

# THE BIG BUILD II

## Sustainability and Resilience

*Seminar-Workshop,  
Lecture & Round Table*

October, 23-24-25  
Madrid 2023

Organizers





# EVENT OVERVIEW

The Spanish Group of IABSE (*International Association for Bridge and Structural Engineering*), the Escuela de Ingenieros de Caminos, Canales y Puertos of the Technical University of Madrid (UPM), the Escuela de Arquitectura of the University of Alcalá (UAH), and the Profesional Association of Civil Engineers in Madrid organize the Seminar – Workshop, Lecture and Round Table: ***The Big Build II. Sustainability and Resilience.***

As population growth continues and demands on our cities increase, new ideas are constantly needed to address urban planning, architecture, and engineering through creative use of materials, construction techniques, and building operations.

Inspirations from natural growth and human behavior are key to developing ideas that adapt to changing climate and depletion of resources. Awareness is key to solving complex issues and the collaboration between academic study, research, and practice is critical.

Organizing  
Committee

M. Dolores G. Pulido, Rosa Cervera Sardá,  
and Jorge Bernabéu Larena

# SEMINAR – WORKSHOP PROGRAM

When?

*Seminar* will promote a dialogue in tall building design where Architecture meets Structure and Academics meet Practice. The *workshop* will give students an approach to high-rise construction with quick exercises to develop innovative vertical structures. The objective will be to achieve the most effective and interesting model with the minimum CO<sub>2</sub> emission. The work will be carried out in teams based on materials provided by the organizers.

Monday 23 & Tuesday 24 October, 2023.

*Monday 23 October 2023*

**09:00**

**Presentation**

**09:15**

**The Big Build II –  
Imaging tall buildings  
through structures**

**10:15**

**How structures melt with and help  
architecture. The future Chamartín  
railway station, skyscrapers and other  
recent singular projects**

**M. BAÑARES DORADO & M. ARAMBURU CELAYA  
ESTEYCO**

**11:15**

**Break**

**MARK SARKISIAN  
Partner SOM**

**11:45**

**Types of height, past and  
present.  
*Mohamed VI tower in Rabat,  
experiences of construction***

**JORGE BERNABÉU LARENA  
ALEJANDRO BERNABÉU LARENA  
UPM & BERNABÉU Ingenieros**

**13:15**

**Break**

**15:00 - 16:00**

**Challenge of tall buildings and  
carbon production. What can a  
structural engineer do?**

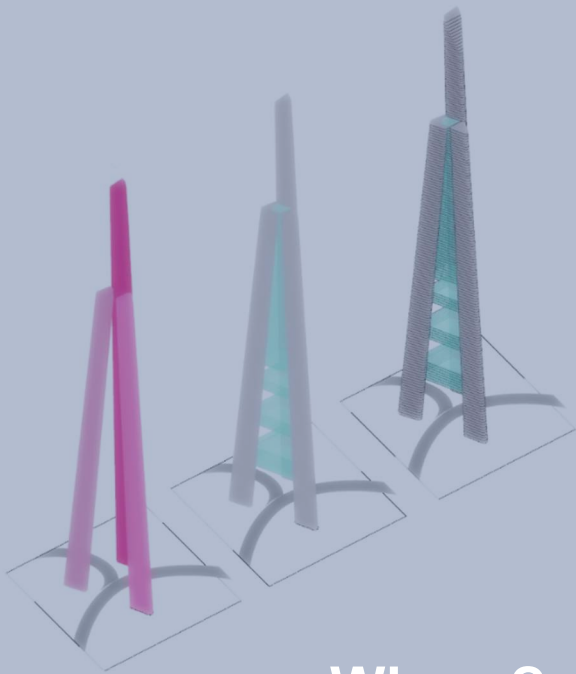
**RICHARD B. GARLOCK  
Partner LERA Consulting Structural Engineers**

**16:00 - 20:00**

**THE BIG BUILD II WORKSHOP. *Part I: Digital  
design, model making***

Where?

