

## CCCESD – REVIEW OF DEPARTMENTS – 2014

### MEMORIAL UNIVERSITY, Earth Sciences

#### Students

Total Enrollment	2013-2014	2012-2013
TOTAL UG (2 <sup>nd</sup> -4 <sup>th</sup> year)	195	169
TOTAL GRAD	85	90
TOTAL STUDENTS	280	259

#### Faculty Interests and Research

- 25 current faculty members including one University Research Professor and four emeritus professors (including two University Research Professors)
- 2 CRC Tier II Chairs; One NSERC IRC
- One CRC Tier II in Seabed Imaging application to soon be made (replacement for faculty member who left MUN)
- Two faculty searches currently under way: Applied Seismology and High-T Geochemistry
- HMDC Chair in Petroleum Geosciences will soon be advertised and will be matched by RDC and hopefully will become an NSERC IRC
- Possible spousal hire in aqueous geochemistry
- Trying to achieve a steady state of 30 full time regular faculty members

#### External Support for Teaching and Infrastructure

- JMH leading initiative for industry support for interdisciplinary (Earth Sciences, Chem, Physics, Physical Oceanography) Centre for Materials Science (CSM)
- Recently opened new HMDC funded EPMA and SEM facility (\$2.5M)
- Looking for renewal of industry funds for field school support for next 5 years
- Trying to establish industry supported Geoscience Student Fund (displays, outreach, infrastructure)

#### Challenges

- Problems with start-up funds for new faculty given the mandate established by the RDC (the main source of start-up funds for all MUN faculty) – not as bad for ESD as with other departments
- Replacement of aging equipment given CFI and NSERC RTI-1 funding constraints; must rely on industry R&D and E&T from offshore revenue
- Retaining faculty in O&G sector
- Attracting high quality applicants for faculty positions and especially chairs
- Increase in enrollment straining teaching infrastructure
- 5-6 looming retirements in next five or so years

*John Hanchar*

### DALHOUSIE UNIVERSITY, Earth Sciences

The department is entering an exciting phase of department renewal. We are currently revising our Strategic Plan, which among other things, commits us to rebuilding capacity in Marine Geoscience. This is partly to align our department with the overall strategic direction of the University, and partly to offset a steady decline in this area following several retirements in the past 10 years.

We are advertising 2 positions - a new Department Chair, to start July 2015, and a new Assistant Professor in Geophysics, Sedimentology, or Geochemistry, to start in July 2016. The latter is the first new junior “no strings” appointment we have had since 1986! We are cautiously optimistic that we will be able to advertise for at least one additional junior position in 2017. These positions are critical, as we will have 4 retirements (1 instructor and 3 professors) in the next 2 or 3 years. In the absence of replacement positions, this would bring our faculty strength down from 11 professors to 8, and 5 instructors to 4 (one of which is a limited-term appointment), well below what is needed to maintain viable PGeo and graduate programmes.

Undergraduate enrolment remains healthy, but has levelled out following increases in the last 3 years to numbers not seen since the 1980s. We currently have ca. 15 students in 4th year (10 doing honours), with 35-40 in 3rd year, and 50-55 in 2nd year. While welcome, the increased numbers are putting severe pressure on our limited space and resources, especially with respect to lab classes.

Graduate enrolment has declined slightly to 35 students (16 PhD, 19 MSc), from 37 the previous year. The chronic problem of inadequate graduate funding at Dalhousie was alleviated slightly by the introduction of a new provincial Graduate Entrance Scholarship programme in May 2014. This is a welcome development, especially as the “resource sector” is identified as a high priority area. However, although 2 new students received scholarships under this programme, the announcement came too late to have much effect on this year’s graduate student numbers. We anticipate a significant improvement in 2015-16. Nevertheless, the decline in PhD enrolment (no new students in 2014 except for one transfer from MSc) is troubling, and may reflect the uncertain NSERC funding climate.

Eight of our faculty hold NSERC Discovery Grants, with the department average close to the discipline average (ca \$30000/y); 3 people are reapplying this year. We have been successful in recent CFI applications (although delays in awarding matching funds and excessive renovation costs continue to be a problem) and have received industry funding from a variety of sources. New provincial support for research related to current petroleum exploration on the Scotian Shelf and Slope are likely to provide funding opportunities for some of our faculty. However, given the current regime at NSERC, and the need to replace

aging equipment, we are very concerned about the prospects for stable and sustainable research funding in the medium- and longer term.

*Rebecca Jamieson*

### **SAINT MARY'S UNIVERSITY, Geology**

**Program Review:** a successful program review in 2013 led to numerous recommendations being implemented in 2014 including building some common curriculum with the recently established Department of Environmental Science and School of Environment. Discussions with senior administration about the creation of a cross-appointment between our Departments in 2015 are in progress.

