



UNIVERSITY OF ALBERTA
5TH ANNUAL

STRUCTURES GRADUATE STUDENTS CONFERENCE

September 6, 2019

The Royal Glenora Club

PROGRAM

SGSC 2019 - Schedule		
Time	Room - Braemar	Room - Strathcona
8:00	Registration and Breakfast	
	Opening Remarks	
9:00	Keynote Speaker : Mark Hagel	
9:30	Masonry Session	Concrete Session
10:45	Break	
11:00	Steel Session	Pipeline Session
12:30	Lunch	
13:30		Poster Session
14:30	Keynote Speaker : Carla Dickof	
15:00	Timber Session	Bridge / Biomechanics Session
16:00	Break	
16:15	Timber Session	Bridge / Biomechanics Session
17:15	Dinner & Awards	
19:00	Closing Remarks	



Mark Hagel

PhD., PEng.

Executive Director, Alberta Masonry Council

Keynote: Meeting Emerging Design Requirements in Modern Construction

Fewer materials were available to construct buildings 125 years ago, and as a result, buildings were often constructed with only one or two materials. A building was once load-bearing masonry construction with a wood-frame roof and floors. Insulation products were almost non-existent. In modern construction practices, variety in architecture is often achieved through varying the use of materials in the cladding and as a result, several different structural materials frequently interact on a single building. Structural implications manifest with continuing changes in the requirements of national energy codes (NECB), as well as impacts to structural design with the introduction of modular construction and robotics to the job site. The power of BIM and finite element analysis have pushed the design limits from simple rectangular footprints to sweeping arcs of glass and steel. These changes to the built environment present exciting challenges and new opportunities for civil engineers to provide safe structural solutions which meet energy code requirements, facilitate robotic and modular construction techniques, and integrate with BIM. This presentation discusses some of these emerging requirements and how structural engineers must now consider much more than just the structural capacity of a beam, wall, slab or column in their designs.

ORAL PRESENTATIONS - Braemar Room

SESSION 1 – MASONRY

Chair: Eziolu Ilozumba

- 9:30 – 9:45 **Alan Alonso** – Structural Performance of Modern Slender Masonry Walls with Slenderness Ratio > 30
- 9:45 – 10:00 **Danny Romero** – Composite and Thermal Behaviour of Masonry Walls and Shear Connectors
- 10:00 – 10:15 **Odin Guzman** – Limit State Functions for Reliability Analysis of Slender Masonry Walls Against Out-of-plane Failure
- 10:15 – 10:30 **Amr Ba Rahim** – Effect of Interior Vertical Reinforcement on the Performance of Partially Grouted Masonry Shear Walls
- 10:30 – 10:45 **Karen Izquierdo** – Increasing the Accuracy of In-plane Shear Strength Predictions for Partially Grouted Masonry Walls

SESSION 3 – STEEL

Chair: Mehsam Khan

- 11:00 – 11:15 **Vahab Esmaeili** – Numerical Assessment of the Stability of Gerber Systems
- 11:15 – 11:30 **Sheldon Twizell** – Evaluation of the Lateral Torsional Buckling Response of Heat Straightened Girders
- 11:30 – 11:45 **Eshagh Derakhshan** – Seismic Response and Design of Low-ductile Steel Multi-tiered Concentrically Braced Frames in Canada
- 11:45 – 12:00 **Abolfazl Ashrafi** – Nonlinear Response History Analysis of Steel Multi-Tiered Eccentrically Braced Frames

SESSION 3 – STEEL (CONT.)

- 12:00– 12:15 **Akram Zain** – Development of a Modular Steel Structure for Multi-storey Buildings
- 12:15– 12:30 **Mahdi Mokhtari** – A Novel Cable Element for Thermo-elastic Analysis

SESSION 5 – TIMBER

Chair: Abolfazl Ashrafi

- 15:00 – 15:15 **Tom Joyce** – Modeling the Load-slip Behaviour of Axially-loaded Self-tapping Screws
- 15:15 – 15:30 **Jialin Li** – Development of Mass Timber Panel-concrete Composite Floor Span Table
- 15:30 – 15:45 **Ning Kang** – Quantifying the Influence of End-support Conditions and Multi-span Effect on Vibration Serviceability of Mass Timber Floors
- 15:45 – 16:00 **Ahmed Mowafy** – Nonlinear Static Analysis of Hybrid Steel-timber Structures Using Fibred-based Nonlinear Model
- 16:15 – 16:30 **Lei Zhang** – Notched Connections in Mass Timber Panel-concrete Composite Floor Systems
- 16:30 – 16:45 **Md Saiful Islam** – Holistic Design Approach for Innovative Panelized Roof of Light Wood Frame House

