Volume 2, Issue 1

Fall 2004

GEOMATICS ENGINEERING

UNIVERSITY OF CALGARY

DEPARTMENT OF GEOMATICS ENGINEERING

Geomatics News

Message from the Head

Dear Readers,

The fall semester was an exciting one with our 25th Anniversary Celebrations providing a strong focal point to draw students, faculty, alumni and external supporters to the University. Thanks to everyone who contributed to the newly established 25th Anniversary Bursaries as they will make a major impact on our undergraduate program.

The Department is continuing to expand and renew. We currently have over 170 undergraduate students, with 25 of these being in the Internship program. Adding in our 80+ graduate students, we exceed 250 students in total. With 19 faculty members, including our newest arrival Dr. Alex Braun, we are well poised to deliver quality undergraduate and graduate programs for another 25 years and beyond!

Elizabeth Cannon
Professor and Head

25th Anniversary Recap

Geomatics Engineering celebrated its 25th Anniversary on October 28 and 29, 2004. The Celebration Banquet was held on October 28 with 275 faculty, staff, alumni, donors and supporters in attendance. Undergraduate and graduate award winners for 2004/2005 were also recognized.

On October 29 there was an Open House which showcased the Department's facilities and research programs. A Lost Peg game was held in which teams used GPS geocaching and conventional surveying to locate a 'lost peg' on campus. The game was won by the "Class of '97" which included Rob Tupper, BCLS, Mark Budgen, PEng, Robb Isaac, PEng, and Lee Andersen, SLS, ALS. Richard Redfern, BCLS, and a member of the Geomatics Engineering Liaison Committee, rounded out the team. The names of the team members will be engraved on the Department's Lost Peg trophy.

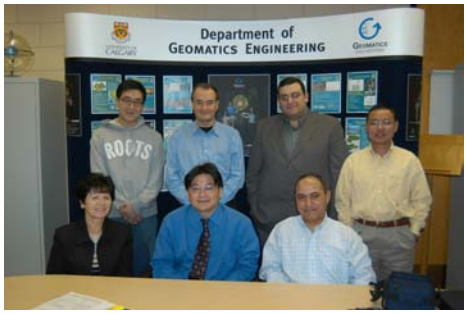
A legacy of this special event was the establishment of three 25th Anniversary Bursaries for each of our second, third and fourth year programs. The original goal of $60,000 was far exceeded by raising $120,000 for these bursaries which are valued at $3,000 each. Thanks to our many supporters and congratulations to the inaugural winners of the award: David Chiu, Angela Jeffray and Sidney Kwakkel.

Inside this issue:

Lost Peg Winners (L to R): Rob Isaac BSc '97, Rob Tupper BSc '97, Mark Budgen BSc '97, Lee Anderson BSc '97, Rich Redfern (BCLS)

Congratulations

- Dr. Bo Huang was appointed Guest Professor of the State Key Laboratory of Information Engineering in Surveying, Mapping, Remote Sensing, Wuhan University, China.



Kai-Wei Chiang successfully defended his PhD thesis

- Kai-Wei Chiang, won the 1st Student Paper Competition of the CPGPS (The International Association of Chinese Professionals in Global Positioning System) for his paper *Development of an Optimal GPS/MEMS Integration Architecture for Land Vehicle Navigation Utilizing Neural Network*.

- Dr. Michael G. Sideris, was conferred the degree of Doctor Honoris Causa by the University of Architecture, Civil Engineering and Geodesy in Bulgaria. in Sofia on September 13, 2004.

- Congratulations to Dr. Mike Barry who was invited to be a new Director to the Board of Directors of the FIG Foundation.

- Chen Xu, won the Best Student Paper in the session "Gravity field modeling from satellite missions" at the IAG International Symposium "Gravity, Geoid and Space Missions—2004", in Porto, Portugal. The award was presented for the paper *Analysis of J2 perturbed relative orbits for satellite formation flying*, co-authored by Chen, Raymond Tsoi and Dr. Sneeuw.

