



# ICPIC 2023

17<sup>TH</sup> INTERNATIONAL CONGRESS ON POLYMERS IN CONCRETE 2023

Concrete-Polymer Composite in Circular Economy

# Book of Abstracts

**17th International Congress on Polymers in Concrete  
ICPIC 2023**

Warsaw, Poland, September 17-20th, 2023



**MAZURKAS**  
Congress Management

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**Monday, 18-09-2023**

<b>SPECIAL SYMPOSIUM C-PC IN CIRCULAR ECONOMY: SEARCHING FOR A NEW PARADIGM</b>			
1.	L. Czarnecki	Introduction / Opening	14:30 – 14:40
2.	L. Czarnecki, D. Van Gemert, R. Wang, M. R. Taha	Searching for a new C-PC development paradigm	14:40 – 15:00
3.	J. Tomaszewska	Construction versus circular economy	15:00 – 15:20
4.	P. Falaciński, A. Machowska	Condition of Circular Economy in Poland	15:20 – 15:40
5.	D.H. Murcia, M. Reda Taha	Emerging Materials and Technologies for Next-Generation Sustainable and Resilient Polymer Concrete	15:40 – 16:00
6.	R. Wang, S. Zhang	Interaction between polymer and cement: A review	16:25 – 16:45
7.	P. Woyciechowski, W. Jackiewicz-Rek, B. Jaworska	Soft means of concrete modification – curing conditions	16:45 – 17:05
8.	M. Frigione, J. L. B. de Aguiar	Innovative building materials containing post-consumer plastics: a rewarding example of Circular Economy in construction	17:05 – 17:25
9.	L. Czarnecki	General discussion – draft of recommendations	17:25 – 18:00
10.	L. Czarnecki	Closing the Symposium	18:00



**Mariaenrica Frigione.** Prof., PhD, from 2013 to 2019 she has been Vice-Rector of University of Salento for Technical Scientific Area and Delegate of the Rector for Internationalization. Since 2018 she is Secretary of “ICPIC – International Congress of Polymers in Concrete” Association (Member of Board of Directors in the sub-committee “International Exchange” since 2013). She is Visiting Professor at “Institute of Technology of Building Materials and Components” of Brno University of Technology, Czech

Republic (since 2019). She has been Member of the international working group on “Aging of composites (FRP) for highways and bridges” from “U.S. Department of Transportation’s Federal Highway Administration (USDOT-FHWA)”, in collaboration with the West Virginia University-Constructed Facilities Center (WVU-CFC) (2013). She is a member of the Board of Expert of TICHE Foundation (Technological Innovation in Cultural Heritage – Italy) for Topic 6: Technologies for Conservation of Cultural Heritage. She is co-author of three international patents on organic-inorganic hybrids. She is author/co-author of more than 260 publications and proceedings of conferences with more than 3000 citations with a Hirsch index of 31 (Source: Scopus). She is first/last author of 75% of her publications indexed in Scopus/Web of Science databases in her career. 28% of her publications in Scopus/Web of Science databases in the last 10 years have international co-authors. She is Associate Editor for *Polymers MDPI* and member of the Editorial Board of the following international journals: *ASCE Journal of Composite for Constructions*, *Polymers*, *Coatings*, *Restoration of Buildings and Monuments*, *Materialy Budowlane*, *Journal Archives of Civil Engineering*, *Engenharia Civil UM Journal*. She is the Guest Editor of several Special Issues and Topical Collections for the following international journals: *Polymers*, *Materials*, *Coatings*, *Sustainability*. She is among the top 2% of the most-cited scientists in the world in the rankings released by Stanford University in 2019 and 2020. She is in the top 2% of the world’s most cited researchers in Elsevier’s career-long and 2021 rankings. She is author and co-author of papers presented in more than 70 International Conferences and more than 30 Italian Conferences, also as invited speaker.

She is Reviewer for more than 60 different international indexed Journals. In 2015 she was awarded of the *Industria Felix Prize*.

Research Interests: innovative materials (cold-curing structural adhesives/matrices for FRP composites, organic-inorganic hybrids/nano-composites as adhesives and protective coatings) for Industry, Constructions and Cultural Heritage; aging, weathering and durability of polymeric materials and composites, thermosetting adhesives, construction materials, materials for Cultural Heritage, functional protective coatings for Industry, Constructions and Cultural Heritage.



**José Barroso Aguiar** is associate professor with habilitation of the University of Minho, Portugal. He is the Director of the Research Centre Territory, Environment and Construction of the University of Minho. He is also the Director of the Doctoral Program in Wastes Management and Treatment. His main research topics are sustainable construction materials, mainly sustainable mortars and concretes. In the last 5 years, he has published 3 books and about 50 scientific papers in international peer-reviewed journals ( $h = 28$ ). In 2018, he won the Owen Nutt Award from International Congress Polymers in Concrete organization. He is member of the Editorial Board of 16 international journals. He was member of the Scientific Commission of about 90 international and national conferences.

## **Innovative building materials containing post-consumer plastics: a rewarding example of Circular Economy in construction**

Mariaenrica Frigione <sup>1\*</sup> and José Luís Barroso de Aguiar <sup>2\*\*</sup>

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Circular Economy, which it is among the priorities of the European Commission, is defined as an economy in which the value of products, materials and resources is maintained for as long as possible and the production of waste is reduced to minimum. Keeping in mind the impact on the environment caused on the one hand by post-consumer plastic waste and on the other hand by production processes of concrete, it is possible to find a solution able, at least partly, to mitigate these two issues. Following the principles of the circular economy, in fact, it is possible to reuse post-consumer plastic waste as fine aggregates in concrete: in this way, post-consumer plastic from waste becomes a resource; at the same time, the use of other natural resources is limited, such as the minerals traditionally used as aggregates in concrete. However, this virtuous solution still presents some problems to study and solve: this work aims to illustrate some of these issues, and provides indications on the aspects to be analyzed and solved.

**Keywords:** Circular economy, Concrete, Post-consumer plastics, Recycling, Sustainable building materials.