



Ministry of Housing, Utilities  
and Urban Communities



Housing & Building National Research Center International Conference  
**Future Vision & Challenges for Urban Development**  
**“Green Smart Sustainable Building between Present & Future”**  
14<sup>th</sup> - 17<sup>th</sup> December 2024 - Cairo, Egypt



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## - Panel Title: Energy and Sustainability

### - Abstract and objectives

This panel explores novel strategies for enhancing sustainability and energy efficiency across various sectors of civil and environmental engineering. It presents a comprehensive exploration of innovative approaches, from solar-driven water reclamation systems designed to reduce greenhouse gas emissions to advanced methods for improving the resilience of infrastructure against climate change and natural hazards. The panel emphasizes the integration of multidimensional decision-making in construction, highlighting the development of tools such as the Construction Data Hub (CDH) and Knowledge-Based Decision Support Systems (KBDSS) to optimize sustainability and reduce carbon emissions. Additionally, it covers the integration of solar PV systems and addresses the quest for zero-energy buildings, discussing the role of building simulation and energy modeling in achieving energy efficiency. By contrasting Canadian and Egyptian energy standards, the panel underscores the necessity of adaptive strategies and practical improvements for attaining sustainable energy goals in diverse climatic conditions.

This panel aims at achieving the following objectives:

- Evaluate Sustainable Water Reclamation Technologies
- Promote Multidimensional Decision-Making in Construction
- Targeting Emission Reduction in Construction
- Explore Zero-Energy Building Solutions
- Community- and city-wide solar PV applications

### - Outlines and biography of speakers

Keynote presentation: Towards Sustainable, Resilient, and Energy-Efficient Smart Cities: Building Infrastructure and Energy Systems of the Future

Presented by **Dr. Mustafa Gül**

Bio: Dr. Mustafa Gül is a Professor in the Department of Civil and Environmental Engineering at the University of Alberta (UofA). He received his BSc and MSc in Civil Engineering from Boğaziçi University in Turkey in 2002 and 2004, respectively. He then pursued doctoral studies at the University of Central Florida (UCF), obtaining his PhD in Civil Engineering in 2009 on monitoring of civil infrastructure systems. Dr. Gül has been an Assistant, Associate and Full Professor at the University of Alberta since 2011. Additionally, Dr. Gül is currently serving as the Director of Internationalization for the Faculty of Engineering. Dr. Gül's current research focuses mainly on developing novel technologies for smart, sustainable, and resilient cities and societies by developing technologies for Crowdsensing-based Monitoring of Built and Natural Environments (CoMBiNE). In addition, Dr. Gül investigates various topics, such as efficient integration of solar PV Systems into energy-efficient buildings and community-wide and city-wide solar PV applications. Dr. Gül has led more than 25+ large-scale research projects in the infrastructure and energy areas funded by various federal and provincial organizations and industry partners, and he has published 90+ journal papers and 100+ conference papers in the areas of infrastructure and energy.



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## **Panel presentation 1: Building a Resilient Future, one block at the time**

Presented by **Dr. C. "Lobo" Cruz-Noguez**

Bio: 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.

## **Panel presentation 2: Application of Decision Support Systems to Reduce Emissions in Construction**

Presented by **Dr. Ahmed Hammad**

Bio: Dr. Ahmed Hammad is currently an Associate Professor in Construction Engineering and Management at the Civil & Environmental Engineering department, University of Alberta. Prior to joining Academia, Dr. Hammad spent 25 years in the construction industry as a Project Planning & Control Manager. His responsibilities included: project scope management, planning, scheduling, cost estimating, cost control and management of project: resources, changes and risks. He has experience working on the Engineering, Procurement and Construction (EPC) phases of several mega multi-billion-dollar Infrastructure, Commercial, Oil Sands, Offshore Conventional Oil and Liquid Natural Gas (LNG) projects. These projects were planned and executed in Canada, USA, South Korea, UAE, Australia and Egypt. Dr. Hammad has published several Journal and Conference papers, provided training in project management, and developed project planning & control systems. His main research interest is: the application of Machine Learning, Optimization and Multiple-Criteria Decision Making (MCDM) techniques to maximize efficiency, minimize waste and achieve sustainability during the EPC phases of construction projects.



