

CATALOGUE
CATÁLOGO

INTERNATIONAL ITINERANT EXHIBITION
EXPOSICIÓN ITINERANTE INTERNACIONAL

RESEARCH in BUILDING ENGINEERING
INVESTIGANDO en INGENIERÍA de EDIFICACIÓN

EXCO'19



UNIVERSITAT
POLITÈCNICA
DE VALÈNCIA

ESCUELA TÉCNICA SUPERIOR DE INGENIERÍA DE EDIFICACIÓN

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de la

EXPOSICIÓN ITINERANTE INTERNACIONAL

INVESTIGANDO

en INGENIERÍA de EDIFICACIÓN EXCO'19

UNIVERSITAT POLITÈCNICA DE VALÈNCIA

ETS de INGENIERÍA de EDIFICACIÓN

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According to the temporary order of the itinerances:

LOCAL CURATORS:

VALENCIA (Spain)

CEVISAMA – Feria Valencia

from January 30th to February 1st 2019

Avinguda de les Fires, s/n, 46035 València - SPAIN

Curator:

ALBIOL IBÁÑEZ, José Ramón

Universitat Politècnica de València

BEIJING (China)

BEIJING YONG SHAN MEDIA CO., LTD, PEKIN

From 21th to 30th March, 2019

Building 47, North District. No.2 Yuquan road, Haidian District, Beijing 100143

Curators:

Zhang LING

Beijing Yong Shan Media Co., Ltd, Pekin

ALBIOL IBÁÑEZ, José Ramón

Universitat Politècnica de València

GLIWICE (Poland)

Silesian University of Technology

From April 26th to May 10th, 2019.

Akademicka 5, 44-100 Gliwice, Poland

Curators:

DAWCZYŃSKI, Szymon

Silesian University of Technology, Gliwice

GÓRSKI, Marcin

Silesian University of Technology, Gliwice

ALBIOL IBÁÑEZ, José Ramón

Universitat Politècnica de València

MILAN (Italy)

POLITECNICO DI MILANO

Scuola di Architettura Urbanistica Ingegneria delle Costruzioni AUIC

From April 29th to May 7th, 2019

Via Andrea Maria Ampère, 2, 20133 Milano MI, Italia

Curators:

POLI, Tiziana

Politecnico di Milano

RE CECCONI, Fulvio

Politecnico di Milano

ALBIOL IBÁÑEZ, José Ramón

Universitat Politècnica de València

SALERNO (Italy)

UNIVERSITÀ DEGLI STUDI DI SALERNO

Dipartimento di Ingegneria Civile- UNISA

From 6th to 13th June, 2019

Via Giovanni Paolo II, 132 - 84084 Fisciano (SA)

Curators:

DI RUOCCO, Giacomo

SICIGNANO, Enrico

ALBIOL IBÁÑEZ, José Ramón

Università degli Studi di Salerno

Università degli Studi di Salerno

Universitat Politècnica de València

ISTANBUL (Turkey)

MIMAR SINAN FINE ARTS UNIVERSITY

From 2th to 9th July, 2019

Pürtelaş Hasan Efendi, Meclis-i Mebusan Cd. No:24, 34427

Beyoğlu/İstanbul, Turquía

Curators:

HATTAP, Sibel Onat

ALBIOL IBÁÑEZ, José Ramón

Mimar Sinan Fine Arts University

Universitat Politècnica de València

ODESSA (Ukraine)

**ODESSA STATE ACADEMY OF CIVIL ENGINEERING
AND ARCHITECTURE**

From 24th September to 1st November, 2019

Didrikhdona St, 4, Odesa, Odessa Oblast, Ukraine, 65000

Curators:

EKSAROVA, Nadia

EKSAREV, Vladimir

ALBIOL IBÁÑEZ, José Ramón

Odessa State Academy of Civil Engineering &
Architecture

Odessa State Academy of Civil Engineering &
Architecture

Universitat Politècnica de València

MATERA (Italy)

Ex Ospedale di San Rocco – Chiesa di Cristo Flagellato

From 22th to 29th October, 2019

Piazza San Giovanni Battista, Matera

Curators:

GUIDA, Antonella

ANDRISANI, Giuseppe

BERNARDO, Graziella

ALBIOL IBÁÑEZ, José Ramón

Università degli Studi della Basilicata

Università degli Studi della Basilicata

Università degli Studi della Basilicata

Universitat Politècnica de València

VILNIUS (Lithuania)

VILNIUS GEDIMINAS TECHNICAL UNIVERSITY

From 5th to 14th November, 2019
Saulėtekio al. 11, Vilnius 10221, Lithuania

Curators:

ŠLIOGERIENĖ, Jūratė
VILUTIENĖ, Tatjana
ALBIOL IBÁÑEZ, José Ramón

Vilnius Gediminas Technical University
Vilnius Gediminas Technical University
Universitat Politècnica de València

OLDENBURG (Germany)

JADE HOCHSCHULE University of Applied Sciences

From 7th to 12th November, 2019
Friedrich-Paffrath-Straße 101, 26389 Wilhelmshaven

Curators:

PRIESEMANN, Thomas
ALBIOL IBÁÑEZ, José Ramón

University Jade Hochschule
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RE CECCONI, Fulvio	Politecnico di Milano

TURKEY

HATTAP, Sibel Onat	Mimar Sinan Fine Arts University, Istanbul
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ŠLIOGERIENĖ, Jūratė
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Vilnius Gediminas Technical University

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Odessa State Academy of Civil Engineering &
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YEKSAROV, Vladimir

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GORSKI, Marcin

Silesian University of Technology, Gliwice
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Sibel Onat HATTAP

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PRÓLOGO DIRECTOR ETS de INGENIERÍA de EDIFICACIÓN

Finalizado el Salón Tecnológico de la Construcción -Exco 2019- y al analizar los resultados del mismo, podemos concluir que, una vez más, hemos superado con creces los objetivos marcados.

