Spring 2015 | Issue 10

University of Waterloo

WATMOVES

UW-ITE STUDENT CHAPTER NEWSLETTER

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WHAT'S INSIDE

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A MESSAGE FROM THE NEW PRESIDENT



As the new president, it is my honour to serve the chapter and work with a great team of students who help run this chapter with their outstanding volunteering work.

The goal of this chapter is to provide members the opportunity to balance studying and social interaction within the transportation group. We also always have in mind that connecting students with professionals within the transportation industry makes students familiar with the challenges facing this industry and current opportunities that they might get involved with in the future. We try to achieve our goals by organizing social events to gather our members in a fun environment outside the formal atmosphere of the university. We also hold seminars and ask professionals from different transportation related fields to introduce their projects and ongoing research to our members. These events provide students opportunities to expand their knowledge as well as their networks with these companies.

Beside the benefits that this student chapter has for our members, it is a great chance for the executive members to experience team work and to develop valuable skills. The new executive team (pictured below) has started its work in May 2015 and since then the chapter has organized a number of events.

I am happy to bring our readers the spring term edition of the WatMoves and I hope you enjoy reading this issue. We are looking forward for your input and suggestions to improve the quality of our chapter.

Sina Varamini, PhD Candidate, E.I.T Chapter President



Front row (left to right): Sina Varamini (President), Dan Pickel (Secretary), Professor Bruce Hellinga (Chapter Advisor), Jordan Douglas Hart-Bishop (Academic Events Director), Siyuan Li (Webmaster) Back row: Hamed Noori (Treasurer), Wenfu Wang (Social Events Director), Sajad Shiravi (Vice President)

ACADEMIC EVENTS

By: Jordan Douglas Hart-Bishop (Academic Events Director)

The Waterloo ITE Student Chapter was pleased to have two speakers present to our members, and participate in the Traffic Bowl at CITE Regina 2015.

Although University of Waterloo did not have a team registered for this year's Traffic Bowl, I had the privilege to compete with two other students in a similar position: Bianca Popescu from the University of British Columbia, and Matthew Harvey from Ryerson University. The team organizing this year's Traffic Bowl created a special wildcard team (that went by many names, with the Best Friends Team being my favourite), and I would like to sincerely thank them for providing us with this opportunity. With our team assembled a mere days before the competition, we did not have much time to prepare, but we managed to get a few practices in between events.



(Left to Right) Matthew Harvey (Ryerson University), Bianca Popescu (University of British Colombia), and Jordan Hart-Bishop (University of Waterloo), competitors at Traffic Bowl

Our Traffic Bowl round against the University of Calgary and University of Alberta teams, was quite wild with the BFT having many ups and downs (but mainly downs). However, it appeared that the last minute studying paid off as we managed to win the round with a well-timed Daily Double. Unfortunately, that was the end of the road for the Best Friends Team, as one condition of competing was that we would not advance to the final round and UofC advanced to the finals as the runnerup. I had a great time competing and franticly preparing with Bianca and Matthew, and look forward to seeing them at future competitions! Our first Academic event of the Spring term was shortly after CITE Regina, in which we were pleased to welcome Bob Henderson from the Region of Waterloo to speak about Road Safety in the Region of Waterloo.

Bob's presentation outlined the Region's philosophy for evidence-based decision making, when prioritizing potential projects within the Region. The presentation provided an interesting perspective on how municipalities approach the challenge which projects to invest in, and what their safety impact may be.

On the behalf of CITE, I would like to thank Bob Henderson and we would be happy to for him to visit us again!

Bob Henderson, CET, LEL, Manager Transportation Engineering Region of Waterloo



The second Academic event for our Spring term came from Dr. Chris Bachmann, a new Assistant Professor at the University of Waterloo. It was great to have Dr. Bachmann come and showcase his research to our students, with his seminar on Modelling Changing Global Trade Patterns and Their Local Transportation Impacts. The presentation focused on how trade agreements such as Canada-Korea Free Trade Agreement (CKFTA), can have a significant impact on our transportation systems due to their impact on freight flows. Dr. Bachmann's research focuses on the intersection of the economy and transportation, and you can read more about his research in this issues Project Highlight. We would like to thank Dr. Bachmann for sharing his research with us, and look forward to seeing him at future Student Chapter events.

Keep an eye open for upcoming events, and if you know someone who would be able to speak with us please let me know at <u>jhartbishop@gmail.com</u>.

