

ICSC15

**The Canadian Society for Civil Engineering
5th International/11th Construction Specialty Conference**

**The University of British Columbia,
Vancouver, Canada
June 7-10, 2015**

Program

Revised June 8, 2015

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Canadian Society for
Civil Engineering



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INSTITUTE



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Keynote #1 CSCE Alan Russell Award Lecture: Dr. Roger Woodhead

The CSCE Construction Division Alan D. Russell Keynote Address

During each CSCE Construction Specialty Conference, the Keynote address shall be known as the "Alan D. Russell Keynote Address". The speaker selected for the keynote shall be acknowledged as having received the honour (award) of providing the address and recognized with a certificate for contributions in the spirit of the person for whom the award is named.

Alan D. Russell is a true pioneer in Construction Engineering and Management education and research in Canada and has made a significant and lasting impact on the whole of this community. Early in his career, he established two construction engineering programs at Canadian Universities. Through his skills as an educator, he has increased the capabilities of many, including a number of the industry's leading practitioners and researchers. His innovative research directions coupled with a comprehensive and tenacious approach have provided great insight to the problems of the industry and broadened our thinking in developing solutions. His dedication and service in many ways to the Canadian construction community has been unwavering and serves as an inspiration to us all.

Upon his retirement, Dr. Russell was requested and agreed to share his unique insight as the Keynote speaker for the CSCE International Construction Specialty Conference. This CSCE honour is established to recognize a lifetime of significant achievements and contributions, and to ensure that there is an on-going forum for those that follow to fulfill their duty to share perspectives on the past, present and future state of the industry.

2015 Award Winner: Dr. Roger Woodhead

Dr. Roger Woodhead has had a long and influential career managing the design of large, complex projects. Of his over 35 years of consulting engineering and construction experience, the last 30 years were spent in management. Dr. Woodhead is currently serving as the Design Manager for SNC-Lavalin on the Ottawa Confederation Line rapid transit project. He served as the Technical Director for the Canada Line Rapid Transit Project in Vancouver from 2005 – 2010. Amongst previous assignments, Dr. Woodhead was the Quality Systems Manager for the Vancouver SkyTrain Millennium Line, Design Manager for a section of the LRT-2 in Kuala Lumpur and the Technical Services Manager on The Hibernia Gravity Base Structure in Newfoundland.



Dr. Woodhead is a registered Professional Engineer in British Columbia and Ontario and a registered Structural Engineer in Washington. He is an Adjunct Professor at UBC and has previously served as chair of the advisory panel on construction management at BCIT.

Keynote Presentation: From the Stone Age to Smart Phones

The lessons learned in the early stages of an engineer's career can impact the body of work that they leave as their legacy. Roger will share what he learned as he has progressed from a humble structural engineer in the "stone age" to recent management roles on mega projects such as Vancouver's Millennium and Canada Lines, the Confederation Line in Ottawa and the Hibernia Gravity Base Structure.

Attendees will have an opportunity to hear about the lessons learned in a long and varied career and some strategies for staying sane when managing mega-projects. The lessons shared will help professionals to

better manage their own career progression and assist academics in knowing what is important for their students' future careers.

Keynote #2 ASCE Peurifoy Award Lecture: Dr. Carl Haas

ASCE Peurifoy Construction Research Award

To recognize individuals who have made outstanding contributions to the advancement of construction engineering through research and development of new technology, principles or practices, the friends, former students, and associates of Dr. R. L. Peurifoy contributed funds, the annual income of which is to be used for the Peurifoy Construction Research Award. The award was officially instituted by action of the Board of Direction in 1984, upon recommendation of the Executive Committee of the Construction Research Council.

2015 Award Winner: Dr. Carl Haas

Carl Haas was selected by the Construction Institute to receive the 2015 Peurifoy Construction Research Award "For his outstanding long-term contributions in the research and science of construction technology, productivity, and workforce improvement."



Carl Haas is the Tier I Canada Research Chair in Construction and Management of Sustainable Infrastructure and a Professor in the Department of Civil and Environmental Engineering at the University of Waterloo in Canada. He holds degrees from UW and CMU. Before UW, he served on the faculty at UT Austin. He has had visiting appointments at AZ State and Ecole Centrale de Lille in France. He has received several research and teaching awards, and has numerous publications. He has supervised many students who are now leaders in our community. His research has been supported by numerous companies such as: Aecon, PCL, Coreworx, OPG, Dupont, Hilti, Fluor, and the Construction Industry Institute (CII), as well as agencies such as TxDOT, MTO, NSERC, NSF, CRC, etc. He is a member of the Canadian Academy of Engineering and a Fellow of the ASCE. He was elected to the US National Academy of Construction in 2013. In 2014 he shared the Construction Industry Institute Outstanding Researcher of the Year Award with Paul Goodrum and Carlos Caldas, and he received the CSCE Walter Shanly Award for outstanding contributions to the development and practice of construction engineering in Canada.

Keynote Presentation: Construction Academic Life Cycle Management

Some observations on construction academic career paths are offered based on personal experience. The objective is to stimulate discussion around challenges and questions we face today in our careers and those which we may face in the future. We know that roles evolve through career stages. As we develop tool and domain knowledge, it is interesting to consider how that coincides with the evolution of those roles, how research, service and teaching activities are renewed and sustained, and how our work impacts practice and the body of knowledge. Challenges along the way include learning and recovering from our mistakes, resolving the parts that art and science play in construction engineering, and figuring out what works for us each as individuals. And, in the end, what constitutes a positive impact and a worthwhile legacy?

Keynote #3 ARCOM Lecture: Dr Chris Harty

This plenary lecture is presented on behalf of the conference partner organization ARCOM, the Association of Researchers of Construction Management, U.K.

2015 ARCOM Lecture: Dr. Chris Harty

Dr Chris Harty is an Associate Professor of Design and Construction Innovation in the School of Construction Management and Engineering at the University of Reading, UK. He is also a Committee Member and currently Treasurer of ARCOM, and an Editor of the journal Construction Management and Economics. He has been the Director of two Engineering and Physical Sciences Research Council centres. A sociologist working in construction, his research interests include the impact of BIM on projects and organisations and healthcare infrastructure provision.



Keynote Presentation: BIM: People, Processes, Perspectives

Building Information Modelling is simultaneously positioned as unproblematic technology-oriented process and wide-sweeping, radical solution to the construction sector's long standing problems of communication, collaboration and coordination. The realities of what BIM is and does in practice are multiple and varied. Drawing on experiences of the UK design and construction sectors, and on several BIM oriented research projects, Dr Harty will discuss the current status of BIM implementation in the UK, and the challenges being faced in responding to the UK government's challenge of being "BIM ready" by 2016.

Keynote #4 ASCE Halpin Award Lecture: Dr. John Taylor

ASCE Daniel W. Halpin Award for Scholarship in Construction

The ASCE Daniel W. Halpin Award for Scholarship in Construction is made to a member of ASCE or the Construction Institute who has demonstrated outstanding scholarship that advances construction engineering as a science. It was named in honor of Daniel W. Halpin, Ph.D., Dist.M.ASCE recognized as one of the leading authorities in the world on the use of simulation in studying construction processes.

2015 Award Winner: Dr. John E. Taylor

Dr. Taylor was selected by the Construction Institute to receive the 2015 Daniel W. Halpin Award for Scholarship in Construction "For his broad and deep, path-breaking research on the effects of dynamic interpersonal and inter-organizational networks on the outcomes of constructed facilities over their lifecycle." In selecting Dr. Taylor for this award, the committee particularly noted his outstanding scholarship that advances construction engineering as a science.



