

# PROGRESS REPORT 2007-2008

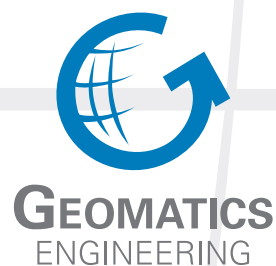
## Department of Geomatics Engineering

Schulich School of Engineering  
University of Calgary



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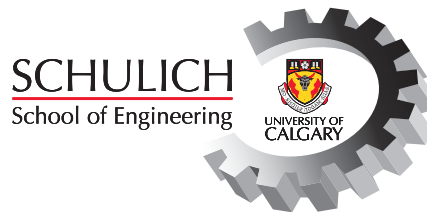


**SCHULICH**  
School of Engineering



# PROGRESS REPORT 2007/2008

## DEPARTMENT OF GEOMATICS ENGINEERING



**May 2008**

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Andrew James Simpson Hunter	Surendran Konavattam Shanmugam
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## HIGHLIGHTS 2007/2008

2007/2008 has been a very prosperous year. I would like to start by thanking our faculty, support and technical staff, and our students for their services, contributions and continued commitment to the Department. This year has brought both changes and challenges to the Department, as we continue to maintain a high quality undergraduate and graduate learning environment, and invest in cutting-edge research in one of the top Geomatics schools in the world.

We are pleased to welcome six new faculty members to our team. These six academics will strengthen our research teams in four vital areas:

- Earth Observation: **Dr. Jeong Woo Kim's** research mainly focuses on integrating state-of-the-art geophysical and geodetic techniques for geohazard analysis and geodynamics.
- Digital Imaging: **Dr. Derek Lichti's** primary research focus is on the use of optical and range imagery for automated 3D object reconstruction for biomedical applications.
- GIS and Land Tenure: Three new faculty members have joined us in this area:
  - Dr. Xin Wang** is a computer scientist specializing in spatial data mining and knowledge engineering.
  - Dr. Andrew Hunter's** current research is focused on the acquisition, use, and analysis of dynamic spatial data under the interrelated themes of Geographic Information Science, Spatial Statistics and GeoComputation.
  - Dr. Steve Liang's** general research areas are Geospatial Information and Communication Technologies (GeoICT).
- Positioning, Navigation, and Wireless Location: **Dr. Mark Petovello's** research interests include global navigation satellite systems (GNSS) and their integration with inertial navigation systems (INS) and other dead-reckoning sensors.

- ◆ Six new faculty members joined the department
- ◆ One new faculty member to join the department in fall 2008.
- ◆ Research funding reaches \$195 K per faculty member
- ◆ Numerous senior faculty and student awards
- ◆ Involvement in high level national and international boards, professional & learned societies
- ◆ Record number of convocants: 54 students



The past year has been a year of some loss, as well. Dr. Cathy Valeo moved to Civil Engineering within the Schulich School of Engineering, but continues to collaborate with our faculty members. Dr. Matthew Tait left the Department to pursue a career in Industry, with one of the world's largest engineering companies. We wish them both the very best in their new endeavours. In addition, our Computer Analyst, Mr. Brad Groat passed away suddenly, in April, after a brief illness.

We are very grateful to Steven and Janet MacPhee for a tremendous monetary donation to the Department that has given us the opportunity to

renovate the Geomatics 3<sup>rd</sup> and 4<sup>th</sup> year home rooms, and has provided additional funding for scholarships for undergraduate students.

Continued on next page

During 2007-2008, the Geomatics Engineering program continued to flourish. A total of 54 students received their BSc degree, 9 students a MSc degree, 3 student a MEng, and 8 students received a PhD degree. Undergraduate enrolment reached 58, 48 and 53 in each successive year of the undergraduate program, in addition to 13 students who entered the Internship Program. Demand for our BSc, MSc and PhD graduands remains exceptionally strong, particularly given the growth in the geomatics sector in Alberta.

The 2007-2008 fiscal period was another very successful year from a research excellence point of view. Faculty members have continued to secure major research funding. Total direct research funding exceeded \$3.9 million, which is approximately \$195,000 in average research funding per faculty member. Numerous awards were received by students and faculty members that are detailed on the following pages. Several faculty members continued to serve in leadership positions on various boards and in learned societies. The Department launched a new web page to keep our supporters, alumni, friends and other colleagues up to date on our activities and direction.

The Department is pursuing an opportunity to expand geomatics research in Alberta and Canada by applying, along with University of Alberta and University of Lethbridge, for provincial and federal funding to develop a centre in Integrated Resource Management. Results of this competition will be announced in the fall of 2008. Both government and Industry have shown keen interest in supporting the continued growth of geomatics-based products and personnel in the Province, and we see this as an exciting opportunity for the future for our Department and geomatics industry in general.

Physical space for the Department, and funding for equipment for the Microlab and Survey Stores, continue to be on-going challenges we face. We are now entering a period where significant and transformational partnerships with Industry will play an important role to help ensure that our labs are equipped with state-of-the art technology, to meet the needs of graduates whose learning matches rapidly-evolving Industry standards. As always, Geomatics Engineering at the University of Calgary is committed to excellence.

Dr. Naser El-Sheimy  
Professor and Head



*Janet MacPhee and Stephen Green  
celebrating the opening of the new  
Green MacPhee Geomatics Homeroom.*

Geomatics Engineering  
Faculty Members at the Annual Retreat  
June, 2007



Back Row: M. Barry, Y. Gao, D. Marceau, N. El-Sheimy, G. Lachapelle, S. Skone, B. Teskey.  
Front Row: M. Sideris, A. Braun, K. O'Keefe, I. Couloigner, A. Habib.  
Missing: M. Collins, C. Valeo

## MESSAGE FROM THE DEAN



The Department of Geomatics Engineering has had another successful year in its programs and research. Congratulations to all the faculty, staff and students who have contributed to the continual building of the Department's reputation and impact, both nationally and internationally. Through numerous faculty appointments over the past year, the Department is well positioned to accelerate its growth and increase its linkages with other strategic priorities in energy, the environment, ICT and biomedical engineering. In particular, the leadership the Department is showing in the development of a provincial Integrated Resource Management research strategy has strengthened its connections to the resource sector and to complementary research programs in Alberta. I am fully confident that these efforts will bear strong fruit in the coming year and I look forward to working with you and the geomatics community to further enhance Alberta's reputation as an international centre of excellence for geomatics activities.

M. Elizabeth Cannon, PEng, FCAE, FRSC  
Dean, Schulich School of Engineering



## AWARDS AND RECOGNITION

Several faculty members received awards in 2007 at the Engineering Faculty Council: **Dr. Ayman Habib**, Geomatics Engineering Graduate Educator Award; **Dr. Gerard Lachapelle**, Geomatics Engineering Research Excellence Award; **Dr. Kyle O'Keefe**, Geomatics Engineering Outstanding Teacher Award.

**Ms. Julia Lai** won the 2007 Donna Geekie Service Award.

**Mr. Suren Shanmugam** received a student sponsorship award from the Swiss Institute of Navigation to present a research paper at the European Navigation Conference held in Geneva in May 2007.

**Dr. Michael Sideris** was elected President of the International Association of Geodesy (IAG) for the period 2007 to 2011.

**Mr. Wouter van der Wal** won the 2007 Canadian Geophysical Union (CGU) Best Student Paper Award.

**Dr. Yang Gao** was awarded the Changjiang Chair Professorship at Wuhan University by the Chinese Ministry of Education and Li Ka-Shing Foundation.

**Ms. Kerri Robinson** won the Hoskin Scientific Best Student Poster Award at the 60th Annual Canadian Water Resources Conference in Saskatoon.

**Mr. Mohammed Daboor** won the Canadian Geophysical Union (CGU) Geodesy Section Best Student Paper Award.

**Mr. Cyrille Gernot** and **Ms. Florence Macchi** have received Best Poster Awards at the iCORE Summit 2007, Banff, August 2007.

**Dr. Susan Skone** won a Best Presentation Award at the ION GNSS 2007.

**Mr. Cyrille Gernot** won a Best Student Award at the ION GNSS 2007.

Industry Canada announced the renewal of **Professor Lachapelle's** Canada Research Chair in Wireless Location for a second seven year term starting April 1, 2008.

Engineering Student Society (ESS) Teaching Excellence Award for Geomatics was awarded to **Dr. Matthew Tait**. This award is based on excellence, enthusiasm and personality in teaching Engineering students throughout their academic years.

Engineering Student Society (ESS) winner of the Golden Geer Award was **Mr. Brandon Ellis**, the student who most embodies the spirit of Engineering .

Engineering Student Society (ESS) winner of the Student of the Year Award was **Ms. Amanda Side**, the student in their final year, who exemplifies Engineering at the Schulich School of Engineering.

**Dr. Michael Sideris, Dr. Nico Sneeuw, Mr. Matthias Weigelt** and **Mr. Chen Xu** were recipients of the 2008 F.W. (Casey) Baldwin Award of the Canadian Aeronautics and Space Institute (CASI). The award was given for their paper entitled "Spaceborne Gravimetry and Gravity Field Recovery", which has been selected as the best paper published in the 2007 volume of Canadian Aeronautics and Space Journal (CASJ).

**Mr. Cyrille Gernot** received the Best Student Presentation Award at the European Navigation Conference 2008.

## AWARDS AND RECOGNITION, continued

**Dr. Chaminda Basnayake**, who received his doctorate from our Department in 2004, won GM's 2006 Charles P. McCuen Award and the 2007 OnStar President's Award. The Charles P. McCuen Award is the highest award offered by GM R&D.

**Mr. Aiden Morrison** was awarded a best presentation award at the University of Calgary 2007 Graduate Student Conference.

**Mr. Richard Ong**, BSc graduand, has been awarded the Chancellor David B. Smith Gold Medal in Engineering and the APEGGA Education Foundation Gold Medal in Engineering for his outstanding performance during his BSc studies.

Third Place for the 2008 John I. Davidson President's Award for Practical Papers in the Journal of Photogrammetric Engineering and Remote Sensing were **Dr. Ayman Habib, Dr. Eui-Myoung Kim and Mr. Changjae Kim**. The title of their paper was 'New Methodologies for True Orthophoto Generation'.

First runner-up for the 2008 Talbert Abrams Award for the following paper in the Journal of Photogrammetric Engineering and Remote Sensing: **Dr. Ayman Habib, Mr. Eui-Myoung Kim and Mr. Changjae Kim**. 'New Methodologies for True Orthophoto Generation'.

Grand prize winner for the 2008 Talbert Abrams Award for the following paper in the Journal of Photogrammetric Engineering and Remote Sensing: **Dr. Michel Morgan, Dr. Kyungok Kim, Dr. Soo Jeong and Dr. Ayman Habib**. Epipolar Resampling of Space-Borne Linear Array Scanner Scenes using Parallel Projection.

*Schulich School of Engineering has entered into a three-year partnership agreement with Alpine Canada Alpin. Professor Gérard Lachapelle (left) and ACA chief athletic officer Max Gartner (right) exchange hats to celebrate the new partnership.*



*Korean Society of Surveying, Geodesy, Photogrammetry and Cartography (KSGPC) and the Department of Geomatics at the University of Calgary in January 2008. The KSGPC Society holds an annual international workshop in order to exchange ideas on recent research activities and initiate collaboration between the society and international partners. The University of Calgary was the chosen location for 2008.*

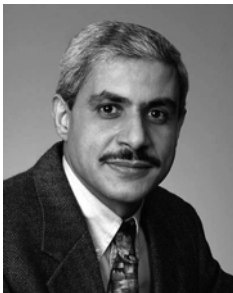
## PERSONNEL Faculty



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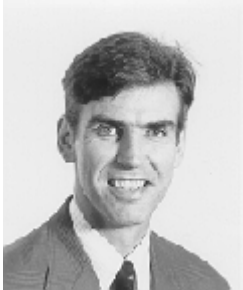
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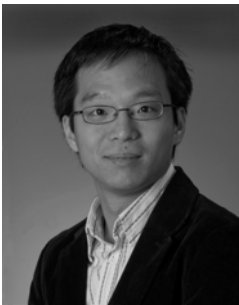




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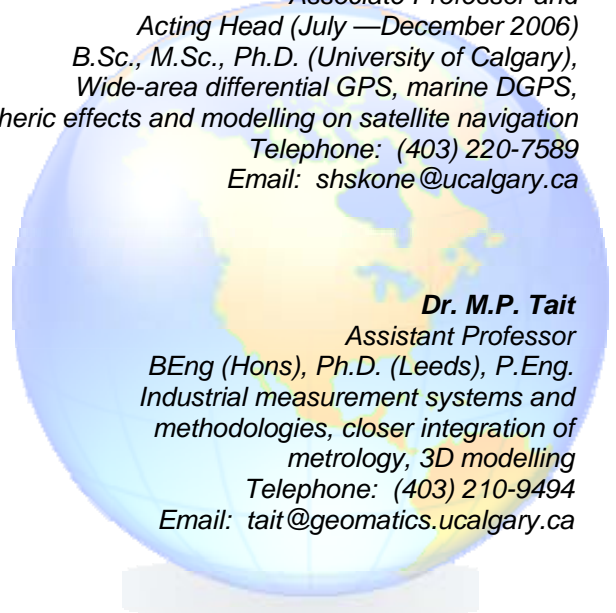
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**Dr. E.J. Krakiwsky**, Ph.D. (Heiskanen Award; The Ohio State University), P.Eng. Least squares estimation and statistical testing, network design, satellite positioning, automatic vehicle location and navigation systems.

**Dr. A.C. McEwen**, Ph.D. (University of London), C.L.S., N.L.S., Cadastral studies, survey law, land registration systems, international land and maritime boundaries surveys for aboriginal land claims.

**Dr. K.P. Schwarz**, Dr.-Ing. (Summa cum laude; Technical University of Berlin), P.Eng., Geodesy, inertial techniques, airborne gravimetry, kinematic positioning and attitude determination by GPS/INS, multi-sensor systems, real-time applications.

## New Faculty Members

**Dr. Xin Wang was appointed in a faculty position in the area of GIS and Land Tenure.**

Dr. Wang holds a Bachelor degree in Computer Science, a M.Eng. degree in Software Engineering from Northwest University, China and a PhD degree in Computer Science from University of Regina. Prior to joining University of Calgary she worked with SaskTel. She was a lecturer at East China University of Science and Technology for three years. At the same time, she was also a software engineer with ASTI Shanghai and a researcher at Fudan University and Shanghai Software Centre. Her research has been primarily in the areas of spatial data mining, ontology and knowledge engineering in GIS.

**Dr. Jeong Woo Kim was appointed in a faculty position in the area of Earth Observation.**

Dr. Kim holds B.Sc. and MSc. degrees in Geophysics from Yonsei University in Korea and a PhD. degree in Satellite Geophysics from the Ohio State University. His professional experiences include Associate Professor with Sejong University in Korea, NRC Research Associate at NASA Goddard Space Flight Center, and Research Scientist at The Ohio State University, State University of New York, and Korea Polar Research Institute. His research activities have been in the areas of global geodynamics and geohazard analysis from integrated geodetic and geophysical measurements including superconducting gravimetry, regional and global geopotential modeling from satellite gravimetry and magnetometry, geoid, gravity, bathymetry, and ocean circulation from satellite radar altimetry, surface and subsurface EM properties and dynamics from optical and radar remote sensing, and microwave remote sensing of sea ice.