PROJECT HIGHLIGHT

By: Dr. Chris Bachmann (Assistant Professor)

ECONOMIC CRITICALITY OF ONTARIO'S HIGHWAY INFRASTRUCTURE

Ontario is the economic heartland of Canada and therefore generates a significant amount of goods movement. It is estimated that Ontario's multimodal transportation system moves over \$1.3 trillion in goods per year. Ontario's multi-modal system carries 49% of Canada's total international trade. Moreover, Ontario highways carry almost 70% of road trade with the United States. Trade aside, southern Ontario is a national hub for production, consumption and transhipment of goods. Moving forward, population growth coupled with growing and diverse trade strategies are likely to place new and increased demands on Ontario's aging infrastructure. Since Ontario shippers and carriers rely on the mobility and accessibility provided by transportation systems, any restrictions or disruptions can have detrimental outcomes not only for the Province's economy but also for the economy of Canada as a whole. This raises a difficult question: which highway segments are most critical to Ontario's economy?

The objective of this research is to study the economic criticality of Ontario's highway infrastructure (i.e., those roads where disruptions would have particularly severe economic consequences). Economic criticality is being measured by simulating the disruption or closing of a link and measuring the length of delays and the value of goods delayed in a transportation system network model. Hence, a disrupted or closed link that causes longer delays or delays to a higher value of goods is viewed as more economically critical than a closed link that causes shorter delays or delays to a lower value of goods. Scenarios reflecting real-world circumstances where multiple links are disrupted or closed at the same time due to various circumstances (e.g., incidents, construction operations, extreme weather events, etc.) will also be simulated.

The outcome of this project will be a detailed analysis of the impact of isolated and multiple disruptions and closures in Ontario's highway network on delays to Ontario's economic flows. Those links which when disabled lead to the greatest increase in economic delay can be referred to as the most critical links (MCLs).

The analysis of MCLs will be useful for many applications. For example, physical redundancy can be planned for the critical links to reduce overall economic vulnerability. Design efforts can be focused towards reducing the likelihood and consequence of disruptions or closures on critical links. Maintenance and reconstruction efforts can be coordinated to avoid scenarios involving combinations of links that create the greatest increase in economic delays. Bridges can be prioritized for rapid bridge replacement or Accelerated Bridge Construction (ABC). These examples demonstrate the many practical applications of knowing the economic criticality of Ontario's highway infrastructure.

DOCTORIAL STUDENT HIGHLIGHT

Shahram Heydari



was motivated to explore the field of Transportation. Prior to joining Dr. Fu's transportation group at the University of Waterloo, Shahram was a research assistant at McGill University, Montreal. He is a member of the Interuniversity Research Center on Enterprise Networks, Logistics and Transportation. He has also been affiliated with the GRIMES research team, an interdisciplinary research group on mobility. environment and safety, for the past three years. His major research interests are in transportation safety and planning, Bayesian statistics, and discrete choice models.

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Shahram has a civil/structural

engineering degree from the

Sapienza", Italy. After working

as a professional engineer in

Italy for about eight years, he

University of Rome

Shahram is currently working on a research project, assigned by Transportation Safety Board of Canada, relative to railway grade crossing safety. He believes that this research study will contribute to our understanding of the complex structure of grade crossing crash data and that, based on his research, decision-makers will be provided by a series of more realistic and comprehensive tools, and would thus be able to allocate safety improvement programs more adequately. In fact, he has a keen interest in understanding causes and consequences with respect to railway crossing crashes and hopes that his work helps make railway crossings safer across Canada and elsewhere.

He enjoys understanding, adopting, and developing advanced mathematical and statistical modeling techniques that can solve complex real world transportation problems.

During his undergraduate and

graduate studies, Shahram has received several awards and scholarships. In 2014, he has been awarded the prestigious Alexander Graham Bell doctoral scholarship (NSERC - CGS D3) and Michael Smith Foreign Study Supplement by Natural Sciences and Engineering Research Council of Canada. In 2015, he was selected to receive a research internship award by Road Safety Research Network (le Réseau de Sécurité Routière), Recherche en a Ouebec government organization located in Montreal. Shahram has been engaged in various collaborative research projects in different research teams and universities and considers his experiences an extremely valuable asset. He was a visiting scholar in transportation group at Texas A&M University from March to August: 2015. To date, he has published six peer-reviewed journal articles and ten peer-reviewed conference papers.

MASTER STUDENT HIGHLIGHT

Zhengyang (John) Lu



Zhengyang (John) Lu is a Master of Applied Science candidate in the Department of Civil and Environmental Engineering at the University of Waterloo. He is working under the supervision of Professor Fu. He completed his undergraduate studies in Transportation Engineering from Tongji University.

