

Preface

We are pleased to announce the successful co-holding of the 2023 9th International Conference on Architecture, Materials and Construction (ICAMC 2023) and the 2023 8th International Conference on Civil Engineering and Materials Science (ICCEMS 2023) in Singapore from June 14 to 16, 2023. These conferences brought together a diverse group of worldwide authors who participated through the online Zoom platform, marking a significant milestone in our conference history.

This year's meeting provided a valuable opportunity for scholars to meet and communicate with each other in person, as the COVID-19 epidemic gradually resolved, and limitations and restrictions were lifted. The academic atmosphere was vibrant, and the event witnessed numerous highlights.

We are proud to present the selection of 11 outstanding papers from global scholars that have been accepted into our conference proceedings. We extend our sincere appreciation to all the individuals who have contributed to ICAMC 2023 and ICCEMS 2023.

We would like to express our gratitude to the technical committee for their rigorous review of all the submitted papers, as well as the organizing committee and volunteers who dedicated their time and efforts to plan, promote, and organize the conferences. We are honored to have had esteemed keynote and invited speakers, including Prof. Zongjin Li, Assoc. Prof. Paulo Mendonça, Prof. Nuno Dinis Cortiços, and Prof. Andrew J. Boyd, whose valuable insights enriched the conferences.

We would also like to extend our thanks to Trans Tech Publications Ltd. for providing an excellent platform to publish the conference proceedings of ICAMC 2023 and ICCEMS 2023. We acknowledge the hard work of our colleagues involved in handling the publication procedures.

Once again, we express our gratitude to all the participants, authors, speakers, and contributors who made ICAMC 2023 and ICCEMS 2023 a resounding success. We look forward to future conferences and the continued advancement of knowledge in the fields of architecture, materials, and civil engineering.

Conference Committee Chairs

Nuno Dinis Cortiços, Universidade de Lisboa, Portugal

Zongjin Li, Macau University of Science and Technology, China

Conference Committees

Conference Chair

Nuno Dinis Cortiços, University of Lisbon, Portugal
Zongjin Li, Macau University of Science and Technology, China

Conference Co-Chairs

Eric J. Strauss, Michigan State University, USA
Paulo Mendonça, University of Minho, Portugal

Program Chairs

Marco Casini, SAPIENZA University of Rome, Italy
João Pedro Costa, University of Lisbon, Portugal
Carol Monticelli, Politecnico di Milano, Italy
Andrew Boyd, McGill University, Canada

Steering Committee

José Afon, University of Lisbon, Portugal
Marina Rynkovskaya, Peoples' Friendship University of Russia (RUDN University), Russia

Publicity Committees

Fouad K. Kaddah, Université Saint-Joseph de Beyrouth, Lebanon
Mohammad Arif Kamal, Aligarh Muslim University, India
Shady Salem, The British University in Egypt, Egypt
Silvia Mazzetto, Prince Sultan University, Saudi Arabia
Sonia Lupica Spagnolo, Politecnico di Milano, Italy

Organizing Committee

Carlos C. Duarte, University of Lisbon, Portugal
Diogo Basto, University of Lisbon, Portugal
Paulo Dinis, University of Lisbon, Portugal
Gianni Montagna, University of Lisbon, Portugal

International Technical Committee

Dariusz Fydrych, Gdansk University of Technology, Poland
Arash Radman, University of Guilan, Iran
Nastassia Sithole, University of Johannesburg, South Africa
Teerapong Senjuntichai, Chulalongkorn University, Bangkok, Thailand
Boonchai Sangpetngam, Chulalongkorn University, Thailand
Gunalaan Vasudevan, Tunku Abdul Rahman University College, Malaysia
A. N. Ede, Covenant University, Nigeria
B. Kondraivendhan, S.V. National Institute of Technology, India
Muttaqin Hasan, Syiah Kuala University, Indonesia
Haryati Yaacob, Universiti Teknologi Malaysia, Malaysia
Ana Almerich-Chulia, Universitat Politècnica de Valencia, Spain
Norhidayah Abdul Hassan, Universiti Teknologi Malaysia, Malaysia
Wan Inn Goh, Universiti Tun Hussein Onn Malaysia, Malaysia
Faridah Hanim Khairuddin, Universiti Pertahanan Nasional Malaysia, Malaysia
Romy Suryaningrat Edwin, Halu Oleo University, Indonesia
V.C. Bringas-Rodríguez, Universidad Católica San Pablo, Perú
D.L. Mayta-Ponce, Universidad Católica San Pablo, Perú