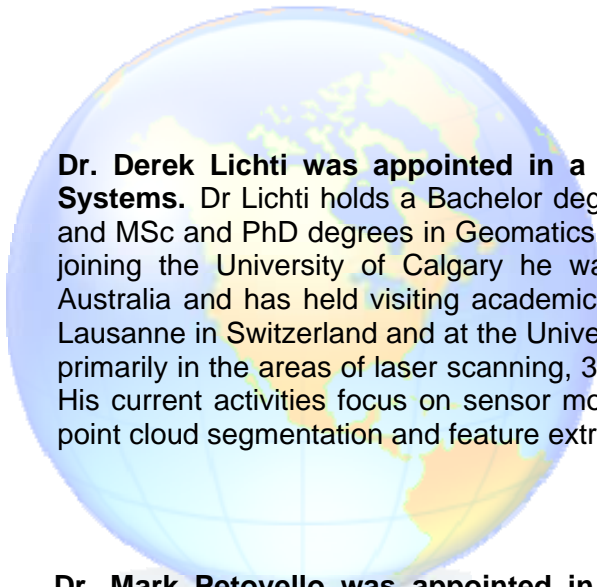
**Dr. Andrew Hunter was appointed in a faculty position in the area of GIS and Land Tenure.**

Dr. Hunter holds a Bachelor of Surveying from the University of Otago and MSc and PhD degrees in Geomatics Engineering from the University of Calgary. He is a Professional Registered Surveyor with the New Zealand Institute of Surveyors, and he has extensive research experience in land tenure, land information systems and geospatial information systems. Dr. Hunter's current research is focused on the acquisition, use, and analysis of dynamic spatial data under the interrelated themes of Geographic Information Science, Spatial Statistics and GeoComputation. The primary application fields within which his research falls include environmental applications related to animal tracking, land use planning and Cadastres. Dr. Hunter has won a number of awards for both teaching and research excellence, and he has a strong record of professional experience within the land surveying community.

**Dr. Steve Liang was appointed in a faculty position in the area of GIS and Land Tenure.**

Dr. Liang holds a Bachelor degree in Survey Engineering from National Cheng-Kung University in Taiwan and a Ph.D. degree in Earth and Space Science from York University in Canada. His general research areas are Geospatial Information and Communication Technologies (GeolCT). Currently, his specific research interests lie at the intersection of Geo-Sensor Networks, Peer-to-Peer (p2p) computing, Wired and Wireless Internet GIS and Social Networks, specifically in the area of the Spatial Sensor Web (SSW), which is a spatial information infrastructure for heterogeneous sensor networks.





**Dr. Derek Lichti was appointed in a faculty position in the area of Digital Imaging Systems.** Dr Lichti holds a Bachelor degree in Survey Engineering from Ryerson University and MSc and PhD degrees in Geomatics Engineering from the University of Calgary. Prior to joining the University of Calgary he was with Curtin University of Technology in Perth, Australia and has held visiting academic appointments at Ecole Polytechnique Federale de Lausanne in Switzerland and at the University of Newcastle, Australia. His research has been primarily in the areas of laser scanning, 3D range cameras and close-range photogrammetry. His current activities focus on sensor modelling and calibration, point cloud registration and point cloud segmentation and feature extraction for automated object reconstruction.

**Dr. Mark Petovello was appointed in a faculty position in the area of Positioning, Navigation and Wireless Location.** Dr. Petovello has Bachelor and PhD degrees in Geomatics Engineering from the University of Calgary. Prior to joining the University of Calgary as a faculty member, he was a Senior Research Engineer in the PLAN group at the University of Calgary where he was responsible for the execution of several GNSS and GNSS/INS related research projects. His research has been primarily in the areas of GNSS and its integration with dead reckoning sensors such as INS. His current activities focus on GNSS software receiver development, including ultra-tight GNSS/INS integration.



*Welcome to the Geomatics Department  
L to R: Andrew Hunter, Xin Wang, Steve Liang,  
Naser El-Sheimy, and JW Kim*



*Welcome to Dr. Derek Lichti and  
Dr. Mark Petovello*



*Farewell to Dr. Caterina Valeo  
On July 01, Caterina left her position in the  
Geomatics Department to join Civil Engineering as  
Associate Professor. We wish her the very best!*

## Adjunct Professors

**Dr. Bo Huang**

Chinese University of Hong Kong

**Dr. Richard Klukas**

UBC Okanagan

**Dr. Bryan Mercer**

Intermap Technologies Corp.

**Dr. Aboelmagd Noureldin**

Royal Military College of Canada

**Dr. Bruno Scherzinger**

Applanix Corporation

**Dr. Nico Sneeuw**

Universität Stuttgart



*Farewell to Dr. Matthew Tait  
In December, 2007, Matthew accepted a  
position as Senior Project Manager, at Colt  
Geomatics. We wish him the very best!*



**Support Staff  
Administrative**

**Marcia Inch**, Administrative Manager  
**Monica Barbaro**, Administrative Assistant  
**Julia Lai**, Administrative Assistant  
**Lu-Anne Markland**, Graduate Program Administrator  
**Julia Millen**, BSc, BMus, MA, Program Administrator,  
SCIberMENTOR Program



*Julia Lai won the 2007  
Donna Geekie Service Award.*



*Stampede Breakfast 2007*

**Support Staff  
Technical**

**Garth Wanamaker**, BSc, Technical Manager  
**Kirk Collins**, BSc, Dipl. Surveying & Mapping  
Technology, Survey Technician  
**Brad Groat**, BA, Dipl. in Electronics Engineering  
Technology, Computer Systems Administrator  
**Kathy Hamilton**, Network Technician Certificate,  
Computer Technician  
**Gail Leask**, Dipl. in Telecomputer Engineering  
Technology, Microcomputer Lab Administrator

## Research Engineers/Associates/Assistants

Walid Abdel-Hamid  
Positioning, Navigation and Wireless Location

Daniele Borio  
Positioning, Navigation and Wireless Location

Saurabh Godha  
Positioning, Navigation and Wireless Location

Jean Gabriel Hasbani  
GIS and Land Tenure

Chen-Yu Hsieh  
Positioning, Navigation and Wireless Location

Martin Lavigne  
Positioning, Navigation and Wireless Location

Hasan Murtaza  
Positioning, Navigation and Wireless Location

Phillip Mutulu  
Earth Observation

Cillian O'Driscoll  
Positioning, Navigation and Wireless Location

Mark Petovello  
Positioning, Navigation and Wireless Location

Rebeca Quinonez-Pinon  
GIS and Land Tenure

Elena Rangelova  
Earth Observation

Surendran Shanmugam  
Positioning, Navigation and Wireless Location

Robert Watson  
Positioning, Navigation and Wireless Location

Bruce Wright  
Positioning, Navigation and Wireless Location

Karen Yee  
Positioning, Navigation and Wireless Location

Cheng Zhang  
GIS and Land Tenure

Zhan Zhang  
Earth Observation

## Post Doctoral Fellows

Hamid Assilzadeh  
Positioning, Navigation and Wireless Location

Mohamed El Habiby  
Earth Observation

Mauricio Gende  
Positioning, Navigation and Wireless Location

Dongqing Gu  
Positioning, Navigation and Wireless Location

Sameh Nassar  
Positioning, Navigation and Wireless Location

Aluir Dal Poz  
Digital Imaging Systems

Ruifang Zhai  
Digital Imaging Systems

Yufeng Zhang  
Positioning, Navigation and Wireless Location





## GUEST LECTURERS

### International Lecture Series

**Mr. Ed Shaw**

CASI President  
*Canada and Radar Satellites*

**Dr. Jan Skaloud**

Swiss Federal Institute of Technology  
Lausanne  
*From Town to Slopes by the Air: Similarities and Differences in Precise Trajectory Estimation in Urban, Mountain and Airborne Environment*

**Dr. John Gyakum**

McGill University  
*Regional Climate Issues in the Context of Global Change.*

**Dr. Mark Psiaki**

Cornell University  
*Collection, Analysis, and Modeling of GPS Scintillation Data from Equatorial Regions*

**Dr. Grace Gao**

Stanford University  
*Decoding Galileo and Compass PRN Codes*

**Dr. Junyong Chen**

State Bureau of Surveying and Mapping  
*Modernization of the Chinese National Geodetic Datum*

### Special Lecture Series

**Dr. Neculai Archip**

Harvard Medical School  
*Medical Image Computing for Image Guided Therapy*

**Mr. Fabio Ayres**

The University of Calgary  
*Medical Imaging and Computer-Aided Diagnosis in Medicine: Detection of Early Signs of Breast Cancer in Mammograms, and Analysis of Retinal Images*

**Mr. Nezam Kachouie**

University of Waterloo  
*Toward an Optimal Solution for Multi-Target Segmentation and Tracking with the Applications to Multi-Cellular Video Analysis*

**Dr. Derek Lichti**

Curtin University of Technology  
*Modelling and Reconstruction Challenges and Solutions in Biomedical Photogrammetry*

**Dr. Naga Mudigonda**

General Dynamics Canada Ltd.  
*Image Analysis and Multi-source Information Fusion Concepts for Medical and Military Applications*

**Dr. Mark Petovello**

The University of Calgary  
*Using Weak GNSS Signals for High Accuracy Navigation*

## Distinguished Lecture Series

### **Dr. Mohinder S. Grewal**

Cal State University, Fullerton, California  
*Advanced Kalman Filtering Applied to Navigation*

### **Dr. Jayanta Ray**

Accord Software & Systems Pvt. Ltd.  
*GNSS Receiver Design*



*Dr. Mohinder Grewal and Graduate Students*

## Visiting Scientists

### **Professor Cheng Wang**

National University of Defense Technology  
Hunan, P.R. China

*Dr. Cheng Wang (right), an Associated Professor at the University of Defense Technology worked for one year with Dr. El-Sheimy's (left) 'Mobile Multi-Sensor Systems Research Team' on automated GIS feature extraction techniques from mapping systems data.*



## ADVISORY COMMITTEES AND STUDENT

### Geomatics Engineering Advisory Committee (GEAC)

It is the responsibility of the Geomatics Engineering Advisory Committee to ensure that the undergraduate, graduate and research programs meet the needs of the country and are kept up to date with society and the rapidly changing technologies.

The 31st annual advisory committee meeting was held on Friday, November 30, 2007. The agenda included discussions on the department strategic plan for the next 5 years, the need to actively recruit undergraduate students, and the opportunities afforded by the Biomedical and the Energy and Environment specializations.

#### Advisory Committee 2007

Name	Affiliation
<b>Eric Desroche, Chair</b>	Intermap Technologies Corporation
<b>Mohamed Abousalem</b>	Hemisphere GPS
<b>Arlin Amundrud</b>	Global Surveys Group Inc.
<b>Danielle Coulter</b>	The City of Calgary
<b>Steve Fediow</b>	Fugro SESL Geomatics Ltd.
<b>Hazen Gehue</b>	SiRF Technology Inc.
<b>Ron Hall</b>	Focus Corporation
<b>Teresa Myrfield</b>	Pacific Land Surveying Ltd.
<b>Stuart Salter</b>	Natural Resources Canada
<b>Kim Sturgess</b>	Alberta WaterSMART
<b>Gary Zhang</b>	MRF Geosystems Corporation
Representatives of the U of C - N. El-Sheimy, M.B. Barry, A.F. Habib	



#### Geomatics Engineering Advisory Committee

First row L to R, Arlin Amundrud, Naser El-Sheimy, Eric Desroche, Stephen Green; Centre row, Gary Zhang, Danielle Coulter, Teresa Myrfield, Victoria Hoyle; Back row, Mike Barry, Ayman Habib, Hazen Gehue, Steve Fediow, Mohamed Abousalem.

## Geomatics Engineering Liaison Committee (GELC)

The Geomatics Engineering Liaison Committee met on November 29, 2007. The committee was established to develop an effective and permanent relationship between the Land Surveyors' Associations and the University of Calgary. The committee consists of two delegates each from the Land Surveying Associations in the four western provinces and the Association of Canada Lands Surveyors, a member at large, as well as the Associates Heads and Cadastral faculty of the Department of Geomatics Engineering at the University of Calgary.

Discussions centered around challenges in recruiting students who would choose to take surveying when they enter university, and a proposal to include representation from provincial governments and federal government surveying agencies on the committee. Formal training for surveying summer and internship students is desirable.

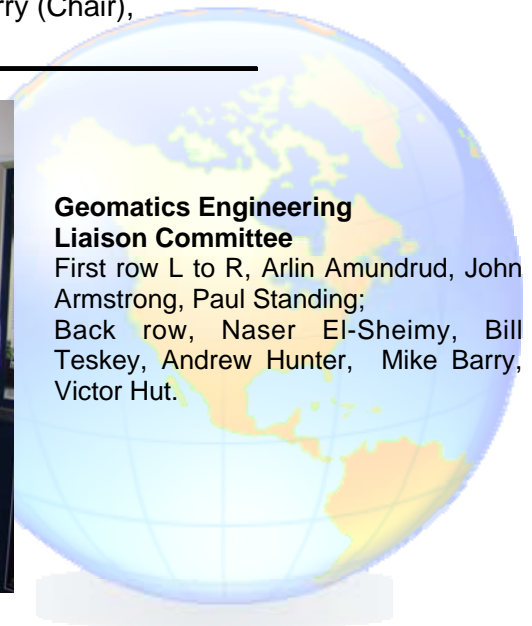
Geomatics Engineering Liaison Committee 2007	
Name	Affiliation
<b>Arlin Amundrud</b>	Member at Large
<b>John Armstrong</b>	Association of British Columbia Land Surveyors
<b>Paul Dixon</b>	Association of Canada Lands Surveyors
<b>Victor Hut</b>	Alberta Land Surveyors Association
<b>Rob Radovanovic</b>	Alberta Land Surveyors Association
<b>Marie Robidoux</b>	Association of Canada Lands Surveyors
<b>Paul Standing</b>	Association of Manitoba Land Surveyors
<b>Roy Pominville</b>	Saskatchewan Land Surveyors Association

Representatives of the U of C were M.B. Barry (Chair), N. El-Sheimy, W.F. Teskey, A.J. Hunter.



### Geomatics Engineering Liaison Committee

First row L to R, Arlin Amundrud, John Armstrong, Paul Standing;  
Back row, Naser El-Sheimy, Bill Teskey, Andrew Hunter, Mike Barry, Victor Hut.





## Student Awards Night

Student Awards Night was held on Tuesday, March 25, 2008. Awards night is an opportunity to publicly recognize the many accomplishments of our graduate and undergraduate students. It also provides an occasion for an informal meeting between members of the profession, students, faculty and other university representatives.

The number of awards available for our students continues to rise, thanks to the commitment of the Geomatics community to our program and to our students.