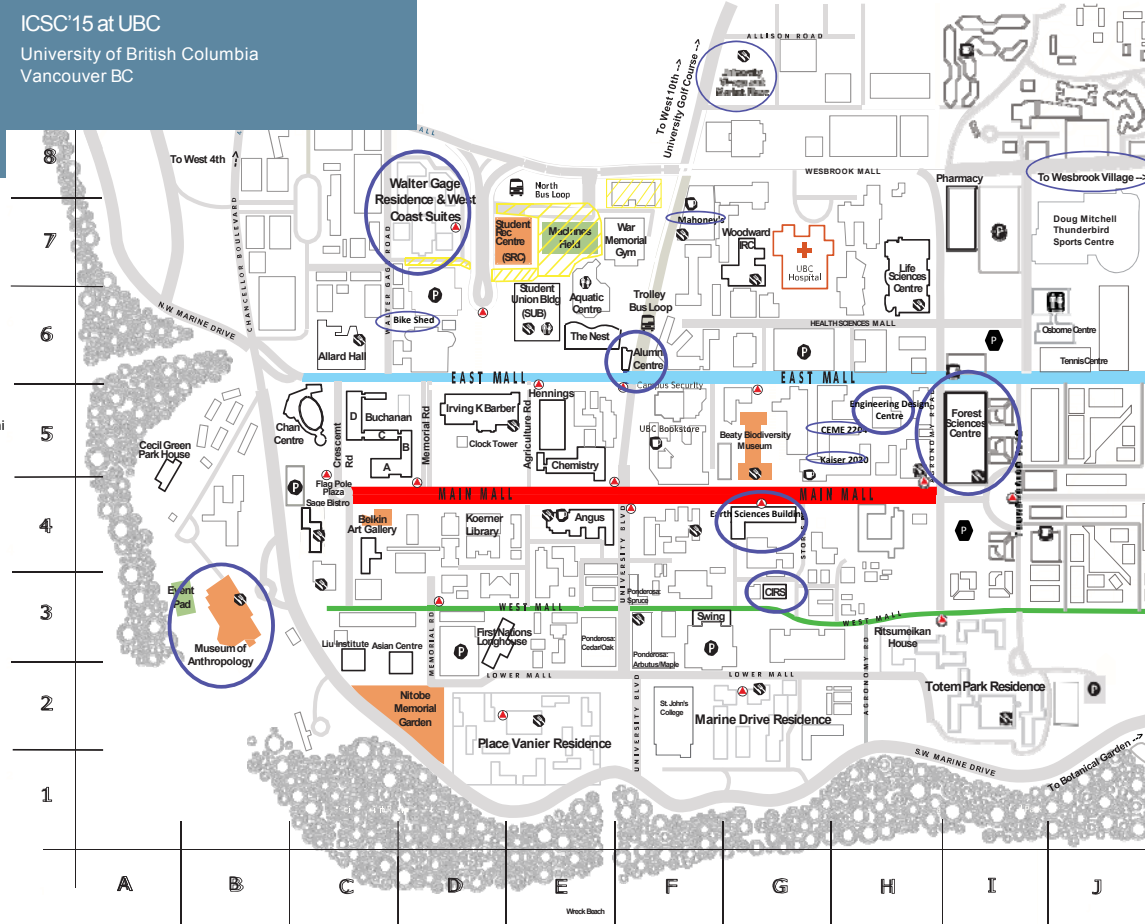
Keynote Presentation: Le Fil Rouge: Exploring Dynamics at the Intersection between Human and Engineered Networks.

Recent reports by the National Academies have encouraged investment in developing a more comprehensive understanding of network dynamics at the intersection between human and engineered networks to address important societal problems. Networks are the structures over which dynamic system behavior unfolds. Network dynamics involve understanding superimposed diffusion processes through different organizational, social and technological network structures. This Daniel W. Halpin Award presentation will introduce a civil engineering network dynamics research paradigm and will describe recently completed and on-going research in the areas of information system integration, globalization, workforce virtualization, energy efficiency and disaster mobility dynamics.



ICSC'15 at UBC
 University of British Columbia
 Vancouver BC

- Accommodation:**
 D7 Gage Residence and West Coast Suites
- Technical Program Venues**
 G4 Earth Sciences Building
 I5 Forest Sciences Building
 G3 CIRS Building
 H5 Engineering Design Centre
- Events:**
 F6 Opening Reception: Alumni Centre
 B3 Museum of Anthropology
- Meeting Locations:**
 H5 Kaiser 2020
 H5 CEME 2204
 F7 Mahoney's
- Other:**
 D6 Bike Share Shed
 G9 University Village (dining, Staples, etc.)



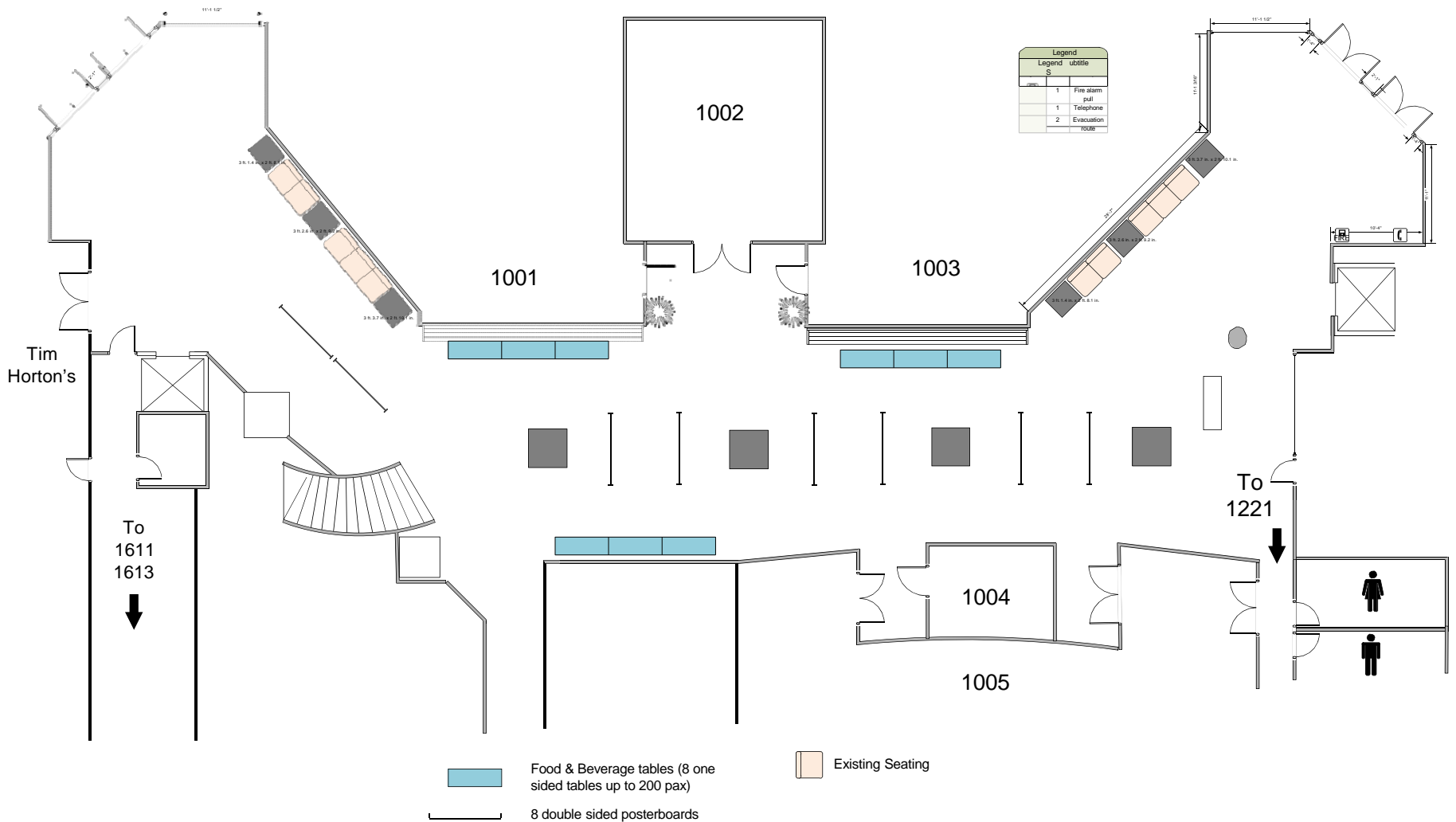
Way Finder
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FOREST SCIENCES LOBBY

NAME: ICSC 2015

DATE: June 7 – 10, 2015





**ICSC15 - The CSCE International Construction Specialty Conference,
Vancouver, June 7 - 10, 2015**

Program (Revised June 8, 2015)

Saturday, June 6

9:00-12:00 (final time TBA)	<u>Graduate Student Colloquium</u> <i>Engineering Design Centre</i>
12:00-13:00	Lunch <i>Engineering Design Centre</i>
13:00-17:00	<u>Graduate Student Colloquium</u> <i>Engineering Design Centre</i>
18:00-20:00	Graduate Student Colloquium Dinner <i>TBA</i>

Sunday, June 7

9:00-12:00 (final time TBA)	<u>Graduate Student Colloquium</u> <i>Engineering Design Centre</i>
12:00-13:00	Lunch <i>Engineering Design Centre</i>
13:00-17:00	<u>Graduate Student Colloquium</u> <i>Engineering Design Centre</i>
19:00-21:00	<u>Opening Reception</u> <i>UBC Alumni Centre</i>

