WatMoves UW-ITE STUDENT CHAPTER NEWSletter

Issue No. 3 Fall 2012

University of Waterloo ite

Inside

Message from the President

With more than 50 graduate students, University of Waterloo transportation research group is one of the most accredited transportation programs in North America. Our faculty and graduate students are involved in various cutting-edge transportation related researches and projects. These involvements have resulted in more than 175 published academic papers and almost 30 awards just during the last three years. Beside the continuous academic success, University of Waterloo ITE student chapter (UW-ITE SC) is also active on serving the professionals and local society through voluntarily work dating back to the 1970s.

As the first active ITE student chapter in Canada, we started to release our seasonal newsletter (WatMoves) from Winter 2012. The positive feedbacks that we got from the local and national transportation engineering communities encouraged us to continue releasing WatMoves while improving its content at the same time. Following the structure of our former newsletters, in this third issue of WatMoves, we included the following sections:

1) Academic Events
2) Social Events
3) PhD. Candidate Highlights
4) Masters Candidate Highlights
5) Professor Highlights
6) Alumni Highlights
7) Project Highlight
8) Awards

At this point, I want to take the opportunity to thank both of our sponsors and executive members who make the release of this issue happen; the former through their generous financial support and the latter through their voluntarily contributions.

Soroush Salek Moghaddam, PhD Candidate

UW-ITE President

Academic Events

Spring term was a great academic season for the UW-ITE Student Chapter. During this term the student chapter hosted one academic seminar.

Periodic Seminars

On September 4th 2012, the UW-ITE SC hosted Dr. Babak Mehran. Dr. Mehran received his BSc from Zanjan National University in Iran, his MSc from Iran University of Science and Technology, and his PhD from Nagoya University in Japan in 2009. He was a Post-Doctoral Researcher at the University of Tokyo, Japan from 2009 - 2011 and currently holds an NSERC Industrial R&D Postdoctoral Fellowship for which he is working with IBI Group on traffic prediction models for ATMS.

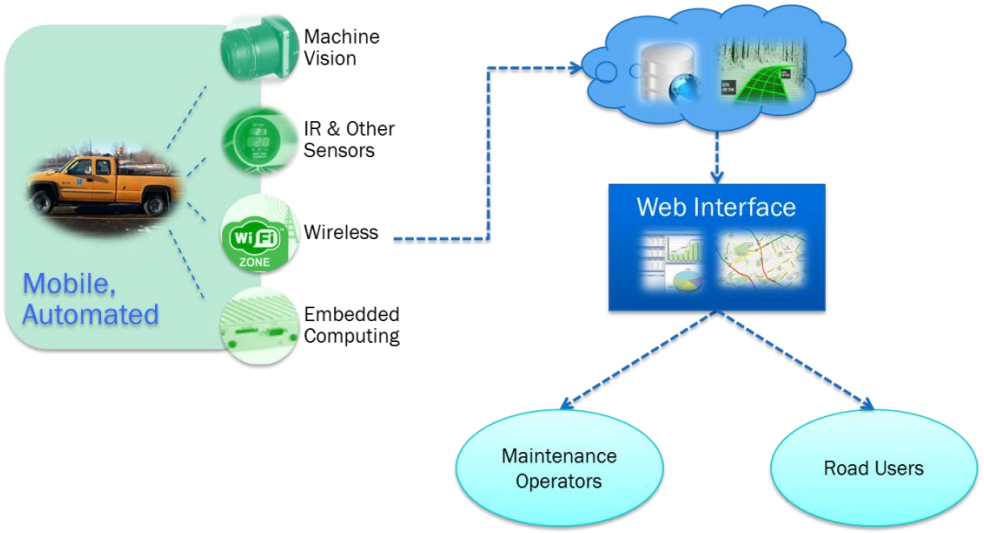
He presented his research entitled "Modeling Traffic Flow in Discrete Time-Space". This presentation had two sections. In the first section, macroscopic features of the traffic flow were reviewed and an application of the variational theory in traffic flow modeling was demonstrated. The second section was dedicated to demonstrate the application of the variational theory in a data fusion framework, which is capable of reproducing vehicle trajectories on signalized urban arterials by combining probe and fixed sensor data.

We look forward to hosting more of these academic seminars as well as a visit to the Pearson International Airport as we head into the Fall term.