*Geomatics Engineering Student Award Winners and Donors*

## Graduate Awards

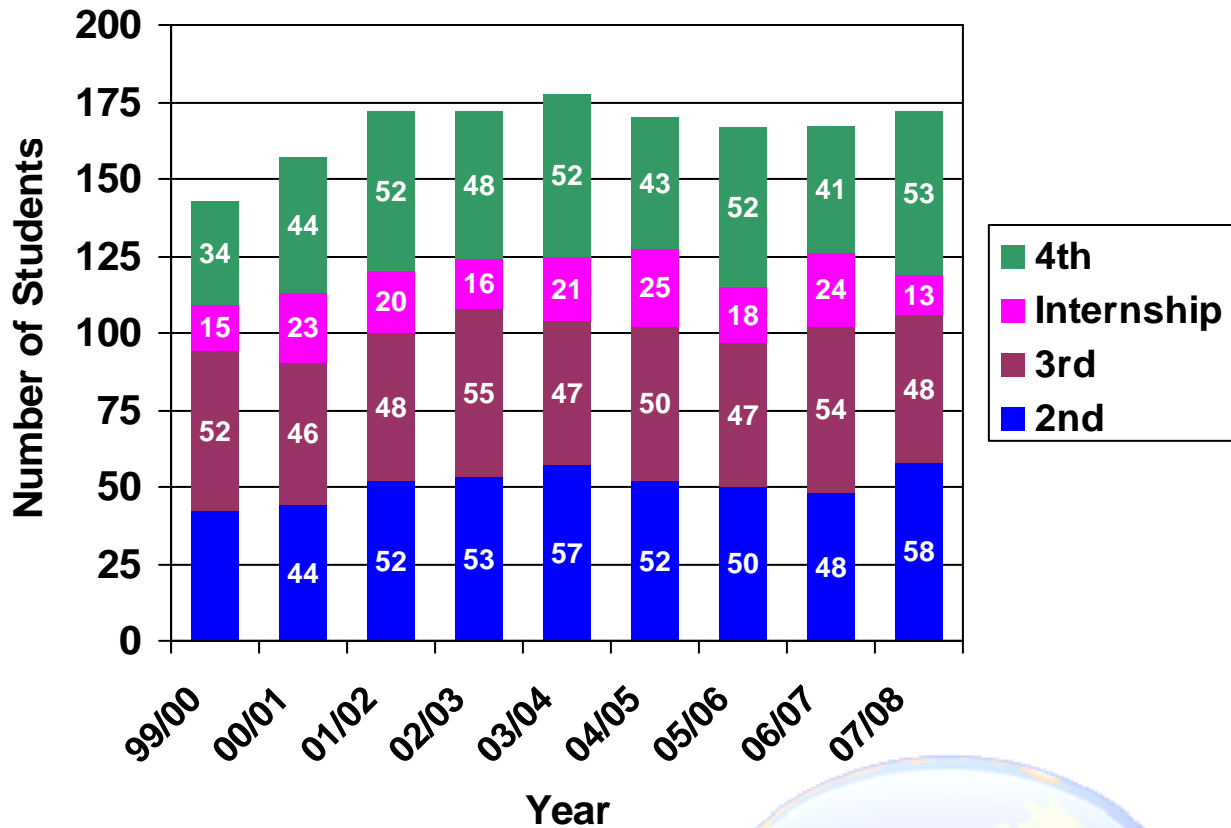
Recipient	Awards
Wes Teskey Chengqian Zhang	Alberta Ingenuity Fund Awards
Chen Xu	C. F. Gauss Award
Feng Tang	China Council Scholarship
Mohammed Dabboor	Eratosthenes Award
Taher Hassan	Egyptian Government Scholarship
Juliano Kersting	ESRI Canada Student Scholarship
Wouter van der Wal	F.R. Helmert Award
Vidyavathy Renganathan	Helmut Moritz Graduate Scholarship
Taher Hassan	Innovation in Mobile Mapping Award
Aiden Morrison	Institute of Navigation (ION) Alberta Section Graduate Award
Chris Goodall Ahmad Reza Abdolhosseini Moghaddam	Institute of Navigation (ION) Graduate Award
Cecile Mongredien	Institute of Navigation (ION) National Award
Cecile Mongredien	Jacques Cartier Award
Cecile Mongredien	KIS94 Graduate Scholarship
Niandry Moreno	Los Andes University Scholarship
Ivan Detchev	NSERC Scholarship
Chris Goodall	NSERC Scholarship
Jennifer He	NSERC CGS Scholarship
Glenn MacGougan	NSERC CGS Scholarship
Wes Teskey	NSERC CGS Scholarship
Priyanka Aggarwal	NSERC IPS Scholarship
Kerri Robinson	NSERC IPS Scholarship
Zainab Syed	NSERC IPS Scholarship
Anna Jarvis	NSERC PGSM Scholarship
Aiden Morrison	NSERC PGSM Scholarship
Changjae Kim	North West Group Scholarship
Chen Xu	Robert B. Paugh Memorial Scholarship in Engineering
Yousif Alghamid	Saudi Aramco Scholarship
Ghazi Ali Al-Rawas	Sultanate of Oman Scholarship
Surendran Konovattam Shanmugam	University of Calgary Silver Anniversary Graduate Fellowship
Axel Ebeling	Werner Graupe International Fellowship in Engineering

## Undergraduate Awards

Recipient	Awards
Dustin James Engen	A.D. (Denis) Hosford Scholarship
Amy Christine Spiers	Alberta Land Surveyors' Association Scholarship
Arne Ove Hals	British Columbia Land Surveyors Foundation Award
Corey Michael Doherty	British Columbia Land Surveyors Foundation H.R. Goldfinch Memorial Award
Meghan Elizabeth A. Walsh	Cannon-Lachapelle Family Scholarship
Carmen Wong	Colt Geomatic Solutions Ltd. Bursary
Eduardo Infante	David Scovill Memorial Bursary
Lindsay Michael McEachern	E.J. Krakiwsky Bursary
Amanda Melissa P. Side	Focus Intec Geomatics Bursary
Tao Lin Eduardo Infante Lindsay Michael McEachern	Geomatics Engineering '25th Anniversary' Bursary
Josiah Yin Lau	Geomatics Engineering Future Leaders Award
Amanda Melissa P. Side Carmen Wong	Geomatics Engineering Student Society Bursaries
Lindsay Michael McEachern	Institute of Navigation Alberta Chapter Bursary
Jacky Chun Kit Chow	Institute of Navigation (ION) Undergraduate Bursary
Trevor Paul Phillips Amy Christine Spiers	J.H. Holloway Scholarship in Geomatics Engineering
Ryan Scott Enns	Jerry J. Simpson Memorial Scholarship
Ian Carl Isackson	Jim Van Dam Scholarship
Shawn Knor Tse	John Deyholos Memorial Award
Kathryn Brenda Hannah	KIS-97 Undergraduate Scholarship
Leighton John Greenstein	L.R. (Dick) Newby Memorial Award
Jacky Chun Kit Chow	Leica Geosystems Limited Scholarship
Coral Amelia M. Bliss Taylor	McElhanney Scholarship
Lindsay Michael McEachern	Ray Lowry Memorial Bursary
Carlo Steven Monette	Saskatchewan Land Surveyors' Association Award
Coral Amelia M. Bliss Taylor	Stephen P. Williams Memorial Award

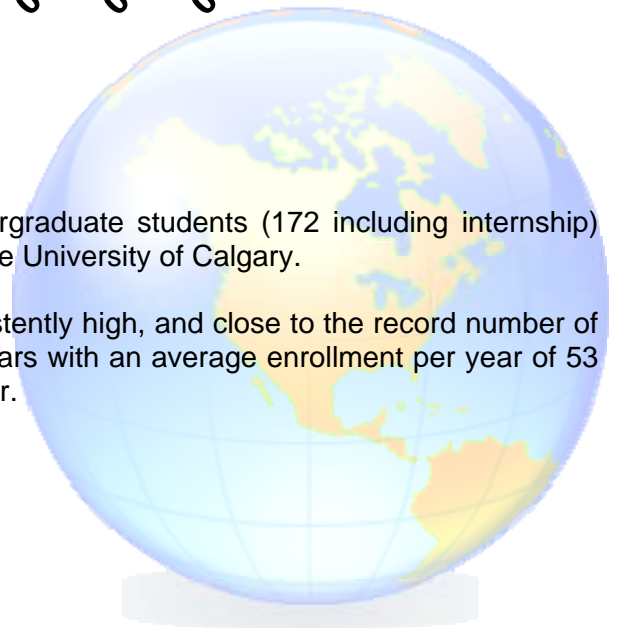
## UNDERGRADUATE STUDIES

### Enrollment

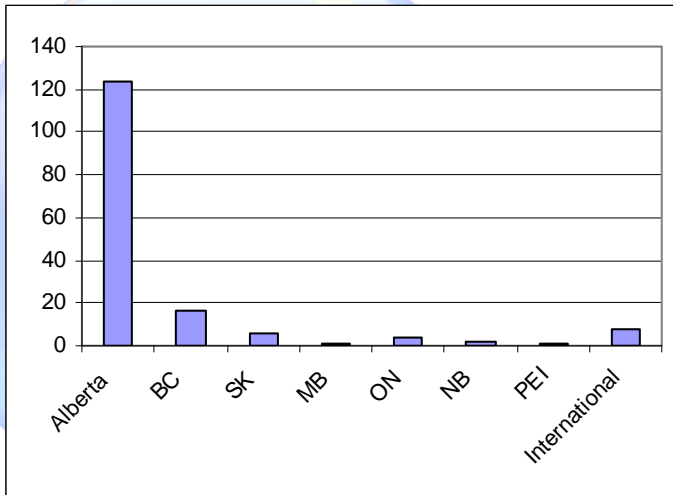


During the 2007/08 academic year, 159 undergraduate students (172 including internship) pursued studies in Geomatics Engineering at the University of Calgary.

Undergraduate enrollment has remained consistently high, and close to the record number of students the Department achieved in recent years with an average enrollment per year of 53 students in each of second, third and fourth year.







The figure to the left shows a breakdown of student enrollment by geographic region. Students from Alberta remain the largest group, and numbers from the other groups remain fairly constant from year to year.

**Student Enrollment by Geographic Region**



*GESS Wins ENGG WEEK 2008*



*Graduating Class of 2008,  
Proudly displaying 'Iron Ring'*



*Amanda Side receiving the  
Student of the Year Award*

## COMMON CORE CURRICULUM

The common curriculum for engineering students is shown in the adjacent table.

Students choose their department at the end of the first year and begin studies specific to that department in the second term of second year.

### Common Program for All Engineering Students

Year 1	Course Number	Course Name
	AMAT 217	Calculus for Engineers and Scientists
	AMAT 219	Multivariable Calculus for Engineers
	CHEM 209	General Chemistry for Engineers
	ENGG 201	Behaviors of Liquids, Gases and Solids
	ENGG 205	Engineering Mechanics I
	ENGG 233	Computing for Engineers I
	ENGG 251	Design and Communications I
	ENGG 253	Design and Communications II
	MATH 221	Linear Algebra for Scientists and Engineers
	PHYS 259	Electricity and Magnetism
	COST -1	Complementary Studies Course
<b>Year 2 (Fall)</b>		
	AMAT 307	Differential Equations for Engineers
	ENGG 319	Probability and Statistics for Engineers
	ENGG 325	Electric Circuits and Systems
	ENCM 339	Programming Fundamentals
	ENGG 349	Engineering Mechanics II
	PHYS 369	Acoustics, Optics and Radiation for Engineers
<b>Abbreviations</b>		
	AMAT	Dept. of Mathematics & Statistics
	CHEM	Dept. of Chemistry
	COST	Complementary Studies Course
	ENCM	Computer Engineering
	ENGG	Faculty of Engineering
	ENGO	Dept. of Geomatics Engineering
	PHYS	Dept. of Physics

## Undergraduate Curriculum in Geomatics Engineering

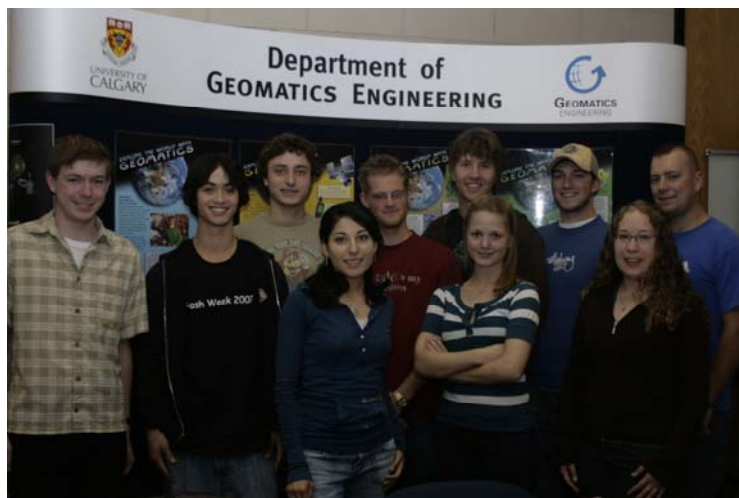
<b>Year 2/Winter</b>	<b>Course</b>	
	AMAT 309	Vector Calculus for Engineers
	ENEL 327	Signals and Transforms
	ENGO 343	Fundamentals of Surveying
	ENGO 351	Introduction to Geospatial Information Systems
	ENGO 361	Adjustment of Observations
<b>Year 3/Fall</b>	<b>Course</b>	
	ENGG 407	Numerical Methods in Engineering
	ENGO 421	Coordinate Systems
	ENGO 431	Principles of Photogrammetry
	ENGO 451	Design and Implementation of GIS
	COST-2	Complementary Study
<b>Year 3/Winter</b>	<b>Course</b>	
	ENGO 419	Geomatics Networks
	ENGO 423	Geodesy
	ENGO 435	Remote Sensing
	ENGO 455	Land Tenure & Cadastral Systems
	ENGO 465	Satellite Positioning
	COST-3	Complementary Study
<b>Year 4/Fall</b>	<b>Course</b>	
	ENGO 500	Geomatics Engineering Project
	ENGO 501	Field Surveys
	TE-1	Technical Elective
	TE-2	Technical Elective
	TE-3	Technical Elective
	COST-4	Complementary Study
<b>Year 4/Winter</b>	<b>Course</b>	
	ENGO 500	Geomatics Engineering Project
	COST-5	Complementary Study
	COST-6	Complementary Study
	TE-4	Technical Elective
	TE-5	Technical Elective
	TE-6	Technical Elective

## Technical Electives in Geomatics Engineering

Course	
BSEN 395	Business Law for Strategic Decision Makers
ENGO 531	Advanced Photogrammetric and Ranging Techniques
ENGO 532	Photogrammetric Techniques for Reconstruction and Manipulation of Biomedical Data
ENGO 545	Hydrography
ENGO 551	Special Topics in GIS
ENGO 559	Digital Imaging and Applications
ENGO 563	Data Analysis in Engineering
ENGO 567	High-Precision Surveys
ENGO 573	Digital Terrain Modelling
ENGO 579	Survey Law and Practice
ENGO 581	Land Use Planning
ENGO 583	Environmental Modelling
ENGO 585	Wireless Location

## GEOMATICS ENGINEERING STUDENT SOCIETY (GESS)

President—Coral Bliss Taylor  
 VP Finance—Malcolm Richmond  
 VP Academic/4th Year Rep—Amanda Side  
 VP Events—Brandon Ellis  
 VP External—Dan Grover  
 Secretary—Mina Saleh  
 3rd Year Rep—Ben Knoechel  
 Webmaster—James Badger  
 Photographer—James Badger  
 Trips Commissioner—Grant Powers  
 Athletics Commissioner—Corey Doherty  
 Career Day—Meghan Gilmore



L to R: James Badger, Dan Grover, Ben Knoechel, Mina Saleh, Grant Powers, Malcolm Richmond, Coral Bliss Taylor, Corey Doherty, Amanda Side, and Brandon Ellis



## GEOMATICS ENGINEERING SURVEY CAMP AT KANANASKIS

An important part of the undergraduate degree program in Geomatics Engineering is the field camp (ENGO 501). This two week camp is held at the Kananaskis Centre for Environmental Research, prior to the start of the Fall Session. It gives incoming fourth year students the opportunity to apply the knowledge and experience gained in the different areas of geomatics to an integrated practical project. In summer 2007, a record number of students attended Survey Camp.



