

Message from the Head

Dear Valued Reader

It has been more than a year since I started as a Department Head. I would like to start by thanking all the faculty and support and technical staff for their services, contributions and continued commitment to the Department. Without your support, I would not have been able to cope with the responsibilities of this position. Also, I would like to thank our undergraduate and graduate students for their achievements and dedication. Without you, we would not be here.

As a department, we celebrated the ultimate achievement of our students: their graduation. In June, we had 56 students finishing

their undergraduate and graduate degrees (30 BSc, 2 MEng, 9 MSc, and 15 PhD). On behalf of the department, I would like to congratulate our graduates and wish them all the best in whatever endeavor they undertake and hope that they will promote the department wherever they are. You are our ambassadors to the Geomatics professional society and the whole community in general. We rely on you for promoting the role of Geomatics to the community and keeping us abreast of any challenges you might have as well as your feedback regarding your educational experience in the Department.

Also, I would like to welcome the incoming

second year students to the Department. Whether Geomatics was your first choice or not, we are sure that you will be pleased with your placement in the Department. Now, you have become members of the Geomatics family, which is known to be one of the key characteristics of the Department. We promise you to do our best to offer you an excellent education environment and to maintain our international leadership in Geomatics.

Finally, I would like to wish you all a relaxing but fruitful summer.

Dr. Ayman Habib
Professor and Head



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Strategy Meeting — June 04, 2010

L to R: Yang Gao, Quazi Hassan, Danielle Marceau, Derek Lichti, Susan Skone, Naser El-Sheimy, Elizabeth Cannon, Gerard Lachapelle, Steve Liang, Ayman Habib, Xin Wang, Bill Teskey, JW Kim, Kyle O'Keefe, Mark Petovello, Andrew Hunter.

Congratulations

- Congratulations to students who completed their graduate studies: Dina Reda Megahed, PhD; Abdalla Mostafa Osman, PhD; Aiden Morrison, PhD; Man Feng, MSc; Pejman Lotfali Kazemi, PhD; and Richard Ong, MSc.

- The CanX - 2 team at the University of Calgary has won the Alouette Award for their contributions to the CanX - 2 nanosatellite mission. This team is led by Professors Susan Skone and Elizabeth Cannon and includes Professor Kyle O'Keefe, MSc candidate Erin Kahr, MSc graduate Lance de Groot and undergraduate student Michael Swab. The CanX - 2 mission was led by the University of Toronto with various academic, industry and government partners participating. The University of Calgary led the GPS radio occultation payload development and implementation for low - cost global atmospheric/ Ionospheric monitoring.

- Mr. Mohammadreza Zaheri, MSc student, won the Track C Best Paper

Award at the IEEE/ION PLANS 2010 conference held in Indian Wells/Palm Springs, California. His paper, co-authored by Dr. Ali Broumandan and Professor Gérard Lachapelle, is on Detection Performance Comparison of Polarization and Spatial Diversity for Indoor GNSS Applications.

- Mr. Jared Bancroft, PhD candidate, Professors Mark Petovello and Gérard Lachapelle, and Messrs Bill Gelatka and Lloyd Bobb, U.S. Navy, received the Casey Baldwin Award for the best paper published during 2009 in the Canadian Aeronautics and Space Journal. The paper, on “Temporal GPS Positioning for Determining the Relative Motion of a Suspended Object in Flight” is the result of a collaborative project between the PLAN Group and the U.S. Navy.

- Nishad Wijesekara has won the Best Poster Award at Annual Scientific Conference–Canadian Geomatics Conference 2010 AND ISPRS COM I Symposium. The Title of the poster is

“Impact of Increased Urbanization in the Calgary Region on the Hydrological Processes in the Elbow River Watershed in Southern Alberta” by G. N. Wijesekara, co-authored by A. Gupta, C. Valeo, J. G. Hasbani and D. J. Marceau.