Monday, June 8, Morning

Plenary Session: Mon-A Earth Sciences 1013 Opening Ceremonies <u>Keynote #1 CSCE Alan Russell Award Lecture: Dr. Roger Woodhead</u>							
Coffee Break Forestry Foyer/Earth Sciences Foyer							
Parallel Sessions: Mon-B							
	Constr Eng & Mgt 1: Cost & Estimation Forestry 1005 Chair: Das Dilip	Constr Eng & Mgt 2: Procurement, Contracting & Legal Affairs Forestry 1001 Chair: Daniel Forgues	Constr Eng & Mgt 3: Equipment Forestry 1003 Chair: Mohamed Issa	BIM 1: Planning Forestry 1221 Chair: Fernanda Leite	Bridges – Design, Constr. & Mgt. Forestry 1611 Chair: Shabtai Isaac	Infra & Asset Mgt 1: Decision-making tools Earth Sciences 1012 Chair: Tarek Zayed	IT 1: Modeling & Simulation Earth Sciences 2012 Chair: Aminah Robinson-Fayek
10:00-10:10							
10:10-10:40							
10:40-11:00	Better Infrastructure Procurement for Public Private Partnerships: An Australian Perspective (#20) J.Smith*, Bond U.; M.Regan, Bond U.; P.Love, Curtin U.	Preliminary Investigation of the Impact of Project Delivery Method on Dispute Resolution Method Choice in Public Highway Projects (#228) G.M.Gad*, Bowling Green St. U.; A.K.Momoh, Bowling Green St. U.; B.Esmaeili, U. Nebraska-Lincoln; D.D.Gransberg, Iowa St. U.	Challenges in Vertical Delivery for High-rise Building Construction (#74) Y.Wei*, U. Toronto; A.F.Pinheiro, U. Toronto; D.Pedraza, U. Toronto; B.Wu, U. Toronto; B.Y.McCabe, U. Toronto	BIM Maturity Assessment And Certification In Construction Project Team Selection (#345) A.Alaghandrad*, École de Tech. Supérieure; A.April, École de Tech. Supérieure; D.Forgues, École de Tech. Supérieure; M.Leonard, Pomerleau Company	Withdrawn	Infrastructure Rehabilitation Planning: Combined System Dynamics And Optimization Methods (#205) R.Rashedi*, U. Waterloo; D.A.Saad; T.Hegazy, U. Waterloo	Application of Fuzzy Logic Integrated with System Dynamics in Construction Modeling (#50) N.Gerami Seresht, U. Alberta; A.R.Fayek*, U. Alberta
11:00-11:20	Investigating the impact of defects on key stakeholders in the UK new housing sector (#35) T.J.Hopkin*, NHBC & U. Reading; S.Lu; P.Rogers; M.Sexton	Best Value Procurement For Highway Design-Bid-Build Projects (#227) B.R.Kolli*, U. Kansas; D.Tran, U. Kansas	A Rapid Lift Study Generation System for Heavy Industrial Projects (#32) Z.Lei, U. Alberta; B.D.Ofrim*, U. Alberta; M.Al-Hussein, U. Alberta; A.Bouferguène, U. Alberta; T.Hasan, U. Alberta	Investigating model evolution in a collaborative BIM environment (#57) E.Poirier*, U. British Columbia; S.Staub-French, U. British Columbia; D.Forgues, École de Tech. Supérieure	Withdrawn	A Process for the Assessment of Infrastructure Related Risk due to Natural Hazards (#246) J.Hackl*, ETH Zürich; B.T.Adey, ETH Zürich; M.Heitzler, ETH Zürich; I.Iosifescu-Enescu, ETH Zürich; L.Hurni, ETH Zürich	Hybrid Object Detection and Marker Recognition System to Monitor Performance of the Hauling Dump Trucks (#105) E.Rezazadeh Azar*, Lakehead U.
11:20-11:40	Modeling Early Payment Discounts and Late Payment Penalties with Singularity Functions (#7) Y.Su, Catholic U. America; G.Lucko*, Catholic U. America	Factors Impacting Selection of Construction Subcontractors (#335) M.Ghaffari*, U. Calgary; F.Sadeghpour, U. Calgary	Optimize Earthwork Hauling Plan with Minimum Cost Flow Network (#175) D.Li, U. Alberta; C.Liu, U. Alberta; M.Lu*, U. Alberta	Comparative Analysis of Existing Building Information Modelling (BIM) Guides (#293) S.Keenlside*, S8 inc.	Ultimate And Fatigue Strength Of GFRP-Reinforced, Full-Depth, Precast Bridge Deck Panels With Zigzag-Shape Transverse Joints Filled With UHPFRC (#350) M.Sayed-Ahmed*, Ryerson U.; K.Sennah, Ryerson U.	Modeling Subway Risk Assessment Using Fuzzy Logic (#225) M.M.Abouhamad*, Concordia; T.Zayed, Concordia	Analytical and simulation modeling of bulldozer's workflows (#148) A.Bulgakov*, SWSU Kursk, Russia; G.Tokmakov, South Russian St. Polytechnic U.; T.Bock, TU Munich
11:40-12:00	An investigation into current tendering process in Saudi construction projects (#34) S.A.Alhammadi*, Shaqra U.	Canam Group BuildMaster Building Construction Innovation (#352) T.Bégin*, Canam Group	An Automated Model for Selecting the Optimum Mobile Crane Model and On-Site Position Using Genetic Algorithms (#128) T.M.Zaki*, American U. in Cairo; O.Hosny, American U. in Cairo; K.Nassar, American U. in Cairo	One relation to rule them all: the point-to-point precedence relation that substitutes the existing ones (#340) M.Hadju*, Budapest U.	Deconstruction and Maintenance of a Steel bridge using Fatigue data and BIM (#295) C.O.Wokem*, SAIT; J.Subedi, SAIT	Developing a System of Systems Framework for Public Transportation Infrastructure Planning Using System Dynamics (#240) S.Mukhopadhyay*, M.E. Hassan; A.Shafaat, Purdue	A Simulation Framework for Ex-Ante Analysis of Safety Hazards in Construction Projects (#100) A.Alvanchi*, Sharif U. Tech.; F.Baniassadi, Sharif U. Tech.; A.Mostafavi, Florida Int. U.
12:00-13:00	Lunch						

Monday, June 8, Afternoon

13:00-14:00						
Plenary Session: Mon-C Earth Sciences 1013						
<u>Keynote #2 ASCE Peurifoy Award Lecture: Dr. Carl Haas</u>						
14:10-15:30						
Parallel Sessions: Mon-D						
	Constr Eng & Mgt 4: Scheduling Forestry 1005 Chair: Jeff Rankin	Constr Eng & Mgt 5: Procurement, Contracting & Legal Affairs Forestry 1001 Chair: Ghada Moustafa	Sustainable Construction 1: LEED/Energy Forestry 1003 Chair: Nora El-Gohary	BIM 2: Implementation Forestry 1221 Chair: Erik Poirier	Infra & Asset Mgt 2: Decision- making tools Earth Sciences 1012 Chair: Dana Vanier	IT 2: Modeling & Simulation Earth Sciences 2012 Chair: Linda Newton
14:10-14:30	Progress Tracking Of Multiple Projects Using Email And Voice (#211) M.Abdel-Monem, U. Waterloo; Z.Abuwarda, U. Waterloo; T.Hegazy*, U. Waterloo	Withdrawn	A Methodology to Evaluate the Effects of School Buildings' Occupancy and Usage on their Energy Consumption (#185) M.M.Ouf*, U. Manitoba; P.Merkel, Manitoba Hydro; M.Issa, U. Manitoba; P.Polyzois, U. Manitoba	BIM Obstacles in Industrial Projects: A Contractor Perspective (#26) M.Ali*, U. Alberta; Y.Mohamed, U. Alberta; H.Taghaddos, PCL; R.Hermann, PCL	A Data Analysis Framework for Optimizing Occupant Energy Use while Sustaining Indoor Environmental Quality (#296) T.Sharmin*, U. Alberta; M.Gul, U. Alberta; M.Al-Hussein, U. Alberta	Integration of Predetermined Motion Time Systems into Simulation Modeling of Manual Construction Operations (#60) A.Golabchi*, U. Alberta; S.Han, U. Alberta; S.M.AbouRizk, U. Alberta
14:30-14:50	Assessing the Management Practices for Small to Medium Sized Canadian General Contractor Organizations (#116) J.Rankin*, U. New Brunswick; C.T.Haas, U. Waterloo; H.Nasir, U. Waterloo; M.Issa, U. Manitoba; R.Quaigrain, U. Manitoba; T.Froese, U. British Columbia	Challenges and Obstacles Facing Tenderers Adopting E-Tendering in the Public Sector of the Construction Industry in Egypt (#86) C.A.Khalil*, American U. in Cairo; A.F.Waly, American U. in Cairo	Thermal Comfort Assessment Through Measurements In A Naturally Ventilated Leed Gold Building (#13) A.A.Kim*, U. Washington; S.Wang, U. Washington; D.Reed, U. Washington	A Framework For Classifying BIM Design Coordination Issues (#329) S.Mehrbod*, U. British Columbia; S.Staub-French, U. British Columbia; M.Tory, U. Victoria; N.Mahyar, U. British Columbia	Optimizing Environmental Sustainability and Public Benefits of Transportation Network Programs (#49) C.Limsawasd*, Florida Int. U.; W.Orabi, Florida Int. U.	An Exploration Of Image-Based Walk Through Technologies (#81) D.C.Bradley, O'Kane Consultants Inc.; S.Rankohi*, U. New Brunswick; J.Rankin, U. New Brunswick; L.Waugh, U. New Brunswick
14:50-15:10	Multi-Objective Schedule Optimization Using Constraint Programming (#209) W.Menesi, U. Waterloo; Z.Abuwarda, U. Waterloo; M.Abdel-Monem, U. Waterloo; T.Hegazy*, U. Waterloo	Closing the Contractual Circle: Investigating Emergent Subcontracting Approaches (#265) S.A.Biancardo*, U. Naples Federico II; N.Osmanbhoy, U. Washington; J.Ottesen, U. Washington; G.Migliaccio, U. Washington; C.M.Clevenger, U. Colorado Boulder	Development and Validation of Regression Models to Predict Annual Energy Consumption of Office Buildings in Different Climate Regions in the United States (#78) S.Shams Amiri; M.Mottahedi; S.Asadi*, Penn St. U.; D.Riley	Structuring The Adoption And Implementation Of BIM And Integrated Approaches To Project Delivery Across The Canadian AECO Industry: Key Drivers From Abroad (#59) S.Tahrani, École de Tech. Supérieure; E.Poirier*, U. British Columbia; G.Aksenova, École de Tech. Supérieure; D.Forgues, École de Tech. Supérieure	Topic Modeling for Infrastructure-related Discussions in Online Social Media (#344) M.NikBakht*, U. Toronto; T.El-Diraby, U. Toronto	An Image-based Framework for Automated Discrepancy Quantification and Realignment of Industrial Assemblies (#47) M.Nahangi*, U. Waterloo; T.A.Czerniawski, U. Waterloo; J.Yeung, U. Waterloo; C.T.Haas, U. Waterloo; S.Walbridge, U. Waterloo; J.West, U. Waterloo
15:10-15:30	Construction Space Float Definition, Quantification, and Analysis (#200) H.Said*, Santa Clara U.; G.Lucko, Catholic U. America	Quality Assurance and Risk Management – A Regulator's Perspective (#351) G.Larocque*, Assoc. of Prof. Eng. And Geosci. of BC	Discovering The Values Of Residential Building Occupants For Value-Sensitive Improvement Of Building Energy Efficiency (#226) K.Amasyali*, U. Illinois at Urbana-Champaign; N.El-Gohary, U. Illinois at Urbana-Champaign	Framing Construction Uses Of Virtual Information Models (#190) L.Jiang*, Penn St. U.; R.M.Leicht, Penn St. U.; J.I.Messner, Penn St. U.	The Interface between Building Information Models and the Public (#310) R.Grover, U. British Columbia; P.Li, U. British Columbia; T.Froese*, U. British Columbia	Improved Localization of Construction Workers in Video Frames by Integrating Detection and Tracking (#242) M.Park*, Myongji U.; I.Brilakis, U. Cambridge
15:30-15:50	Coffee Break Forestry Foyer/Earth Sciences Foyer					