Por lo que respecta a la "Exposición de Tecnología e Investigación en Edificación", su comité científico internacional, seleccionó un total de 117 paneles y 55 artículos, por lo que nadie pone en duda de que estamos ante un certamen que es referente para los investigadores del sector de la edificación, tanto nacionales como de otros países. Una de nuestras principales aspiraciones ha sido su internacionalización y que todas las 37 universidades participantes pudieran mostrar sus investigaciones en la exposición, por lo que, a lo largo de este año, será itinerante por diversas universidades participantes.

Asimismo quiero resaltar la calidad de las conferencias impartidas, el alto nivel de los conferenciantes y el interés de las actividades desarrolladas.

Por último, quiero transmitir, en nombre de la Escuela Técnica Superior de Ingeniería de Edificación de la Universitat Politècnica de València el agradecimiento a CEVISAMA por el apoyo a este evento, al profesor José Ramón Albiol Ibáñez, director de Exco 2019 y a todo su equipo que, con su trabajo y dedicación, lo han hecho posible.

¡¡Exco 2020 nos espera!!

Dr. Francisco Javier Medina Ramón
Director de la Escuela Técnica Superior de Ingeniería de Edificación

PROLOGUE DIRECTOR ETS of BUILDING ENGINEERING

After finishing the Technological Fair of Construction-Exco 2019- and analyzing the results of it, we can conclude that, once again, we have far exceeded the objectives set.

With regard to the "Exhibition of Technology and Research in Building", its international scientific committee, selected a total of 117 panels and 55 articles, so no one doubts we are facing a contest that is a reference for researchers in the building sector, both national and other countries. One of our main aspirations has been its internationalization and that all 37 participating universities could show their research in the exhibition, so, throughout this year, it will be traveling by several participating universities.

I also want to highlight the quality of the lectures given, the high level of the speakers and the interest of the activities developed.

Finally, I would like to convey, on behalf of the Technical School of Building Engineering of the Universitat Politècnica de València, the thanks to CEVISAMA for the support of this event, to Professor José Ramón Albiol Ibáñez, director of Exco 2019 and to all his team, with their work and dedication, they have made it possible.

Exco 2020 awaits us !!

*Dr. Francisco Javier Medina Ramón
Director ETS of Building Engineering*

PROLOGUE DIRECTOR EXCO'19

Once completed The XXXIII CONSTRUCTION TECHNOLOGY EXHIBIT - EXCO'19 within the activities planned in the International Salon CEVISAMA, organized by the ETS of Building Engineering; I am writing to all of you Professors, Director, Management Team, Administration and Services Personnel, Scientific Committee, Organizing Committee, Speakers, Participants, Delegation of Students and Students for the excellent collaboration in EXCO'19.

I wish to convey my sincere thanks to all of you who make possible EXCO, projecting in an international event such as CEVISAMA, the technological and human greatness of our Faculty.

*In this edition the exhibition has been presented by various European and Asian Universities throughout the year 2019, so it will have an international character. In chronological order, exhibitions have been held at the **Beijing Yong Shan Media Co., Ltd. Pekin (China)**, **Silesian University of Technology (Poland)**, **Politecnico di Milano (Italy)**, **Università degli studi di Salerno (Italy)**, **Mimar Sinan Fine Arts University (Istanbul)**, **Odessa State Academy of Civil Engineering and Architecture (Ukraine)**, **Università degli studi della Basilicata Matera (Italy)**, **Vilnius Gediminas Technical University VGTU (Lithuania)**, **Jade hochschule Wilhelmshaven Oldenburg (Germany)**. This is a wonderful experience for all. Thank you for all the effort and dedication they have used to make this exhibition possible.*

Thank you all for making EXCO possible.

All the best for EXCO'19!

Best Regards

Dr. José R. Albiol-Ibáñez

Vice Dean International Relations, Exchange Programs, Communication & Entrepreneurship.

Director EXCO'19

ETS Building Engineers - Building 1B

Camino de Vera S/N 46022 Valencia SPAIN

UNIVERSITAT POLITÈCNICA DE VALÈNCIA

PROLOGUE DIRECTOR EXCO'19

Thank you for all the effort and dedication they have realized to make this Catalogue book possible.

I want to thank the excellent participation of the collaborating Universities:

1. *Universitat Politècnica de València, España.*
2. *Nottingham Business School, England.*
3. *Vilnius Gediminas Technical University, Vilnius, Lithuania.*
4. *Universidad de Costa Rica*
5. *Università degli Studi di Basilicata, Matera, Italia.*
6. *Universidad Tecnológica de La Habana José Antonio Echeverría, Cuba.*
7. *Università degli Studi Firenze, Italia*
8. *Università di Pavia, Italia.*
9. *Odessa State Academy of Civil Engineering & Architecture, Odessa, Ukraine*
10. *Politecnico di Milano, Italia.*
11. *Università di Salerno, Italia.*
12. *Silesian University of Technology, Politechnika Śląska, Gliwice, Poland.*
13. *University of British Columbia, Vancouver, Canada.*
14. *Universidad de Alcalá de Henares, Madrid, España.*
15. *Florida A&M University, Florida, USA.*
16. *Mimar Sinan Fines Arts University, Istanbul, Turkey.*
17. *Universidad Mayor de San Andrés, La Paz, Bolivia.*
18. *Universidad de la República (Udelar) de Uruguay.*
19. *Universidad John F. Kennedy, Argentina.*
20. *Universidad de Castilla-La Mancha, España.*
21. *Universidad de Granada, España.*
22. *Università degli Studi della Campania "Luigi Vanvitelli", Napoli.*
23. *Politecnico di Bari, Italia.*
24. *Università degli Studi di Roma "Tor Vergata", Italia.*
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.*
30. *University of New South Wales, Sydney, Australia.*
31. *Università di Pisa, Italia.*
32. *Universidad de Ibagué, Colombia.*
33. *Beijing Yong Shan Media Co., Ltd. Pekin*
34. *Università degli Studi dell'Aquila, Italia.*
35. *Universitat Jaume I, Castellón, España.*
36. *University of Applied Sciences and Arts of Southern Switzerland*
37. *Institut für Bau- und Infrastrukturmanagement /ETH Zürich*

Thank you all for making EXCO possible. All the best for EXCO'20!