**Faculty and Staff:** The Department has 5 full-time faculty, 6 part-time faculty, 1 secretary at 60% (shared with another program), and 2 technical staff. In addition to preliminary discussions about a cross-appointment with ENVIS in the area of stable isotope geochemistry and hydrogeology, we will be advertising for a CRC Tier II Chair in Petroleum Systems Geochemistry and Reservoir Quality in late 2014. This will be the first increase in full-time faculty contingent in the Department since 1986. Two new part-time faculty joined the Department in 2013 and 2014, one teaching introductory geology, and the other to teach hydrogeology, which has been archived for 6+ years. We continue to pursue a lecturer position to accommodate increasing enrollments but University budget cuts in response to falling domestic enrollment and anticipated provincial tuition freeze have put a hiring stop on lecturer positions for at least 2 years.

**Programs:** In addition to reactivation of a level 3000 hydrogeology course and creation of an outdoor groundwater measurement facility for this course (including pumping and test wells on campus), we have created our own GIS course (to be taught in January 2014 for the first time) and have revised our curriculum to “enforce” a 60 credit hour GEOL stream for students interested in Professional Geoscientist Registration. Currently, 95% of our students are enrolled in this extended program.

Since 2012 we have seen a steady increase in enrollment in our introductory geology courses (from 50 students to 100 students in GEOL1201), and a doubling of students in the majors program (from 20 to 40 students entering 2<sup>nd</sup> year Mineralogy). We have started to offer our core petrology and structural geology courses annually to accommodate this increase in enrollment and are struggling with teaching resources. Major commitments to teaching infrastructure in 2013-2014 from the Dean of Science include renovations to our two core classroom spaces, the creation of a new 20 seat advanced petrology laboratory, and purchasing of 20 Olympus BX51 reflected- transmitted light microscopes for this laboratory.

Currently there are 8 graduate students in the Department (3 Ph.D., 5 M.Sc.) of which 4 have external scholarships.

**Research:** Faculty continue to attract solid research funding from industry and government sources. Currently 2 faculty hold NSERC Discovery Grants. Faculty were awarded 2 infrastructure (CFI and internal) grants in 2014 to purchase a confocal Raman microscope for fluid inclusion analysis and a new field emission SEM for mineral analysis to replace our existing SEM. Decommissioning of our aging XRF in 2014 will be followed by installation of a new ICPMS instrument in 2015.

2 PDFs were hired in 2014. As mentioned in a previous section, we have approval to advertise a CRC Tier II Chair this fall.

*Jacob Hanley*

### **ACADIA UNIVERSITY, Earth and Environmental Science**

The university continues to experience growth and, like last year, is near its perceived limit of around 3500 full-time students. The University remains in a deficit funding situation though, as tuition increases have been limited and provincial funding has not increased significantly. The E&ES department has experienced around a 35% increase in student enrolment in the past 4 years, with about 160 majors split equally between environmental science and geoscience. We currently are supervising 14 graduate students, though graduate courses are considered as overload teaching at Acadia. Though no replacements of retiring/ departing faculty have been authorized in the past 5 years our department recently received a 3 year position that has provided some relief from overload teaching. We have also been fortunate in securing some per-course replacements as well. Still, the effects of this growth are now becoming extreme, with severe pressure to enlarge classes, reduce sections and limit elective options.

This fall we underwent a review of our undergraduate Geology and Environmental Geoscience programs and our graduate Geology program. Though the report from the reviewers is still forthcoming, this was an important internal exercise, and led to the realization that we need more proactive planning and served to strengthen our position with administration as our successes and stresses were made apparent. In particular it was noted that we enjoy a very high rate of research and administrative success and, in the words of the Dean of Research and Graduate Studies are “the most active department on campus, regardless of size”.

Our service courses (Natural Disasters and Oceanography) and first year Geology courses enjoy very high enrollment and result in well over half of all students at Acadia taking a geology course, a situation that has enhanced our visibility and profile on campus. These courses are important internal (to Acadia) retention tools. Our graduate program continues to be vital though accessing both internal and external funding continues to be difficult. Increasingly, we find ourselves partnering with industry to provide graduate student opportunities.

*Ian Spooner*

## UNIVERSITÉ LAVAL, Geology and Geological Engineering

Program	1 <sup>st</sup> year in 2014	1 <sup>st</sup> year 2005-2013 avg.	Total in program
U Geology	26	13	38
U Geological engineering	34	28	113
M.Sc. Earth Sci. (research)	12	6	34
M.Sc. Env. Tech.	7	3	11
Ph.D. Earth Sci.	6	4	26

More than 6000 students (an all-time high) are registered this fall at the faculty of Science and Engineering (the increase in 1<sup>st</sup> year student enrolment is 3.2%). Student enrolment in our departmental programs has also increased in 2014. Undergraduate numbers of first year students is the highest in 15 years. High recruitment of graduate students in 2014 is the consequence of hiring 3 new professors since March 2013. A faculty member has retired last September, and the number of professors is now at 13.