Monday, June 8, Afternoon

15:50-17:10						
Parallel Sessions: Mon-E						
	Constr Eng & Mgt 6: Construction methods Forestry 1005 <i>Chair: Aminah Robinson-Fayek</i>	PM 1: Planning, Scheduling & Control Forestry 1001 <i>Chair: Thomas Froese</i>	Sustainable Construction 2: LEED/Energy Forestry 1003 <i>Chair: Ali Mustafavidarani</i>	BIM 3: Implementation Forestry 1221 <i>Chair: Sheryl Staub-French</i>	Infra & Asset Mgt 3: LCC/PPP Earth Sciences 1012 <i>Chair: Konrad Siu</i>	IT 3: Modeling & Simulation Earth Sciences 2012 <i>Chair: Tarek Zayed</i>
15:50-16:10	Constructability: Capabilities, Implementation, and Barriers (#14) <i>M.K.Al-Alawi*, U. Alberta; M.Ali, U. Alberta; S.Johnson, JV Driver; S.Han, U. Alberta; Y.Mohamed, U. Alberta; S.M.AbouRizk, U. Alberta</i>	Design and validation of the first phase of the new Chronographical Standard Protocol for construction project scheduling (#104) <i>F.Ardila, École de Tech. Supérieure; A.Francis*, École de Tech. Supérieure</i>	Brazilian and Canadian Oil & Gas Industries – Similarities, Differences, Challenges and Perspectives for a Sustainable Industry (#212) <i>R.R.Aragao*, U. Toronto; T.El-Diraby, U. Toronto</i>	Automated Production Planning in Panelized Construction Enabled by Integrating Discrete-Event Simulation and BIM (#48) <i>H.Liu*, U. Alberta; M.S.Altaf, U. Alberta; Z.Lei, U. Alberta; M.Lu, U. Alberta; M.Al-Hussein, U. Alberta</i>	Public-Private Partnerships – Analysis of Government Implementation Units (#301) <i>A.M.Abdel Aziz*, U. Washington; A.Elmahdy, U. Washington</i>	Implementation of Construction Industry Best Practices into Workflow Management Systems (#260) <i>B.Golzarpoor*, U. Waterloo; C.T.Haas, U. Waterloo</i>
16:10-16:30	Comparing Performance of Construction Projects Delivered through Different Delivery Methods (#277) <i>E.Rigotti, Polytechnic of Turin; G.Migliaccio*, U. Washington; A.De Marco, Polytechnic of Turin</i>	Applying the Chronographical Approach for Modelling Different Types of Projects (#101) <i>A.Francis*, École de Tech. Supérieure</i>	Comparative Evaluation of LEED and QSAS Credits using Life Cycle Analysis: Case Study from Qatar (#16) <i>S.O.Attallah*, Ball St. U.; A.Kandil, Purdue U.; A.Senouci, Qatar U.; H.Alderham, Qatar U.; K.Abdelwarith, Purdue U.</i>	Methodology for Automated Generation of 4D BIM (#72) <i>A.Montaser*, Concordia; O.Moselhi, Concordia</i>	The Influence of Public-Private Partnerships on Design Flexibility and Downstream Design Feedback in the Presidio Parkway (#179) <i>E.I.Antillon*, U. Colorado; A.Javernick-Will, U. Colorado Boulder; K.R.Molenaar, U. Colorado Boulder</i>	Self- Calibrated WSN For Indoor Tracking And Control Of Construction Operations (#130) <i>M.Ibrahim*, Concordia; O.Moselhi, Concordia</i>
16:30-16:50	Identifying Factors Affecting Motivation of Construction Crew Workers (#11) <i>M.Raoufi, U. Alberta; A.R.Fayek*, U. Alberta</i>	Characterizing Coordination In Both Loose And Very Tightly Coupled Utility Reconstruction Processes (#181) <i>L.L.Olde Scholtenhuis*, U. Twente; T.Hartmann, U. Twente; A.Doree</i>	Minimizing Greenhouse Gas Emissions and Water Consumption of Existing Buildings (#323) <i>M.Abdallah*, U. Colorado Denver; K.El-Rayes, U. Illinois at Urbana-Champaign; C.M.Clevenger, U. Colorado Boulder</i>	QR-Coded Clash-Free Drawings: An Integrated System of BIM and Augmented Reality to Improve Construction Project Visualization (#187) <i>T.M.Zaki*, American U. in Cairo; C.A.Khalil, American U. in Cairo</i>	Assessment of Network-level Environmental Sustainability in Infrastructure Systems using Service and Performance Adjusted Life Cycle Analysis (#102) <i>M.Batouli*, Florida Int. U.; A.Mostafavi, Florida Int. U.</i>	Construction Productivity Model Using Fuzzy Approach (#307) <i>E.Elwakil*, Purdue U.; T.Zayed, Concordia; T.Attia, HBNRC</i>
16:50-17:10	A Systematic Progress Model for Construction Method Innovation (#271) <i>Y.Qiu*, Hunan U.</i>	Development of Mechanisms by Using Conceptual System Dynamics Models to Resolve Delay in Construction Projects (#279) <i>D.K.Das*, CUT, Free St., South Africa</i>	ENERGY STAR Windows' Performance and Orientation (#208) <i>M.Jalili, Colorado St. U.; C.M.Clevenger*, U. Colorado Boulder; M.Ozbek, Colorado St. U.; M.Abdallah, U. Colorado Denver</i>	Tracking Construction Projects Progress Using Mobile Hand-Held Devices (#65) <i>M.Marzouk*, Cairo U.; M.Zaher</i>	Reliability Analysis Of Water Distribution Networks Using Minimum Cut Set Approach (#263) <i>A.U.Mohammed*, Concordia; T.Zayed, Concordia; O.Moselhi, Concordia; A.AlHawari</i>	Robotization Of Slip Form For Monolithic Construction Of Tall Buildings (#68) <i>A.Bulgakov*, SWSU Kursk, Russia; D.Parshin, Don St. Technical U., Rostov on Don, Russia; N.Buzalo, South Russian St. Polytechnic U.</i>
17:45-22:30	<p>Conference Banquet Downtown Vancouver (Buses leave from Gage Towers at 17:45)</p>					