Escuela de Ingenieros de Caminos,  
Canales y Puertos - UPM  
Calle del Profesor Aranguren, 3,  
28040 Madrid, Room Torres Quevedo





# SEMINAR – WORKSHOP PROGRAM

*Tuesday 24 October 2023*

**09:00**

**Creative Approaches to  
Sustainability and Resilience  
for Tall Building Structures**

**MARK SARKISIAN**  
Partner SOM

**10:00**

**From Nature to  
Architecture**

**ROSA CERVERA SARDÁ**  
Alcala University & Cervera  
Arquitectos

**11:00**

**Break**

**11:30 – 14:00**

**THE BIG BUIL II  
WORKSHOP. *Part I: Digital  
design, model making***

**14:00**

**Break**

**15:30 – 20:00**

**THE BIG BUIL II  
WORKSHOP. *Part II: Final  
presentation and critique***

**Where?**

Escuela de Ingenieros de  
Camino, Canales y Puertos,  
UPM, Calle del Profesor  
Aranguren, 3, 28040 Madrid  
Room Torres Quevedo





# SEMINAR – WORKSHOP SPEAKERS



## ***Mark P. Sarkisian***

**PE, SE, NAE, LEED BD+C**, Partner of Seismic and Structural Engineering in the San Francisco office of Skidmore, Owings & Merrill LLP, has developed innovative engineering solutions for over 100 major building projects around the world including some of the tallest and most complex. Mark holds ten U.S. Patents and five International Patents for high-performance seismic structural mechanisms designed to protect buildings in areas of high seismicity and for seismic and environmentally responsible structural systems. He is the author of “Designing Tall Buildings – Structure as Architecture,” and teaches at UC Berkeley, California College of the Arts, Stanford University, Cal Poly, Northeastern University, NC State University, the Pratt Institute, Technical University of Madrid, and Alcala University. He has a BS-CE Degree from the University of Connecticut and is a Fellow of the Academy of Distinguished Engineers, an MS-SE Degree from Lehigh University, an Honorary Doctorate Degree from Clarkson University, and an Honorary Master’s Degree from the Politecnico di Milano.

## ***Rosa Cervera***

Ph D. Architect, Professor and former Dean of the School of Architecture of the University of Alcalá. Current director of the Master's Degree in Advanced Architecture and City Projects. She is the author of writings and books on architecture, among which we highlight: "Bionics, Biomimetics and Architecture" (2019); "Space and Time in Architectural Composition" (2018); Recycling Mumbai. Re-imagining the slum" (2012). "Madrid, Recycled City" (2011), "Iron in 19th century Madrid architecture" (2006). A regular speaker in professional and academic circles, she has given lectures in Spain, China, India, USA, Bolivia, Peru, El Salvador, Venezuela, Romania, Italy, etc. As an architect, Rosa Cervera has received several awards -the "Antonio Maura" award, the COAM award, the "Transfer of Knowledge" award- and has won several international architecture competitions, including the following: Embassy Complex of the People's Republic of China in Spain; Feng Cheng Administrative Center, Shanghai, China; National Water Museum in Hangzhou; Tai Da Square in Chengdu; Bridge over the Hai He in Tianjin. Rosa Cervera is a pioneer in research into Bionics, Biomimetics and the application of biological structures to innovative and efficient architecture and urban design. A direct result of these studies is the Self-Sustainable Vertical Garden City, Bionic Tower. She is a founding member and current president of Cátedra China.



# SEMINAR – WORKSHOP SPEAKERS



## ***Richard B. Garlock***

Richard B. Garlock, P.E. is a Partner at LERA Consulting Structural Engineers. With nearly 30 years of experience designing efficient structural solutions to realize complex architectural visions, his expertise ranges from academic and research buildings to high-rise office and residential towers, high-end retail and complex civic structures. He has experience in the structural design of buildings of all heights, including mid-rise, high-rise, supertall and mega-tall projects. Rich is currently serving as the Partner-in-Charge/Project Director for a new residential building at Columbia University, and a number of high-profile developments in New York City, Philadelphia, Miami and Virginia, with programs ranging from luxury residential towers to office and laboratory space. He is also leading LERA's team that was recently commissioned for the structural design of a major addition and renovation to the Rock 'N' Roll Hall of Fame & Museum in Cleveland, OH. Rich previously served as the Project Director for multiple mixed-use towers in Malaysia, and for the design of 4 World Trade Center, which was the first building to open on the original WTC site in 2013. He was also a member of the WTC Recovery Team following the September 11th attacks, and participated in the investigation of the baseline performance of the WTC towers conducted by the National Institute of Standards and Technology. Since 2005, Rich has been a Visiting Lecturer for Princeton University's Department of Civil and Environmental Engineering, and has a long and successful working relationship with the university encompassing many campus buildings, including the School of Architecture Renovation, Friend Center for Engineering, Butler College Residences and Lewis Center for the Arts. He is also a Structures Specialist for the State of New Jersey Office of Emergency Management Urban Search. Rich was an invited presenter at the 2019 CTBUH World Congress in Chicago, IL, where he spoke about major trends in structural design innovations for tall buildings in the past, present and future. He was also an invited presenter at the 2017 NASCC: The Steel Conference, where he presented on the complex structural design of 4 World Trade Center, in honor of the project winning the Presidential Award of Excellence in Engineering from the American Institute of Steel Construction.