His research interests lie in leveraging advanced information and communication technologies to provide innovative solutions to transportation problems. During his Master's studies, he has studied the application of automated video processing techniques to understand driver behaviors; he has also explored the usage of Bluetooth and Wi-Fi signals to measure travel times. He believes that the new technologies have brought a wealth of transportation data, from which a smarter transportation system can be built. Inspired by this belief, he is completing his Master's research on Weather-responsive Signal Control Strategies. John's research aims to (1) measure weather impact on traffic flow and driving behavior using video trajectory data; (2) develop weather-responsive signal control strategies helping increase efficiency and safety at intersections in

adverse weather conditions. He conducts simulation studies to evaluate the developed weather strategies.



Automated video processing software interface

In his spare time, John enjoys playing soccer and board games.

ALUMNI STUDENT HIGHLIGHT

Michael Linton



Michael Linton is a recent MASc graduate from the Innovative Transportation Solutions System (iTSS) Lab at UW. He was supervised by Prof. Liping Fu and his thesis research was focused on real-time monitoring of winter highway conditions using a smartphone-based connected vehicle monitoring system. During his time at UW, Michael was involved in several other projects with iTSS Lab including the investigation of optimal winter road maintenance operations at the Town of Oakville and comparing the performance of winter road monitoring equipment with Ontario Ministry of Transportation.

At UW, Michael was actively involved in the UW-ITE Student Chapter and served as Academic Events Coordinator in 2014. He believes that being involved in the ITE chapter is invaluable to transportation engineering students and provides a great opportunity to share knowledge and connect with the transportation industry.

After graduation, Michael began working with Crozier & Associates in the transportation division and supports

land development at various stages - from carrying out transportation impact assessments at the predevelopment stage to recommending transportation demand management strategies to address parking issues post-development. He is also currently serving as a Young Member on the Transportation Research Board's Winter Maintenance Committee.

In his spare time, Michael plays basketball and enjoys cooking (and eating!) and is soon hoping to learn to play the guitar. He believes in being multifaceted and takes every opportunity to learn something new.

TRAFFIC BOWL 2016

By: Wenfu Wang

Participants Needed for 2016 ITE Collegiate Traffic Bowl

The Institute TE Collegiate Traffic Bowl is an annual competition amongst ITE student chapter teams across America and Canada. The competitions in Traffic Bowl are structured similar to the TV game shows such as "Jeopardy", but with traffic engineering, transportation planning, and ITE itself for the clues, questions, and answers.

The 2016 ITE Traffic Bowl Season will soon be underway. Ahead of next Canadian ITE (CITE) Annual Conference in Kelowna, British Columbia, the CITE student chapter at University of Waterloo (UW) now starts recruiting participants for next year's CITE Traffic Bowl. Based on the CITE requirements, *four full-time registered students at University of Waterloo that have not reached their 27th birthday as of August 1, 2016 are qualified to participate in next year's game*. UW's traffic bowl team members from last year will on be hand to train this year's teams. Get in touch with us at <u>uw.ite.sc@gmail.com</u> if you are interested in joining us!



CLOSING REMARKS FROM THE EDITOR

After more than four years, WatMoves has now become a regular celebration of our achievements and an encouragement to us when we are facing various challenges. In the past term, the University of Waterloo ITE Student Chapter has hosted/facilitated various meaningful academic and social events, and one event to highlight is our cohosting of the Student Mixer for the 2014 Canadian Institute of Transportation Engineers Annual Conference in the Waterloo Region. Thank you and congratulations to everyone who made these events possible! With efforts and hardworking, we are expecting a more productive and successful 2015 Fall Term. Hope everyone enjoy this WatMoves issue!

Sina Varamini and Dan Pickel, WatMoves Issue 10 Editors

SPONSORS

We would like to thank our sponsors for supporting and helping us achieve our chapter goals. So we give a big THANK YOU to Hatch Mott MacDonald, CIMA+ and TSRG for their support during this year.

If you would like to get more information on sponsorship opportunities, please contact us at <u>uw.ite.sc@gmail.com</u> To learn more, please go to: www.civil.uwaterloo.ca/transportation/ite

We also welcome companies who are interested in coming to Waterloo to present unique transportation projects that they are undertaking.

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Want to be our sponsor? Be our first Gold-Level Sponsor.

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UW-ITE STUDENT CHAPTER Contact:

<u>uw.ite.sc@gmail.com</u> To learn more please go to <u>www.civil.uwaterloo.ca/transportation/ite</u>