Tuesday, June 9, Morning

7:45-12:00	Industry Innovations Symposium <i>CIRS Auditorium</i>	
7:45-8:15	Registration and Breakfast <i>CIRS Foyer</i>	
8:15-8:30	Opening Remarks	
8:30-9:15	Theme 1 Keynote Speakers: Emerging trends in Infrastructure Construction	
	Delivering large infrastructure projects in collaborative environments. <i>Ross A. Gilmour, B.C. Area Manager, Peter Kiewit Infrastructure Company</i>	
	Smart infrastructure, data sensing and collection technologies, flying robots. <i>Burcu Akinci, Professor in Civil and Environmental Engineering, Carnegie Mellon University</i>	
9:15-10:00	Theme 2 Keynote Speakers: Emerging trends in Design and Project Organization	
	Structuring, collecting and moving data from design and construction into facility management and operations <i>Geraldine Rayner: Architect AIBC BA DipArch RIBA LEED AP</i>	
	Organizational considerations in BIM implementation, BIM deliverables. <i>Jennifer Whyte, Professor in Innovation and Design, School of Construction Management and Engineering, University of Reading, UK</i>	
10:00-10:20	Coffee Break <i>CIRS Foyer</i>	
10:20-11:20	Theme 3 Keynote Speakers: Emerging trends in Building Construction and Renewal	
	BIM, Virtual design and construction. <i>Marwan Bakri, Director of BIM / Virtual Construction Services, Ledcor Construction Limited</i>	
	BIM, Lean Construction, prefabrication and modular construction, sustainable construction. <i>Mohamed Al-Hussein, Professor in Civil and Environmental Engineering, University of Alberta</i>	
	Sustainable urban renewal, high-performance buildings, knowledge-based systems. <i>Chimay Anumba, Department Head and Professor of Architectural Engineering, Pennsylvania State University</i>	
11:20-12:00	Panel Discussion	
12:00-13:30 (12:00-13:10 for CII Track)	Lunch <i>Earth Sciences Foyer</i>	CSCE Construction Division Meeting CEME 2204 <i>Chair: Farnaz Sadeghpour</i>

Tuesday, June 9, Afternoon

13:30-15:10 (13:10-15:10 for CII Track)		Parallel Sessions: Tue-D						
	Constr Eng & Mgt 7: Health & Safety Forestry 1005 Chair: Matthew Hallowell	Sustainable Construction 3: Design and construction for the future Forestry 1001 Chair: Kasun Hewage	CII-sponsored Research 1 Forestry 1003 Chair: Baabak Ashuri	IT 4: Computer Applications Forestry 1221 Chair: Amr Kandil	Construction Education Forestry 1611 Chair: Mohamed Issa	Construction Case Studies 1 Forestry 1613 Chair: Adel Francis	Infra & Asset Mgt 4: Performance Mgt Earth Sciences 2012 Chair: Dana Vanier	BuildingSMART BIM Forum CIRS BC Hydro Decision Theatre
13:10-13:30			Demographic Influences On Construction Craft Shortages In The U.S. And Canada (#183) <i>M.A.Albattah*, U. Colorado Boulder; P.M.Goodrum, U. Colorado Boulder; T.R.Taylor, U. Kentucky</i>					
13:30-13:50	Lessons Learned From Using Bio- And Environmental Sensing In Construction: A Field Implementation (#270) <i>W.Lee*, U. Washington; G.Migliaccio, U. Washington; K.Lin, U. Washington; F.Russo, U. Naples Federico II</i>	System Dynamics Modelling For An Urban Water System: Net-Zero Water Analysis For Peachland (BC) (#63) <i>G.K.Chhipi Shrestha*, U. British Columbia Okanagan; K.Hewage, U. British Columbia; R.Ssadiq, U. British Columbia</i>	Explaining The Influence Of Change Reasons On Cost And Schedule Performances (#317) <i>D.Grau*, Arizona St. Univ.; E.Back; N.Hossain, Arizona St. Univ.</i>	Development of an Automated 3D/4D As-built Model Generation System for Construction Progress Monitoring and Quality Control (#312) <i>R.Maalek*, U. Calgary; J.Y.Ruwanpura, U. Calgary; D.Lichti, U. Calgary</i>	Exploring Knowledge Areas Offered in Project Management Programs in Construction (#121) <i>L.D.Nguyen*, Florida Gulf Coast U.; Y.Chih, Australian National U.; B.Garcia de Soto, ETH Zürich</i>	An Empirical Study on the Sustainability of Panelized Residential Building Construction (#9) <i>H.X.Li*, U. Alberta; H.Yu; M.Gul, U. Alberta; M.Al-Hussein, U. Alberta; D.Chmiel</i>	Forecasting breakage rate in water distribution networks using Evolutionary Polynomial Regression (#201) <i>F.Karimian*, Concordia; H.Elsawah; T.Zayed, Concordia; O.Moselhi, Concordia; A.AlHawari</i>	*Speakers Include: Sheryl Staub-French, Associate Professor in Civil Engineering at the University of British-Columbia Linda Newton, Defense Construction Canada, Director, Project Development, bSC John Hale, Department of National Defense, Chair, Operations committee, bSC Susan Keenlside, S8 inc, Chair, Members community, bSC Erik Poirier, University of British-Columbia, Chair, Communications committee, bSC TBA
13:50-14:10	A Strategic Safety-Risk Management Plan For Recovery After Disaster Operations (#106) <i>M.S.Fard Hosseini*, U. Nebraska-Lincoln; B.Esmaeili, U. Nebraska-Lincoln; R.Wood, U. Nebraska-Lincoln</i>	Performance Indicators For Sustainability Assessment Of Buildings (#302) <i>M.Kamali, U. British Columbia; K.Hewage*, U. British Columbia</i>	Multi-Perspective Assessment Method For Measuring Leading Indicators In Capital Project Benchmarking (#145) <i>J.Choi, U. Texas at Austin; S.Yun*, Constr. Ind. Inst.; S.P.Mulva, Constr. Ind. Inst.; D.P.Oliveira, Constr. Ind. Inst.; Y.Kang, U. Seoul</i>	Maintaining Vertical Gardens Using Quadrotor Aerial Inspection (#67) <i>A.Bulgakov*, SWSU Kursk, Russia; R.Schach, Tech. U. Dresden; S.Emelianov, SWSU Kursk, Russia; D.Sayfeddine, South Russian St. Polytechnic U.; V.Erofeev, St. U. Mordovia, Saransk, Russia</i>	Teaching Engineering Literacy To Non-Engineering Students In Formal Learning Environments (#324) <i>M.El Asmar, Arizona St. Univ.; A.Chokor, Arizona St. Univ.; D.Grau*, Arizona St. Univ.</i>	Characterizing Bottlenecks in Building Design Coordination Meetings (#252) <i>H.B.Cavka*, U. British Columbia; S.Staub-French, U. British Columbia; M.Tory, U. Victoria</i>	Condition Diagnostics of Steel Water Tanks Using Correlated Visual Patterns (#195) <i>V.S.Kalasapudi*, Arizona St. Univ.; P.Tang, Arizona St. Univ.</i>	
14:10-14:30	An Integrated Framework to Prevent Unsafe Proximity Hazards in Construction by Optimizing Spatio-Temporal Constraints (#126) <i>N.Roofigari Esfahan*, McMaster U.; J.Wang, McMaster U.; S.Razavi, McMaster U.</i>	Optimization Of An Office Building Envelope For Environmental Impact Minimization (#92) <i>R.Azari*, U. Texas at San Antonio; S.Garshasbi; P.Amini; Y.Mohammadi; H.Rashed-Ali, U. Texas at San Antonio</i>	Overview of Construction Sustainability Research Products (#134) <i>J.T.O'Connor, U. Texas at Austin; N.Torres, Fluor Co.; J.Woo*, U. Texas at Austin</i>	Outdoor Automated Data Acquisition for Progress Reporting (#88) <i>A.Montaser*, Concordia; O.Moselhi, Concordia</i>	Understanding the implications of augmented reality out of context in engineering education (#186) <i>S.K.Ayer*, Arizona St. Univ.; J.I.Messner, Penn St. U.; C.J.Anumba, Penn St. U.</i>	Effectiveness of Automated Machine Guidance Technology in Productivity Improvement: Case Study (#269) <i>E.Rezazadeh Azar*, Lakehead U.; G.Agnev, Lakehead U.; A.Parker, Lakehead U.</i>	Infrastructure Condition Assessment Based on Low-cost Hyper-Spatial Resolution Multispectral Digital Aerial Photography (#199) <i>S.Zhang*, U. New Mexico; S.M.Bogus, U. New Mexico; C.D.Lippitt, U. New Mexico</i>	
14:30-14:50	Hazardous Proximity Zone Design for Heavy Construction Equipment (#322) <i>I.Alwolusi, U. Alabama; E.Marks*, U. Alabama; N.Pradhananga, Florida Int. U.; T.Cheng, ExxonMobile Upstream Research Co.</i>	The Effect of Shading Design and Materials on Building Energy Demand (#77) <i>N.Haghighi, Texas A&M-kingsville; S.Asadi*, Penn St. U.; H.Babaizadeh</i>	Development and Utilization of the Project Definition Rating Index for Small Industrial Projects (#189) <i>W.Collins*, Arizona St. Univ.; K.Parrish, Arizona St. Univ.; E.Gibson, Jr., Arizona St. Univ.</i>	An Integrated Process-based Simulation Platform For Construction Project Planning (#331) <i>R.Scherer, Tech. U. Dresden; A.Ismail*, Tech. U. Dresden</i>	A Case Study of Hybrid Learning Implementation in Construction Engineering (#219) <i>A.Karabulut Ilgu, Iowa St. U.; C.Jahren*, Iowa St. U.; D.Jeong, Iowa St. U.; L.Cormicle, Iowa St. U.</i>	A Smart Mobile App for Site Inspection and Documentation (#119) <i>L.D.Nguyen*, Florida Gulf Coast U.; A.Koufakou; C.Mitchell</i>	Assessment Of The Level Of Service (LOS) Of Public Recreational Centre Buildings: An Uncertainty Based Approach (#308) <i>R.J.Ruparathna*, U. British Columbia; K.Hewage, U. British Columbia; R.Ssadiq, U. British Columbia</i>	
14:50-15:10	A statistical safety control model for construction sites using location systems (#40) <i>T.Edrei; S.Isaac*, Ben Gurion U.</i>	Value – Oriented Approach to Home Energy Audit Process Design (#264) <i>F.Wu*, Penn St. U.; D.Riley; R.M.Leicht, Penn St. U.</i>	A Review of the Current Knowledge and Practice Related to Project Progress and Performance Assessment (#83) <i>R.E.Orgut*, N. Carolina St. U.; J.Zhu, Florida Int. U.; M.Batouli, Florida Int. U.; A.Mostafavi, Florida Int. U.; E.J.Jaselskis, N. Carolina St. U.</i>	Using Simulations to better train future and existing Construction Engineers (#37) <i>T.M.Korman*, Cal Poly St. U.</i>	Scheduling Refresher-based Rescue and Evacuation Training for Wind Turbine Technicians (#95) <i>K.Lawani*, Glasgow Caledonian U.; B.Hare, Glasgow Caledonian U.; I.Cameron, Glasgow Caledonian U.</i>	Shifting Logics Of Constructability And Design: A Study Of Emerging AEC Integrated Practices For Energy Performance (#146) <i>C.Monson*, U. Washington; L.Osburn, U. Washington; C.Dossick, U. Washington; H.Burpee, U. Washington; G.Neff, U. Washington</i>	Energy Loss Modeling of Water Main Breaks: A Hybrid System Dynamics Agent-Based Modeling Approach (#274) <i>H.Zamenian*, Purdue U.; D.M.Abraham, Purdue U.; K.M.Faust, Purdue U.</i>	
15:10-15:40	Coffee Break <i>Forestry Foyer/Earth Sciences Foyer</i>							

