papers and 120 papers from over 28 countries. The plenary keynotes and papers cover the wide spectrum of the topics related to Natural fibres and materials, Mechanical performances of bio-based building materials and design properties, Hygroscopic and hygrothermal properties of biomaterials, Acoustic and durability performance of bio-materials, sustainability of bio-based materials, Agro-by products, treatment of fibres, Eco-friendly binders with low CO₂-emission and Low embodied carbon energy, Advances in research methodologies and Bio-materials testing, modeling building materials Rammed earth, Life-cycle assessment of materials, recycling materials, and others.

On behalf of the Local Organizing Committee of ICBBM2019, we would like to take this opportunity to express our sincere thanks to all our contributors and participants for their carefully prepared, stimulating and thought provoking manuscripts; to the organisers of conference for their dedicated task; to the members of the Technical and Scientific Committee for their time and effort of reviewing the papers and their valuable assistance, without which the conference could not be formed.

The organisation of a conference of this scale could not have been possible without the support and contributions of many organisations and individuals. This conference would not have been possible without the financial support given by the numerous sponsors. We also value the support of RILEM organization (The International Union of Laboratories and Experts in Construction Materials, Systems and Structures), American Concrete Institute (ACI) and Concrete Society (CS).

Thanks go to all those who have devoted their time and effort to the organization of the conference and publication of the proceedings, including secretarial staffs and research students for their diligent work in bringing this ICBBM2019 to success!

Belfast, 26th June 2019

Mohammed Sonebi – Queens University Belfast (UK)

Sofiane Amziane – University of Clermont Auvergne (France)



Plenary speakers



Durability of bio-based building materials

Prof. Romildo Dias Toledo Filho

Prof. Romildo D. Toledo Filho is a Full Professor of Materials and Structures at the Federal University of Rio de Janeiro (PEC/COPPE/UFRJ), Brazil. He is Director of the Centre Brazil-China for Climate Change and Energy Technology Innovation, Head of the Sustainability Center for Research and Education on Environmental Friendly Materials and Technologies (NUMATS) of the Federal University of Rio de Janeiro and President of the Brazilian Society for Non-Conventional Materials (ABMTENC). He has conducted extensive research on vegetable fibre-reinforced cement composites, bamboo materials characterization, use of bamboo as concrete reinforcement, full-culm bamboo characterization, bamboo-earth construction, bamboo-bioconcrete and rice husk ash and sugar-cane bagasse as mineral additives for concrete. Prof. Toledo Filho is the author of over 170 journal papers and over 300 papers in Conferences. He has coedited 5 books and published 15 book chapters. He has coordinated over 70 R&D projects funded by different industrial sectors.



Performance of bio-based building material: products meeting expectations

Dr. Dennis Jones

Dr. Dennis Jones is an Associate Professor at Luleå University of Technology, Skellefteå, Sweden. He has worked in areas related to wood science and technology and bio-based materials for nearly 25 years, having worked for research institutes and universities in the UK, Sweden, Denmark and The Netherlands. He was the Chair of COST Action FP1303 (Performance of Bio-based Building Materials) which concluded in 2017, and is also Vice-Chair of COST Action FP1407 (Understanding wood modification through an integrated scientific and environmental impact approach (ModWoodLife)) concluding in 2019.



Earth construction materials: from past to modern buildings

Prof. Jean-Emmanuel Aubert

Prof. Jean-Emmanuel Aubert is Professor of Civil Engineering at University Paul Sabatier in Toulouse, France. He is the head of Civil Engineering and Geosciences department of "UPSSITECH" school of engineers and he works in Laboratoire Matériaux et Durabilité des Constructions (Materials and Structures Durability Laboratory). He is the head of one of the three research teams of this laboratory dedicated to "Innovating Materials" and composed of 30 researchers and 20 PhD students. His research themes are the sustainable and low-impacts construction materials especially in the fields of waste valorization in concrete and road construction, and earthen construction materials (with or without bio-aggregates).



Growing change: designing the new city

Prof. Greg Keeffe

Prof. Greg Keeffe is Head of the School of Natural and Built Environment. He is an academic and designer with 25 years' experience in sustainability, energy use and its impact on the design of building and urban space. He has experience of working closely with architects and planners to develop exciting ways of designing buildings and re-invigorating the city through the application of innovative sustainable technologies, informing his work on the sustainable city as synergistic super-organism. In this way, he has sought to develop a series of theoretical hypotheses about our future existence on the planet, through a series of technological and spatial interventions. Most of his work comes out of a free-thinking open-ended discussion about how things should be.