The Department of Geomatics Engineering would like to thank the following companies for their participation in the annual Survey Camp Equipment Day, or for the generous loan of equipment over the duration of Survey Camp:

*Butler Survey Supplies Ltd.  
Cansel Survey Equipment  
Spatial Technologies  
SAIT Polytechnic*



Survey Camp 2007

## ENGINEERING INTERNSHIP PROGRAM

This program offers an optional cooperative educational work experience for all students who have completed their third year of engineering. Participants spend 12 to 16 months in paid jobs.

<b>Student Name</b>	<b>Placement Company</b>	<b>Faculty Mentor</b>
Bayram, Amina	Geoseis Inc.	Mike Barry
Chen, Buke	Stantec	Andrew Hunter
Flerkevitch, Olga	Hemisphere	Gerard Lachapelle
McLennan, Derek	Uzushlo Electric Co. Ltd.	Jeong Woo Kim
Chan, Billy	Terrapoint Canada Inc.	Ayman Habib
Engen, Dustin	CDL Systems Ltd.	Kyle O'Keefe
Enns, Ryan	CDL Systems Ltd.	Steve Liang
Eykens, Peter	Intermap Technologies Corporation	Susan Skone
Getzlaf, David	POINT Inc.	Bill Teskey
Kern, Emily	Autodesk Inc.	Danielle Marceau
Qing, Jie	Fugro SESL Geomatics	Yang Gao
Tang, Mark	Stantec Consulting Ltd.	Mike Barry
Tse, Shawn	Intermap Technologies	Michael Sideris





## ENGO 500

The objective of the ENGO 500 group project course is the development of skills in cooperative research, report preparation and seminar presentation. Students plan and execute a project that must conform with professional requirements. The project must have design, measurement, analysis and presentation components. Submission and defense of progress reports and a final report are required.

## ENGO 500 Special Presentations

### **Practical Offshore Project Management**

Bruce Calderbank  
Hydrographic Survey Consultants Intl. Ltd

### **Projects at NovAtel**

Jonathan Auld  
NovAtel Inc.

### **LiDAR Analysis on Power Lines**

Leannah Green  
Colt Geomatics

### **The Human Factor in Management**

Mohamed Abousalem  
Hemisphere GPS

### **GIS Project Management**

Gary Zhang  
MRF Geosystems

### **Projects for Clearly Defined Problems and Wicked Problems**

Michael Barry  
University of Calgary

## ENGO 500 GROUPS 2007/2008

Project Title	Group Members	Supervisor
Specification Design for integrated Cadastral Surveys	Kirsti Barber, Cody Moser, Ryan Pals, Tyson Quocksister	Barry
Analysis of Polarimetric SAR (POLARSAR) Image Data over Kruger National Park, South Africa	Max Miller, Llana Samaroo, Kyle Titus	Collins
Multi-Sensor Integration	Luc Cairns, Ben Clipperton, Ian Isackson, Pavlo Karbovnyk	El-Sheimy
Analysis of High Precision Real-Time Kinematic Positioning Systems	Craig Doram, Andrew King, Dale Madsen	Gao
Integration of Photogrammetric and LiDAR Data for 3d Visualization	Mina Saleh, Amanda Side, Duy Tran, Carmen Wong	Habib
Vision Measurement (VM) System	Eryn Gibbs, Aaron Shufletoski, Nichola Sinclair-Foreman Amy Spiers	Habib
Sustainable Land Development	Corey Doherty, Brandon Ellis, Carlo Monette, Coral Bliss Taylor	Hunter
Environmental Monitoring of the Alberta Oil Field from Satellites	Kurtis Shawn Bahna, Marc Hallworth, Roberto Infante, Josef Man	Kim
Design, Testing and Analysis of a High Performance Pedestrian Navigation System	Tao Lin, Richard Ong, Saman Orou	Lachapelle
Real-Time UofCalgary – a Web 2.0-based Spatial-enabled Tagging System for the U of C Campus	Mahmoud Abdelrahman, Britton Armstrong, Karim Assem, Tamara Bonham	Liang
Creating a Cellular Automata Model to Simulate the Propagation of a Spatio-Temporal Phenomenon	George Caraba, Meghan Gilmore, Anil Sinha	Marceau
Igliniit: Tracking Inuit Hunters and Climate Change with GPS	Brandon Culling, Josiah Lau, Tina Mosstajiri, Trevor Phillips	O'Keefe
Evaluation of GNSS Observation Errors and Biases	Arne Hals, Tram Phan, Philomena Akehurst	Skone
Comparison of Deformation Monitoring Methodologies at Nose Hill Test Site	Leighton Greenstein, Shannon Hill, Kristopher Kwiatkowski, Denis Luu	Teskey



## GEOMATICS ENGINEERING CAREER DAY

On Thursday, February 7, 2008, the Geomatics Engineering Student's Society and the Department of Geomatics Engineering hosted their twelfth annual Career Day. Career Day provides a forum for both companies and students to interact and discuss topics and career opportunities in the Geomatics industry. Several guest speakers made presentations on various topics throughout the day. In addition to these presentations, students and company representatives participated in the Industry Showcase, which was introduced to provide all participants with an opportunity to discuss careers in Geomatics.

The Geomatics Engineering Student's Society would like to thank all participants and sponsors for making this year's Career Day a success.

### Career Day Participants 2008

AeroTec	Alberta Geomatics Group
Alberta Land Surveyors' Association	AltaLIS
Altus Ltd.	Applanix Corporation
Association of BC Land Surveyors	Autodesk
Caltech Surveys Ltd.	Canadian Hydrographic Service
Canadian Institute of Geomatics	Can-Am Geomatics Corp.
CDL Systems Ltd.	Challenger Geomatics
Colt Engineering Corporation	Focus Corporation Ltd.
Fugro SESL Geomatics Ltd.	Global Surveys Group
Hemisphere GPS	IBI Group
Intermap Technologies	Jones Geomatics Ltd.
Marshall Macklin, Monaghan Ltd.	McElhanney Land Surveys Ltd.
Midwest Surveys Inc.	Natural Resources Canada (Alberta)
Natural Resources Canada (Ontario)	NavCom Technology, Inc.
NovAtel Inc.	Point Inc.
Saskatchewan Land Surveyors Association	SiRF Technology Inc.
Stantec Geomatics Ltd.	Stewart, Weir & Co. Ltd.
The Orthoshop	Trimble Navigation
Underhill Geomatics	

## GRADUATE STUDIES

### Enrollment

The number of graduate students remained fairly steady with a total of 115 students (96 full-time, 19 part-time). During the academic year 2007/2008, students were either enrolled in the graduate program or finishing their theses. Fifty-six were working towards their PhD degree, 49 towards their MSc degree and 10 towards their MEng degree. Students originated from 14 different countries. There were 20 students that graduated during the reporting period, 8 with a PhD degree, 9 with a MSc and three with a MEng. Details are given in the following tables.

**Full-time PhD Students 2007/2008**

Name	Supervisor	Name	Supervisor
Aggarwal, Priyanka	El-Sheimy	Megahed, Dina Reda	Lachapelle/O'Driscoll
Al-Fanek, Ossama	Skone	Mongredien, Cecile	Lachapelle/Cannon
Al-Rawas, Ghazi	Valeo	Moreno, Niandry	Marceau
Anwar, Morshed Sk.	Marceau	Morrisen, Aiden	Lachapelle/Cannon
Bang, Ki In	Habib	Muthuraman, Kannan	Lachapelle/Klukas
Bhuiyan, Mohammad	Lachapelle/Klukas	Orlob, Martin	Braun
Bian, Yong	Mercer	Raaflaub, Lynn	Valeo
Broumandan, Ali	Lachapelle/Nielsen	Rangelova, Elena	Sideris
Daboor, Mohammed	Braun	Renganathan, Vid-yavathy	Braun
Ebeling, Axel	Teskey	Sun, Debo	Cannon/Petovello
El-Ghazouly, Ahmed	El-Sheimy	Syed, Zainab	El-Sheimy
Ellum, Cameron	El-Sheimy	Tang, Feng	Sideris/Gao
Gao, Jianchen	Cannon	Teskey, Wesley	El-Sheimy
Gernot, Cyrille	Lachapelle/O'Keefe	Tiwari, Rajesh	Skone
Goodall, Christopher	El-Sheimy	van der Wal, Wouter	Sideris
Hassan, Taher	El-Sheimy	Wang, Fang	Marceau
He, Jianxun	Valeo	Wang, Min	Gao
Hunter, Andrew	El-Sheimy	Whittal, Jennifer	Barry
Kersting, Ana Paula	Habib	Wijesekara, Gayan	Marceau
Kim, Changjae	Habib	Xu, Chen	Sideris
Konavattam, Surendran	Lachapelle/Nielsen	Xu, Feng	Gao
Kwak, Eunju	Habib	Yang, Yong	El-Sheimy
Lotafali Kazemi, Pejman	Lachapelle/O'Driscoll	Youssef, Mohamed	El-Sheimy/Noureldin
Macchi, Florence	Lachapelle/Petovello	Yuksel, Yigiter	El-Sheimy
		Zhang, Chengqian	Collins

## Full-Time MSc and MEng Students 2007/2008

Name	Supervisor	Name	Supervisor
<b>MSc Students</b>			
Abbasiannik, Saloomeh	Lachapelle/Petovello	Kim, Kyoung-Min	Habib
Abdolhosseini Moghadam, Ahmed Reza	Lachapelle/Nielsen	Knezevic, Aleksander	Lachapelle
Al-Durgham, Mohannad	Habib	Kwakkel, Sidney P.	Lachapelle/Cannon
Bancroft, Jared Brian	Lachapelle/Cannon	Li, Tao	Lachapelle/Petovello
Butterworth, Carina M.	Tait	Liakopoulos, Alexandros	Sideris
Cai, Changsheng	Gao	Liu, Hang ( Terry)	El-Sheimy
Cao, Wei	Cannon/O'Keefe	Mahfuz, Mohammad Upal	Lachapelle/Nielsen
Chandramouli, Magesh	Huang/Gao	Marji Qais Kamal	Cannon
Chang, YuChuan	Habib	Muhsen, Abdel Rahman	Barry
Chiu, David Sung – Tat	O'Keefe	Ni, Jingwen	Couloigner
de Groot, Lance	Skone/O'Keefe	Omran, Nabila	El-Sheimy/Habib
Detchev, Ivan	Habib	Osman, Mostafa	El-Sheimy/Noureldin
Feng, Man	Skone	Robinson, Kerri L	Valeo
Fraser, Scott	Marceau	Sadeque, Mohammed	Skone
Ghafoori, Fatemeh	Skone	Salimi, Nazila	Lachapelle/Nielsen
Hasbani, Jean-Gabriel	Marceau	Taghvakish, Sina	Braun
Izadpanah, Ashkan	Lachapelle/O'Driscoll	Tao, Wenyong	Gao
Jarvis, Anna Marie	Habib	Timmins, Tracy L.	Hunter/Barry
Jha, Maya Nand	Gao	Yao, Donghua	Lachapelle/Skone
Kassab, Ala'a Shawqi	Gao/Liang	Zhang, Zhan	Blais
Kersting, Juliano	Habib	Zhao, Xing (Bob)	El-Sheimy
Kieser, Michael E. J.	Marceau	Zheng, Botao ( Shirley)	Marceau
<b>MEng Students</b>			
Alghamdi, Yousif	Habib	Khan, Muhammad A	El-Sheimy
Anderson, Teresa	El-Sheimy		

### Part-Time Graduate Students 2007/2008

Name	MEng	MSc	PhD	Supervisor
Ali, Ibraheem			1	Braun/Sideris
Bobey, Michael James		1		El-Sheimy
Charkhand, Betash	1			El-Sheimy
Ching, Kwan Kit ( Stephen)	1			Cannon
MacGougan, Glenn Donald			1	O'Keefe/Klukas
El-Gizawy, Mahmoud L			1	El-Sheimy
Garin, Lionel Jacques Joseph			1	Lachapelle
Guo, Libing		1		Huang/Blais
Joseph, Angelo			1	Lachapelle
Kent, Steve	1			Blais
Nicholson, Natalya			1	Skone/Cannon
Radons, Charlene Marcia	1			Skone/O'Keefe
Srajer, Peter	1			Lachapelle
Tsoi, Raymond		1		Cannon
Wu, Sally Xia	1			Habib
Zhang, Huasiu (Larry)		1		Blais/Collins
Zhang, Hongmin (Holly)	1			Collins
Zheng, Bo			1	Lachapelle
<b>Total</b>	<b>7</b>	<b>5</b>	<b>7</b>	

### External Convocants Supervised by ENGO Faculty

Name	Degree	Date	Graduate Thesis Title	Co-Supervisor	Dept/Institution
Alexander Ebner	MSc	Apr 08	On the attainable accuracy of multi-system GNSS positioning in high-multipath urban environments	Lachapelle	Technical University Graz.
Daniele Borio	PhD	Apr 08	A Statistical Theory for GNSS Signal Acquisition	Lachapelle	Dipartimento di Elettronica, Politecnico di Torino.
P. Gaggero	MSc	Feb 08	Effect of oscillator instability on GNSS signal integration time	Lachapelle	University of Neuchâtel
Dingchen Lu	PhD	Jul 07	Multipath Mitigation in TOA Estimation Based on AOA	Lachapelle	Dept of Electrical & Computer Engg, U of C
Erol Bihter	PhD	Jul 07	Investigations on local geoids for geodetic applications	Sideris	Istanbul Technical University



