



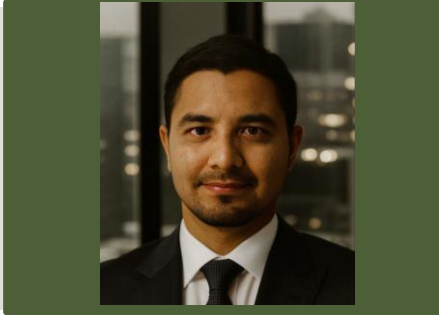
Housing and Building
National Research Center



Housing & Building National Research Center International Conference
Future Vision & Challenges for Urban Development
"Green Smart Sustainable Building between Present & Future"
Cairo, Egypt - 15th - 17th December 2024



Ministry of Housing, Utilities
and Urban Communities



Dr. C. "Lobo" Cruz-Noguez

Professor, Civil Engineering

Lecture Title: Building a Resilient Future, one block at the time

Abstract :

Canadian infrastructure is increasingly challenged by geological hazards, deterioration due to aging, and man-made threats. These challenges have been exacerbated by climate change, manifesting in more frequent flooding events, fires, severe freeze-thaw cycles, and stringent thermal demands on Canadian communities. To address these issues, several strategies have been developed to reduce risk levels in critical infrastructure systems and enhance their resilience – the capacity to withstand catastrophic events and quickly return to full functionality. Key strategies include advanced probabilistic methods to better understand the occurrence of natural hazards and uncertainties in structural system designs. Additionally, new design methods have been developed to fully utilize the strength reserves in infrastructure elements, leading to safer and more resilient structures.

This seminar presents a cohesive framework for identifying and enhancing the response of structural systems, focusing on reinforced masonry wall systems. Masonry walls are chosen for their inherent durability, strength, stiffness, and desirable thermal mass properties. Both experimental and analytical studies investigate the behavior of out-of-plane load-bearing flexural walls and the in-plane response of partially-grouted shear walls. These studies lead to improved mechanics-based tools for design and the identification of previously unaccounted strength reserves in these structural systems.

Field of Experience:

Carlos "Lobo" Cruz-Noguez is a professor at the Civil and Environmental Engineering Department of the University of Alberta. He received his BSc and MSc from the National Autonomous University of Mexico, and in 2010, his PhD in Bridge Engineering from the University of Nevada, Reno. He joined the UofA in 2013.

His research interests lie in the analysis and design of damage-resistant concrete and masonry elements, large-scale and component testing, finite-element modelling, and the use of innovative materials in resilient structures. In 2017, he was appointed as the Masonry Contractors Association of Alberta (MCAA) Endowed Chair, working with more than 60 companies in the province, comprising engineering, contractor, and supplier firms. In 2018, he created The Masonry Centre at the University of Alberta. The Centre comprises 6 professors and more than 30 graduate students working in several areas: structural, composite materials, lean construction, reliability, building science, automation, and robotics. Under his leadership, the Centre has attracted more \$4.8M since 2018 to advance masonry research. He was recently appointed to the prestigious MCAA University of Alberta Engineering Research Chair, awarded to the top 10% of engineering research programs at the Faculty of Engineering. A recipient of multiple faculty- and university-wide teaching awards, since 2024 he serves as the Associate Dean (Education) at the College of Natural and Applied Sciences at the University of Alberta.