Arun Lukjan, Rajamangala University of Technology Srivijaya, Thailand
Gary Durán, Peruvian University of Applied Science, Peru
Panumas Saengam, King Mongkut's Institute of Technology Ladkrabang, Thailand
Ting Zhang, Wuxi Taihu University, China
Vladimir Simon Montoya, Universidad Continental, Perú
Fredy Alberto Huamán Mamani, Universidad Católica San Pablo, Perú
Fernando Alonso Cuzziramos Gutiérrez, Universidad Católica San Pablo, Perú
Christiono Utomo, Institut Teknologi Sepuluh Nopember, Indonesia
Ayse Ozcan, Michigan State University/SPDC Urban and Regional Planning, East Lansing, USA
Katherine Wendy Toralva Garay, Continental University, Huancayo
Isabelle Fortuné, LRA / ENSA du Toulouse, France
Arcan Yanik, Istanbul Technical University, Turkey
Morad Abdelkader, Ain Shams University, Egypt
Qi Zhou, Southeast University, China
Claudia Casapulla, University of Napoli Federico II, Italy
Fahriye Hilal Halicioglu, Dokuz Eylul University, Türkiye
Liliana Soares, Instituto Politécnico de Viana do Castelo, Portugal; Research Centre for Architecture, Urbanism and Design, Portugal
Ben Ammar Ben Khadda, University of Biskra, Algeria
Andrea Miano, University of Naples Federico II, Italy
Antonio Salzano, University of Naples Federico II, Italy
Uzma Khan, Rizvi College of Architecture, India
Wei-Ting Lin, National Ilan University, Taiwan
Kinga Korniejenko, Cracow University of Technology, Poland
Kozo Kadowaki, Meiji University, Japan
Viroon Kamchoom, King Mongkut's Institute of Technology Ladkrabang, Thailand
Li-Mei Huei, Tamkang University, Taiwan
Pavlo Maruschak, Ternopil Ivan Pul'uj National Technical University, Ukraine
Chu-Tsen Liao, National Taipei University of Technology, Taiwan
Vladimir Montoya T., Universidad Continental, Perú
Paola Pérez M., Universidad Continental, Perú
Jackeline Balvin M., Universidad Continental, Perú
Yun-Shang Chiou, National Taiwan University of Science and Technology, Taiwan
Mogrovejo Gutierrez Ruben Esau, Universidad Peruana De Ciencias Aplicadas, Peru
Ching-Yu Hsu, R.O.C. Naval Academy, Taiwan
Ya-Hui Chen, Naval Academy, Taiwan
Andhika Sahadewa, Bandung Institute of Technology, Indonesia; Indonesian Geotechnical Institute, Indonesia
Indra Djati Sidi, Institut Teknologi Bandung, Indonesia
ABBOUDI Said, Univ. Bourgogne Franche-Comté, UTBM, France
Chulsoo Kim, Pukyong National University, Republic of Korea
Xueyu Pang, China University of Petroleum (East China), China
Shoichi Ota, Kyoto Institute of Technology, Japan
Nathan Fash, Roger Williams University, USA
Olga Mesa, Roger Williams University, USA
International Reviewer Committee
Elise ZGHEIB, Saint – Joseph University, Lebanon
Theodoros Chrysanidis, International Hellenic University, Greece
Nadjib HEMAIDI ZOURGUI, National Earthquake Engineering Research Centre C.G.S, Algeria
Myzatul Aishah Kamarazaly, Taylors University Lakeside Campus, Malaysia

Ayse Ozcan, Michigan State University/SPDC Urban and Regional Planning, East Lansing, MI/USA

Katherine Wendy Toralva Garay, Continental University, Huancayo

Morad Abdelkader, Ain Shams University, Egypt

Ching-Yu Hsu, Naval Academy, Taiwan

Reviewer Committees

Choy Peng Ng, Universiti Pertahanan Nasional Malaysia, Malaysia

W. Labib, Prince Sultan University, Saudi Arabia

Abdelhakim Daoui, M'hamed Bougara University of Boumerdes, Algeria

Masykur Kimsan, Halu Oleo University, Indonesia

Shamontee Aziz, Bangladesh University of Engineering and Technology, Bangladesh

Mudhafer H. Salman, Highway and Bridges Engineering Department, Duhok Polytechnic University, Iraq

Mustapha A. Umar Sa'ad, Abubakar Tafawa Balewa University, Nigeria

Huynh, trong-phuoc, Can Tho University, Vietnam

Elise Zgheib, Saint – Joseph University, Lebanon

Theodoros Chrysanthidis, International Hellenic University, Greece

Ngoc Hieu Pham, Hanoi Architectural University, Vietnam

Bolanle Deborah Ikotun, University of South Africa, South Africa

Thi Hai Yen Nguyen, Industrial University of Ho Chi Minh City, Vietnam

Anil Cherian, Strainstall Middle East, UAE

Huber Nieto-Chaupis, Universidad Autónoma del Perú, Peru

Samuel I. Egwuonu, Owerri Imo State, Nigeria

Yun-Shang Chiou, National Taiwan University of Science and Technology, Taiwan

Rabah Hamzaoui, Université Paris-Est, Institut de Recherche en Constructibilité, France

Xing Fang, Auburn University, USA

Mohammad Alharthai, Najran University, Saudi Arabia