



**JOAN R. CASAS**



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## 2024 Khan Distinguished Lecture Series

*The Fazlur Rahman Khan Distinguished Lecture Series honors Dr. Fazlur Rahman Khan's legacy of excellence in structural engineering and architecture*

*Initiated and Organized by* PROFESSOR DAN M. FRANGOPOL

The Fazlur Rahman Khan Endowed Chair of Structural Engineering and Architecture  
Department of Civil and Environmental Engineering, ATLSS Engineering Research Center,  
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### “Sustainability and Digitalization in Bridge Engineering”

Friday, September 13, 2024 – 4:30 pm EDT

Lecture will be live streamed, [must REGISTER HERE for live stream link](#)

<http://www.lehigh.edu/frkseries>

In step with the abounding vitality of the time, structural engineer **Fazlur Rahman Khan** (1929-1982) ushered in a renaissance in skyscraper construction during the second half of the 20th century. Fazlur Khan was a pragmatic visionary: the series of progressive ideas that he brought forth for efficient high-rise construction in the 1960s and '70s were validated in his own work, notably his efficient designs for Chicago's 100-story John Hancock Center and 110-story Sears Tower -- the tallest building in the United States since its completion in 1974.



**Fazlur Rahman Khan**

Lehigh endowed a chair in structural engineering and architecture and has established this lecture series in Khan's honor. It is organized by **Professor Dan M. Frangopol**, the university's first holder of the Fazlur Rahman Khan Endowed Chair of Structural Engineering and Architecture, and sponsored by the Departments of Civil & Environmental Engineering, and Art, Architecture & Design.

**Joan R. Casas** is a professor of bridge engineering and structural management at the School of Civil Engineering of the Technical University of Catalonia (UPC-Barcelona-Tech) in Barcelona. Master's (1984) and Ph.D. (1988) degrees from Technical University of Catalonia. Main expertise related to bridge design and management, specially focusing on safety assessment and structural health monitoring and management of existing bridges. Author or co-author of 39 books and chapters of books, 180 papers in refereed technical journals, and over 350 conference proceedings. Among other editorial boards, he is the Managing Editor of the journal Structure and Infrastructure Engineering, Associate Editor of the ASCE Journal of Bridge Engineering, and Specialty Chief Editor of Frontiers in the Built Environment, Bridge Section. He has received several awards, including the **Bill Curtin Medal** from the Institution of Civil Engineers from UK for the best paper describing innovative design in civil engineering, the **IABMAS-Senior Prize** in recognition of outstanding contributions to the application of advanced bridge inspection, assessment and monitoring techniques, and the **T.Y. Lin Medal** in recognition of outstanding contributions to bridge engineering. Founding member and Secretary General of IABMAS since 1999 and Chair of IABMAS conferences in Barcelona in 2002 and 2022.

**Sustainability and Digitalization in Bridge Engineering.** Sustainability and digitalization are two main topics in many research programs and professional activities related to bridges worldwide. It seems that the bridge community (including designers, contractors, managers and stakeholders) can largely benefit from the current digital transformation where processes using digital technologies are able to create new or to enhance existing bridge engineering practices. Since the budgets for bridge construction and maintenance are scarce, sustainability has to be implemented in all areas of activity for a proper use of the limited resources. Apart from being both of paramount importance nowadays and in the future, the concepts of sustainability and digitalization are very different. Therefore, the tools needed for their full adoption in the bridge engineering field must also be different in their basis and formulation. The aim of this lecture is to analyze the actual bridge engineering practices related to sustainability and digitalization, trying to evaluate their actual level, and seeking to their level of accomplishments in relation to an optimal situation. The focus of the presentation is mainly on the bridge management area, being the area where the new IoT paradigm and digital tools are being profusely introduced, mainly under the task of bridge health monitoring. It shows how digitalization allows for a much better geometrical and structural definition as well as health monitoring of existing bridges. However, relevant challenges also appear when introducing the new digitalization technologies in the specific world of bridges. These challenges are not only technical, but also related to the personal, educational and social aspects of the human force (bridge inspectors, evaluators and managers) that have to implement the new tools in the daily activities of bridge management. The last part of the lecture is devoted to this human factor.

**FAZLUR RAHMAN KHAN** (1929 - 1982) One of the foremost structural engineers of the 20th century, Fazlur Khan epitomized both structural engineering achievement and creative collaborative effort between architect and engineer. Only when architectural design is grounded in structural realities, he believed — thus celebrating architecture's nature as a constructive art, rooted in the earth — can “the resulting aesthetics ... have a transcendental value and quality.” His ideas for these sky-scraping towers offered more than economic construction and iconic architectural images; they gave people the opportunity to work and live “in the sky.” Hancock Center residents thrive on the wide expanse of sky and lake before them, the stunning quiet in the heart of the city, and the intimacy with nature at such heights: the rising sun, the moon and stars, the migrating flocks of birds. Fazlur Khan was always clear about the purpose of architecture. His characteristic statement to an editor in 1971, having just been selected Construction's Man of the Year by *Engineering News-Record*, is commemorated in a plaque in Onterie Center (446 E. Ontario, Chicago): “*The technical man must not be lost in his own technology. He must be able to appreciate life; and life is art, drama, music, and most importantly, people.*”



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**1 PDH will be awarded to eligible attendees for each lecture  
(minimum webinar participation time of 55 minutes is required)**

Please contact the Khan Chair office at 610-758-6123 or Email: [infrk@lehigh.edu](mailto:infrk@lehigh.edu) with any questions.