Tuesday, June 9, Afternoon

15:40-17:00 (15:40-17:20 for CII Track)		Parallel Sessions: Tue-E					
	Constr Eng & Mgt 8: Productivity, benchmarking and workforce issues Forestry 1005 Chair: Famaz Sadeghpour	PM 2: Project performance Forestry 1001 Chair: Jeff Rankin	CII-sponsored Research 2 Forestry 1003 Chair: Amy Javernick-Will	IT 5: Modeling & Simulation Forestry 1221 Chair: Shabtai Isaac	Construction Case Studies 2 Forestry 1613 Chair: Adel Francis	Infra & Asset Mgt 5: Bridges Earth Sciences 2012 Chair: Miklos Hajdu	BuildingSMART BIM Forum CIRS BC Hydro Decision Theatre <i>Speakers continued from previous session</i>
15:40-16:00	Culture And Organizational Culture In The Construction Industry: A Literature Review (#173) J.O.Choi*, Iowa St. U.; G.M.Gad, Bowling Green St. U.; J.S.Shane, Iowa St. U.; K.Strong, Colorado St. U.	A Time-Cost-Quality Trade-Off Model For Nuclear-Type Projects (#244) M.Shahtaheri*, U. Waterloo; H.Nasir, King Abdulaziz U.; C.T.Haas, U. Waterloo; T.Salimi, U. Waterloo	Development of an Operational Excellence Model to Improve Safety for Construction Organizations (#96) H.Liu*, U. Kentucky; E.Jazayeri, U. Kentucky; G.B.Dadi, U. Kentucky; W.F.Maloney, U. Kentucky; K.J.Cravey, Day & Zimmermann	Building a sustainable occupant's performance based model for institutional buildings (#303) D.I.Salem*, Purdue U.; E.Elwakil, Purdue U.; A.Kandil, Purdue U.	Expediting Emergency Construction Procurements: Case Studies in Success (#94) D.D.Gransberg*, Iowa St. U.; J.Rueda-Benavides, Iowa St. U.	Comparative Study Of Current Practice In Bridge Condition Assessment (#220) M.H.Ahmed*, Concordia; A.Bhowmick; O.Moselhi, Concordia	
16:00-16:20	Exploring The Behavioral Pattern Of Stakeholders In Construction Projects Which Used Best-Value Selection (#287) S.Hasanzadeh*, U. Nebraska-Lincoln; B.Esmaeili, U. Nebraska-Lincoln; K.R.Molenaar, U. Colorado Boulder	Principles, Characteristics, and Methodology to Develop a Project Management Assessment Tool at the Construction Project Level (#316) A.G.Sanjuan*, U. British Columbia; T.Froese, U. British Columbia	State Of Practice In Portfolio Management: A Comprehensive Survey (#38) R.Masoumi*, Northeastern U.; B.Ashuri, Georgia Tech.; R.E.Minchin, U. Florida; M.Shahandashti, Georgia Tech.; A.Touran, Northeastern U.	A Relative Energy Prediction Methodology To Support Decision Making In Deep Retrofits (#289) P.Gultekin*, PSU; C.J.Anumba, Penn St. U.; R.M.Leicht, Penn St. U.	Implementing Alternative Technical Concepts in Design-Bid-Build Projects (#10) D.D.Gransberg*, Iowa St. U.; G.M.Gad, Bowling Green St. U.; J.Rueda-Benavides, Iowa St. U.	Research For Generating 2D-Drawings of Superstructure in Highway Bridge (#320) W.Jiang*, Kansai U.; S.Tanaka, Kansai U.	
16:20-16:40	Quantifying the Socioeconomic Disruptions Caused by Construction in Densely Populated Areas (#76) A.A.El-Sayed*, Cairo U.; O.El-Anwar, Cairo U.	Simulated Schedule Delay Mitigation via Float Allocation (#25) G.Lucko*, Catholic U. America; R.C.Thompson, Catholic U. America	Energy-Based Safety Risk Management (#214) D.Alexander, U. Colorado; M.R.Hallowell*, U. Colorado; J.A.Gambatese, Oregon St. U.	The Feasibility Of Plug-Load Monitoring And Energy-Saving Interventions In Residential And Office Buildings On The University Of Washington Campus (#18) H.Kosonen*, U. Washington; A.A.Kim, U. Washington	A Case Study on the Use of LED Temporary Construction Lighting System (#135) Y.J.Huang, U. Washington; K.Lin*, U. Washington; J.Angeley, U. Washington	Developing Failure Age Prediction Model of Hazardous Liquid Pipelines (#285) L.Parvizsedghy*, Concordia; T.Zayed, Concordia	
16:40-17:00	Social Capital in Construction Projects: An Exploration (#160) T.Y.Koh*, U. Hong Kong; S.Rowlinson, U. Hong Kong; M.M.Tuuli, Loughborough U., UK	How well did a multi-stakeholder management framework for remote sites model the realities on and off-site of a scottish highlands infrastructure marine project-reflective case study (#325) L.Kestle*, UNITEC Inst. of Tech., Auckland, New Zealand.	Motivation For Interface Management In Construction: A Project Complexity Perspective (#197) S.Ahn*, U. Michigan; S.Shokri, U. Waterloo; S.Lee, U. Michigan; C.T.Haas, U. Waterloo; R.Haas, U. Waterloo	Data Collection Framework for Construction Safety Research (#110) Y.Chen*, U. Toronto; E.Alderman, U. Toronto; B.Y.McCabe, U. Toronto; D.Hyatt, Rotman School of Mgt.	Identifying The Sources Of Complexity In The Urban Train Project In Puerto Rico (#64) A.A.Gonzalez Quevedo, U. Puerto Rico - Mayaguez; C.Lopez del Puerto*, U. Puerto Rico - Mayaguez	BrIM Implementation for Documentation of Bridge Element Condition for Inspections (#262) F.Al-Shalabi, Iowa St. U.; Y.Turkan*, Iowa St. U.	
17:00-17:20			Advanced Work Packaging as emerging methodology to improve project performance in the industrial construction sector. (#230) S.Ponticelli*; W.J.O'Brien; F.L.Leite, U. Texas at Austin				
Business Meetings							
17:30-19:30	ASCE CRC Business Meeting Kaiser 2020						
19:30-21:30	CSCE Construction Division Dinner Mahoneys						