Best Regards

*Dr. José R. Albiol-Ibáñez
Vice Dean International Relations, Exchange Programs, Communication & Entrepreneurship.
Director EXCO'19
ETS Building Engineers - Building 1B
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UNIVERSITAT POLITÈCNICA DE VALÈNCIA*

北京開幕

在北京的第一年榮幸地主辦了國際展覽會 EXCO 2019 "建築工程研究"。在我公司的主廳裡可以看到張貼著建築，建築，城市規劃，環境保護，經濟學，文化遺產甚至神經工程等領域的科學作品的海報。如此廣泛的演講主題引起了大學的學生和員工對展覽的極大興趣。在這一點上，應該強調的是，如果沒有巨大的個人承諾來籌備何塞·拉蒙·阿爾比奧爾·伊巴涅斯博士和他的整個團隊，來自瓦萊尼亞大學的波哥大理工大學的原EXCO 2019 José Ramón Albiol Ibáñez 展覽就不可能實現。將戰車交給 Rodolfo Navarro 先生的合作。

Mr. Zhang Ling

PROLOGUE BEIJING

The first year in Beijing had the honour to host the international exhibition EXCO 2019 'Research in Construction Engineering'. Posters presenting scientific works in such fields as construction, architecture, urban planning, environmental protection, economics, cultural heritage and even neural engineering could be seen in my company main hall. Such a wide spectrum of presented topics resulted in a very high interest of professionals visiting the exhibition. At this point, it should be emphasized that this enormous success would not have been possible without a huge, personal commitment to the preparation of the original EXCO 2019 exhibition by Dr. José Ramón Albiol Ibáñez and his entire team from the Universitat Politècnica de València. Give the Tanks to Mr. Rodolfo Navarro for his collaboration.

Mr. Zhang Ling

WSTĘP GLIWICE

Wydział Budownictwa Politechniki Śląskiej w Gliwicach już trzeci rok z rzędu miał zaszczyt gościć w swoich murach międzynarodową wystawę EXCO 2019 „Badania w Inżynierii Budowlanej”. W dniach od 26 kwietnia do 10 maja 2019 roku w holu głównym budynku Wydziału można było oglądać postery przedstawiające prace naukowe z takich dziedzin jak budownictwo, architektura, urbanistyka, ochrona środowiska, ekonomia, dziedzictwo kulturowe czy nawet inżynieria neuronowa. Tak szerokie spektrum prezentowanych tematów wpłynęło na bardzo duże zainteresowanie studentów i pracowników Uczelni odwiedzających wystawę. W tym miejscu należy podkreślić, że tego olbrzymiego sukcesu nie byłoby bez ogromnego, osobistego zaangażowania w przygotowanie oryginalnej wystawy EXCO 2019 dra inż. José Ramóna Albiola Ibáñeza oraz całego Jego zespołu z Politechniki w Walencji. A fakt, że z roku na rok wystawa poszerza grono swoich odbiorców, goszcząc w nowych krajach i na nowych uczelniach partnerskich, świadczy o potrzebie organizacji takich wydarzeń, które oprócz celów czysto naukowych mają również za zadanie integrację międzynarodowego środowiska naukowego.

Dr. Szymon DAWCZYŃSKI

PROLOGUE GLIWICE

The Faculty of Civil Engineering at the Silesian University of Technology (Gliwice, Poland) for the third year in a row had the honour to host the international exhibition EXCO 2019 'Research in Construction Engineering'. From April 26 to May 10, 2019, posters presenting scientific works in such fields as construction, architecture, urban planning, environmental protection, economics, cultural heritage and even neural engineering could be seen in the Faculty's main hall. Such a wide spectrum of presented topics resulted in a very high interest of students and employees of the University visiting the exhibition. At this point, it should be emphasized that this enormous success would not have been possible without a huge, personal commitment to the preparation of the original EXCO 2019 exhibition by Dr. José Ramón Albiol Ibáñez and his entire team from the Universitat Politècnica de València. And the fact that from year to year the exhibition expands its audience by visiting new countries and new partner universities shows the need to organize such events, which in addition to purely scientific purposes are also intended to integrate the international scientific community.