Social Events

Although the winter was not that harsh this year, here in UW the professors and graduate students could not wait for getting out and enjoying the good taste of Canadian burgers and sausages in a BBQ event. On Friday, June 22nd UW-ITE-SC held its summer BBQ event in beautiful Waterloo Park. The event was quite a success, as most of our professors and graduate students attended the event with their families.

Project Highlight



Automated Winter Road Surface Condition Monitoring System

Development of Cloud Based Automated Winter Road Surface Condition Monitoring System

Dr. Liping Fu

Monitoring of winter road surface conditions during and after snowstorms is essential for most transportation agencies in Canada who are responsible for winter road maintenance. Information on road surface conditions can be used to assess the need for maintenance service, compare the effectiveness of different treatment methods, and evaluate the quality of the maintenance services delivered by contractors across different maintenance yards. Real-time information on road surface conditions is also invaluable to the road users who can use the information to improve their travel and driving decisions such as where, when and in what mode to travel.

Currently, however, winter road surface conditions are monitored mostly through personal observations and manual recording, which lacks objectivity, repeatability, details and timeliness. Road weather and surface conditions can also be monitored using RWIS (Road Weather Information Systems), which consists of weather and pavement sensors installed at specific locations on the road network, or by continuous friction measurement equipment (CFME) and spectroscopic snow and ice cover sensors. These technologies are too costly to be widely adopted and have significant limitations in spatial and temporal coverage.

The iTSS Lab at the University of Waterloo has developed and demonstrated a winter road condition monitoring system that uses a combination of machine vision and artificial intelligence algorithms along with inexpensive data collection hardware to classify snow/ice coverage. Unlike existing solutions, the proposed system analyses single/multiple lanes instead of a point (or a line in case of a moving sensor) and can hence more accurately determine coverage of snow and other contaminants. To further enhance the classification performance of the algorithms, image data is combined with maintenance (plowing and salting) as well as weather and

environmental data (pavement temperature, precipitation and wind speed).

After several development iterations, the prototype autonomous data collection unit consists of a GPS module, a machine vision camera, infrared thermometer, and an interface for collection of vehicle data from the onboard Engine control Unit (ECU), all developed on embedded Linux using open source technologies. The collected data are pre-processed and transmitted to a central server via Wi-Fi or 3G connection. On the server end, the system consists of a cloud based web server that provides an interface to remotely configure data collection units, an application that receives, processes and stores the collected data, and a web interface through which the users can access a live view of road condition status.

The current and previous versions have all been installed and tested on actual maintenance trucks operated by Ministry of Transportation Ontario (MTO)'s area maintenance contractors and have been used to collect road surface condition data for evaluating the effectiveness of alternative maintenance treatments. The real life data and results from the system have been used as a promotion tool to demonstrate the usefulness of the system to maintenance contractors as well as municipalities.

Showcased at MTO Open House

"This effort will fill a need of the Ontario road maintenance industry for an automated, objective, real-time system to monitor and report on road surface conditions and maintenance operations during winter storms…" Mr. Max Perchanok, Ministry of Transportation Ontario (MTO)

"As a maintenance contractor for MTO we are also responsible for patrolling and reporting road conditions during and after winter storm events. Currently all our monitoring activities are carried out manually by our patrol staff. We are very interested in the mentioned technology, which will provide a significant advantage in terms of tracking and reporting the actual road conditions, optimizing maintenance, and improving the overall efficiency of the winter maintenance process…" Mr. Ken Lang, Manager, Steed and Evans Limited

"Staff at OGRA has seen a demonstration of the prototype software and very impressed with the real time web interface and data visualization the system offers. We believe that this technology once fully built out will be a significant tool to assist the municipalities in responding to winter events…" Mr. Brian Anderson, Manager, Ontario Good Road Association (OGRA)

Professor Highlight

Carl Haas

Carl 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. He grew up in Waterloo and is a UW SYDE engineering grad, but then went to CMU in the US for grad school. After that, he spent over 14 years at UT Austin as a professor before returning to Waterloo.

His research, teaching and consulting are in the areas of advanced construction and transportation technology, sustainability, and construction productivity. Based on this work, he has received some research and teaching awards over the years. He has supervised numerous graduate students as well and enjoys working with them now as partners on research projects and service work. For example, recent PhD grads include Dr Arash Shahi who is a Product Development Manager at a local high tech firm called Coreworx, Saiedeh Razavi who is a Professor at McMaster, and Yelda Turkan who is a Professor at Iowa State. Adrien Guillamet finished his MASc this spring and is now doing an internship at KLA Tencor in San Francisco.