- Chris Goodall, was awarded the Alberta Land Surveyors' Association Graduate Studies Scholarship.

- Congratulations to students who defended their theses: Haiying Hou (MSc), Anastasia Salycheva (MSc), Suen Lee (MSc), Jayanti Sharma (MSc), Zhi Jiang (MSc), Paul Alves (PhD), Kai-Wei Chiang (PhD), Alan Ip (MSc), Walid Abdel-Hamid (PhD), Ping Lian (MSc), Vicky Hoyle (MSc).

Elizabeth Cannon congratulated by Dr. Gilles Paquet at the induction ceremony to become a Fellow of the Royal Society of Canada

Student News

- Undergraduate student Vidya Rangayyan, an intern with Radarsat International, put her engineering talents to work on a CIDA-funded project in Bangladesh aimed at improving flood monitoring and good governance of the water sector. She has played a key volunteer role with the U of C's chapter of Engineers Without Borders. She also helped design and implement Sustainably Canadian into the engineering curriculum.

- This year's Engineering Week was held January 10-14, 2005 and it proved to be a success. Over $4,500 was raised and donated to the Calgary Women's Emergency Shelter as result of various fundraising events. The Department of Geomatics took home 3rd place in an exciting race with the other departments. Although the final results were close, Chemical Engineering finished first. Geomatics engineering won a number of events throughout Engg Week including Road Trip, Iron Chef, Movie Night, and Bar Olympics.

The students would like to extend a special thanks to Drs. Tait, El-Sheimy, and Couloigner for their contributions to helping make this year's Engineering Week a successful one. We would also like to take this opportunity to thank all the companies that provided sponsorship and silent auction items for Engineering Week. This event would not have been possible without their support.

IRON CHEF—ENGG Week—2005
LtoR: A. Latos, I. Couloigner, M. Tait, M. Broadbent, M. Forsyth, C. Huber, N. El-Sheimy

Visitors

- Fireweed Design & Communications conducted a focus group November 22 to find out what factors were important to the students as they prepare to enter the workforce.

- NASA Stennis Space Center in Southern Mississippi had a Breakfast Seminar September 14 on Geomatics Export & Research Opportunities.

Industry Canada, International Trade Canada, and the Department of Geomatics invited participants to learn more on how companies could access commercial and collaborative research opportunities in geomatics with NASA and its private, government, and academic partners at the John C. Stennis Space Centre, www.ssc.nasa.gov, located near Biloxi, Mississippi.

Research Spotlight

Geomatics Engineering for Solving Biomedical Problems

Supported by the Alberta Ingenuity Fund and NSERC, Ms. Rita Cheng, a MSc student in Geomatics Engineering with specialization in Biomedical Engineering, has been working with Dr. Janet Ronsky (Mechanical and Manufacturing Engineering) and Dr. Habib on the co-registration of MRI imagery.

Ms. Cheng is focusing on translating standard Geomatics techniques into medical applications, where she is using surface matching techniques for the co-registration of temporal MRI imagery of knee joint structures.

The output from the co-registration of two MRI images (the red box includes a trans-formed MRI image into the reference frame of another image – background)

Digital Photogrammetric Applications

With the increasing availability and improved quality of low cost digital cameras, there has been a growing interest to utilize these systems for close range photogrammetric applications. The digital photogrammetry group has been working on automated calibration and stability analysis of amateur digital cameras. Following the calibration and stability analysis, the group has been working on utilizing these imaging systems for CAD modeling of buildings.

Evaporation from the Forest Floor

The moisture content of the organic layer of the forest floor, known as duff, is an important factor that influences its consumption during a forest fire. Since the drier the duff, the greater its consumption, how duff dries over time is very important in determining its potential for consumption.

In an attempt to quantify the evaporation of water from the different duff layers, an intensive laboratory experiment has been established by the Environmental Information Systems Group. Twelve samples of duff collected from areas around Whitecourt, Alberta, and representative of six different forest types have been set up in a meteorologically isolated environment. Part of the laboratory setup is shown in the picture below.