- APEGGA Congratulates Bill Teskey in appreciation for his personal contributions to the engineering profession, Dr. Bill Teskey has earned the prestigious designation of Fellow by Engineers Canada. Engineers Canada takes great pride in creating a Fellowship that recognizes individuals who have made outstanding contributions to the engineering profession through their professional accomplishments.

Other News

- Elizabeth Cannon, Dean of the University of Calgary’s Schulich School of Engineering, and incoming President of the University of Calgary, was conferred the honorary degree of Doctor of Science from Acadia University at its Spring 2010 convocation. In conferring the honorary degree to Professor Cannon,



Chancellor Arthur Irving noted Elizabeth’s extraordinary accomplishments in the areas of research, service to the profession and pioneering work in promoting science and engineering among young women. Professor Cannon is an alumnus of Acadia University. 2010 marks the 150th anniversary of the Acadia Alumni Association. Professor Cannon is a member of the Position, Location and Navigation (PLAN) Group in the Schulich School of Engineering, and is known around the world for her expertise in Global Navigation Satellite Systems (GNSS). She is a former NSERC/Petro - Canada Chair for Women in Science and Engineering and has served the profession and government boards in a wide variety of areas.

- The President of the International Society of Photogrammetry and Remote Sensing ISPRS, Prof. Orhan Alta (second from left), Istanbul Technical University, Turkey and Professor Clive Fraser (second from right), Department of Geomatics, The University of Melbourne visited the Department on June 12, 2010. During their visit, they had meetings with Dr. Derek Lichti (left) and Dr. Ayman. Habib (right).



Research Spotlight

Determining “Snow Gone” Stage from MODIS-based Indices

Article by Dr. Quazi K. Hassan (Earth Observation for Energy and Environment)

“Snow gone” (SGN) stage is one of the critical variables that describe the start of the official forest fire season in the Canadian Province of Alberta. In this study, our (me and my MSc student Navdeep S. Sekhon) objective is to evaluate the potential of MODIS-based indices for determining the SGN stage. Those included: (i) enhanced vegetation index (EVI), (ii) normalized difference water index (NDWI) using the shortwave infrared (SWIR) spectral bands centered at 1.64 μm (NDWI1.64 μm) and at 2.13 μm (NDWI2.13 μm), and (iii) normalized difference snow index (NDSI). These were calculated using the 500 m 8-day gridded MODIS-based composites of surface reflectance data (*i.e.*, MOD09A1 v.005) for the period 2006–08. We performed a qualitative evaluation of these indices over two forest fire prone natural subregions in Alberta (*i.e.*, central mixedwood and lower boreal highlands). In the process, we generated and compared the natural subregion-specific lookout tower sites average: (i) temporal trends for each of the indices, and (ii) SGN stage using the ground-based observations available from Alberta Sustainable Resource

Development. The EVI-values were found to have large uncertainty at the onset of the spring and unable to predict the SGN stages precisely. In terms of NDSI, it showed earlier prediction capabilities. On the contrary, both of the NDWI’s showed distinct pattern (*i.e.*, reached a minimum value before started to increase again during the spring) in relation to observed SGN stages. Thus further analysis was carried out to determine the best predictor by comparing the NDWI’s predicted SGN stages with the ground-based observations at all of the individual lookout tower sites (approximately 120 in total) across the study area. It revealed that NDWI2.13 μm demonstrated better prediction capabilities (*i.e.*, on an average approximately 90% of the observations fell within ± 2 periods or ± 16 days of deviation) in comparison to NDWI1.64 μm (*i.e.*, on an average approximately 56% of the times the SGN stages fell in the range of 121–136 DOY). The generalized spatial patterns are discussed as follows: In general, temperature decreases northwards in the northern hemisphere [13], so that the northward increment of SGN stages in our study would be expected.

The natural subregions in the high elevation areas (*i.e.*, alpine and sub-alpine as shown in polygon I; montane in the middle of polygon II; upper boreal highlands in the middle of polygon III; and sub-alpine in polygon IV) experienced relatively high SGN stages (*i.e.*, in the range of 137–200 DOY). This is reasonable as the high elevation areas experience relatively cooler temperature regime, which influences the snow to stay relatively longer period of time.