Carl serves on a number of editorial boards and professional committees. At the Transportation Research Board (TRB), he served as Chair of the Committee on Applications of Emerging Technologies (A2F09), as a member of the Group 2 Council on Design and Construction of Transportation Facilities, and as a member of the Committee on Construction Management (AFH10). He has served on many ASCE committees over the years as well, the NSERC Discovery Grants review committee, and as a member of the BOD of the International Association for Automation and Robotics in Construction. He is active in the Construction Industry Institute (CII), which is an organization of over 100 major member corporations all of which operate at the national or international level. This summer, he completed his term as Chair of their Academic

Committee. His research has been supported by companies including: Coreworx, SNC Lavalin, Aecon, OPG, GSE&C, Software Innovation, Dupont, Hilti, Houston Lighting and Power, Fluor, Crafco, EPRI, the Construction Industry Institute (CII) and their member companies, as well as agencies such as TxDOT, MTO, NSERC, NSF, CRC, etc. He is a member of the Canadian Academy of Engineering.

Carl's interests outside of work focus on his family mostly. His wife, Jennifer, is the Department Head, Information Services and Resources Davis Centre Library. His son Cameron plays competitive hockey, loves Lego, and enjoys reading Bernard Cornwell and Patrick O'Brien novels. His daughter Greta is a competitive figure skater, enjoys school, and reads copiously. Carl also likes to play hockey and squash and go for long cross country ski runs in the winter. He can occasionally be found at the Grad House as well.

Getting field data with Dr Turkan

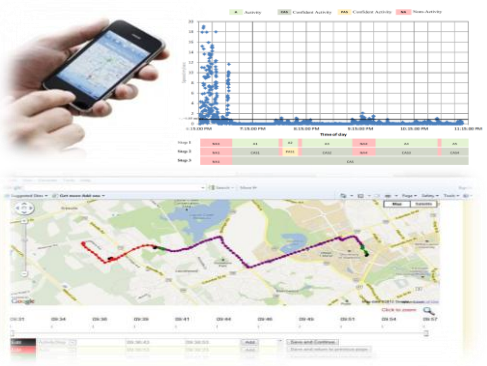
At the end of the hockey season

PhD Candidate Highlight

Akram Nour

Akram is a PhD Candidate under the supervision of Dr. Hellinga and Dr. Casello. His research is in the field of Intelligent Transportation System and Travel Behaviour. Advances in wireless communications and technologies have provided the opportunity to collect detailed information on travel trajectory using sensors-embedded smart-phones such as GPS and accelerometer. These types of smart-phones are routinely carried by people during their daily activities. Therefore, these devices have great potential to replace conventional travel survey forms. Akram's PhD research is mainly focused on automating the travel behavior inference using smart phone data. He also has interest in the area of Intelligent Transportation System (ITS), public transportation planning, travel behaviour modeling and simulation.

Akram has published 2 journal papers and 4 conference papers to date. He has also been honoured with different scholarships and awards during his studies from different sources: Massachusetts Institute of Technology (MIT), University of Waterloo, University of Umm AlQura, etc. Lately, he won the "CITE Michel Van Aerde Memorial Award for students in Doctoral Studies for 2012". Akram is an active member of UW Transportation System Research Group. He has been serving in UW-ITE Student Chapter the executive members since 2007 in different position: President, Vice-President, Webmaster, Academic events director, and Treasurer before taking on the role of Social event director.



Away from the academia, Akram enjoys his free time to perform different activities with his lovely wife and three kids: swimming, biking, traveling and discovering new places. Did you say LEGO? Yes, his kids love to visit and play in LEGO-Land; however, our PhD candidate hates spending hours in building a village with a complete transportation system with LEGO for his three little Smurfs, he said.

I think you are not wondering anymore about his spare time!

Masters Candidate Highlight

Roshanak Taghipour

Roshanak Taghipour is a Transportation Engineering Master's candidate in the Department of Civil and Environmental Engineering at The University of Waterloo, working under the supervision of Professor Hellinga. She completed her undergraduate studies in Computer Engineering and gained 8 years of professional experience working as a software engineer.