ORAL PRESENTATIONS - Strathcona Room

SESSION 2 – CONCRETE

Chair: Qiwei Mei

- 9:30 – 9:45 **Mohammad J. Tolou Kian** – Reinforced Concrete Shear Walls with Improved Damage-Resistance Properties
- 9:45 – 10:00 **Shaghayegh Abtahi** – Development and Application of Fibre Beam-column Element Considering Bond-slip under Corrosion
- 10:00 – 10:15 **Benedict Egbon** – The Strength Prediction of Notched Sandwich Panels under Push-through test
- 10:15 – 10:30 **Helmi Alguhi** – Shear Strength Prediction of FRP-reinforced Concrete Beams without Stirrups: Review of Codes and Guidelines
- 10:30 – 10:45 **Brittney Lopushinsky** – Discrete Steel Collar Retrofitting of Square Reinforced Concrete Columns with Deficient Lap Splices

SESSION 4 – PIPELINE

Chair: Odin Guzman

- 11:00 – 11:15 **Meng Lin** – Crack Initiation Criteria for XFEM in Pipeline Steel
- 11:15 – 11:30 **Sylvester Agbo** – Tensile Strain Capacity of X42 Vintage Pipelines with Varying Girth Weld Flaw Sizes Subjected to Bending
- 11:30 – 11:45 **Saher Attia** – Evaluation of Elbow Element Behavior in Abaqus under Internal Pressure
- 11:45 – 12:00 **Drulabh Bartaula** – Simulation of Fatigue Crack Growth in Pipelines Using XFEM
- 12:00 – 12:15 **Nahid Elyasi** – Effectiveness of Using Extended Finite Element Method to Predict Tensile Strain Capacity of X52 Vintage Pipeline

SESSION 4 – PIPELINE

(CONT.)

- 12:15 – 12:30 **Eziolu Ilozumba** – An Innovative Method for Improved Performance of Buried Pipelines Subjected to Compressive Ground Movements

SESSION 6 – BRIDGE + BIOMECHANICS

Chair: John Spencer

- 15:00 – 15:15 **Zhaohan Wu** – Behaviour of 27-year-old Prestressed Concrete Bridge Girders
- 15:15 – 15:30 **Nima Shirzad** – Smart Monitoring of Bridges using Mobile Sensing Technologies
- 15:30 – 15:45 **Liyang Huang** – Finite Element Modeling of Prestressed Bridge Girder with and without Corrosion Induced Deterioration
- 15:45 – 16:00 **Zhenning Liu** – Parameter Estimation of a Shake Table Tested Bridge Column with Bond-slip Effect using Bayesian Inference
- 16:15 – 16:30 **Abdullah Aljaaidi** – Assessment of Repair Techniques for GFRP Reinforced Bridge Barriers using Vector 2
- 16:30 – 16:45 **Qiwei Mei** – A Deep Learning Algorithm Considering Connectivity of Pixels for Automatic Crack Detection
- 16:45 – 17:00 **Mohammad Salem** – An Equivalent Constitutive Model of Cancellous Bone
- 17:00 – 17:15 **Maha Ead** – Investigation of Pelvic Symmetry and the Development of 3D Pelvic Models



Carla Dickof

PEng., MASc.

Senior Specialist Engineer, Fast + Epp

Keynote: Research Collaboration with Academia for Ground Breaking Projects

In the context of applying research to push the design and construction of tall wood buildings forward, this keynote will discuss the role of academia and the partnership with structural engineering consultant firms to develop innovative system with the intent of using the system in a high profile building the Vancouver. To address the design challenges associated with a 10 story timber building in a high seismic zone, Fast+Epp forged a partnership with the UofA Advanced Research in Timber Structures (ARTS) to test and analyze the lateral system for the building. Examples of the testing approach and the building overall will be discussed.

POSTER PRESENTATIONS - Strathcona Room

Junran Sun – Investigation on the Difference in the Mechanical Properties of Fresh vs Frozen vs Vitrified Menisci

Aslan Zarei – Development of Design Guide for One-way Concrete Slabs Reinforced with GFRP Bars

Mehrdad Palizi – Implementation of Green-Naghdi Hypoelastic Models into Abaqus

Md Riasat Azim – Nonparametric Strain Based Damage Detection Methodology for Railway Truss Bridges

Xinfang Zhang – Mesh Sensitivity in Failure Pressure Prediction of Crack in Corrosion Defects using XFEM

Jiadaren Liu – A Flexure-shear Coupled Fibre Beam Element Based on Modified Compression Field Theory

Ngoan Do – Ride Quality Assessment of a Canadian Railway Line using Smartphone Sensors

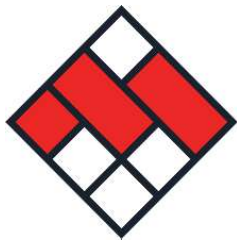
Chaofan Yi – Mix Design Formulation of Metakaolin-based Geopolymer

Moad Bani – Nonlinear Static Analysis of Steel Concentrically Braced Frames Designed to CSA S16-14 Provisions

Miguelangel Bilotta – Assessment of Design Procedure for Slender Masonry Walls for Future Optimization

Masoud Gohari – Use of Recycled Concrete as Coarse Aggregate in Structural Concrete

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