Our study is a proof of concept in

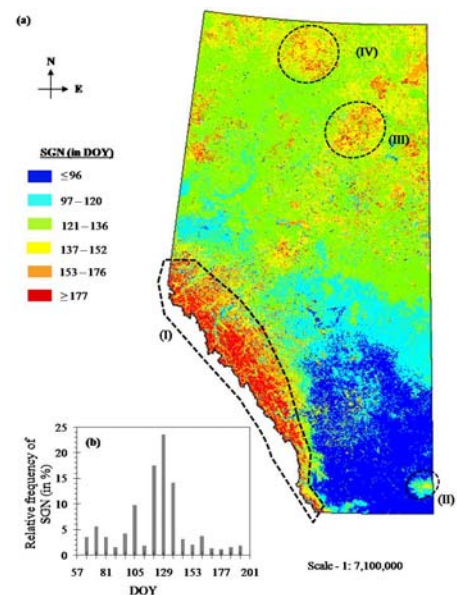


Figure 1. (a) Map of NDWI2.13 μm based SGN predictions for the entire province of Alberta; and (b) relative frequency distribution of the predicted SGN.

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Alumni Voice

I fell into Geomatics Engineering by chance. In September of 1992 I arrived in Calgary determined to get a degree in Chemical Engineering. At the time, I had never even considered Geomatics (or Surveying as it was called then). However, a chance seating beside the current Geomatics department head at the Engineering awards dinner changed all of that. By the end of the night he had convinced me that Geomatics was the program for me. Fortunately, he was 100% correct.

Since graduating in 1999 I have primarily focused on the use of kinematic LiDAR systems for surveying and mapping. I have been involved in the design and development of LiDAR systems for fixed wing aircraft, helicopters, UAVs and passenger vehicles. The design and development of these systems has taken full advantage of the education and training I received at the University of Calgary. Most of the technology I am currently working with

didn't exist when I was a student, and the solid foundation I received in hands on problem solving has allowed me to excel in my career.



Craig Glennie, PhD 1999
Vice President of Engineering, Terrapoint



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determining SGN stages, so thus, it will potentially be incorporated in the framework of forest fire management in the Province of Alberta. However, we suggest to quantifying the applicability of the described approach before implementing over other biomes/regions in Canada or elsewhere in the world. In order to understand more details, we refer the readers to the following article:

“Sekhon, N. S., Hassan, Q.K., and Sleep, R. W., 2010. Evaluating Potential of MODIS-based Indices in Determining “Snow Gone” Stage over Forest-dominant Regions. *Remote Sensing*, v. 2, pp. 1348-1363” and also available at <http://www.ucalgary.ca/qhassan/publications>.

Department Activities

- Caden Bancroft was born May 28, 2010, weighing 8 lbs 14 oz! Sophia was very excited to see her new



brother. Congratulations to Jared and Candace Bancroft.



- Undergraduate class of 2010 visit Switzerland in May with Dr. Steve Liang (far left) as chaperone.

The Schulich Student Activities Fund (SSAF) generous donation makes the Switzerland trip more accessible to students without the financial means to cover the full cost. A ten day tour showcased some of the leaders involved in the European Geomatics industry, as well as some spectacular Swiss scenery and culture. This is the fourth time this amazing opportunity has been granted to students attending the University of Calgary’s Geomatics Engineering program. An awesome educational and cultural experience

Coming Events

- ENGO 638 GNSS Receiver Design—Aug 16-27, 2010. Instructor D. Borio
- Survey Camp—Monday, August 23 to Sept. 2, 2010
- Fall term begins—Monday September 13, 2010. (except for Block Week courses)

Sites to Visit:

- <http://plan.geomatics.ucalgary.ca/>
- <http://www.geoconf.ca/>
- <http://www.ambercore.com/terrapoint.php>