# SEMINAR – WORKSHOP SPEAKERS



## ***Jorge Bernabéu Larena***

Ph.D. Civil Engineer, Associate Professor at the School for Civil Engineering of the Technical University of Madrid (UPM) in the subjects of landscape, construction history, and creative design. He is recognized with the UPM Educational Innovation Award. He works in two lines of research: design and innovation in structural engineering; public works heritage, landscape and construction history. He has 25 years of professional experience in projects of singular structures and bridges during which he has been awarded in 7 international competitions with a jury. He is partner of Bernabéu Ingenieros.



## ***Alejandro Bernabéu Larena***

Ph. Civil Engineer, he is an expert in structures of singular buildings with more than twenty years of experience, CEO of Bernabeu Ingenieros, founded in 2014. He has developed projects worldwide working in collaboration with well-known architects such as Herzog & de Meuron, David Chipperfield, Dominique Perreault, Nieto Sobejano, Rafael de la Hoz or Burgos & Garrido. He is Professor at the School of Architecture, Technical University of Madrid, and has lectured in different other Universities. He has been awarded with the IABSE prize, and with the prize for outstanding young engineers, by the Spanish Civil Engineers Association in Madrid.



# SEMINAR – WORKSHOP SPEAKERS



## ***Miguel Bañares Dorado***

MSc in Civil Engineering. Linked to the structural design from the beginning of his professional career, he has more than 26 years track record on the field. He has developed many schemes from concept to completion with experience in contract types such as design and build and DBFO, particularly in Spain, Sweden, Belgium, Ireland, Chile, Colombia, Turkey and U.K. He has a long experience as a Principal Engineer in structures, being involved in the design and construction of very different kind of structural typologies, including singular bridges and buildings, asset management of existing structures, football stadiums, LNG tanks, buried structures, offshore wind designs and rehabilitation of historical constructions. Since 2007 he manages a Structures Department, organizing and directing technically the different staff teams and supervising the structural aspects of the Projects. Besides his facet as a structural designer, he has also directed various multidisciplinary projects for linear infrastructures and liquefied-gas facilities. He also plays an active role as an independent checker, and is co-author of several publications on structures. Miguel is also a MSc in Civil Engineering in Chile and Colombia, and partner of Esteyco.



## ***Miquel Aramburu Celaya***

MSc in Civil Engineering with more than 16 years track record in structural design. Long experience as Structural Engineer in design and construction of several structural typologies such as road, railway and pedestrian bridges, industrial construction, ie. LNG tanks, offshore wind design and major architectural projects, i.e. New Chamartin station tender phase. At the same time Co-Author of international publications for some of these projects. He has developed his career both at national and international companies, developing innovative solutions particularly in Spain, Romania, Belgium, Ireland, Switzerland, Sweden, Norway, Chile and Paraguay. Member of Esteyco since 2014, nowadays holds the position of Lead Structural Engineer of Integrated Projects Business line.

# ROUND TABLE PANELISTS



## ***José Antonio Martín-Caro***

Over his nearly 30 years of experience, José A. Martín-Caro has combined teaching and research activities with an unrivalled track record on engineering projects. Based in a global approach, he has performed his professional activity in structures, geotechnics, including monitoring, rehabilitation, repair and new construction projects. His strong research background in infrastructure maintenance and cultural heritage puts him in the best position to lead innovation in these fields and play an active role in national and international technological projects. In the building field, the projects for shopping malls, hospital, offices, sports complexes and buildings and skyscraper stand out, highlighting among the current projects, the Santiago Bernabeu stadium, the new BBVA Headquarters, the Caleido tower. In the area of civil engineering, he has designed numerous road and railway bridges as well as footbridges. He is associate professor at UPM and CEO of INES consultant.