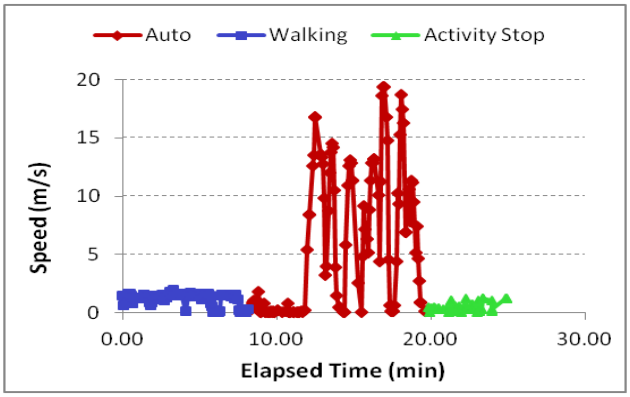
Working on an Intelligent Transportation Systems (ITS) project was a start point of interest for her to switch to Transportation Engineering field. Her graduate research focus is design, development and optimization of an automatic smart-phone based travel behavior surveying system, which records the position of the smart phones (using the onboard GPS unit) at a prescribed frequency. The recorded positioning data are automatically sent to a

designed dedicated server where they can be processed and utilized to determine the travel characteristics of individuals (e.g., trip mode and trip purpose). In this way, the designed Framework can be utilized in future trip surveys, as it is capable to record the trip diaries of individuals more accurately and at the same time less expensively compared to the conventional manual surveys. The development of transportation systems management policies is further facilitated using the provided cell-phone based framework.

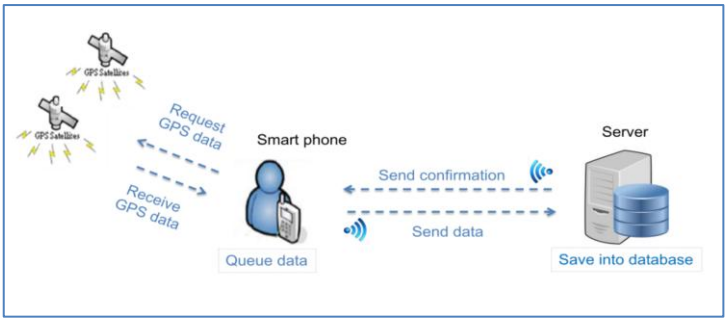
Roshanak presented a part of her research work in 4th Annual Joint CITE Section Student Presentation Competition - Southwestern Ontario and Toronto Sections - and was awarded the 2nd place. A more complete version of her research was also accepted and presented in 2012 ITS Canada ACGM, held in Quebec City.

Roshanak served as a previous Academic Event Director at UW-ITE Student Chapter. During her activity she had the chance to organize many academic seminars presented not only by Canadian professors, visiting scholars, transportation professionals and students, but also by different international Transportation academic members. “It was a great opportunity to bring together this mixture of valuable Transportation thoughts and skills from different parts of the world here at The University of Waterloo. Moreover, working as a member of UW-ITE executive board provided me with excellent personal experience and capability development.”

Finalizing her research work, Roshanak expect to graduate this November (2012), and then she seeks to work in the industry sector, while improving her knowledge and skills as a transportation engineer.



Blue: Walking
Red: Auto
Green: Activity Stop



Alumni Highlight

Pedram Izadpanah

I graduated in 2010 and was co-supervised by Dr. Hellinga and Dr. Fu.

I joined CIMA+ in 2009 which is a consulting firm active in a broad range of engineering practices including transportation engineering. At the time when I started working for CIMA+, I had finished most of the analyses of my Ph.D. research and had drafted a couple of chapters of my thesis. But it was still very challenging to manage both working full time and finishing my Ph.D. It appears that perhaps a new trend is forming among particularly Ph.D. students to join the workforce before finishing off their thesis and I personally discourage it based on my experience.

Currently I am a Project Manager at CIMA+ and mostly involved in Road Safety and Intelligent Transportation Systems (ITS) projects. Our clients are mostly road agencies in North America such as Ministry of Transportation Ontario (MTO). My interests at this time are more focused on learning more about Project Management and writing wining proposals. Concurrently, I try to keep up with publishing papers in academic and professional venues.

I have continued my involvement with CITE after my experience with the University of Waterloo ITE Student Chapter. I am currently a member of the CITE Technical Liaison Committee (TLC) as well as the TAC Road Safety Standing Committee. I have found voluntarily contributions to professional organizations very rewarding in my career.

