

EXHIBITION CATALOG

INTERNATIONAL ITINERANT EXHIBITION

“RESEARCH IN BUILDING ENGINEERING EXCO’22”

INTERNATIONAL ITINERANT EXHIBITION EXCO 2022

ETS DE INGENIERÍA DE EDIFICACIÓN

UNIVERSITAT POLITÈCNICA DE VALÈNCIA

Camino de Vera S/N, 46022 Valencia – Spain

Location:

UNIVERSIDAD TECNOLÓGICA DE LA HABANA
José Antonio Echeverría
LA HABANA - CUBA

From December 1st to December 9th, 2022

FACULTY OF CIVIL ENGINEERING

Calle 114 # 11901 / Ciclovía y Rotonda CP 11500, Marianao, Habana 15, La Habana, CUBA.

Curators of Exhibition:

Dra. Odalys ÁLVAREZ RODRÍGUEZ (Local Curator)

Dr. Alejandro LÓPEZ LLANUSA (Local Curator)

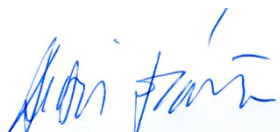
Dr. Hugo R. WAINSHOK RIVAS (Local Curator)

Dr. José Ramón ALBIOL IBÁÑEZ (International Curator)

Exhibition

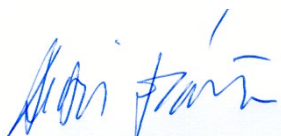
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INTERNATIONAL ITINERANT EXHIBITION “Research in Building Engineering - EXCO’22”



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EDIFICACION

PROLOGO CUJAE

La Facultad de Ingeniería Civil de la Universidad Tecnológica de La Habana José Antonio Echeverría (CUJAE, CUBA) ha tenido el honor de ser anfitriona, por cuarto año consecutivo, de la Exposición Internacional EXCO 2022 'Research in Building Engineering'. La misma estuvo enmarcada en el V Congreso Internacional de Ingeniería Civil, evento que formó parte a su vez de la XX CONVENCION CIENTIFICA DE INGENIERIA Y ARQUITECTURA (CCIA 20) celebrada en el mes de noviembre del mismo año. El Palacio de las Convenciones de la Habana fue la sede escogida para exponer una selección de carteles que ilustraban trabajos científicos en campos tan diversos como la Construcción, la Arquitectura, el Urbanismo, la Protección del Medio Ambiente, la Economía, el Patrimonio Cultural y la Ingeniería Neuronal los cuales despertaron el interés de visitantes y delegados por igual, tanto por su calidad intrínseca como por la amplitud del espectro de temas abarcados. Este evento es una gran oportunidad para divulgar la ciencia que se hace alrededor de todo el mundo, así como para propiciar el intercambio y encuentro de líneas de investigación comunes a escala internacional. Queremos destacar que este enorme éxito no hubiera sido posible sin el enorme compromiso personal invertido en la preparación de la exposición original EXCO 2022 por parte del Dr. José Ramón Albiol Ibáñez y todo su equipo de la Universidad Politécnica de Valencia. Estamos seguros que esta voluntad se verá retribuida por el alcance de un público cada vez más amplio con el cual, más allá de fines puramente científicos, también se pretenden crear y fortalecer los lazos de integración, intercambio y amistad imprescindibles para la consolidación de una comunidad científica internacional que esté a la altura de su misión social.

Dr. Alejandro López Llanusa



CUJAE'S FOREWORD

The Faculty of Civil Engineering of the José Antonio Echeverría Technological University of Havana (CUJAE, CUBA) has had the honor of hosting, for the fourth consecutive year, the EXCO 2022 'Research in Building Engineering' International Exhibition. It was framed in the V International Congress of Civil Engineering, an event that was part of the XX SCIENTIFIC CONVENTION OF ENGINEERING AND ARCHITECTURE (CCIA 20) held in November of the same year. The Palacio de las Convenciones de La Habana was the venue chosen to exhibit a selection of posters illustrating scientific works in fields as diverse as Construction, Architecture, Urbanism, Environmental Protection, Economy, Cultural Heritage and Neural Engineering, which aroused the interest of visitors and delegates alike, both for their intrinsic quality and for the breadth of the spectrum of topics covered. This event is a great opportunity to disseminate the science that is done around the world, as well as to promote the exchange and meeting of common lines of research on an international scale. We want to highlight that this enormous success would not have been possible without the enormous personal commitment invested in the preparation of the original EXCO 2022 exhibition by Dr. José Ramón Albiol Ibáñez and his entire team from the Polytechnic University of Valencia. We are sure that this desire will be rewarded by the reach of an ever-widening public with which, beyond purely scientific purposes, it is also intended to create and strengthen the bonds of integration, exchange and friendship essential for the consolidation of a community international scientist that lives up to its social mission.

Dr. Alejandro López Llanusa



PROLOGUE DIRECTOR EXCO'22

The Faculty of Building Engineering of the UNIVERSITAT POLITÈCNICA DE VALÈNCIA - SPAIN, organized on June 13th to 17th, 2022, "The XXXVI Construction Technology Exhibition" EXCO'22 and the International Itinerant Exhibition "Research in Building Engineering" along year.