Each sample, depending on its thickness, has had three or four soil moisture sensors installed: one horizontally in the mineral soil, one horizontally in the lower duff layer, one horizontally in the upper duff layer, and one vertically through the top of the duff. Moisture contents will be monitored continually as the samples dry for two months from a completely saturated state. Potential evaporation will be determined using measurements of temperature and humidity and by the application of a modified pan evaporation technique.

The results from this study will be used to help in the prediction of potential duff consumption over large and small scales. The study is being conducted by Lynn Raaflaub, a Ph.D candidate in the department under the supervision of Dr. Caterina Valeo.

Lynn Raaflaub, PhD Candidate

Alumni Voice

Every year I go back to Calgary to visit family and friends. One of the rituals we do every time is to cruise around the UofC campus to relive and share those fine memories of the old days of being a UofC student.

It has been nine years since I left UofC after spending five years working on my masters, doctorate and also teaching at the department of geomatics engineering. Since graduation, I have assumed a number of positions in Calgary, Houston and currently in Santa Clara, California, with Thales Navigation, formerly Ashtech Inc. and Magellan Corporation.

With Thales, I have had a few exciting positions including Marketing Product Manager, Director of Marketing, Sr. Director of WW Engineering, and currently Sr. Director of OEM programs. In my current position, I manage the company's major OEM programs including the NeverLost® car navigation program for our joint venture with The Hertz Corporation.

Through all these years, I have been fortunate to experience a highly dynamic, multicultural and multifaceted business environment. I am thankful to my years and experience at UofC that put me on the first step of the ladder.

Mohamed Abousalem, PhD 1996

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Welcome To Dr. Alexander Braun who joined the Department on Oct 01 as an Assistant Professor, Geodesy.

Dr. Braun holds a PhD (magna cum laude) in Geophysics from the University of Frankfurt. He is both a geodesist and geoscientist with a strong background in the interdisciplinary field of space geodesy, geodynamics and geophysics. Dr. Braun's current research is focused on the application of space geodetic data in monitoring crustal deformation and sea level change. In particular, satellite altimetry using both laser and radar sensors, and geodynamic modeling, are part of his expertise.

Dr. Braun was a research scientist at the GeoForschungsZentrum Potsdam, Germany for four years. He is currently a senior research associate at the Laboratory of Space Geodesy and Remote Sensing and the Byrd Polar Research Center, of The Ohio State University.

Department Activities

- Undergrad student enrolment for 04/05 is sitting at 178 (including internship students).
- Geomatics Engineering Advisory Committee met October 25th.
- Department Christmas party Dec. 21.
- GPS/GNSS Conference was held in December in warm and sunny Sydney, Australia. Dr. Gerard Lachapelle, Dr. Yang Gao and Dr. Susan Skone attended.
- GIS workshop was held on January 06, 2005. Faculty and industry reps reviewed the GIS stream.
- Geomatics Engineering Liaison Committee met February 07.
- Several geomatics companies met with our students for recruitment purposes.
- Geomatics Engineering Career Day February 8, 2005.

Some faculty members attended the GPS/GNSS conference held in Sydney, Australia

Coming Events

- Faculty of Engineering Student Excellence Awards - February 10
- Look for upcoming information on our fourth year project course presentations and industry presentations. Watch for posters.
- Special Graduate Courses: DSP with Applications to Geomatics Engineering, May 16-27; Advanced Physical Geodesy, May-June, Thursdays; Advanced GPS Receiver Technology, June 6-17; Techniques for Close-Range Measurement, July 11-22;

Sites to Visit:

- *http://www.bclandsurveyors.bc.ca*
- *http://www.alsa.ab.ca*
- *http://www.slsa.sk.ca*
- *http://www.amls.ca*
- *The Department Publications:*

www.geomatics.ucalgary.ca/research/publications/index.php