## Graduate Studies Convocants 2007/2008

Name	Degree	Date	Graduate Thesis Title	Supervisor
Carina Butterworth	MSc	Jun-08	Measuring Permafrost Deformation Caused by Climate Change Using Differential Interferometric Synthetic Aperture Radar	Tait
Cécile Mongrédien	PhD	Jun-08	GPS L5 Software Receiver Development for High-Accuracy Applications	Lachapelle/ Cannon
Niandry Moreno	PhD	Jun-08	A Vector-based Geographical Cellular Automata Model to Mitigate Scale Sensitivity and to Allow Objects' Geometric Transformations	Marceau
Yong Yang	PhD	Jun-08	Tightly Coupled MEMS INS/GPS Integration with INS Aided Receiver Tracking Loops	El-Sheimy
Jean Gabriel Hasbani	MSc	Jun-08	Semi-Automatic Calibration of a Cellular Automata Model to Simulate Land-use Changes in the Calgary Region	Marceau
Qais K. Marji	MSc	Jun-08	Precise Relative Navigation for Satellite Formation Flying Using GPS	Cannon
Peter Srajer	MEng	Jun-08	n/a	Lachapelle
Ahmad Reza Abdolhosseini Moghaddam	MSc	Jun-08	Enhanced Cellular Network Positioning Using Space-Time Diversity	Lachapelle/ Nielsen
Xia ( Sally) Wu	MEng	Jun-08	n/a	Habib
Magesh Chandramouli	MSc	Nov-07	Integration of GA-Based Multiobjective Optimization with VR-Based Visualization to Solve Landuse Problems	Huang/Gao
Mohannad Al-Durgham	MSc	Nov-07	Alternative Methodologies for the Quality Control of LiDAR Systems	Habib
Andrew Hunter	PhD	Nov-07	Sensor Based Animal Tracking	El-Sheimy
Kerri L. Robinson	MSc	Nov-07	Modeling Aquatic Vegetation and Dissolved Oxygen in the Bow River, Alberta	Valeo
Surendran Konavattam Shanmugam	PhD	Nov-07	New High Sensitivity Detection Techniques for GPS L1 C/A and Modernized Signal Acquisition	Lachapelle/ Nielsen
Chen Xu	PhD	Nov-07	The Torus-Based Semi-Analytical Approach in Spaceborne Gravimetry	Sideris
Elena Rangelova	PhD	Nov-07	A Dynamic Geoid Model for Canada	Sideris
Donghua Yao	MSc	Nov-07	Interference Effects on GPS L2C Signal Acquisition and Tracking	Lachapelle/ Skone
Raymond Tsoi	MSc	Nov-07	Precise GPS Relative Navigation for Future Geodetic Satellite Formation Flying Missions	Cannon
Teresa Anderson	MEng	Nov-07	n/a	El-Sheimy
Jianchen Gao	PhD	Nov-07	Development of a Precise GPS/INS/On-board Vehicle Sensors Integrated Vehicular Positioning System	Cannon

## Graduate Seminars 2007/2008

SPEAKER	TOPIC
Michael Kieser	Multi-agent modeling to understand stakeholders' land-use decisions in a residential land development project in Southern Alberta
David Chiu	UWB Assisted GPS RTK in Hostile Environments
Cyrille Gernot	Comparison Of L1 C/A L2c Combined Acquisition Techniques
Aiden Morrison	Embedded GNSS Receiver-Acquisition Failure Due to Thermal Variation
Florence Macchi	Development New Algorithms Of Acquisition For Galileo L1, Testing Using Real Data And Statistical Analysis
Changjae Kim	Integration of photogrammetric and LiDAR data for more complete surface description
Ki In Bang	Lidar System Calibration Using Planar Patches
Taher Hassan	Common Adjustment of Land-based and Airborne Mobile Mapping System Data
Cecile Mongredien	GPS L5 Software Development for High-Accuracy Applications
Debo Sun	GPS/Reduced IMU with a Local Terrain Predictor in Land Vehicle Navigation
Carina Butterworth	Measuring Permafrost Deformation caused by Climate Change using DInSAR
Ali Broumandan	Angle of Arrival Estimation and Beamforming in Wireless Geolocation Systems
Chris Goodall	Intelligent Integration of a MEMS IMU with GPS using a Reliable Weighting Scheme
Vidya Renganathan	Arctic Sea Ice Freeboard Heights from Satellite Altimetry
Cheng Zhang	Integrating Image Texture Into Individual Tree Crown Classification On Airborne MEIS Imagery
Cecile Mongredien	Real-Time Attitude Determinations Using Dual-Frequency Receivers
Jingwen Ni	Assessing SO <sub>2</sub> -Stressed Lodgepole Pine Needles Using Hyperspectral Reflectance near gas plants in Elbow Valley, Calgary
Sk. Morshed Anwar	Multi-agent model to simulate the impact of human activities on wolf behavior in the Banff National Park (BNP) in Alberta, Canada
Wenyao Tao	Real-time Water Vapor Sensing/Measurements with Precise Point Position Algorithm And Canadian Geodetic (GPS) Network
Yong Yang	Tight MEMS IMU/GPS Integration With IMU Aided Receiver Tracking Loop
Niandry Moreno	Implementation Of A Dynamic Neighborhood In A Land-Use Vector-Based Geographic Cellular Automata Model
Magesh Chandramouli	IntegralIntegration of GA-based multiobjective optimization with VR-based visualization to solve landuse problems
Mohannad Al-Durgham	Error Analysis and Alternative Methodologies for the Quality Control of LiDAR Systems
Lance de Groot	Investigation of radio occultation techniques for Canadian applications
Jennifer He	Stormwater reuse for irrigation
Nazila Salimi	
Ahmad Abdolhosseini Moghaddam	Enhanced Cellular Network Positioning using Space-Time Diversity
Andrew Hunter	A New Technology Solution for the Study of Bear Movement and Habitat Use
Elena Rangelova	Models of Time-Variable Geoid and Orthometric Heights for a Dynamic Vertical Datum in Canada
Qais Marji	Satellite Formation Flying
Zainab Syed	Economical and Robust Inertial Sensor Configuration for a Portable Navigation System

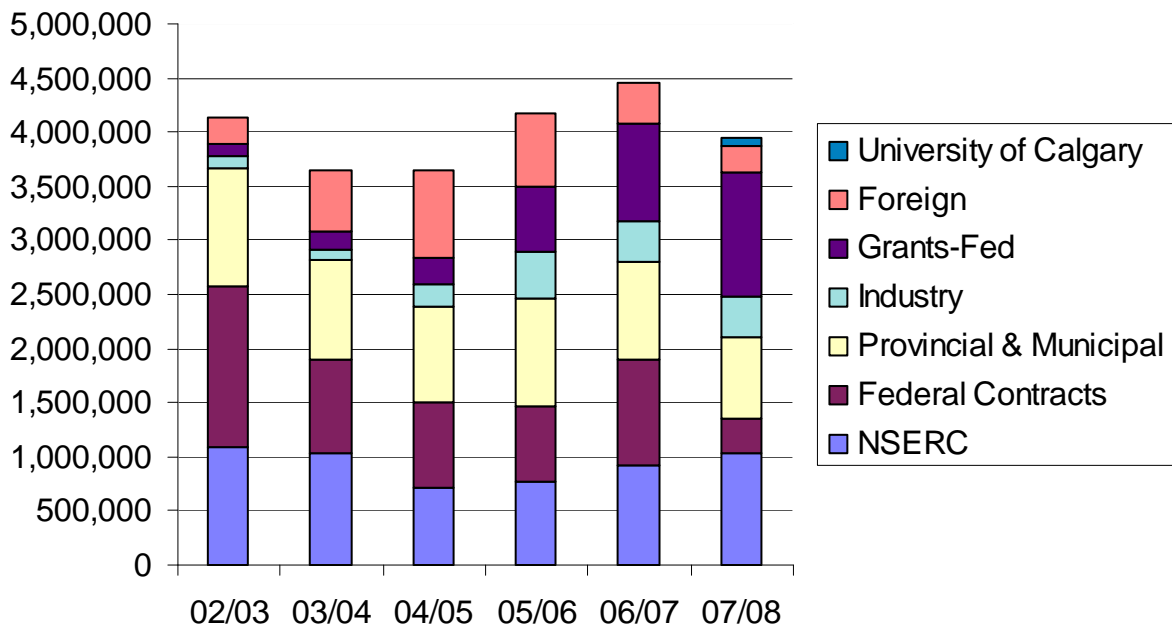
# RESEARCH

## Research Statistics

Research is an integral part of Department activities. It allows individual faculty members to stay at the leading edge of their area of specialization and to apply their knowledge to current problems in industry and government. It also provides funding for research associates and graduate students. It thus supports the education of highly trained future engineers and the teaching activities of the Department.

Direct research funding for this report year was at \$3,945,137.

**Direct Research Funding by Source  
2002/03—2007/08**

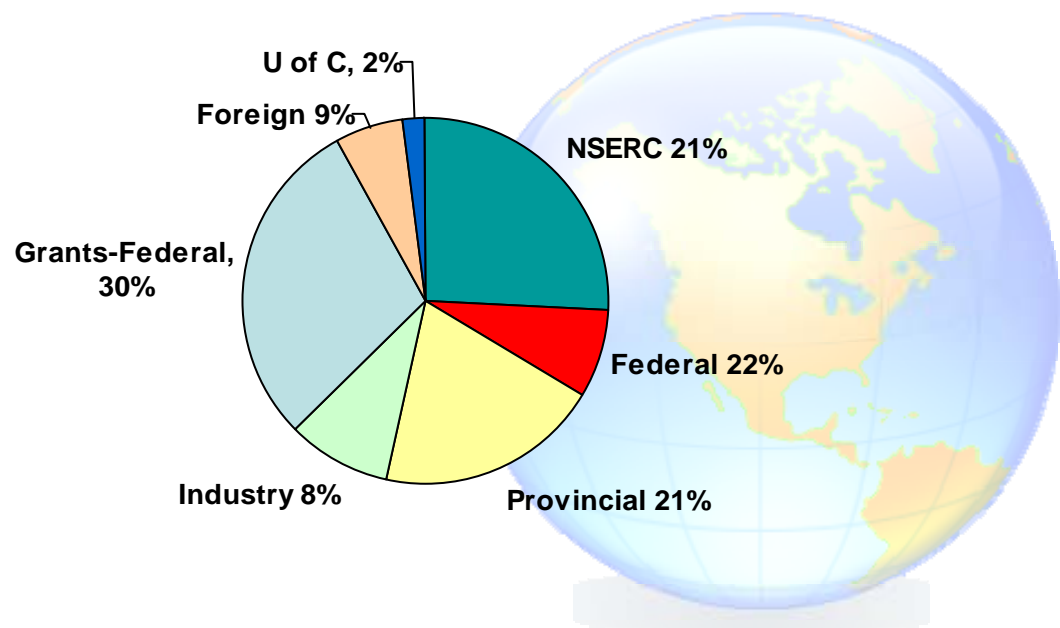


**Research Grants and Contracts for the Period  
April 1, 2007 – March 31, 2008**

Source	Amount
NSERC	\$1,034,640
Federal Government Contracts	324,004
Federal – Grants	1,159,650
Provincial and Municipal Government	747,929
Industry	369,106
Foreign Agencies	243,612
University of Calgary	66,197
<b>Direct Research Support</b>	<b>\$3,945,137</b>
Research Scholarships	\$363,317
<b>Total Research Support</b>	<b>\$4,308,454</b>

The figure on the previous page shows direct research funding for the last six years and the one below shows the research funding by source for 2007/2008

**Direct Research Funding by Source 2007/08**





## MAJOR RESEARCH AREAS

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### Positioning, Navigation and Wireless Location

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M.E. Cannon, N. El-Sheimy, Y. Gao, G. Lachapelle,  
K. O'Keefe, M. Petovello, S. Skone, W. Teskey

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### Earth Observation

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A. Braun, M. Collins, I. Couloigner,  
J.W. Kim, M. Sideris, S. Skone

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### GIS and Land Tenure

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M. Barry, A. Hunter, S. Liang,  
D. Marceau, X. Wang

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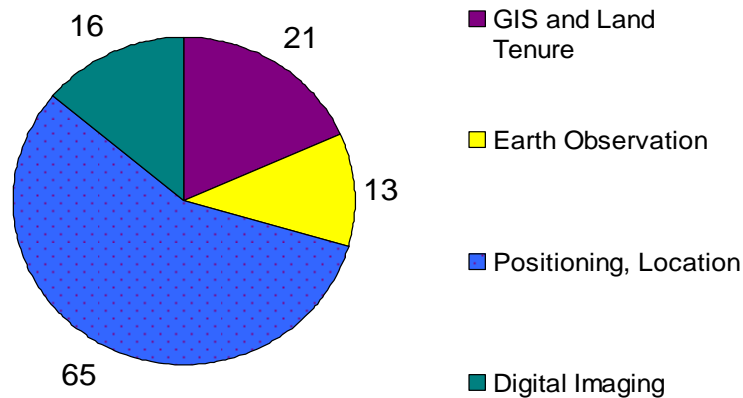
### Digital Imaging Systems

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M. Collins, I. Couloigner, N. El-Sheimy,  
A. Habib, D. Lichti, M. Tait

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## Graduate Student Distribution by Area May 2007 – April 2008



Research projects being conducted in the above major research areas are listed in tables on pages 41 to 45.

The number of graduate students working in each area is indicated in the above figure. Some factors in the distribution of students are: the number of faculty members per research area, and the number of new faculty members in the department that are currently in the early stages of recruiting students and building their research groups.