Conferences are scheduled in UNIVERSITAT POLITÈCNICA DE VALÈNCIA - SPAIN, the speakers are national and international of recognized prestige from Europe, Asia and America. These conferences are aimed at professionals and students of the UPV to broaden their knowledge and experiences.

EXCO'22 promotes the entrepreneurship of the young UPV generations, participation in conferences.

The International Itinerant Research Exhibition EXCO'22 has the collaboration of 63 Universities from America, Europe, Africa, Asia and Oceania. Promoting collaboration between institutions and professors at the international level.

It fosters interdisciplinary collaboration of the professor staff within the UPV with 63 International Universities; It has the participation of 9 departments and 8 research institutes of the UPV in EXCO'22.

The participating entities are:

Universities:

1. *Universitat Politècnica de València, España.*
2. *Politecnico di Milano, Italia.*
3. *Mimar Sinan Fines Arts University, Istanbul, Turkey.*
4. *Nottingham Business School, England.*
5. *Vilnius Gediminas Technical University, Vilnius, Lithuania.*
6. *Universidad de Costa Rica*
7. *Università degli Studi di Basilicata, Matera, Italia.*
8. *Universidad Tecnológica de La Habana José Antonio Echeverría, Cuba.*
9. *Università degli Studi Firenze, Italia*
10. *Università di Pavia, Italia.*
11. *Odessa State Academy of Civil Engineering & Architecture, Odessa, Ukraine*
12. *Università di Salerno, Italia.*
13. *Silesian University of Technology, Politechnika Śląska, Gliwice, Poland.*
14. *University of British Columbia, Vancouver, Canada.*
15. *Universidad de Alcalá de Henares, Madrid, España.*
16. *Florida A&M University, Florida, USA.*
17. *Universidad Mayor de San Andrés, La Paz, Bolivia.*
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23. *Politecnico di Bari, Italia.*
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25. *Hanze University of Applied Sciences, Groningen. Nederland.*



26. *Jade Hochschule Wilhelmshaven/Oldenburg, Germany.*
27. *New York University, Tandon School of Engineering. USA.*
28. *McGill University, Canada*
29. *Nanyang Technological University, Singapore.*
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33. *Beijing Yong Shan Media Co., Ltd. Pekin*
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38. *University North, Varaždin, Croacia*
39. *South Ukrainian National Pedagogical University, Odessa, Ukraine.*
40. *Kharkiv National University of Civil Engineering and Architecture, Ukraine.*
41. *Universitat de València, Spain.*
42. *Perm National Research Polytechnic University, Perm, Russia*
43. *University of Cape Town, South Africa.*
44. *National University of Singapore.*
45. *TU Delft, The Netherlands.*
46. *Politecnico di Torino, Italy.*
47. *Wuhan University, Wuhan, China.*
48. *University of Oregon, USA.*
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50. *Shenzhen University School of Architecture, Shenzhen, China.*
51. *Hokkaido University, Sapporo, Japan*
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61. *Tecnológico de Monterrey. México.*
62. *MIT Massachusetts Institute of Technology. USA.*
63. *Gdańsk University of Technology, Poland.*

Thank you all for making EXCO possible.

Best Regards

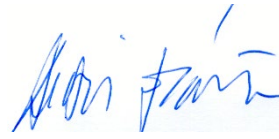
Dr. José R. Albiol-Ibáñez

**Vice Dean International Relations, Employment, Business Cathedra & Entrepreneurship
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CHAPTER 1 ECONOMY

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Alejandro Campillo Almajano / Alicia Llorca-Ponce / Andrés José Cózar Lizandra

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M^a Emilia Casar Furió

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Alicia Llorca-Ponce / Adrián González Jiménez / Gregorio Rius-Sorolla

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Mayte Maldonado Alvarez / Igor Fernández Plazaola / Antoni Montañana i Aviñó

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Fabiola Colmenero Fonseca / Francisco Javier Cárcel Carrasco / Graziella Bernardo / Luis Manuel Palmero Iglesias / Jorge Arturo Gutiérrez Camarena

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2.8.- ENERGY DECARBONISATION IN SMEs. INITIAL RESULTS IN SMEMPOWER PROJECT

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2.9.-ORGANIZATION OF INFORMATION FOR INDUSTRIAL BUILDINGS' EVALUATION. RecoverIND

C. Rivero-Camach / A. Martínez-Rocamora / M.D. Alba-Rodríguez / J. Solís-Gumán1,2,3, M. Marrero

2.10.- RENEWABLE ENERGY TECHNOLOGIES IN UNIVERSITY BUILDINGS IN THE IBERIAN PENÍNSULA: A STUDY OF ARCHITECTURAL AND URBAN PLANNING BARRIERS

Joaquín Fuentes-del-Burgo / Elena Navarro-Astor

2.11.- ORGANIZATION OF INFORMATION FOR INDUSTRIAL BUILDINGS' EVALUATION. RECOVERIND

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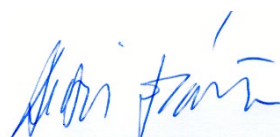
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