Dr. Szymon DAWCZYŃSKI

PROLOGO MILANO**EXCO and Politecnico di Milano
By Tiziana Poli* and Fulvio Re Cecconi****

* AUIC School, ABC Dept, Politecnico di Milano – Head of Building and Construction Engineering BScEng Degree

** AUIC School, ABC Dept, Politecnico di Milano – Vice-Head of Building and Construction Engineering BScEng Degree

Il Politecnico di Milano con il corso di Ingegneria edile e delle costruzioni partecipa a EXCO dal 2017. Questa iniziativa ha segnato il processo di internazionalizzazione del corso di studi che da questa collaborazione ha tratto un notevole impulso di crescita. Il confronto (e la mostra itinerante è sicuramente il principale riferimento del confronto) tra docenti, ricercatori e studenti sui principali temi di innovazione nel settore della costruzioni per la ricerca e la didattica, è sicuramente un valore aggiunto per la definizione di percorsi formativi condivisi e/o complementari, per l'integrazione delle competenze ad una scala sovranazionale e per porre le basi di una ricerca di alto profilo. I temi e gli ambiti di ricerca attualmente esplorati nel corso di studi di Ingegneria edile e delle costruzioni sono principalmente orientati a:

- l'ingegnerizzazione del progetto, per quanto attiene agli aspetti tecnologici (involucro, strutture, impianti meccanici, impianti elettrici, ...), prestazionali (modellazione e validazione delle prestazioni tra le quali il contenimento dei consumi energetici, il comfort, la sicurezza, ...), operativi e cantieristici;
- l'ingegnerizzazione del processo edilizio che, a partire dal progetto, si sviluppa attraverso l'appalto, la costruzione, il collaudo, la gestione, la manutenzione, la dismissione;
- la gestione dei flussi informativi digitali nel processo edilizio (BIM based);
- la progettazione di materiali e di componenti edilizi innovativi e il relativo controllo del processo produttivo;
- l'attività di supporto alla progettazione architettonica e alla direzione dei processi tecnico-amministrativi.

I differenti approcci alla ricerca mostrati dalle sedi che partecipano a EXCO mettono in evidenza la ricchezza e l'innovazione che contraddistinguono oggi il settore delle costruzioni. Ed è un piacere per il corso di studi IEC del Politecnico di Milano fare parte di questa iniziativa ideata da UPV e coordinata dal Prof. José Ramón Albiol Ibáñez.

PROLOGUE MILAN

The Politecnico di Milano has been participating in EXCO since 2017 with the course in Building and Construction Engineering. This project has influenced the internationalization process of the course of study, which has gained considerable boost for growth from this initiative.

The exchange of views (and the travelling exhibition is certainly the main point of the exchange) among professors, researchers and students on the main themes of innovation in the construction sector for research and teaching, is undoubtedly an added value for the definition of shared and / or complementary training paths, for the integration of skills on a global scale and to provide the basis for a high-profile research.

The topics and research areas currently being explored in the course of studies in Building and Construction Engineering are mainly oriented to:

- *project engineering, with regard to technological aspects (envelope, structures, mechanical systems, electrical systems, ...), performances (modelling and validation of performances including the reduction of energy consumption, comfort, safety, ...), operational and construction aspects;*
- *the engineering of the building process which, starting from the design, develops through tendering, construction, commissioning, management, maintenance and dismantling;*
- *the management of digital information flows in the building process (BIM based);*
- *the design of innovative building materials and components and the related control of the production process;*
- *the support for architectural design and the management of technical-administrative processes.*

The different approaches to research that EXCO's participating institutions have shown highlight the richness and innovation that characterise the construction sector today. And it is a privilege for the course in Building and Construction Engineering of the Polytechnic of Milan to be part of this initiative conceived by UPV and coordinated by Prof. José Ramón Albiol Ibáñez.

PROLOGO – EXCO UNISA 2019

È stato motivo di grande soddisfazione organizzare l'EXCO'19 International Exhibition, nel periodo 6-13 Giugno 2019, presso l'Università degli Studi di Salerno. È stata, infatti, la prima volta che EXCO International Exhibition è transitata presso la nostra università, consentendo a ricercatori, docenti, dottorandi e studenti di conoscere ed apprezzare un interessante, ampio ed innovativo panorama di ricerca nel campo dell'industria delle costruzioni. Ciò è il risultato di proficui rapporti accademici e di ricerca che da alcuni anni l'Università degli Studi di Salerno intrattiene con la UPV di Valencia. L'accordo Erasmus+, siglato nel 2016 dal prof. Giacomo Di Ruocco, ha dato il via a scambi accademici tra le nostre università, offrendoci l'opportunità di conoscere colleghi di elevato spessore scientifico quali i proff.ri Luis Palmero Iglesias, Elena Navarro-Astor, Andrea Salandin. In primis corre l'obbligo di ringraziare il Direttore di EXCO, prof. dr. José Ramón Albiol-Ibáñez, personalità di eccezionale professionalità ed efficienza, il quale ci ha offerto l'opportunità di prendere visione dello stato dell'arte della ricerca condotta da colleghi di varie università, leader internazionali nel campo dell'ingegneria edile, nonché di presentare alcuni prodotti della ricerca del personale accademico (ricercatori, docenti, dottorandi) del Dipartimento di Ingegneria Civile dell'Università di Salerno. A seguito del grande interesse scientifico suscitato dall'evento del giugno scorso, saremmo onorati di ospitare, presso l'Università di Salerno, anche EXCO 2020.

Prof. Enrico Sicignano

Prof. Giacomo Di Ruocco

PROLOGUE - EXCO UNISA 2019

It was a great satisfaction to organize the EXCO'19 International Exhibition, in the period 6-13 June 2019, at the University of Salerno. It was, in fact, the first time that EXCO International Exhibition passed through our university, allowing researchers, lecturers, PhD students and students to know and appreciate an interesting, broad and innovative panorama of research in the field of construction industry. This is the result of fruitful academic and research relations that the University of Salerno has had for some years with the UPV of Valencia. The Erasmus+ agreement, signed in 2016 by Prof. Giacomo Di Ruocco, has given rise to academic exchanges between our universities, giving us the opportunity to meet colleagues of high scientific importance such as the proff.ri Luis Palmero Iglesias, Elena Navarro-Astor, Andrea Salandin. First of all, we must thank the Director of EXCO, Prof. Dr. José Ramón Albiol-Ibáñez, a personality of exceptional professionalism and efficiency, who gave us the opportunity to view the state of the art of research conducted by colleagues from various universities, international leaders in the field of construction engineering, as well as to present some products of the research of academic staff (researchers, lecturers, PhD students) of the Department of Civil Engineering of the University of Salerno. Following the great scientific interest aroused by the event last June, we would be honored to host, at the University of Salerno, also EXCO 2020.