## Projects in Positioning, Navigation and Wireless Location

Project Name	Contract Type	Faculty Investigators
A National System for Water Vapour Estimation Using GPS and its Applications	Federal	Y. Gao S. Skone
Adaptive and Flexible GNSS Technology Development for Automotive Systems	NSERC Provincial Industry	G. Lachapelle K. O'Keefe M. Petovello
Alberta Ingenuity Fund - Research Allowance-Studentship	Provincial	K. O'Keefe
Alpine Canada Alpine Sponsorship Agreement	Industry	G. Lachapelle S. Skone
ASW-GPS and Ionospheric R&D Support	Foreign	G. Lachapelle M.E. Cannon
COC Project	Industry	G. Lachapelle
CRC—Faculty Support	U of C	N. El-Sheimy
CRC	Federal	N. El-Sheimy
Dept./Schulich School of Engineering Starter Grant	U of C	M. Petovello
Development of a Meteorological Probe for Aircraft	Federal	N. El-Sheimy S. Skone
Development of a Two Component Personal Navigation System	Federal	N. El-Sheimy A. Hunter
Development of a Humidity and Temperature Probe with MEMS-based Inertial Ref. for Aircraft Use	Industry	N. El-Sheimy
Development of Reconfigurable GNSS Software Receivers	Federal	M.E. Cannon G. Lachapelle M. Petovello
Fast Convergence of Precise Point Positioning	Federal Industry	Y. Gao
General Research Area of Wireless Location	Foreign	G. Lachapelle
Geo-Intelligent Collaborative Decision Support System for Real-Time Disaster & Emergency Management	Industry	Y. Gao
Geomatics Enhancements with Dual Use of GPS II/III and Galileo: High Accuracy Position with GPS & Galileo	Federal	G. Lachapelle M.E. Cannon Y. Gao N. El-Sheimy R. Klukas
iCORE Chair in Wireless Location	Provincial	G. Lachapelle
Integrated Vehicle Navigation of Communication Systems Development	Federal	M.E. Cannon G. Lachapelle
Integration of Kinematic GPS with Emerging Inertial Measurement	NSERC	M.E. Cannon
Intelligent Information Infrastructure for Wireless Multi-Sensor Motes Applications	NSERC Industry	N. El-Sheimy

## Projects in Positioning, Navigation and Wireless Location, continued

Project Name	Contract Type	Faculty Investigators
Intelligent Structural Monitoring Project	NSERC	W. Teskey N. El-Sheimy
Intelligent Structural Monitoring	Industry	W. Teskey
Market Study and Business Model Project for M2G Mobile Mapping	Federal	N. El-Sheimy
Mitigation of Atmospheric Effects on GNSS	NSERC	S. Skone
Multi-Sensor Motes Amplification	Industry	N. El-Sheimy
Multi-Sensor Navigation Systems	Federal	N. El-Sheimy
Multi-Sensor System for Improved Quality of Life	Federal	N. El-Sheimy
Next Generation Direct Geo-Referencing Technology for Airborne Mapping	NSERC	N. El-Sheimy Y. Gao
Observation and Modelling of Radio Frequency Propagation for Improved Wireless Location in Urban and Indoor Environments	NSERC	K. O'Keefe
Performance Analysis of Multiple Global Navigation Satellite Systems	NSERC	G. Lachapelle
Proposal for Galileo Ground Station in Calgary	Industry	G. Lachapelle
Receiver Testing	Industry	Y. Gao
Signal Tracking and Measurement Infrastructure to Support Wireless Location and Communications Research	Federal	G. Lachapelle M. E. Cannon
Space Weather Hazards: Monitoring & Mitigation	NSERC	S. Skone G. Lachapelle
Triple Carrier Attitude Determination with GPS and Galileo	Foreign	G. Lachapelle K. O'Keefe M. Petovello
Turtle Mountain Deformation Monitoring	Provincial	W. Teskey
Ultra-Tight Software HSGPS/INS Receiver Phase II	Federal	G. Lachapelle M. Petovello
Wireless Location in Geomatics with the Emerging GPS II/III and Galileo Systems	Federal	G. Lachapelle M.E. Cannon
Wireless Location with GPS II/III and Galileo	Federal	G. Lachapelle M.E. Cannon

## Projects in Earth Observation

Project Name	Contract Type	Faculty Investigators
Analysis of Forest Stand Structure Using Spatial Characteristics of High-resolution Image Data	Provincial	M. Collins
Canadian Altimetry Database and Processing System (CADS)	Federal	A. Braun
Climate Variability and its Impact on Hydrology of small Mid-Continent Lakes and Wetlands	Foreign	A. Braun
Electromagnetic Land Surface Classification for Optimal Mobile Communication Modeling	Provincial	J.W. Kim
Mapping the Ocean Surface with Geodetic and Oceanographic Tools	Federal	J.A.R. Blais A. Braun M. Sideris
Monitoring Air Pollutants Using Thermal IR Camera	NSERC	I. Couloigner
Multi-Satellite Determination of Global and Regional GEOIDE and Sea Level Changes	NSERC	M. Sideris
Quantification of Sea Ice Thickness and Surface Water Levels in the Arctic Ocean and Canada Using Satellite Altimetry	NSERC	A. Braun
Risk Reduction Through Continuous Geodetic Monitoring	NSERC	M. Sideris
Space Gravimetry Contributions to Earth Monitoring	Federal	M. Sideris A. Braun
Uncertainty Management in Environmental Modelling	NSERC	M. Collins



*Elena Rangelova  
successfully defended her PhD thesis*



*Mohannad Al-Durgham  
successfully defended his MSc thesis*





## Projects in Digital Imaging Systems

Project Name	Contract Type	Faculty Investigators
Calibration & Stability Analysis of Medium-Format Digital Cameras	Foreign	A. Habib
Development of LiDAR Aided Mono-Plotting and True Ortho-photo Generation	Industry	A. Habib
Development of LiDAR-Aided Mono-Plotting and True Ortho-Photo Generation	Federal	A. Habib
Development of M2G Multi-Sensor Geomatics System	Federal	A. Habib
GIS Campus Project	U of C	A. Habib
Next Generation Direct Geo-referencing Technology for Airborne Mapping	NSERC	A. Habib
Object-Oriented Classification for Urban Mapping	NSERC	I. Couloigner
Radar Remote Sensing - Aspects of Radar Interferometry & Polarimetry	Industry	B. Mercer
Semi-Automated 3D Complex Building Extraction from Multiple Aerial Images	Foreign	A. Habib



*Dr. Michael Barry, Dr. Isabelle Couloigner,  
Dr. Caterina Valeo and Dr. Naser-El-Sheimy*



*Dr. Rod Blais and Dr. Yang Gao*



*Dr. Elizabeth Cannon, Dr. Gerard  
Lachapelle and Dr. Naser El-Sheimy*

### Christmas 2007

## Projects in GIS and Land Tenure

Project Name	Contract Type	Faculty Investigators
Calibration of a Cellular Automata Model for the Elbow River Watershed	Municipal	D. Marceau
CRC In Mobile Multi-sensor Geomatics (M2G) Systems	Federal	N. El-Sheimy
Development of M2G - A Mobile Multi-Sensor Geomatics System	Federal	N. El-Sheimy
Development of a Multi-Agent Model for the Saguenay - St. Lawrence Marine Park in Quebec	Unclassified	D. Marceau
Development of a Multi-Agent Model to Facilitate the Sustainable Management of Boat Traffic in the Saguenay-St. Lawrence Marine Park and Marine Protected Area in Quebec	NSERC	D. Marceau
Development of a Multi-Agent System to Simulate the Behaviour of Wildlife Species in Relation to Recreational Activities in Banff National Park	Federal	D. Marceau
Development of a Two Component Personal Navigation System	Federal	N. El-Sheimy
Integration of Student Developed Model into Elbow River Watershed	Provincial	D. Marceau
Intelligent Information Infrastructure for Wireless Multi-Sensor Motes Applications	NSERC	A. Hunter
Optimizing Air Quality in the Context of Expanding Petroleum Operations: A Receptor Approach	Industry	D. Marceau
Real-time Airborne Mapping System	NSERC	N. El-Sheimy
Real Time Detection of Oil Spills Using Laser Induced Fluorescence LiDAR Internet Based Temporal GIS and Mobile Emergency Asset Management	NSERC	Y. Gao
Real Time MCSDSS to Improve Fire Response	Federal	Y. Gao
Spatial Dynamic Modeling for Environmental Recourse Management	NSERC	D. Marceau
Talking Titrer	NSERC	M. Barry
Using Multi-media Data to Support Land Tenure Security, Part of the Talking Titrer System	Industry	M. Barry

## LICENSES AND PATENTS

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- Petovello, M., M.E. Cannon and G. Lachapelle, C<sup>3</sup>NAVIG<sup>2</sup>™- Combination of Code and Carrier Phase for Navigation using GPS and GLONASS. Licensed by University Technologies International.
- Petovello, M., M.E. Cannon and G. Lachapelle, SAINT™- software for the integration of GPS and low cost inertial navigation systems. Licensed by University Technologies International, a wholly-owned subsidiary of the University of Calgary.
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- Skone, S., TECMODEL Software, Licensed by University Technologies International.
- Yang, Yong and N. El-Sheimy, Inertial Simulator—An Inertial Navigation Simulation Tool, 2007. Licensed by University Technologies International.

## PUBLICATIONS

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- Kim, J.W., C.K. Shum, B. Chao (Guest Edited) (2008) Earth, Planets and Space - Special Issue '**Geohazards and the Role of Space-Born Observations**', 60 (5): 447-528, ISSN 1343-8832.
- Marceau, D.J., A. Ménard et N. Moreno, (2008) Les automates cellulaires appliqués à la simulation des changements d'utilisation du sol: Sensibilité à l'échelle spatiale et temporelle. Dans: **Information géographique et dynamiques urbaines**, vol 1 Thériault, M. et F. Desrosiers, eds, Lavoisier-Hermes Science Publication, pp 227-251.

### Refereed Journals

- Anwar, M., C. Jeanneret, L. Parrott, D.J. Marceau (2007) Conceptualization and implementation of a multi-agent model to simulate whale-watching activities in the St. Lawrence estuary in Quebec, Canada. **Environmental Modeling and Software**, 22: 1775-1787 Article ID 246703, 14 pages (doi:10.1155/2008/246703).
- Asgharzadeh, M.F., R.R.B. von Frese, H.R. Kim, T.E. Leftwich, J.W. Kim, (2007) Spherical prism gravity effects by Gauss-Legendre quadrature integration, **Geophysical Journal International**, 169(1): 1–11.
- Bae, K.-H., D. Belton, D.D. Lichti (2007) Pre-processing procedures for raw point clouds from terrestrial laser scanners. **Journal of Spatial Science**, 52(2): 41-50.
- Bae, K.-H., D.D. Lichti (2008) A method for automated registration of unorganized point clouds. **ISPRS Journal of Photogrammetry and Remote Sensing**, 63 (1): 36-54.
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- Teskey, W., N. El-Sheimy, Y. Yang (2007) Alignment Monitoring Using MEMS-Based Sensors. **Proceedings of the 8th Conference on Optical 3D Measurement Techniques**, Zurich, Switzerland, June 9-12
- Wang, M., Y. Gao (2008) A Controlled Experiment of Real-Time Precise Point Positioning for Deformation Monitoring. **Proceedings of ION NTM 2008**, San Diego, California, January 28-30.
- Wang, X., H.J. Hamilton (2008) Using Clustering Methods in Geospatial Information Systems, **Proceedings of the Sixteenth International Conference on Geoinformatics**, Guangzhou, China, June.
- Watson, R.W., M.G. Petovello, G. Lachapelle, R. Klukas (2007) Impact of Oscillator Errors on IMU-Aided GPS Tracking Loop Performance, **Proceedings of European Navigation Conference GNSS 2007**, Geneva, May 29-31, 15 pages.
- Yang, Y., N. El-Sheimy, (2007) Tracking Loop Level Integration for GPS/MEMS IMU. **Proceedings of ION GNSS 2007**, Fort Worth, Texas, September 25-28.
- Zhai, R. A. Habib (2008) Use of LiDAR Data to Constrain the Matching of Conjugate Features in Large-Scale Imagery over Urban Areas. **ASPRS Annual Conference Bridging the Horizons: New Frontiers in Geo-Spatial Collaboration**, Portland, Oregon, April 28– May 2.

### Scholarly Presentations and Seminars

- Ali, I., A. Braun, M.G. Sideris (2007) Combining TOPEX and ICESat altimetry for the determination of the Great Lakes surface. 2007 Joint CMOS, CGU and AMS Congress, St. John's, Newfoundland and Labrador, May 28 – June 1.
- Cannon, M.E., (2007) Keynote Address to Calgary Area Girl Guides Youth Awards, Calgary, October 28.
- Cannon, M.E., (2007) Mentoring Panel Discussion, Nexen, Calgary, December 5.
- Cannon, M.E., (2008) Women's Leadership Panel Discussion on Mentoring, Women's Executive Network Top 100, Calgary, February 7.
- El-Habiby, M., M.G. Sideris (2007) The use of Wavelet Transform in Gravity Field Applications. 9th GEOIDE Annual Scientific Conference, Halifax, Nova Scotia, June 6-8.
- El-Habiby, M., M.G. Sideris (2007) Wavelet Representation of the Deflection-Geoid and Inverse Vening Meinesz Integrals, 2007 Joint CMOS, CGU and AMS Congress, St. John's, Newfoundland and Labrador, May 28-June 1.
- El-Habiby, M., M.G. Sideris (2007) Wavelets as a regularization tool-A combined wavelet and conjugate gradient method for the inversion of geodetic integrals, 2007 Joint CMOS, CGU and AMS Congress, St. John's, Newfoundland and Labrador, May 28-June 1.
- El-Sheimy, N., (2007) GPS/INS Integration, Germany, July.
- El-Sheimy, N., (2007) Inertial Navigation Systems and their Applications in Positioning and Mapping, NovAtel Inc, Calgary, May.



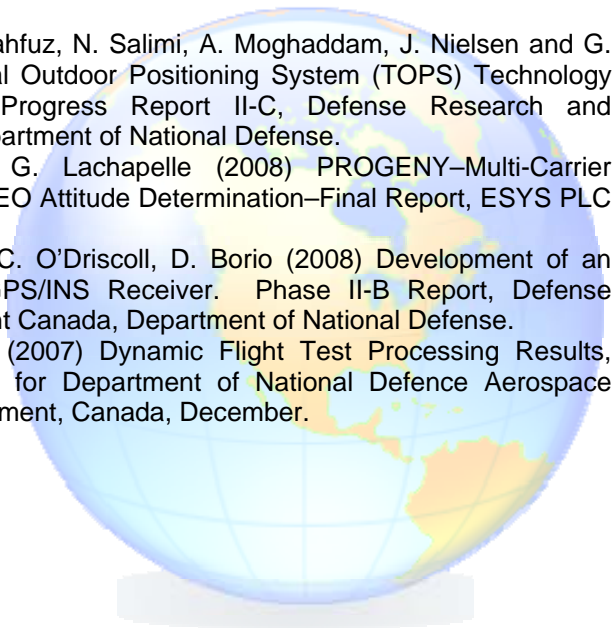
- El-Sheimy, N., (2007) Mobile Mapping Systems, Padova University during the 5th International Symposium on Mobile Mapping Technologies, May.
- Erol, B., R. Klees, M.G. Sideris, R.N. Celik (2007) Combining GPS, Levelling and Geoid Data using Estimated Stochastic Parameters for Vertical Control in North-West of Turkey. 2007 IAG General Assembly, Perugia, Italy, July 2-13.
- Gao, Y., (2007) A Station-based Deformation Monitoring Approach and Integer Ambiguity Resolution, Wuhan University, May
- Gao, Y., (2007) Advances in Precise Point Positioning and Applications, Xian Institute of Surveying and Mapping, China, May
- Gao, Y., (2007) MEMS IMU/GPS Integrated Vehicular Navigation System, Wuhan University, May
- Gao, Y., (2007) Precise Point Positioning and Mobile Asset Management, Geoid Breakfast Research Talk, Montreal, May
- Gao, Y., (2007) Precise Positioning of LEO Satellite Sensors, State Key Laboratory of Information Engineering in Surveying, Mapping and Remote Sensing, Wuhan, June
- Gernot, C. (2007) GPS tracking performance under water, ice and snow. GEOIDE NCE Inter-Group Workshop, Halifax, June 6.
- Habib, A., (2007) New Approach for Building-Roof Segmentation using Airborne Laser data, GeoTec, Twenty-first conference for geo-spatial technology professionals, AB, Canada, May.
- Habib, A., (2007) Trends in Digital Imaging Systems: Canadian Perspective, American Society of Photogrammetry and Remote Sensing (ASPRS) Annual Conference: Identifying Geo-Spatial Solution, USA, May.
- Hasbani J-G., D.J. Marceau (2007) Calibration of a cellular automata model to simulate land-use changes in the Calgary region, Geo-Tech Event, May.
- Hunter, A. J. S., G. Stenhouse, N. El-Sheimy (2007) A new technology solution for the study of bear movement and habitat use: The Animal Pathfinder™, 18th International Conference on Bear Research and Management, Monterrey, Mexico, November
- Hunter, A. J. S., G. Stenhouse, N. El-Sheimy (2007) Paths and images: A new technology solution for animal tracking, The Wildlife Society 14th Annual Conference, Tucson, Arizona, USA, September
- Hunter, A.J.S., N. El-Sheimy, B. Wright, G. Stenhouse (2007) A-tracker: An animal tracking solution, The Fifth International Symposium on Mobile Mapping Technology (MMT'07), ISPRS, Padua, Italy, May 28-31.
- Kim, J.W., (2007) Monitoring and Predicting Natural Hazard from Satellite Observations. Organized by Korea Ministry of Science & Technology, broadcasted on TV. Nov. 23.
- Kim, J.W., (2008) Analysis of Korean Superconducting Gravimeter Measurement Geological Survey of Canada, Sidney, BC Mar. 27.
- Kim, J.W., (2008) Geomatics Engineering - Position Yourself Ahead of the Crowd 2008 Seminar for High School Students Regarding Post Secondary Education organized by The Korean Student Association and The University of Calgary. Mar. 15.
- Kim, J.W., (2008) Geomatics Engineering: Position Yourself Ahead of the Crowd and Geohazard Analysis from Integrated Geodetic and Geophysical Measurements Department of Earth & Environmental Sciences, Korea University, May 8
- Lachapelle, G. (2007) (PLAN) Research, Development and Testing Capabilities. Invited Presentation, Politecnico di Torino, May 25.
- Lachapelle, G. (2007) Adaptive and Flexible GNSS Technology Development for Automotive Systems. General Motors R&D Lab, Warren, MI, October 15.
- Lachapelle, G. (2007) GPS/INS Pedestrian Navigation. Invited Seminar, Stanford University, USA, May 9.
- Lachapelle, G. (2007) Wireless Location. iCORE Summit, Banff, August 23-25.