## ***Juan Carlos Arroyo Portero***

MSc Civil Engineer, PhD in Architecture. Dean of the Politechnical School at the Nebrija University. Partner and founder of CALTER Ingeniería (Structural consultancy firm), INGENIO.XYZ (online platform to learn structures), INWIND (contractor of wind in situ concrete towers), and CINTER (publishing house). More relevant publications: EHE-98 (co-author); Jiménez Montoya. Hormigón armado (reinforced concrete), eds 15 and 16. Arroyo, Messeguer, Morán; Números gordos en el proyecto de estructuras (Rough numbers in structural design) 50.000 books sold. More relevant designs: Nuevas Torres Colón, Mobil footbridge Bilbao (Calter-SBP), Arch footbridge Chamartín (Calter-SBP), Extension of T4 Airport Madrid-Barajas; and Comercial center 60000 m<sup>2</sup> structure without expansion joints.

# SEMINAR – WORKSHOP REGISTRATION



Registration for the ***seminar-workshop*** is free for all students (undergraduate, master and doctorate) belonging to the School of Civil Engineering of the Technical University of Madrid, UPM, and to the School of Architecture of the University of Alcalá, UAH.

For all other participants, the fee is 50 €.

To register, send an e-mail to the IABSE Spanish Group (***geiabse@gmail.com***), specifying participant's given name and surnames, affiliation, and e-mail address.

The email must include a copy of the bank transfer receipt (if applicable), to be sent by October 23, 2023, indicating in the concept of the transfer the full name of the participant.

Bank:	CaixaBank
Bank address:	c/ Ríos Rosas, 44, 28003 Madrid
Account Number:	ES49 2100 3226 0213 0011 2627
Swift code:	CAIXESBBXXX
Beneficiary:	Grupo Español de IABSE

Nuevas Torres Colón, Madrid  
LVA + architects – CALTER Ingeniería  
*Picture by Paco Gómez*





# LECTURES

When?

Where?

Registration

## **Inventive Architecture – A Sum of the Parts**

By Mark Sarkisian, Partner SOM

13:00 h

## **Caleido: Tower and Plint. Designing a vertical campus in the heart of Madrid**

By José A. Martín-Caro, INES Consultant Engineers

13:45 h

Wednesday 25 October 2023, 13:00 h – 15:00 h

School of Architecture, Alcala University, UAH

c/ Santa Úrsula, 8

28801 Alcalá de Henares, Madrid

Free admission. To register, send an e-mail to the IABSE Spanish Group ([geiabse@gmail.com](mailto:geiabse@gmail.com)) indicating the attendee's given name and surnames, affiliation, and e-mail address.

# ROUND TABLE

**Presentation  
Moderator  
Panelists**

**When?  
Where?**

**Registration**

## Strategies for Sustainable Future Urban Developments. Challenges of High-Rise Construction

*M. Dolores Esteban Pérez* – Dean of Colegio ICCP in Madrid

*M. Dolores G. Pulido* – Chair of the Spanish Group of IABSE

*Mark Sarkisian* – SOM

*Richard B. Garlock* – LERA Consulting Structural Engineers

*Rosa M. Cervera Sardá* - University of Alcalá

*Juan Carlos Arroyo Portero* – Calter

*Miguel Bañares Dorado* – Esteyco

*Jorge Bernabéu Larena* - UPM & Bernabéu Ingenieros

*José A. Martín-Caro* - INES Consultant Engineers & UPM

Wednesday 25 October 2023, 18:00 h - 20:30 h

Colegio de Ingenieros de Caminos, Canales y Puertos,  
Room Auditorio, c/ Almagro, 42, 28010 Madrid

*Free admission.* To register, send an e-mail to the IABSE Spanish Group ([geiabse@gmail.com](mailto:geiabse@gmail.com)) indicating the attendee's given name and surnames, affiliation, and e-mail address.

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## Sustainability and Resilience

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