



SCHULICH
School of Engineering

DEPARTMENT OF
GEOMATICS
ENGINEERING

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DEPARTMENT OF GEOMATICS ENGINEERING

Geomatics News

TERM Spring/Summer YEAR 2016 • Volume 13, Issue 3

Dear Reader,

Spring/summer 2016 was an exciting time for the department. We were very pleased to welcome three new faculty members in July and August.

Dr Mozhdeh Shahbazi joined in mid-August as Assistant Professor in Digital Imaging Systems. She received her BSc degree in Civil/Surveying Engineering from University of Isfahan, Iran and her MSc degree in geomatics/photogrammetry engineering from University of Tehran. She earned her PhD in Applied Geomatics from the l'Université de Sherbrooke for her research on unmanned aerial systems for precise three-dimensional modeling of the environment. She was also a Lecturer at Cégep de Chicoutimi.

Dr Ivan Detchev joined the department at the beginning of August as Instructor in Surveying and Mapping. Ivan earned his BScE (First Division) in Geomatics Engineering from the University of New Brunswick and MSc and PhD degrees in Geomatics Engineering from our department. Ivan also has industry experience in surveying and remote sensing.

His previous employers include G. R. Williams Land Surveying Ltd. (Vancouver, BC) and Pacific Geomatics Ltd. (Surrey, BC).

Dr Alex Bruton joined as Senior Instructor in Engineering Entrepreneurship in July. His is an interdisciplinary position that will allow Alex to teach and contribute to Geomatics Engineering as well as engineering entrepreneurship initiatives within the Schulich School of Engineering. Alex holds a BSc in Surveying Engineering and PhD in Geomatics Engineering from our department as well as an MBA from UofC. He founded the education and innovation design firm, The In-nographer, and was a tenured faculty member at Mount Royal University.

We are also pleased to announce that Administrative Assistant Monica Freeman is now a full time member of the department.

The department's undergraduate computing facility, affectionately known as the Microlab, was upgraded over the summer. It features 58 brand-new OptiPlex 24 7000 Series All-in-One (7440) desktop PCs. In addition, we received in April a gift of 25 LFM software licences from LFM

Software Ltd that will be used for 3D modelling of laser scanner data in undergraduate and graduate courses.

In June we hosted the Class of 2006 for their ten-year reunion. Dr Kyle O'Keefe and I gave them a tour of the engineering building—both old and new—showed off our new equipment and provided updates on faculty, staff and students. It was a very fun experience.

Finally, we were saddened to learn of the passing of Ed Scovill in May. Ed was a great contributor to and friend of the department. Ed and Ann Scovill were the donors of the David Scovill Memorial Bursary, which is awarded every year to an undergraduate Geomatic Engineering student entering third year. Ed will certainly be missed by all of us here in Geomatics Engineering.

Sincerely,

Derek

schulich.ucalgary.ca/geomatics

AWARDS & HONORS

- Chunyang Yu, a PhD student supervised by Dr. Naser El-Sheimy, won the Young excellent papers award at the 7th China Satellite Navigation Conference (CSNC 2016) for her paper 'Indoor Map Aiding/Map Matching Smartphone Navigation Using Auxiliary Particle Filter'.

- Dr. Naser El-Seimy was invited to give the keynote presentation on Sensors for Navigation at the 7th CSNC 2016 conference.

- Dr. Yang Gao was invited to lead multiple sessions at the 7th CSNC 2016 conference as his many of his students presented papers on advanced Navigation topics.

- Dr. Zhe He, a former Post-Doctoral Fellow under Dr. Mark Petovello's supervision won an 'Outstanding Youth Paper' award at the 7th CSNC 2016 conference for his paper titled 'Evaluation of GPS/BDS Indoor Positioning Performance and Enhancement'

- Dr. Ruisheng Wang was awarded an NSERC research grant for A VAU LiDAR Mapping System for Innovative Mapping applications

- Dr. Quazi Hassan was featured in an article 'Engineering professor using NASA satellite data to forecast forest fires'

- Dr. Quazi Hassan was awarded an NSERC research grant for Use of Remote Sensing in Developing a Forest Fire Occurrence Management System

- Dr. Naser El-Sheimy received the Samuel Gamble Award during a ceremony at the International Society for Photogrammetry and Remote Sensing (ISPRS) congress. This award is offered to those who have contributed significantly to development, organization or professional activities of the Photogrammetry, remote sensing and spatial information sciences at the national or international level.