Wednesday, June 10, Morning

7:00-10:00							Business Meetings	
7:00							ASCE JCEM Editorial Board Meeting Forestry 1003	CII Business Meetings
8:00								
9:00-10:00		Plenary Session: Wed-A <i>Earth Sciences 1013</i>						
		Keynote #3 ARCOM Lecture: Dr. Chris Harty						
10:00-10:30		Coffee Break <i>Forestry Foyer/Earth Sciences Foyer</i>						
10:30-11:50		Parallel Sessions: Wed-B						
	Constr Eng & Mgt 9: Productivity, benchmarking and workforce issues Forestry 1005 Chair: Amr Kandil	Constr Eng & Mgt 10: Health & Safety Forestry 1001 Chair: Linda Newton	IT 6: Computer Applications Forestry 1003 Chair: Kasun Hewage	BIM 4: Applications Forestry 1221 Chair: Nora El-Gohary	PM 3: Project performance Forestry 1611 Chair: Jessica Kaminsky	Sustainable Construction 4: Design and construction for the future Forestry 1613 Chair: Ali Mustafavidarani	Infra & Asset Mgt 6: Decision-making tools Earth Sciences 1012 Chair: Dana Vanier	
10:30-10:50	Exploring The Relationship Between Project Integration And Safety Performance (#311) B.Esmaili ^{1*} ; E.Pellicer ² S.Hasanzadeh ¹ ; K.R.Molenaar ¹ ; A.Sanz ² , ¹ U. Nebraska-Lincoln ² U. Politécnica de Valencia	Ergonomics and Physical demand analysis in a construction manufacturing facility (#231) X.Li ^{1*} ; G.Fan ¹ ; A.Abudan ¹ ; M.Sukkariéh, U. windsor; N.Inyang, All Weather Windows; M.Gul ² ; M.El-Rich ¹ ; M.Al-Hussein ¹ , ¹ U. Alberta	Automated Monitoring of Hardhats Wearing for Onsite Safety Enhancement (#138) Z.Zhu*, Concordia; M.Park, Myongji U.; N.Elsafy	Integrating Building Information Modeling (BIM) With Sustainable Universal Design Strategies To Evaluate The Costs And Benefits Of Building Projects (#109) B.T.Alsayyar*, U. Ottawa; A.Jrade, U. Ottawa	Application of Prospect Theory to management decisions under risk on construction projects (#54) J.Fiolet*, U. Waterloo; C.T.Haas, U. Waterloo	Risk Of Wildfires With Known Ignition Points: Case Of Residential Buildings (#234) E.Kalhor*, U. New Mexico; V.Valentin, U. New Mexico	An Image-Based Data Model For Subway Condition Assessment (#245) T.Dawood*, Concordia; T.Zayed, Concordia; Z.Zhu, Concordia	
10:50-11:10	Comparison of Construction Equipment Emissions for Seven Construction Projects (#17) W.Rasdorf, N. Carolina St. U.; J.Hummer, Wayne St. U.; I.Arocho*, N. Carolina St. U.	A Conceptual Accident Causation Model Based on the Incident Root Causes (#115) E.Pereira, U. Alberta; H.Taghaddos, PCL; R.Hermann, PCL; S.Han, U. Alberta; S.M.AbouRizk*, U. Alberta	Multi-agent System for Improved Safety and Productivity of Earthwork Equipment Using Real-time Location Systems (#315) F.Vahdatikhaki, Concordia; A.Hammad*, Concordia; S.M.Langari, Concordia	Improve Communication Process On Construction Sites Using Mobile Technologies And Cloud Computing (Paper in French, Presentation in English) (#346) S.Frenette*, École de Tech. Supérieure; D.Forgues, École de Tech. Supérieure	Ex-Ante Assessment of Vulnerability to Uncertainty in Complex Construction Project Organizations (#70) J.Zhu*, Florida Int. U.; A.Mostafavi, Florida Int. U.	Testing The Correlation Between Indoor Environmental Quality And Productive Time (#147) W.Khoury, American U. Beirut; I.M.Srour*, American U. Beirut; A.Yassine, American U. Beirut	A State-Of-The-Art Competency Model For Advanced Commercial Building Workforce (#276) D.Riley; M.Roskoski; M.Safari; A.G.Zaballero; M.Kazemi Rad; S.Asadi*, Penn St. U.	
11:10-11:30	Investigation On Construction Workers' Social Norms And Managers' Desired Norms Regarding Absence: Preliminary Results From A Norm Elicitation Study (#198) S.Ahn*, U. Michigan; B.Choi, U. Michigan; S.Lee, U. Michigan	Live safety demos: New method to enhance situational awareness and situational interest through emotional engagement. (#218) S.Bhanbadri, U. Colorado; M.R.Hallowell*, U. Colorado	Telematics Data-Driven Prognostics System for Construction Heavy Equipment Health Monitoring and Assessment (#149) H.Said*, Santa Clara U.; T.Nicoletti, DPL America	A Semantic Similarity-Based Method for Semi-Automated IFC Extension (#156) J.Zhang*, U. Illinois at Urbana-Champaign; N.El-Gohary, U. Illinois at Urbana-Champaign	A Framework for Organizations Performance Assessment Using Fuzzy Approach (#291) E.Elwakil*, Purdue U.; Z.Rathore, Purdue U.	Photobiological Treatment Plants Which Are Integrated with Building's Architectural Shell (#203) N.Buzalo*, South Russian St. Polytechnic U.; P.Ermachenko, Platov South-Russian St. Polytechnic U. (NPI); A.Bulgakov, SWSU Kursk, Russia; R.Schach, Tech. U. Dresden	Road Maintenance Information Management System Based on Product Data Model Considering Disaster Use (#318) S.Kubota*, Kansai U.	
11:30-11:50	Measuring High-Level Project Productivity for Alberta Capital Projects (#239) S.Yun*, Constr. Ind. Inst.; S.P.Mulva, Constr. Ind. Inst.; D.Y.Kim, Dongeui U.	Symmetrical and Asymmetrical Tool Belt Loading Effects on the Postural Stability of Construction Workers (#127) H.Jebelli ^{1*} ; K.Yang ¹ ; C.R.Ahn ¹ ; T.L.Stentz ¹ ¹ U. Nebraska-Lincoln	Enhancing The Construction Safety Training By Using Virtual Environment: V-Safe (#161) I.A.Kiral, Bogazici U.; S.Comu*, Bogazici U.; C.Kavaklioglu, Minerva Consultancy	Design Change Management using BIM-based Visualization Model (#191) V.Moayeri*, Concordia; O.Moselhi, Concordia; Z.Zhu, Concordia	A neural network based model for cost estimation of industrial buildings at the project's definition phase (#28) A.Alvanchi*, Sharif U. Tech.; A.Shafiee, Sharif U. Tech.; S.Biglari, Sharif U. Tech. - Kish campus	Governmental Dust Control in Construction Industry: A study of policies (#273) W.Shibe ¹ *, Chongqing U.; Y.Kunhui, Chongqing U.	Using Game Theory for Creating Evolutionary Stable Strategy for Post Disaster Insurance (#29) M.Eid, U. Tennessee; I.El-Adaway*, U. Tennessee; K.Coatney, Mississippi St. U.	
11:50-13:00		Lunch <i>Earth Sciences Foyer</i>						