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### **Panel presentation 3: Achieving Net Zero Energy in Residential Buildings: Strategies and Challenges in Canada and Egypt**

Presented by **Dr. Maysoun Ismaiel**

Bio: Maysoun is a Structural and Building Envelope Restoration consultant at Read Jones Christoffersen (RJC) Engineering in Edmonton, Alberta, Canada. She earned her BSc and MSc in structural engineering from Cairo University in Egypt, and in 2022 she earned her PhD in Building Science from the University of Alberta. Her research, focusing on the thermal performance of concrete masonry cavity walls, has garnered several prestigious awards, including the Masonry Contractors Association of Alberta Graduate Scholarship in 2019 and the Alberta Graduate Excellence Scholarship in 2020. Maysoun has extensive teaching experience through her roles at the University of Alberta (2018-2022) and the German University in Cairo (2014-2018). Also, she has published numerous research papers and presented at esteemed conferences. In the industry, she has applied her expertise in roles such as Structural Design Engineer at Arab Consulting Engineers (ACE) in Egypt (2013-2014) and Masonry Design Coordinator at the Canada Masonry Design Centre (CMDc) (2022-2024). At CMDc, she contributed to the development of CSA S304 standards and edited the "Masonry Structures Behaviour and Design" textbook. Currently, at RJC Engineering, Maysoun is involved in site assessments, formulating building science and structural rehabilitation programs, and condition assessments. Her commitment to advancing engineering education and sustainable building practices is evident in her efforts to bridge the gap between theoretical research and practical applications, promoting more energy-efficient building designs.

### **Panel presentation 4: Sustainability and Circular Economy Approaches within The Context of Water & Wastewater Treatment**

Presented by **Dr. Mohamed Gamal El-Din**

Bio: Dr. Mohamed Gamal El-Din is a Professor in the Department of Civil and Environmental Engineering at the University of Alberta. His research focuses on innovative treatment approaches for municipal and industrial wastewater, including oil and gas. Since 2011, he has held an NSERC Senior Industrial Research Chair in Oil Sands Tailings Water Treatment and is also a Theme Lead for the Future Energy Systems (FES) theme on Resilient Reclaimed Land and Water Systems. In 2024, Dr. Gamal El-Din was awarded Killam Award for Excellence in Mentoring and the Albert E. Berry Medal by the CSCE for outstanding contributions to the field of environmental engineering in Canada. In 2017, Dr. Gamal El-Din was awarded Killam the Alberta Science and Technology Leadership (ASTech) Foundation Award for Innovation in Oil Sands Research. He is a Jinshan Distinguished Professor at Jiangsu University and was awarded the Research Chair in Environmental Engineering at Tongji University in China in 2020. In 2023, he was appointed the Canada Research Chair (Tier 1) in Sustainable and Resilient Wastewater Treatment for Reuse. Additionally, he was named the UofA Engineering Research (UAER) Chair in Community-Based Wastewater Management with a focus on advancing a circular economy. Dr. Gamal El-Din also serves as the Director of the Water Research Centre (WRC) at the University of Alberta since 2023. Dr. Gamal El-Din's commitment to education and research is unparalleled. Over the course of two decades, he has supervised a diverse group of 215 students and staff members. Under his mentorship, these individuals have grown into accomplished professionals who are making significant contributions to their respective fields. Dr. Gamal El-Din is also a prolific researcher, with an extensive body of work that includes 340 peer-reviewed journal papers and 420 conference and workshop presentations, among other publications. His contributions to the field have been widely recognized, as evidenced by his impressive h-index of 72, and 17,103 citations as per Google Scholar.