- Dr. Steve Liang was featured in the article on the Schulich Insider, <http://schulichinsider.ca/news/using-internet-things-smart-devices-can-transform-society>. He is working to champion the Internet of Things.

- Dr. Derek Lichti received a Certificate of Recognition for excellent service as Editor-in-Chief of the ISPRS Journal of Photogrammetry and Remote Sensing at the International Society for Photogrammetry and Remote Sensing congress in July 2016

- Dr. Ruisheng Wang received a 2nd research award from Google for his work into creating better, more realistic 3D maps that advance mapping technologies

- Dr. You Li was the first China Scholarship Council (CSC) Cotutelle student to graduate from both the University of Calgary and Wuhan University in China to get a dual degree for working on navigation algorithms for low-cost sensors.



Undergraduate Switzerland Trip

2016 Swiss Trip Experience

By Dominik Obad
Swiss Trip Commissioner

The 2016 Geomatics Engineering Student Societies (GESS) Switzerland Trip was the second time I was lucky enough to tag along on the "once in a lifetime" kind of trip. The second time experiencing the trip I was excited to be the commissioner of the trip, which in my experience made it an even more exciting experience. The thrill of running such a trip with some of your closest peers throughout the amazing landscapes and places in Switzerland was truly a time I will not soon forget. I hope to highlight some of my personal favorite moments from this trip.

Our group of 25 students and Dr. Kyle O'Keefe embarked on the 12 day trip in early May, just after the conclusion of the 2015/2016 school year. Meeting with everyone at the airport before departing Calgary's airport is when you could see everyone's excitement for the summer intensify as it begins with thoughts of what the next dozen days holds in store. I'm sure its easy to picture the sheer excitement a group of 25 students have who are about to plunge head first into a trip full of learning, new experiences and culture.

This bubbling excitement is extremely helpful throughout

the first few days of the trip. As soon as the landing gear of the airplane hit the tarmac in Geneva, the group was already setting out to the first stop. With bags freshly loaded off the plane and into storage at Geneva's main train station, all 26 bodies hustle through the scenic Swiss streets to the United Nations Office in Geneva. The first stop on the tour featured a tour through the historic grounds of the United Nations building, and consisted of historic pieces, rooms and architecture within the building and its surrounding grounds. Students got a glimpse of the chambers where some of the international laws they've been studying in class were written, a truly amazing start to the tour without a doubt.



With the long travel day and UN tour completed the students finally had a chance to get some rest after 36 odd hours of travel. I'm sure I can speak for most of the students on the trip that we are unfortunately accustomed to spending this length of time without sleep, cramming to finish a lab on time or the

night before a midterm. Nonetheless by the end of the first day on European soil, all were ready to rest up before heading to the Swiss polytechnic school in Lausanne (EPFL).

EPFL or École polytechnique fédérale de Lausanne is situated beautifully just off the shore of Lake Geneva. The students upon arrival at the school were greeted by Dr. Jan Skaloud (a former University of Calgary Geomatics Engineering student) and his colleague Bertrand Merminod. These two gave a wonderful introduction of Swiss education system and the exciting going-ons at EPFL. These included, but were not limited to Hyperspectral imaging, Autonomous navigation (Redundant Inertial Navigation), and UAV mapping. These presentations were given by Dr. Skaloud and Merminod as well as some of there post-grad students at EPFL. Upon the conclusion of these presentations, a short time was made available for the group to mingle and ask questions with the professors and students at EPFL.

Incredibly Dr. Jan Skaloud arranged for a tour of the senseFly head office in Cheseaux-sur-Lausanne. This highlight from the trip allowed our group to see first hand the process undertaken at senseFly that goes into the hard & software of products such as the eBee and



eXom drones. Lucky enough there was even time for students to get hands-on time flying both of the eBee and Exom drones around the senseFly facilities. I cannot express how grateful we are to the senseFly team, and Dr. Skaloud for surprising us with this opportunity to visit a company so highly regarded within the geomatics community. The events at EPFL were the final stops during our groups time in the Lausanne-Geneva area.

