

March 12, 2014

New Multi-Scale Modelling Approaches to Assess Wind Effects on Buildings

The seminar is presented by **Girma.T. Bitsuamlak**, Canada Research Chair in Wind Engineering, Associate Professor and Associate Director, WindEEE Research Institute, Western University, London, On, Canada.



Sustainable building design entails consideration and integration of climate responsiveness. Therefore a clear understanding and realistic modelling of the complex interaction between the climate and the built-environment is a prerequisite. This necessitates unprecedented urban climate modelling (such as wind) at high temporal and spatial resolution. To alleviate this challenges researchers at Western have developed a unique three-dimensional hexagonal wind testing chamber, WindEEE Dome, which can be configured to produce different flow types including straight flows, shear flows, downbursts and tornados. The facility makes use of 106 individually controlled fans in varying configurations to achieve these flows. Sixty of these fans are equipped with a system for gusting the fans at up to 1hz. The inner hexagonal test chamber is approximately 25m wall to wall, with 1600 floor roughness elements to control the boundary layer and a 5m diameter turntable in the centre (Figure 1). The WindEEE Dome is configurable in both closed and open loop circuits. The open loop circuit and exterior platform allows for wind driven rain testing and testing of large scale test objects which would otherwise not fit inside WindEEE. The WindEEE dome also has a unique system which allows for up to 2m/s translation of tornados and downbursts (of approx. 4 meters in diameter) inside the facility. From a climate perspective, sustainability design parameters are driven by normally recurring conditions, but design for resiliency is governed by extreme weather conditions such as hurricane, tornado and winter storms. The unique flow generation capabilities of WindEEE at large scale enables holistic wind effect studies on buildings and neighborhoods both from sustainability and resiliency perspectives.



Time and Location

The seminar will be held on **March 12, 2014** between 12pm and 1pm at the University of Toronto, **Galbraith Building, Room 303**, located at 35 St. George Street, Toronto, Ontario, M5S 1A4.

Expert Speaker

Dr. **Girma.T. Bitsuamlak**, PEng, is an Associate Professor and Associate Director of the WindEEE Research Institute at the Western University in London, Ontario, and holds the Canada Research Chair in Wind Engineering. With a background in building and wind engineering, Dr. Bitsuamlak's research interest and experience include experimental and computational wind engineering, and science of buildings. He has been educated in Addis Ababa, Indian Institute of Technology Roorkee, and Concordia Universities. Prior to joining Western, he has worked as an assistant professor at Florida International University in Miami and as senior Wind Engineer with RWDI Inc (a world leading wind consulting firm) in Guelph, Ontario. While at FIU, Dr. Bitsuamlak co-developed a hurricane testing facility "Wall of Wind". While at RWDI he has executed experimental aeroelastic analysis of supper-tall buildings such as Freedom Tower in New York and Burj Khalifa in Dubai in a boundary layer wind tunnel.



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