Almost one year ago, October 2011, my wife and I were blessed with the birth of our son, Ryan. Although we had to make a lot of adjustments, he is such a joyful kid who makes our life much more enjoyable.

The Transportation Group of the University of Waterloo is very well recognized amongst our clients and peers. I utilize my technical and non-technical capabilities which I learned during my graduate studies at the University of Waterloo on a daily basis and I am proud to be a UW Grad!

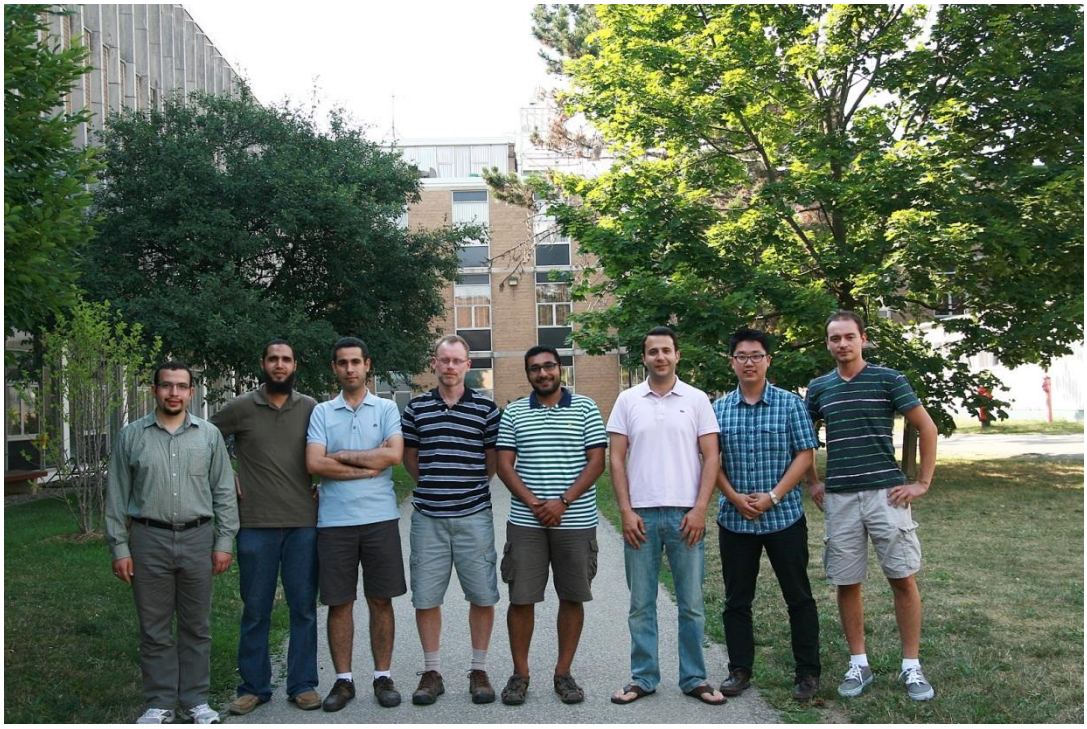
Recent Awards

Received by UW-ITE Student Chapter Members

Student	Program	Awards
Usama Shahdah	PhD	Ontario Graduate Scholarship
Ehsan Bagheri	PhD	Ontario Graduate Scholarship
Andrew Northmore	MASc	Ontario Graduate Scholarship 3rd Place Student Paper in Transportation at CSCE 2012

Closing Remarks

Starting from this term, we have a new position in our committee; Kevin Yeung who is a 4th year undergraduate student will act as the undergraduate activities director. Thus, we hope to observe more involvement of undergraduate students in our chapter activities. To reflect the achievements of this new position, we will add a new section (i.e., undergrad student highlight) to our next issue of WatMoves.



Sponsors

UW-ITE Sponsors

Visit our website for more information on sponsorship opportunities.

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 Soroush Salek at uw.ite.sc@gmail.com. There is also more information about the student chapter and sponsorship levels in our website, 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.

Gold Level:

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

Silver Level:

Hatch Mott MacDonald

Bronze Level:

CIMA+ Partners in excellence

TSRG Transportation Systems Research Group

UW-ITE Student Chapter
Contact:
uw.ite.sc@gmail.com
www.civil.uwaterloo.ca/transportation/ite