Next was to move North to historic city of Bern.



Bern holds the offices of Swisstopo. Swisstopo is the official home for Switzerland's national mapping agency and the Swiss Federal Office of Topography. This visit consisted of a visit to the Zimmerwald observatory and

Undergraduate Switzerland Trip continued

Geostation. The scenic hilltop above Bern is where ZIMLAT (a one meter Laser and Astrometric Telescope) is positioned neighboring the alps. The Zimmerwald observatory is also where the reference point for the Swiss National Survey (LV95).



*"Holy Point" for Geodetic network
in Switzerland—Photo by Nathan Patton*

We were greeted by Elmar Brockmann, who is head of "Geodetic Bases and Permanent Networks" at swisstopo, and he very graciously gave us a tour and history of the facility. With the sun still shining down on us at the end of the day we were treated to the amazing site of the observatory opening up on our inside and out tour of the telescope on top of Zimmerwald. Many a pictures was taken atop the observatory, which situated in a pasture, gave a picturesque view of the alps that many tourists probably never get to see. A truly spectacular way to spend time at the only stop in Bern.



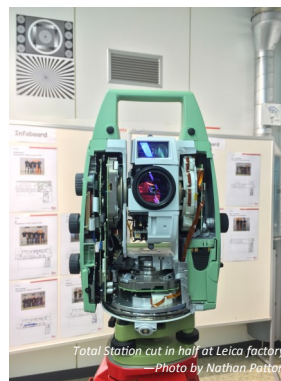
View from the top of the Observatory—Photo by Nathan Patton



Church outside the Observatory—Photo by Nathan Patton

The final two standout moments of the trip occurred in the largest Swiss city of Zurich. For myself the highlight with the GESS trip was the days spent at the Leica Geosystems headquarters in Heerbrug. (A short train ride from Zurich to the small town of Heerbrug gives students the chance to tour for the day at the spectacular facilities at Leica geosystems). The morning was spent listening to presentations on Leica's new multi-station (Leica Nova MS60) and GNSS antenna (Leica Viva GS16). Our group was extremely excited to see the new products within the industry that may in the future be used regularly in their day to day jobs. The afternoon consisted of a grounds tour of Leica Geosystems at Heerbrug. This tour stopped by the testing facility, the manufacturing

building, Swiss optic and through Leica's airborne systems laboratory. (We were lucky to receive a complimentary defective lens as a souvenir). With each stop of the tour, we realized that we had taken a paralleling class within the geomatics engineering curriculum. There was a plethora of questions and learning taking place throughout the afternoon. The final stop of the tour was at Leica Geosystems showroom, which is home to a large inventory of former and current Leica products for viewing. The historic equipment from the early 20th century garnered the largest group of onlookers in the showroom. Both trips to the Leica factory are engrained in my memory, as the hospitality and kindness we received from the group in Heerbrug will stick with us all every time a tripod is levelled and RTK point stored.



*Total Station cut in half at Leica factory
—Photo by Nathan Patton*

The final stop of the trip returns to a University in Switzerland, this time at ETH Zurich. Our festivities at ETH began with an introduction from Prof. Andreas Wieser

the Director of Studies in Geomatics Engineering and Planning who briefed us on the current events at ETH Zurich and more specifically the Department of Civil, which holds within it the Geomatics Department in Zurich. Professor Wieser covered such topics as Environmental and Geomatics Engineering, the specific programs within the ETH geomatics program and Engineering and Planning. This was followed by two postdoc presentations on their research at ETH within the geomatics discipline. To wrap up the formal tour of the geomatics department at ETH a guided tour of the calibration lab was held. Here students got to see first hand the high precision laboratory used for a multitude of testing and even some curriculum labs were held. Students were able to compare their own studies to that of the students at ETH, and see the capabilities that the calibration lab was used for.