Prof. Enrico Sicignano

Prof. Giacomo Di Ruocco

PROLOGUE ISTANBUL EXCO'19

Mimar Sinan Güzel Sanatlar Üniversitesi, "Geleneksel Türk Evi" dersi ile 2019 yılı başında Exco'ya katılmıştır. Exco ile uluslararası ortak ortak çalışmalar yapma imkanı doğmuştur. Exco gezici sergisi İstanbul'da Üniversitemize gelerek, akademik camia ve öğrenciler için yapı, inşaat ve mimarlık alanlarında yol gösterici olmuştur. Prof. Jose Ramon Albiol Ibanez tarafından verilen iki konferans çevre, ekonomi, nöral mühendislik, miras, teknoloji, şehir planlaması konularında yenilikçi malzeme, üretim için aydınlatıcı bilgiler verilmiştir. Exco ile gelenekselden geleceğe malzeme ile teknoloji, kullanımı irdelemiş, gelecek için mimari ve inşaat sektöründe yeni umutlar doğmuştur. Mimar Sinan Güzel Sanatlar Üniversitesi, Prof. Jose Ramon Albiol İbañez tarafından koordine edilen bu girişimin bir parçası olmaktan mutluluk duymaktadır.

Dr. Sibel Hattap

PROLOGUE ISTANBUL EXCO'19

Mimar Sinan Fine Arts University has participated Exco at the beginning of 2019 with the course of "Traditional Turkish House". The opportunity of making international collaborations with Exco has cameup. Exco mobile exhibition came to our University in Istanbul and guided the academic community and students in the fields of construction, building and architecture. The two conferences given by Prof. Jose Ramon Albiol Ibanez in thefields of production, environment, economy,neural technology, engineering, heritage and town planning have provideden lightening information about innovative materialand production. With Exco, theuse of material and technology from the traditional to the future has been explored and new hopes have emerged for the sector of architecture and construction. Mimar Sinan Fine Arts University is pleased to be a part of this initiative coordinated by Prof .Dr. Jose Ramon Albiol Ibañez.

Dr. Sibel Hattap

ПРОЛОГ ОДЕСА

Масштаб и характер международного архитектурно-строительного форума Cevisama содействует эффективному проведению научных конференций и выставок EXCO под эгидой Инженерно-строительного института Политехнического университета Валенсии. За последние 3 года, благодаря руководству проф. José R. Albiol-Ibáñez, количество участников EXCO увеличилось до 37 университетов разных стран, а выставка приобрела активный передвижной характер.

Одесские исследователи получили возможность продемонстрировать качественные работы, способные дать экономический эффект, сберечь энергоресурсы, подходы и методы сохранения и преемственного развития архитектурно-исторической среды. Традиционно результаты исследований по инновационным строительным технологиям и материалам EXCO2019 также были представлены в Одесской государственной академии строительства и архитектуры и обсуждены на лекциях проф. José R. Albiol-Ibáñez и проф. Luis Palmero Iglesias.

Групповая динамика и синергия университетов, исследователей дополняют интересные идеи каждого из участников, способствуют поиску нестандартных решений. Передвижная выставка EXCO2019 стала одним из масштабных мероприятий научного обмена, образования, которое обеспечивает благоприятные условия для развития международного сотрудничества и плодотворного общения специалистов в сфере архитектурно-строительного инжиниринга.

Проф. Надия Ексарева
Доц. Владимир Ексарев

PROLOGUE ODESSA

The scale and nature of the international forum Cevisama contributes to the effective conduct of scientific conferences and exhibitions of the EXCO under the auspices of the Civil Engineering Institute of the Polytechnic University of Valencia. Over the past 3 years, thanks to the leadership of Dr. José R. Albiol-Ibáñez, the number of participants in the EXCO increased to 37 universities of different countries, and the exhibition acquired an active traveling character.

Odessa researchers were given the opportunity to demonstrate high-quality work that can give an economic effect, save energy resources, approaches and methods of preservation and successive development of the architectural and historical environment. Traditionally, the results of research on innovative building technologies and materials EXCO'2019 were also presented at the Odessa State Academy of Civil Engineering and Architecture and discussed at lectures by Dr. José R. Albiol-Ibáñez and Dr. Luis Palmero Iglesias.

The group dynamics and synergy of universities and researchers complement the interesting ideas of each of the participants and contribute to the search for innovative solutions. The EXCO'2019 mobile exhibition has become one of the large-scale events of scientific exchange and education, which provides favorable conditions for the development of international cooperation and fruitful communication of specialists in the field of architectural and civil engineering.