Wednesday, June 10, Afternoon

13:00-13:50							
Plenary Session: Wed-C Earth Sciences 1013							
Keynote #4 ASCE Halpin Award Lecture: Dr. John Taylor							
14:00-15:20							
Parallel Sessions: Wed-D							
	Constr Eng & Mgt 11: Productivity, benchmarking and workforce issues Forestry 1005 Chair: Jeff Rankin	Constr Eng & Mgt 12: Health & Safety Forestry 1001 Chair: Linda Newton	IT 7: Computer Applications Forestry 1003 Chair:	BIM 5: Facility Management Forestry 1221 Chair: Sheryl Staub-French	PM 4: Organizational Leadership and Management Forestry 1611 Chair: Amr Kandil	Sustainable Construction 5: Design and construction for the future Forestry 1613 Chair: Mohamed Issa	Infra & Asset Mgt 7: Decision-making tools Earth Sciences 1012 Chair: Miklos Hajdu
14:00-14:20	Scheduling Optimization of Linear Projects Considering Spatio-Temporal Constraints (#107) N.Roofigari Esfahan*, McMaster U.; S.Razavi, McMaster U.	Investigating The Barriers And Potentials Of Applying Lean Principles In The Egyptian Construction Industry: An Action Research Approach For Applying Value Stream Mapping (#166) M.R.Ali*, Cairo U.; A.Hamdy, Cairo U.; O.El-Anwar, Cairo U.	A Divide-and-Conquer Algorithm for 3D Imaging Planning in Dynamic Construction Environments (#196) C.Zhang*, Arizona St. Univ.; P.Tang, Arizona St. Univ.	Integrating Building Information Modeling And Conceptual Design Towards Effective Facilities Management: A Framework Title (#188) E.T.Al-Kattan*, U. Ottawa; A.Jrade, U. Ottawa	Comparative study of relationship management in design-bid-build and design-build project delivery methods in infrastructure projects (#176) J.Kerer*, Bowling Green St. U.; G.M.Gad, Bowling Green St. U.	Life Cycle Analysis Of Reused Steel Using The Economic Input-Output Method (#120) J.Yeung*, U. Waterloo; S.Walbridge, U. Waterloo; C.T.Haas, U. Waterloo	Integrated Asset Management of Water and Wastewater Infrastructure Systems – Borrowing from Industry Foundation Classes (#299) A.Ganjidoost*, U. Waterloo; C.T.Haas, U. Waterloo; M.Knight, U. Waterloo; A.Unger, U. Waterloo
14:20-14:40	Optimizing Linear Schedules: Congestion-Minimization Approach (#125) N.Roofigari Esfahan*, McMaster U.; S.Razavi, McMaster U.	Measuring Construction Workers' Attention Using Eye-Tracking Technology (#222) S.Bhoir, U. Nebraska-Lincoln; S.Hasanzadeh, U. Nebraska-Lincoln; B.Esmaeili*, U. Nebraska-Lincoln; M.D.Dodd, U. Nebraska-Lincoln; M.S.Fard Hosseini, U. Nebraska-Lincoln	Automated dimensional compliance assessment with incomplete point cloud (#163) T.A.Czerniawski*, U. Waterloo; M.Nahangi, U. Waterloo; C.T.Haas, U. Waterloo; S.Walbridge, U. Waterloo	Evaluation of Organisational Context and Requirements for Leveraging Building Information Models to Support Handover and Operations & Maintenance (#251) H.B.Cavka*, U. British Columbia; S.Staub-French, U. British Columbia; R.Pottinger, U. British Columbia	Do Strong Or Weak Ties Matter In Knowledge Networks? (#229) C.Poleacovschi*, U. Colorado Boulder; A.Javernick-Will, U. Colorado Boulder	Reducing heat island effect by using Recycled Glass Cullet in Asphalt Shingles (#5) M.Kiletico; M.Hassan*, Louisiana St. U.; L.Mohammad, Louisiana St. U.	A comparison of geographic intervention grouping methods for infrastructure intervention planning across multiple networks (#255) C.Kielhauser*, ETH Zürich; B.T.Adey, ETH Zürich; N.Lethanh, ETH Zürich
14:40-15:00	Electronic Document Management Systems For Transportation Construction Industry (#132) F.Guo*, Iowa St. U.; C.Jahren, Iowa St. U.; Y.Turkan, Iowa St. U.	Sensor-Based Factorial Experimental Study On Low Back Disorder Risk Factors Among Roofers (#238) D.Wang, W. Virginia U.; B.Hu, W. Virginia U.; F.Dai*, W. Virginia U.; X.Ning, W. Virginia U.	Research for Generating 3D Model from Laser Scanner Data Removed Noise (#319) S.Tanaka*, Kansai U.; R.Imai, Nat. Inst. for Land & Infra. Mgt.; K.Nakamura, Osaka U. Economic; K.Kawano, Kansai U.; S.Kubota, Kansai U.	Review Of BIM Quality Assessment Approaches For Facility Management (#342) P.Zadeh*, U. British Columbia; S.Staub-French, U. British Columbia; R.Pottinger, U. British Columbia	Culture and Construction (#27) L.Allison*, U. Washington; J.Kaminsky, U. Washington	3D Finite Element Modeling of Recycled Glass Cullet in Asphalt shingles (#6) M.Hassan*, Louisiana St. U.; S.Asadi, Penn St. U.; A.Beheshti, Louisiana St. U.	Application Of FAHP And Shannon Entropy In Evaluating Criteria Significance In Pipeline Deterioration (#348) Z.Zangenehmadar*, Concordia; O.Moselhi, Concordia
15:00-15:20	Benefits Of Integrating Building Information Modeling And Geographical Information System In Construction Management And Control (#167) A.A.Al-Saggaf*, U. Ottawa; A.Jrade, U. Ottawa	Real-Time Accident Detection Using UWB Tracking (#275) C.Andolfo*, U. Calgary; F.Sadeghpour, U. Calgary	Design and Development of 3D-CAD Engine (#321) S.Tanaka*, Kansai U.; T.Froese, U. British Columbia; S.Kubota, Kansai U.; K.Nakamura; K.Monobe, Miyagi U.	Investigating Occupants' Behaviour Using Emerging Building Information Modelling (#52) H.F.Abanda*, Oxford Brookes U.; L.F.Cabeza, GREA Innovació Concurrent U. de Lleida Pere de Cabrera	Analysing Parties' Behaviours on Mediating Building Management Cases (#51) S.O.Cheung*, City U. Hong Kong; T.Y.Chan, City U. Hong Kong; K.T.You, U. Auckland	An exploratory study to investigate the influence of cement properties on the durability of concrete made with fly ash (#75) A.Rosario-Lugaro, U. de Puerto Rico-Mayaguez; O.I.Molina-Bas*, U. de Puerto Rico-Mayaguez; E.Reyes-Pozo, U. Politécnica De Madrid	
15:20-15:40	Coffee Break Forestry Foyer/Earth Sciences Foyer						

Wednesday, June 10, Afternoon

15:40-17:00		Parallel Sessions: Wed-E				
		<p>Constr Eng & Mgt 14: Construction methods Forestry 1001 Chair: Farnaz Sadeghpour</p>		<p>BIM 5: Facility Management Forestry 1221 Chair: Sheryl Staub-French</p>	<p>PM 5: Risk and Project Controls Forestry 1611 Chair: Konrad Siu</p>	<p>Infra & Asset Mgt 8: Decision-making tools Earth Sciences 1012 Chair: Nora El-Gohary</p>
15:40-16:00		<p>A Typology for Space Usage on Construction Sites (#339) A.Gordon*, EllisDon; F.Sadeghpour, U. Calgary</p>		<p>SocioBIM: Bim-To-End User Interaction For Sustainable Building Operations And Facility Asset Management (#326) A. Shooolestani*, U. British Columbia; B. Shooolestani, U. British Columbia; T. Froese, U. British Columbia; D. Vanier, U. British Columbia</p>	<p>A Model to Evaluate the Maturity of Construction Organizations' Disability Management Practices (#123) R. Quaigrain*, U. Manitoba; M. Issa, U. Manitoba</p>	<p>Axiology-based Value Quantification Modeling for Buildings (#223) L. Zhang*, U. Illinois at Urbana-Champaign; N. El-Gohary, U. Illinois at Urbana-Champaign</p>
16:00-16:20		<p>Predictive Modeling of Prefabrication Feasibility for the United States Electrical Contracting Firms (#150) H. Said*, Santa Clara U.</p>		<p>A Decision-making Algorithm for Selecting Building Information Modeling Functions (#202) S. Bhoir, U. Nebraska-Lincoln; A. Schwab, U. Nebraska-Lincoln; B. Esmaeili*, U. Nebraska-Lincoln; P.M. Goodrum, U. Colorado Boulder</p>	<p>Identifying Influential Factors for Capital Construction Project Planning Strategies (#56) M. Safa*, U. Waterloo; S. MacGillivray, Valency Inc., ; M. Davidson, Ontario Power Generation; C. T. Haas, U. Waterloo; E. Gibson, Jr., Arizona St. Univ.; K. Kaczmarczyk, OPG</p>	<p>Statistical Modeling of Public Attitudes Towards Water Infrastructure Management Alternatives in Shrinking Cities (#221) K.M. Faust*, Purdue U.; D.M. Abraham, Purdue U.; H. Zamenian, Purdue U.</p>
16:20-16:40		<p>Development Of A Cost Normalization Procedure For National Health Care Facility Benchmarking (#290) V. Sharma*, U. Texas at Austin; S. Yun, Constr. Ind. Inst.; D.P. Oliveira, Constr. Ind. Inst.; S.P. Mulva, Constr. Ind. Inst.; C. Caldas, U. Texas at Austin</p>		<p>Tracking Indoor Air Quality of Buildings using BIM (#66) M. Marzouk*, Cairo U.; I. Gamal; K. Al-Gahtani, King Saud U.</p>	<p>Guideline To Apply Hedging To Mitigate The Risk Of Construction Materials Price Escalation (#142) M.A. Al-Zarrad*, U. Alabama; G.P. Moynihan, U. Alabama; S. Vereen, U. Alabama</p>	<p>A routing algorithm to construct candidate work zones with distance constraints (#261) C. Eicher; N. Lethanh*, ETH Zürich; B. T. Adey, ETH Zürich</p>
16:40-17:00		<p>Role of Formwork Systems In High-Rise Construction (#349) H.A. Abou Ibrahim, American U. Beirut; F.R. Hamzeh*, American U. Beirut</p>		<p>A Novel Framework For Bim Enabled Facility Energy Management – A Concept Paper (#258) F. Al-Shalabi, Iowa St. U.; Y. Turkan*, Iowa St. U.</p>	<p>Management of Construction Risk through Contractor's All Risk Insurance Policy – A South Africa case study (#192) S. Musundire, U. Johannesburg; C. O. Aigbavboa*, U. Johannesburg</p>	<p>An Ontology-Supported Transaction Formalism Protocol in Infrastructure Management (#247) J. Zeb*, U. British Columbia; T. Froese, U. British Columbia</p>
18:00-22:30	<p>Closing Reception and Awards Ceremony UBC Museum of Anthropology</p>					
18:00-19:30	<p>Reception</p>					
19:30-20:00	<p>Awards Ceremony</p>					
20:00-22:00	<p>Optional: Guided Tours of Museum and Join the Volunteer Appreciation Dinner (Outside/Food Trucks).</p>					