As a final send off to our trip through Switzerland, the Student Society at ETH set up a guided tour for us through Zurich and an inter-University Barbecue between the University of Calgary students and the ETH students held on campus. An outstanding way to cap off the trip, where the attendees could socialize with other students about what they had experienced over the past 12 incredible days.

Survey Camp—ENGO 501 2016



2016 Survey Camp took place at the Barrier Lake Field Station from August 22 to 31 with 30 students and 7 staff in attendance.

The 10 day camp included calibration, cadastral, deformation, static GNSS, RTK, and Hydrography and GIS exercises and the annual lost peg competition.

The weather was so nice this year that some of the students even ventured into the lake.

This year's winners are, Rida Khan, Jose Mora, Gurveer Sra, Kevin Van Eerde and Samuel Vito, with an estimated position of 21.8cm from the true location.

Special thanks to Bob Haagsma, ALS, Aaron Shuftoski, BCLS, and Arlin Amundrud, ALS, for their professional presentations on the final day of the camp.

Survey Camp 2017 is scheduled for August 21st to 30th, 2017.



Canada—France Exchange with ENAC

This past spring I had the pleasure of spending three weeks in Toulouse, France. Nicknamed “La Ville Rose” (“The Pink City”) for the abundant use of pink terracotta bricks in their architecture, Toulouse is located on the banks of the River Garonne in the southwest part of France and is the country’s fourth largest city. As the centre of the European aerospace industry—home to the largest space centre in Europe, and companies such as *Airbus*, *Thales Alenia Space* and *Astrium Satellites* have offices in the area—Toulouse is somewhat of a geomatics hotbed.

Although the food and wine

were excellent and the Euro Cup was in full swing during my stay, the trip was part of an exchange agreement between the University of Calgary and Ecole Nationale de l’Aviation Civile (ENAC; French Civil Aviation University) designed to allow undergraduate students, graduate students and faculty to travel between the two institutions.

The primary purpose of my stay was to teach a course in ENAC’s “MSc in GNSS” program on the integration of GNSS and inertial technologies. With a total of 11 students from Europe, Asia and Africa, the course was a lot of fun to teach and sparked



several interesting discussions as students from different backgrounds shared their experiences and understandings of the material.

It was a shame we only had three weeks together (although maybe the students feel differently). The trip was also an excellent opportunity to meet colleagues from ENAC and to

learn about some of the excellent research they are doing in the area of positioning and navigation with GNSS. We also discussed longer-term collaboration opportunities between the schools and between individual researchers.

To reciprocate, ENAC sent Dr. Olivier Julien—a former PhD student in our department, and Head of the SIGNAL processing and NAVigation (SIGNAV) research group—to Calgary to teach a three-week long grad course in our program. Dr. Julien’s course was on reliable navigation with GNSS and was attended by XX students.

Upon completion of his course, Dr. Julien remained in Calgary for another three weeks. During this time, he met with some of our students and we continued our discussions regarding longer-term collaboration.

Overall, this year’s exchange was an excellent experience for me, and I think the students that attended Dr. Julien’s class would say the same. I encourage others who might be interested in pursuing this type of exchange to take advantage of the opportunity.

And if you do visit Toulouse, I recommend a stop at (43° 36’10.56”N, 1°26’42.30”E)... the cake is delicious!

Mark Petovello



Visiting Professors from EPFL & ENAC

During the summer, the Department offered two Graduate level courses taught by sessional instructors, Dr. Jan Skaloud, Martin Rehak and Dr. Olivier Julien.

Dr. Jan Skaloud and Martin Rehak, from École Polytechnique Fédérale de Lausanne (EPFL) were here in June for a concentrated two week time period and taught “Hands on UAV for Precise Mapping” . The photos are from Dr. Skaloud of his class learning by doing hands-on activities out in the field.



Dr. Olivier Julien, from Ecole Nationale de l'Aviation Civile (ENAC) was here for 3 weeks in July, teaching a course titled, “Reliable GNSS Navigation”. Dr. Olivier Julien

graduated with his PhD in Geomatics Engineering from our Department in 2005 and it was an absolute pleasure to have him back in the Department to teach this course.



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