*Dr. Nadia Yeksareva
Dr. Vladimir Yeksarev*

PROLOGO MATERA

“EXCO 2019 Matera” è stato un prestigioso convegno internazionale che ha fatto riflettere i ricercatori provenienti dai cinque continenti sul concetto di riuso del patrimonio architettonico, urbanistico, industriale e sulla conservazione dei beni culturali. Tutto ciò è stato affrontato in una prospettiva interdisciplinare, scientifica e globale. Il congresso ha affrontato questioni metodologiche, tecniche, accademiche o progettuali inerenti la documentazione, la conservazione, il riutilizzo e il recupero del patrimonio architettonico, urbano o paesaggistico. Una delle attività più importanti è stata l’esposizione di lavori di ricerca internazionali presentati sotto forma di Poster che nel 2017 per la prima volta sono stati esibiti come mostra itinerante in diverse Università estere prendendo il via dall’Università della Basilicata e si è spostato poi in altre università. L’Università degli Studi della Basilicata ha organizzato anche quest’anno “EXCO 2019 Matera”, presso la sede della Chiesa di Cristo Flagellato nella città di Matera durante la giornata del 22 Ottobre 2019 con tema “Arte e Scienza”. Molto spesso arte e scienza colgono insieme, quasi all’unisono, lo “spirito dei tempi” e lo rafforzano. La sincronia talvolta è stupefacente, pressoché perfetta. Matera ha ospitato, quindi, per la seconda volta la mostra itinerante internazionale sui materiali e le tecnologie costruttive “Exco Matera 2019” organizzata dal Dicem (il dipartimento delle Culture europee e del Mediterraneo dell’Università della Basilicata). Si è trattato di un evento che si tiene da più di 30 anni a febbraio, a Valencia in concomitanza con la fiera espositiva ‘Cevisama’, una delle più importanti al mondo sui materiali ceramici, vetri e allestimenti e finiture per gli ambienti interni. Evento coordinato dal Direttore “EXCO 2019” Prof. Dr. José Ramón Albiol-Ibáñez e con la partecipazione, per la prima volta in una sede estera, del Magnifico Rettore dell’Universitat Politècnica de València UPV Dr. Francisco José MORA MAS.

Prof. Antonella GUIDA
 Prof. Graziella BERNARDO
 Prof. Giuseppe ANDRISANI

PROLOGUE MATERA

"EXCO Matera 2019" was a prestigious international conference that makes researchers from the five continents reflect on the concept of re-use of architectural, urban, industrial and cultural heritage conservation. All of this has been inserted in an interdisciplinary, scientific and global perspective. The congress deals with methodological, technical, academic or planning issues concerning the documentation, conservation, reuse and recovery of architectural, urban or landscape heritage. One of the most important activities was the exhibition of international research works presented in Posters, in 2017 for the first time they were exhibited as a traveling exhibition in various foreign Universities, taking off from the University of Basilicata and then was moved to other universities . Also this year the University of Basilicata organized "EXCO 2019 Matera" at the Church of Cristo Flagellato in the city of Matera during the day of 22 October 2019 with the theme "Art and Science". Very often art and science gather together, almost in unison, the "spirit of the times" and reinforce it. Synchrony is sometimes amazing, almost perfect. Matera hosted, for the second time, the international traveling exhibition on materials and construction technologies "Exco Matera 2019" organized by Dicem (the department of European and Mediterranean Cultures of the University of Basilicata). This is an event that has been held for more than 30 years in February, in Valencia to coincide with the 'Cevisama' exhibition, one of the most important in the world on ceramic materials, glass and fittings and finishes for indoor environments. Event coordinated by the Director "EXCO 2019" Prof. Dr. José Ramón Albiol-Ibáñez and with the participation, for the first time in a foreign university, of the Rector of the Universitat Politècnica de València UPV Dr. Francisco José MORA MAS.

Prof. Antonella GUIDA
 Prof. Graziella BERNARDO
 Prof. Giuseppe ANDRISANI

PROLOGAS VILNIUS

2019 m. Lapkričio mėn. Vilniaus Gedimino technikos universitetas (VGTU) antrą kartą surengė tarptautinę mokslo darbų parodą EXCO2019, kurią organizavo Valensijos politechnikos universitetas (UPV). Ši mokslo darbų paroda leido VGTU tyrėjams, darbuotojams ir studentams susipažinti su įvairiausiais statybos (civilinės inžinerijos) ir susijusių sričių tyrimais, kuriuos atliko kolegos iš UPV ir kitų bendradarbiaujančių universitetų.

Prieš keletą metų, kaip „Erasmus“ mainų programos dėstytojai, lankėmės UPV, kur turėjome neįkainojamą galimybę pamatyti vykdomus tyrimus ir sužinoti apie unikalią EXCO programą, kurioje dalyvavo aukšto lygio mokslo institutai civilinės inžinerijos srityje.

Didžiulis „EXCO“ komandos ir jos direktoriaus prof. dr. José Ramón Albiol-Ibáñez indėlis ne tik suburia įvairių universitetų tyrėjų, bet ir sukuria naują, unikalią erdvę bendradarbiavimui. Tai prisideda prie mokslo tyrimų populiarinimo ir matomumo, suteikia puikią platformą pristatyti savo institucijos mokslininkų darbus ir pamatyti kolegų iš kitų aukščiausių pasaulio mokslo institucijų vykdomą veiklą, susirasti mokslo partnerius ir prisistatyti jauniems tyrėjams.

DR Jūratė ŠLIOGERIENĖ

DR Tatjana VILUTIENĖ

PROLOGUE VILNIUS

In November 2019, Vilnius Gediminas Technical University (VGTU) hosted for the second time the international scientific exhibition EXCO2019, organized by University Polytechnic Valencia (UPV). This exhibition of scientific works allowed VGTU researchers, staff and students to get acquainted with a wide range of research in construction (civil engineering) and related fields performed by colleagues from UPV and other cooperating universities.

A few years ago, as an Erasmus exchange teacher, we visited UPV, where we had an invaluable opportunity to see ongoing research and learn about the unique EXCO program involving high-level research institutes in civil engineering.

A tremendous amount of work by the EXCO team and its Director prof. dr. José Ramón Albiol-Ibáñez not only brings together researchers from different universities, but also creates a new, unique space for collaboration. This contributes to the promotion and visibility of research, and provides an excellent platform for presenting the work of scholars in your institution, and see activities carried out by colleagues from other top-level scientific institutions in the world, find partners in science, and introduce themselves for young researchers.