- Lachapelle, G. (2007) Wireless Location: Evolution or Revolution? Wireless Connection, Banff, November 15-16.
- Lachapelle, G., M. Petovello (2007) GNSS Kinematics Methods. Navtech Seminars One-Day Course, Fort Worth, Texas, September 25.
- Lachapelle, G., M. Petovello (2008) GPS Theory and Applications. Three-Day Course to NovAtel Inc, January.
- Liu, Z. S. Skone, H. Sun Y. Gao (2007) Seasonal Variations of the Accuracies of GPS-Derived Water Vapor. CMOS-CGU-AMS Congress 2007, St. John's, NL, May.
- Marceau D.J., J-G. Hasbani (2007) Simulating land-use changes and management scenarios in the Elbow river watershed using a cellular automata model, Bow River Watershed Science Forum, University of Calgary, May
- Marceau, D.J., (2007) Dynamic modeling of natural and human systems, Complexity Science Group, University of Calgary, May.
- Moreno N., D.J. Marceau (2007) Modeling land-use changes using a novel vector-based geographic cellular automaton, The 18th IASTED International Conference on Modelling and Simulation, Montreal, June.
- Morrison, A. (2007) Phase Lock Loop Tracking Performance Under Ionospheric Scintillation. GEOIDE NCE Inter-Group Workshop, Halifax, June 6.
- Petovello, M., G. Lachapelle (2007) GNSS Receiver Signal Processing. Electronics and Telecommunications Research Institute, Korea, November 6.
- Rangelova E., M.G. Sideris (2007) Combined vertical motion model-A case study for the Great Lakes. 2007 IAG General Assembly, Perugia, Italy, July 2-13.
- Rangelova, E., M.G. Sideris (2007) Analysis of GRACE time-variable mass redistribution signals over North America. Jubilee Scientific Conference for the 65 Years of the University of Architecture, Civil Engineering and Geodesy. Sofia, Bulgaria, May 17-18.
- Rangelova, E., G. Fotopoulos, M.G. Sideris (2007) On the combined use of GRACE and geodetic observations for vertical motion in the Great Lakes region. 2007 Meeting of the AGU, San Francisco, CA, Dec. 10-14.
- Skone, S. (2007) Detection of Geomagnetic Pc 3 Pulsations using GPS, Proceedings of the URSI 2007 North American Radio Science Meeting, July 22-26, Ottawa.
- Skone, S. (2007) Mitigation of ionospheric effects on DGPS and WADGPS operations. Invited presentation at the AGU Fall Meeting, Session G51D, December 10-14, San Francisco, CA.
- Skone, S. (2007) Opportunities in Atmosphere Monitoring Offered by Modernized/ New Global Navigation Satellite Systems. Invited presentation at the AGU Fall Meeting, Session G51D, December 10-14, San Francisco, CA.
- Stenhouse, G., A.J.S Hunter, N. El-Sheimy (2007) Animal pathfinder: Tracing the life of a grizzly bear with images and sensors, Animal-bourne Imaging Symposium, Washington, DC, USA, October
- Tait M., (2007) Quality Assurance with Laser Scanning in Construction Management and Revamp Projects, Zeus Development Corporation, Houston, TX. June.
- Tocho, C. M.G. Sideris (2007) Estimation of a new high-accuracy marine geoid model offshore Argentina using CHAMP and GRACE-derived geopotential models. 2007 IAG General Assembly, Perugia, Italy, July 2-13.
- van der Wal, W., M.G. Sideris, P. Wu (2007) Detecting Large Scale Mass Changes in North-America from Space. 9th GEOIDE Annual Scientific Conference, Halifax, Nova Scotia, June 6-8.
- van der Wal, W., P. Wu, H. Wang, M.G. Sideris, H.H.A. Schotman (2007) Using GRACE derived gravity rates to constrain postglacial rebound in North America, 2007 IAG General Assembly, Perugia, Italy, July 2-13.
- Xu, C., M.G. Sideris (2007) Evaluation of the Regularization Methods Used in the Torus-Based Semi-Analytical Approach for Gravity Field Recovery, 2007 IAG General Assembly, Perugia, Italy, July 2-13.

- Xu, C., M.G. Sideris, N. Sneeuw (2007) Feasibility of gravity field recovery from GRACE line-of-sight (LOS) gradiometry observations using the torus approach. 2007 Meeting of the AGU, San Francisco, CA, Dec. 10-14.
- Xu, C., M.G. Sideris, N. Sneeuw (2007) Spherical Harmonic Analysis and Synthesis in Satellite Gravity Gradiometry Using the Torus Approach. 2007 Joint CMOS, CGU and AMS Congress, St. John's, Newfoundland and Labrador, May 28 – June 1.

### Technical Reports, Technical Notes, Research Reports

- Cannon, M.E., M.G. Petovello, J. Gao and S. Sun (2007) Design and Development of a Precise GPS/INS/On-Board Sensor Positioning System - Phase III, Contract Report prepared for Human-Machine Interface Group, Production Engineering Development Division, Toyota Motor Corporation, Japan, November.
- Forsberg, R., H. Skourup, O. Andersen, P. Knudsen, S. Laxon, A. Ridout, J. Johannesen, F. Siegesmund, H. Drange, C. Tscherning, D. Arabelos, A. Braun, V. Renganathan (2007) Combination of Spaceborne, Airborne, and In-situ Gravity Measurements in Support of Arctic Sea Ice Thickness Mapping, Technical Rep. 7, European Space Agency, Danish National Space Center, 136, May
- Habib, A., K. Bang, M. Aldelgawy, D. Chang, C. Kim, A. Kresting, J. Lay (2007) Algorithmic Development for Rapid Updating of GIS Database Using Multi-Source Geo-Spatial Data. Technical Report Submitted to Sejong University for the Seoul City Project.
- Habib, A., C. Kim, K. Bang, A. Kersting, J. Kersting, A. Jarvis, R. Zhai, I. Detchev (2008) Semi-Automated 3D Complex Building Extraction from Multiple Aerial Images and LiDAR Data. Submitted to the Korean Electronics and Telecommunications Research Institute (ETRI), April.
- Lachapelle, G., M.G. Petovello (2007) Dynamic Flight Test Processing Results, Contract Report prepared for Department of National Defence Aerospace Engineering Test Establishment, Canada, December.
- Lachapelle, G., M.G. Petovello, R. Ong (2007) Development and Evaluation of a Receiver Communication Manager, Contract Report prepared for General Motors of Canada, June.
- Lin, T., A. Broumandan, U. Mahfuz, N. Salimi, A. Moghaddam, J. Nielsen and G. Lachapelle (2008), Tactical Outdoor Positioning System (TOPS) Technology Demonstration-Stage 3. Progress Report II-C, Defense Research and Development Canada, Department of National Defense.
- O'Keefe, K., M. Petovello, G. Lachapelle (2008) PROGENY–Multi-Carrier Ambiguity Resolution for LEO Attitude Determination–Final Report, ESYS PLC and Telespazio, April.
- Petovello, M., G. Lachapelle, C. O'Driscoll, D. Borio (2008) Development of an Ultra-Tight Software HSGPS/INS Receiver. Phase II-B Report, Defense Research and Development Canada, Department of National Defense.
- Petovello, M., G. Lachapelle (2007) Dynamic Flight Test Processing Results, Contract Report prepared for Department of National Defence Aerospace Engineering Test Establishment, Canada, December.





### Licenses and Patents

- Barry, M., 2008 April Talking Titler Object Manager; Surveyor General of Canada.
- Barry, M., 2008 Feb Talking Titler Object Manager; Director of Land Regularisation, Lagos State, Nigeria.
- Barry, M., 2008 June Talking Titler Object Manager, Diane Dumashie.
- Hunter, AJS., N. El-Sheimy, G. Stenhouse, B. Wright (2007) Multi-sensor Systems for Animal Tracking Applications.
- Hunter, AJS., N. El-Sheimy, Z. Syed, B. Wright (2007) Portable Navigation Systems.
- Lachapelle, G, M. Petovello and C. O'Driscoll (2007) GSNRx™ - GNSS Software Receiver. Developed by the PLAN Group

### Articles in Magazines

- El-Sheimy N., (2006) The Potential of Partial IMUs for Land Vehicle Navigation, Inside GNSS, Spring 2008, pp. 16-24.
- El-Sheimy N., T. Hassan, M. Lavigne, (2007) VISAT: Mapping what you see, Coordinates, 3(V), May07, pp: 6-11.
- Liang, S.H.L., (2007) Introduction to the World-Wide Sensor Web, Ontario Professional Surveyor, 50(4): 6-11
- O'Driscoll, C., and G. Lachapelle (2007) Can multiple antennas provide improvement in indoor positioning? GPS World Discussion Forums, <http://forums.gpsworld.com/>
- Schleppe, J. (2007) How well can GPS signals penetrate avalanche snow? Inside GNSS, September-October Issue, pp. 24-26.

### Interviews/Broadcasts

- Barry, M., (2007) CBC Radio, Land Administration Strategy in Somaliland and applying Talking Titler System in Nigeria. January.
- Marceau, D.J., (2008) Interview for Radio-Canada French TV Channel in Alberta, May 1.
- Marceau, D.J., (2008) Interview for the Calgary Journal, March 20.
- Marceau, D.J., (2008) Interview for the student radio, campus University of Calgary, January 23.
- Marceau, D.J., (2008) Interview for the Gauntlet, University of Calgary, January 17.
- Marceau, D.J., (2008) Interview for Golden West Radio, January 9.
- Marceau, D.J., (2007) Interview for the Supplement of the Calgary Sun, December 12.
- Marceau, D.J., (2007) Interview for Research in Action, U of C. publications, June 15.
- Marceau, D.J., (2007) Interview for the ISEEE Supplement, University of Calgary, June 15.



## Posters

- Abbisian Nik, S. (2007) Assessment of GPS, GLONASS and GPS/GLONASS. Presented at Schulich School of Engineering 4th Annual Graduate Student Research Conference, Apr 30–May 1.
- Alfonsi L., P.J. Cilliers, G. De Franceschi, M. Materassi, C.N. Mitchell, V. Romano, S. Skone, P. Spalla, A.W. Wernik (2007) UAMPY contribution to eGY, Proceedings of XXIV IUGG Assembly, Perugia, Italy, July 2-13.
- Ali, I., A. Braun, M.G. Sideris (2007) Combining TOPEX and ICESat altimetry for the determination of the Great Lakes surface, 2007 Joint CMOS, CGU and AMS Congress, St. John's, Newfoundland and Labrador, May 28-June 1.
- Broumandan, A., (2007) AOA Estimation and Multipath Mitigation for CDMA Signals. Presented at Schulich School of Engineering 4th Annual Graduate Student Research Conference, Apr 30–May 1.
- Cai, C., Y. Gao, (2007) Precise Point Positioning Using Integrated GPS and GLONASS Observations, 9th GEOIDE Annual Scientific Conference, Halifax, NS, June 6-8.
- de Groot, L., K. O'Keefe, S. Skone (2007) Intercomparison of Radio Occultation, Radiosonde, and Numerical Weather Prediction for Canadian Occultation Events, 9th GEOIDE Annual Scientific Conference, Halifax, NS, June 6-8.
- Ebner, A., (2007) A geometric GNSS multipath model for urban environments. Presented at Schulich School of Engineering 4th Annual Graduate Student Research Conference, Apr 30–May 1.
- El-Habiby, M., M.G. Sideris (2007) The use of Wavelet Transform in Gravity Field Applications, 9th GEOIDE Annual Scientific Conference, Halifax, NS, June 6-8.
- Gernot, C. (2007) GPS Signal Disturbances by Water in Various States. Presented at Schulich School of Engineering 4th Annual Graduate Student Research Conference, Apr 30–May 1.
- Gernot, C., (2007) A Novel L1 And L2C Combined Detection Scheme for Enhanced GPS Acquisition Poster Paper, iCORE Summit 2007, Banff, August 23-25.
- Gernot, C., (2007) A Novel L1 And L2C Combined Detection Scheme for Enhanced GPS Acquisition Poster Paper, GEOIDE NCE Annual Conference, Halifax, June 6-8.
- Hasan Bhuiyan, Z., (2007) Efficient Implementation of a Code Tracking Loop for the GPS L5 Signal. Presented at Schulich School of Engineering 4th Annual Graduate Student Research Conference, April 30–May 1.
- Izadpanah, A., (2007) GPS multipath effects on Closely-spaced Antennas. Presented at Schulich School of Engineering 4th Annual Graduate Student Research Conference, Apr 30–May 1.
- Jakobsen, J., (2007) Double Difference Effect of Simulated GNSS Errors. Presented at Schulich School of Engineering 4th Annual Graduate Student Research Conference, Apr 30–May 1.
- Kazemi, P., (2007) A Weak GPS Signal Tracking Method for a Stand-Alone Software Receiver. Presented at Schulich School of Engineering 4th Annual Graduate Student Research Conference, Apr 30–May 1.
- Macchi, F., (2007) Algorithms of Acquisition of the Galileo L1 Signal and Testing Using Real Data. Poster Paper, iCORE Summit 2007, Banff, August 23-25.
- Macchi, F., (2007) Algorithms of Acquisition of the Galileo L1 Signal and Testing Using Real Data. Presented at Schulich School of Engineering 4th Annual Graduate Student Research Conference, Apr 30–May 1.
- Macchi, F., (2007) Development of a one channel Galileo L1 software receiver and testing using real data. Poster Paper, GEOIDE NCE Annual Conference, Halifax, June 6-8.