DR Jūratė ŠLIOGERIENĖ

DR Tatjana VILUTIENĖ

EXCO and Jade University of Applied Sciences, Oldenburg

by Thomas Weßels (Lecturer) and Thomas Priesemann (Vice Dean)

Department of Civil Engineering Geoinformation Health Technology

Die Jade Hochschule in Oldenburg, Fachbereich Bauwesen Geoinformation Gesundheitstechnologie, nahm in 2019 erstmalig an der EXCO teil. Im Anschluss an die Einladung durch den Koordinator der EXCO, Prof. Dr. José Ramón Albiol Ibáñez, wurde im Fachbereich festgestellt, dass das Konzept der EXCO nicht nur perfekt in die Internationalisierungsstrategie des Fachbereichs passt, sondern auch vielfältige Schnittstellen für eine Zusammenarbeit bietet. Dabei sind insbesondere folgende Aspekte hervorzuheben:

- Unter dem Dach der EXCO findet sich eine breit gefächerte Auswahl an Themen zu Kernaspekten des Bauingenieurwesens wie auch benachbarter Fachdisziplinen. Diese Themenvielfalt bildet sehr gut die Themenvielfalt in der Lehre an der Jade Hochschule wider, weshalb Synergieeffekte zu erwarten sind.
- Die Jade Hochschule ist immer an Forschungsthemen mit fachlicher und gesellschaftlicher Relevanz interessiert. Die unter dem Dach der EXCO präsentierten Themen geben vielfältige Ansatzpunkte für zukünftige Forschungsvorhaben und ermöglichen einen Vergleich mit anderen Hochschulen.
- Forschung und Lehre werden auch in Zukunft an Internationalität gewinnen. Das internationale Konzept der EXCO unterstützt den Aufbau von internationalen Kooperationen.

Grundsätzlich ist die EXCO eine Konferenz, die einen breiten Überblick über die Themenvielfalt im Bauwesen zu Beginn des 21. Jahrhunderts abbildet. Die Jade Hochschule betrachtet es als ein Privileg, zu dem Kreis der teilnehmenden Institutionen gehören zu dürfen und dankt der UPV und dem Koordinator der EXCO für ihre Initiative.

PROLOG OLDENBURG

The department of Civil Engineering Geoinformation Health Technology of Jade University of Applied Sciences, Oldenburg, took part in EXCO for the first time in 2019. Following an invitation by the co-ordinator of EXCO, Prof. Ph.D. José Ramón Albiol Ibáñez, the department realized that the concept of EXCO is not only fitting perfectly into the department's strategy of internationalization but also offering diverse interfaces for collaboration. Especially the following aspects are to be highlighted:

- *The roof of EXCO covers a diverse range of topics from civil / building engineering and related disciplines as well. This diversity reflects the broad range of topics in education at Jade University of Applied Sciences, thus synergy effects are expected.*
- *Jade University of Applied Sciences is always interested in research topics with professional and social relevance. The topics presented under the roof of EXCO are offering many starting points for future research projects and a comparison with other universities.*
- *Education and research will gain internationality in the future. The international concept of EXCO supports the implementation of international co-operations.*

In general EXCO is a conference that offers a broad overview on diverse topics in civil / building engineering at the beginning of the 21st century. It is a privilege for Jade University of Applied Sciences to be part of it and thanks UPV and the co-ordinator of EXCO for organizing it.

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CHAPTER 4

HERITAGE

CAPÍTULO 4 PATRIMONIO

VITRUVIO

**INTERNATIONAL JOURNAL OF ARCHITECTURAL TECHNOLOGY AND
SUSTAINABILITY: AN OPPORTUNITY FOR RESEARCH PUBLICATIONS
AND SCIENTIFIC DISSEMINATION**

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Abstract

The international journal *Vitruvio* has been founded in 2015 with the aims to promote and disseminate research activities in the fields of architecture and building engineering, reinterpreting the principles of *firmitas*, *utilitas* and *venustas* of De Architectura di Vitruvio (I century BC) according to the needs of the modern world. The magazine is published twice a year and utilizes a double blind peer review policy. Since 2018, Vitruvio belongs to the list of scientific journals recognized by the Italian research evaluation system for the disciplinary Macro-sector 08 Civil engineering and architecture. Manuscripts in English can be submitted through the Open Journal System platform, <https://polipapers.upv.es/index.php/vitruvio/about/submissions#onlineSubmissions>. The magazine is focused on two key themes of construction sustainability: 1) Conservation, Restoration and Re-use of Architectural Heritage; 2) Resilience and Sustainability of Built Environment. The two themes have some overlaps in the case of interventions on built heritage because nowadays they must also aim to make buildings resilient and smart, namely less vulnerable to catastrophic events, such as earthquakes, flooding landslides, using innovations arising from new information and communication technologies. The journal involves various scientific expertises and it includes different topics related to the processes of new buildings and to restoration and conservation interventions of built heritage.

Keywords

Scientific dissemination, Architectural Heritage, Re-Use, Resilient constructions, Landscape

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Enfoque y alcance: La revista internacional *Vitruvio* fue fundada en 2015 con el objetivo de promover y difundir trabajos originales en los campos de la arquitectura y la ingeniería que contribuyen a la sostenibilidad de los edificios. La elección del nombre de la revista pone de relieve la conciencia de que la sostenibilidad de la construcción moderna puede ser perseguida respetando los principios de *firmitas, utilitas and venustas* (De Arquitectura, Vitruvio, siglo I a.C.). Vitruvio es una revista de revisión por pares. Es una revista científica, incluida en la lista ANVUR, área 08, Ingeniería Civil y Arquitectura, cuyo objetivo es promover y fomentar la investigación de vanguardia centrada en dos áreas principales que pueden ser abordadas desde diversos

- Conservación, rehabilitación y Re-uso del patrimonio arquitectónico
- Resiliencia y sostenibilidad de los edificios y medio ambiente

Temas:

Diseño y técnicas constructivas. Patrimonio cultural digital. Enfoque energético. Patrimonio arquitectónico.