- Mahtuz, U., (2007) Performance Evaluation of Multiple GNSS Receivers. Presented at Schulich School of Engineering 4th Annual Graduate Student Research Conference, Apr 30–May 1.
- Mongrédien, C., (2007) Development of a GPS L5 Software Receiver. Presented at Schulich School of Engineering 4th Annual Graduate Student Research Conference, Apr 30–May 1.
- Morrison, A., (2007) Factors Limiting Modern Satellite Navigation. Presented at Schulich School of Engineering 4th Annual Graduate Student Research Conference, Apr 30–May 1.
- Morrison, A., (2007) Thermal Unreliability in Embedded Navigation Systems. Poster Paper, GEOIDE NCE Annual Conference, Halifax, June 6-8.
- Mutharaman, K., (2007) Evaluation of Data/Pilot Tracking Algorithms for GPS L2C Signals Using a Software Receiver. Presented at Schulich School of Engineering 4th Annual Graduate Student Research Conference, Apr 30–May 1.
- Quinonez-Pinon, M. R., W. van der Wal, C. Valeo, S. Marshall (2007) Validating gravimetry measurements in Canada with a continental scale hydrological database, CMOS-CGU-AMS 2007 Conference, St. John's, Newfoundland, May 28–June 01.
- Quinonez-Pinon, M.R., C. Valeo (2007) The use of different sapwood area mensuration methods: Implications in modelling canopy transpiration and catchment's water balance, CMOS-CGU-AMS 2007 Conference, St. John's, May 28-June 01.
- Raaflaub, L.D., C. Valeo (2007) Hydrological properties of the organic layer of the forest floor for use in drying models, CMOS-CGU-AMS 2007 Conference, St. John's, Newfoundland, May 28-June 01
- Robinson, K., C. Valeo, M.C. Ryan, A. Chu (2007) Modelling aquatic vegetation and dissolved oxygen in the Bow River, Alberta, Canada, Canadian Water Resources Association 60th Annual National Conference, Water Science & Technology: Implications for Water Management, Saskatoon, June.
- Robu, I., J.L Ronsky, R Frayne, A Habib, (2007) Assessment of a Novel Technique for In Vivo Investigation of Joint Cartilage Deformation Characteristics, 2007 ASME Summer Bioengineering Conference, Colorado, June.
- Skone S., H. van der Marel (2007) Activities 2003-2007 for IAG Sub-Commission 4.3: GNSS Measurement of the Atmosphere, Proceedings of XXIV IUGG Assembly, Perugia, Italy, July 2-13.
- Sun, D. (2007) Performance Analysis of GPS Receiver with INS Aiding. Presented at Schulich School of Engineering 4th Annual Graduate Student Research Conference, April 30–May 1.
- Valeo, C., S. Skone, M.R. Quinonez-Pinon (2007) GPS derived precipitable water vapour as a source of data for evapotranspiration modelling, CMOS-CGU-AMS 2007 Conference, St. John's, Newfoundland, May 28-June 01.
- van der Wal, W., M.G. Sideris, P. Wu, (2007) Detecting Large Scale Mass Changes in North-America from Space., 9th GEOIDE Annual Scientific Conference, Halifax, Nova Scotia, June 6-9
- Xu, C., M.G. Sideris, N. Sneeuw (2007) Spherical Harmonic Analysis and Synthesis in Satellite Gravity Gradiometry Using the Torus Approach, 2007 Joint CMOS, CGU and AMS Congress, St. John's, Newfoundland and Labrador, May 28-June 1

## ACADEMIC AND PROFESSIONAL SERVICES

- M. Barry**
- Director, Federation Internationale des Geometres (FIG) Foundation
  - Canada Representative, Federation Internationale des Geometres (FIG) Commission 7
  - Canadian Council of Land Surveyors Board of Examiners Coordinating Committee
  - Canadian Institute of Geomatics (CIG) Certification Committee
  - Undergraduate Studies Committee
  - Chair Geomatics Engineering Liaison Committee
- A. Braun**
- Research Associate, Arctic Institute of North America
  - Steering Committee, International Altimetry Service (IAS) of the International Association of Geodesy (IAG)
  - Convener, GGEO Symposium, Crete, Greece
  - Scientific committee and invited panel member, ESA Space for Hydrology Workshop, Geneva
  - Member, The International Institute for Infrastructure Renewal and Reconstruction (IIIRR), Sound Science Initiative, American Geophysical Union, European Geophysical Union, Canadian Geophysical Union, member at large, Geodesy Section.
  - Reviewer, J. Geophysical Research, J. of Geodynamics, Phys. Chem. Earth. Int., Sensors, J. of Global Positioning Systems, Geomatica, Remote Sensing of Environment, Int. J. of Remote Sensing, J. of Geodesy, Pure and Applied Geophysics, Earth Sciences Research Journal, Hydrological & Earth System Science
  - Schulich School of Engineering Internship committee and Student activities Fund Committee
- M.E. Cannon**
- Canada Foundation for Innovation (CFI) Board of Directors
  - Enbridge Income Fund Board of Trustees
  - NSERC Expert Panel on IP
  - TELUS World of Science Board of Directors, (Currently Vice-Chair)
  - Alberta Ingenuity Fund Board of Trustees
  - Alberta Information and Communications Technology Institute Board
  - Alberta Science and Research Authority Board of Management
  - NSERC GSC Restructuring Committee
  - Top 40 Under 40 Selection Board
- M. Collins**
- APEGGA, Board of Examiners
  - APEGGA Committee on Aboriginal Affairs
  - Associate Editor, International Journal of Remote Sensing
  - Reviewer for several technical journals
  - Reviewer for NSERC grant proposals





- I. Couloigner**
- Member, European Association of Remote-Sensing Laboratories
  - Member, Canadian Image Processing and Pattern Recognition Society
  - Member, Alberta Geomatics Group
  - Member, APEGGA
  - Reviewer, for Several International Journals

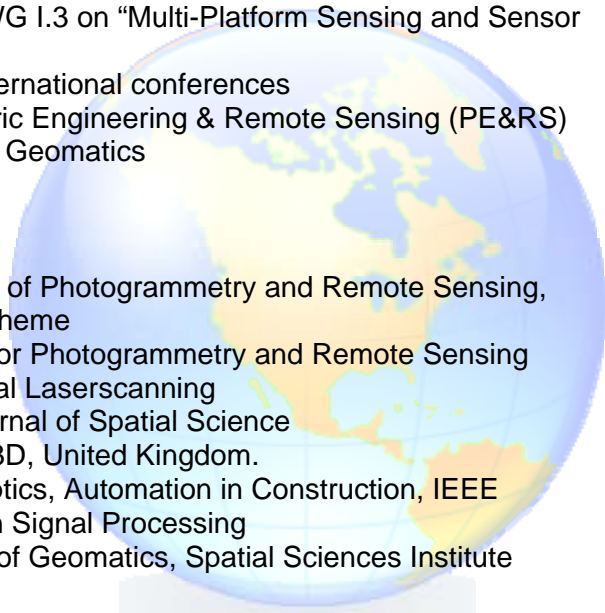
- N. El-Sheimy**
- Canada Research Chair in Mobile Multi-sensor Geomatics Systems
  - President, Technical Commission I, International Society for Photogrammetry and Remote Sensing (ISPRS)
  - Member, GEOIDE NCE Research Management Committee
  - Technical Program Chair, Co-Chair and Member, Organizing Committee for a number of national and international conferences
  - Member of the Editorial Board of Journal of Survey Review, Coordinates, and Journal of Applied Geodesy
  - Vice Chair, the IAG WG SC4.1 "Mobile Multi-Sensor Systems"

- Y. Gao**
- Board of Directors, International Association of Chinese Professionals in Global Positioning Systems
  - Chairman, IAG Sub-Commission 4.5 "High Precision GNSS"
  - Special Examiner, Board of Examiners for Canada Land Surveyors
  - Associate Editor, IEEE Transactions on Vehicular Technology
  - Editorial Board, Journal of Global Positioning Systems
  - Reviewer for refereed journals and grant applications
  - Session chair and program committee members for international conferences

- A. Habib**
- Member, American Society for Photogrammetry and Remote Sensing (ASPRS).
  - Member, International Editorial Board of the Korean Journal of Geomatics.
  - Member, Editorial Board of the Brazilian Journal of Cartography (RBC) in the field of Photogrammetry and Remote Sensing.
  - Session Chair/Moderator for several ISPRS conferences and symposia.
  - Reviewer for the journals of PE&RS, Photogrammetric Record, ISPRS, Geomatica, Australian Journal of Spatial Science, Computer Vision and Image Understanding, and IEEE transactions on Aerospace and Electronic Systems.
  - Member, British Columbia Community of Practice for Medium-Format Digital imaging Systems
  - Member, British Columbia Community of Practice for LIDAR Systems
  - Special Examiner for the Canadian Board of Examiners for Professional Surveyors (CBEPS) in the are of Remote Sensing and Applied Photogrammetry
  - Member, British Columbia Community of Practice for Digital Orthophoto Generation Associate editor for the Geomatica Journal for the area of Photogrammetry



- A. Hunter**
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  - Department Rep Internship Advisory
  - Member Learning and Instructional Development Subcommittee
  - Member Department Website Development
- JW. Kim**
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  - Member, American Geophysical Union
  - Member, IEEE GSRS (Geoscience and Remote Sensing Society)
  - Member, Korea Remote Sensing Society
  - Member, Korea Soc. of Env. Geology
- G. Lachapelle**
- Chair, Institute of Navigation Alberta Chapter
  - Editorial Board, GPS World
  - Editorial Board, GPS Solutions
  - Columnist, Inside GNSS
  - Editorial Board, International Journal on Navigation and Measurement
  - Member, External Research Advisory Board
  - Editor for Navigation, IEEE Transactions on Aerospace and Electronic Systems
  - Associate Editor-in-Chief, IEEE Transactions on Aerospace and Electronic Systems
  - Guest Editor, International Journal on Navigation and Measurement Special Issue on Future GNSS Signals.
- S. Liang**
- Secretary, the ISPRS TC I WG I.3 on "Multi-Platform Sensing and Sensor Networks"
  - Session Chair for several international conferences
  - Reviewer for Photogrammetric Engineering & Remote Sensing (PE&RS)
  - Member, Canada Institute of Geomatics
- D. Lichti**
- Guest Editor, ISPRS Journal of Photogrammetry and Remote Sensing, Terrestrial Laser Scanning Theme
  - Chair, International Society for Photogrammetry and Remote Sensing Working Group V/3 Terrestrial Laserscanning
  - Editorial Board Member, Journal of Spatial Science
  - Project Associate, Heritage 3D, United Kingdom.
  - Journal reviewer: Applied Optics, Automation in Construction, IEEE Journal of Selected Topics in Signal Processing
  - Member: Canadian Institute of Geomatics, Spatial Sciences Institute (Australia)





**D. Marceau**

- Member of the International Program Committee for the IASTED International Conference on Modeling and Simulation, Quebec
- Member of the scientific committee of the Digital Earth Summit on Geoinformatics, Postsdam/Berlin, Germany
- Member of the program committee of the Spatial Knowledge and Information Conference, Fernie BC
- Member of the organisation and the scientific committees of the International Conference on Geographic Object-Based Image Analysis, Calgary
- Member of the international editorial board of *La Revue internationale de géomatique*
- Member of the international editorial board of the Indonesian Journal of Remote Sensing
- Editor for the GIScience section in *The Canadian Geographer*
- Member of ISEEE (Institute for Sustainable Energy, Environment, and Economy), U. of Calgary
- Member of the hiring committee of a Faculty member in Chemical and Petroleum Engineering, University of Calgary
- Member of the selection committee for a Faculty position, Faculty of Environmental Design, University of Calgary

**K. O’Keefe**

- Member, Institute of Navigation, Canadian Institute of Geomatics, Canadian Aeronautics and Space Institute, American Geophysical Union
- Member, Faculty Gender and Diversity Committee
- Member, Department Awards Committee, Department Merit Advisory Committee
- Editorial Board, *GPS Solutions*
- Member, IAG WG 4.5.1 Network RTK, WG 4.5.4 Data Processing of Multiple GNSS Signals
- Reviewer, *IEEE Aerospace and Electronic Systems*, *IEEE Vehicular Technology*, *GPS Solutions*, *Journal of Geodesy*

**M. Petovello**

- Contributing editor, *Inside GNSS* magazine’s *GNSS Solutions* column
- Co-Editor, U.S. Institute of Navigation Red Book on *Integrated Navigation*
- Vice-Chair, Institute of Navigation Alberta Section
- Chair, U.S. Institute of Navigation’s Student/Education Outreach sub-committee
- Session Chair, 2008 IEEE Vehicular Technology Conference (VTC)
- Session Chair, U.S. Institute of Navigation GNSS 2008 Conference
- Member, U.S. Institute of Navigation, APEGGA
- Reviewer, *IEEE TAES*, *IEEE TWireless*, *IEEE TVT*, *Proceedings of the IEEE*, *Journal of Geodesy*, *International Journal of Navigation and Observation*

- M. Sideris**
- Associate Dean (Engineering), Faculty of Graduate Studies
  - Member, Board of Directors of the GEOIDE NCE
  - President, International Association of Geodesy (IAG)
  - Member, Bureau and Executive Committee of the IAG
  - Member, Executive Committee of IUGG
  - Fellow of the IAG and of the International Geoid Service
  - Member of several IAG special study groups, commissions, and working groups
  - Member, Board of Directors of the Bureau Gravimetric International
  - Reviewer for the Journal of Geodesy, Geomatica and Journal of Geophysical Research
  - Member, Editorial Board, Journal of Geodesy and Cartography
  - External reviewer, NSERC Grants
- S. Skone**
- Institute of Navigation Western Council Member-at-Large
  - NSF CEDAR Science Steering Committee
  - Chair, Canadian Navigation Society
  - CASI Executive Council
  - Associate Editor, Canadian Aeronautics and Space Journal
- M. Tait**
- Vice-Chairman, Calgary CIG Branch
  - Member of the American Society of Photogrammetry and Remote Sensing
  - Member, Academic Appeals Committee
  - Chair of IAG WG4.2.2 'Dynamic Monitoring of Buildings'
  - Member, FIG WG V/3
- W. Teskey**
- Co-Chair, Faculty of Engineering Academic Appeals Committee
  - Canadian representative to Commission 6 (Engineering Surveys) of the International Federation of Surveys (FIG)
  - Member, Publications Committee, Journal of Surveying Engineering
- X. Wang**
- Program Committee Member, The 5th International Conference on Fuzzy Systems and Knowledge Discovery (FSKD'08) and The 4th International Conference on Natural Computation (ICNC'08)
  - Reviewer, Pattern Recognition, IEEE International Conference on Data Mining (ICDM 2007)
  - Committee member, Faculty Gender and Diversity in Engineering Committee (GDEC)
  - Member, The Association of Chinese Professionals in Geographic Information Systems