Focus and scope: The international journal *Vitruvio* has been founded in 2015 with the aims to promote and disseminate original work in the architecture and engineering fields which make a contribution to the sustainability of buildings. The choice of the magazine's name highlights the awareness that the sustainability of modern construction can be pursued while respecting the principles of *firmitas, utilitas and venustas* (De Arquitectura, Vitruvio, 1 century BC). *Vitruvio* is a double blind peer-reviewed journal. It is a scientific journal, included in the ANVUR list, area 08, Civil Engineering and Architecture. The International Scientific Committee is aimed at promoting and encouraging cutting edge research focused on two main areas that can be approached from several topics.

- Conservation, Restoration and Re-use of Architectural Heritage
- Resilience and Sustainability of Built Environment

Topics:

Design and Construction Technique. Digital Cultural Heritage. Energy Focus. Building Heritage.

Indexing:

Emerging Sources Citation Index (Web of Science)

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A glimpse of covers and papers



Vol.0 N°1 (2015) Dec.2015



Vol.3 N° 2 (2018) Dec.2018



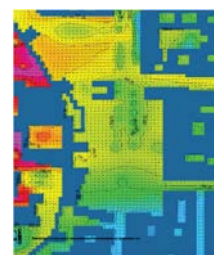
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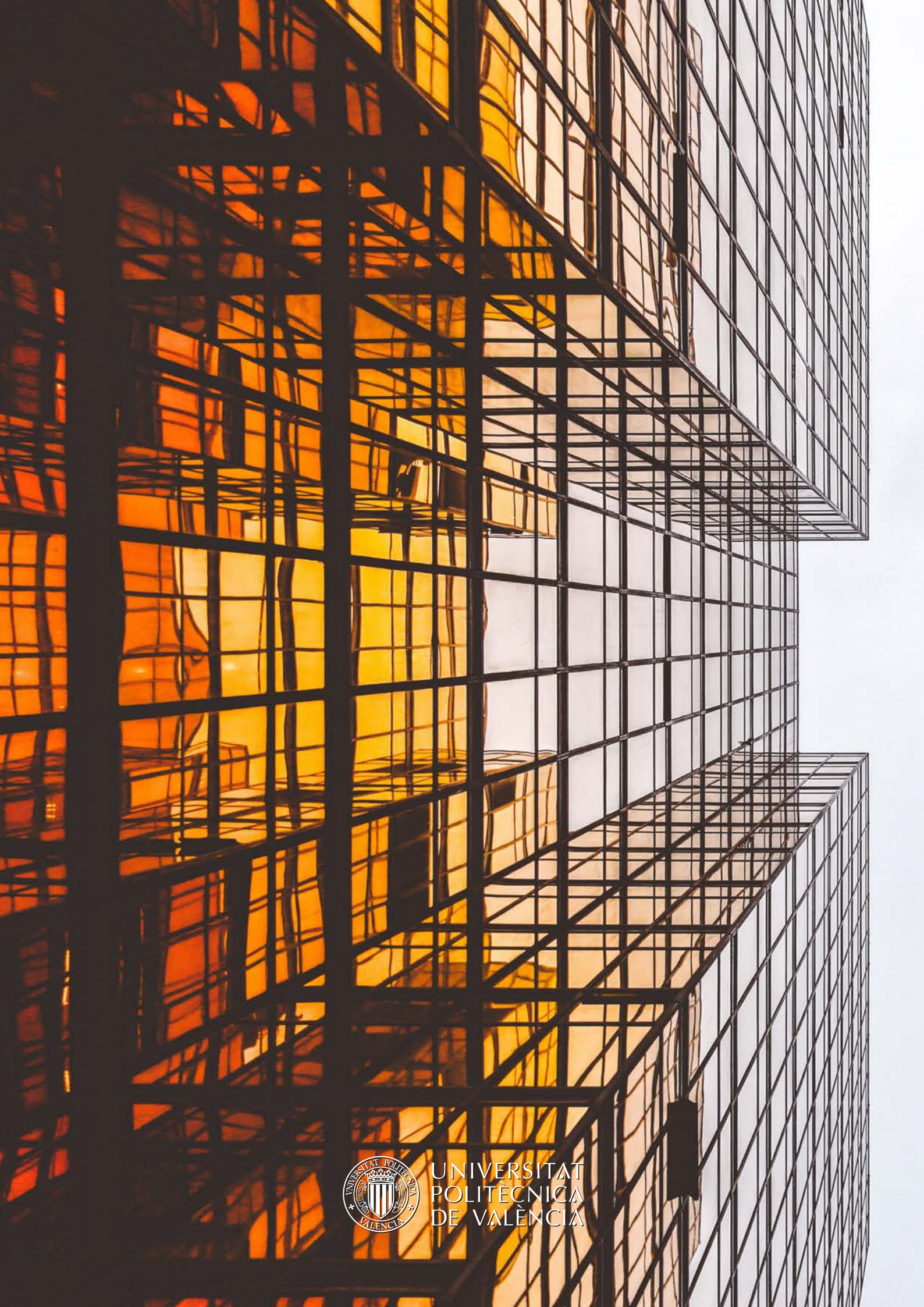
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