The “*Interactive Petrography Laboratory*” dedicated to undergraduate and graduate teaching to groups of 40 students is fully operational. It is equipped with 21 polarizing microscopes (transmitted & reflected lights) and the latest visualization technologies (cameras & computers, HD projector, HD TV).

Successful international field courses were held in Iceland (2011) and Scotland (2013) and an upcoming one is on track for 2015.

A new research center on the Geology and Engineering of Mineral Resources is in the making. It will regroup 30 professors from 5 departments (principally geology, geological engineering, mining engineering) and with thematic ranging from Mineral Exploration, Mining operations, Ore processing, and Responsible mineral resources development.

Government budget cuts have been retroactively applied to budgets of all universities in the province. This translated to a 42M\$ cut at Laval. More cuts are expected for the year 2015-2016.

On October 15, the Quebec government announced the creation of a “Northern Institute of Quebec”, a network that will regroup expertise of researchers from 3 universities: Laval, McGill, INRS.

Marc Constantin

## McGILL UNIVERSITY, Earth and Planetary Sciences

### Students registered in the Earth and Planetary Sciences Program

Students	Total Enrollment 2014-2015	Total Enrollment 2013-2014	Total Enrollment 2012-2013	Total Enrollment 2011-2012	Notes
U1	14 (+4)*	15 (+6)*	11 (+5)*	14 (+6)*	
U2	10 (+7)*	11 (+6)*	18 (+3)*	13 (+2)*	
U3	17 (+7)*	19 (+4)*	12 (+6)*	16 (+6)*	
Honours	6	8	11	10	
Total UG	47 (+18)*	53 (+16)*	52 (+14)*	53 (+14)*	Not including Physics/Geophysics program, ~ 2/year
M.Sc.	18	18	25	30	
Ph.D.	33	31	23	25	
Total Grads	51	49	48	55	
Total	98 (+18)*	102 (+16)*	100 (+16)*	105 (+14)*	

\*Numbers in parentheses are students registered in a declared minor concentration in EPS/Geology/Geochemistry

As can be appreciated from the above table, the student population has been stable for a number of years. In contrast, the Phys/Geophys, ESYS, and B.Sc. Env.–Earth Sciences programs have all grown a bit this year. We expect the number of graduate students to grow slightly given the number of newly established and incoming young faculty members.

In 2013, two new faculty members joined the Department of Earth and Planetary Sciences, Prof. Rebecca Harrington in September 2013 and Prof. Kim Berlo in December 2013. Prof. Berlo is a volcanologist studying metal transport in volcanic gases. Before joining McGill, Prof. Berlo was the recipient of several prestigious postdoctoral fellowships and was also awarded one of the highly competitive European Research Council's Young Investigator Startup awards. Prof. Harrington's research is directed towards the understanding of low-intensity earthquakes and their relevance to the controls and the onset of major earthquakes. More recently, we have been able to offer a tenure-track faculty position to Dr. Jamie Kirkpatrick, a structural geologist, currently an Assistant Professor at the University of Colorado, who will be joining the Department in January 2015. Finally, Dr. Natalya Gomez, a very promising young Canadian geophysicist, presently a post-doctoral fellow at the Courant Institute in New York City, will join the Department in August 2015. Prof. Gomez works on the geodynamics of climate change and, in particular, on the effects of melting ice and the resulting elastic rebound on spatial and temporal changes in sea level. The Department will

soon be advertizing for a tenure track joint position with the Department of Physics in the field of exo-planets. On May 31, 2014, Profs. Andrew Hynes and Don Francis retired from the Department.

The Department of Earth and Planetary Sciences (EPS) is involved, together with the Departments of Atmospheric and Ocean Sciences (A&OS) and Geography, in the Earth-System Science program (ESYS). Prof. John Stix from EPS is the ESS program director and Prof. William Minarik from EPS is the ESS student advisor. The program hosts about 20 highly capable and motivated students (29 graduates to date with an impressive median CGPA of 3.55). During the 2013 year, the Earth System Science major program grew to 22 majors, with the addition of 9 new U1 students. In the last year, the ESYS Honours Major and the ESYS Minor were installed, along with some modifications to the major core requirements. Finally, in 2013, Prof. John Stix/EPS and Prof. John Gyakum/A&OS were awarded a grant to mount a MOOC (Massive Open Online Course) based on their successful Natural Disaster (EPSC/ATOC-185) course. The MOOC was launched on May 28, 2014, had over 12,000 registrations, ~500 successfully completed all the course requirements.

On May 3-7, 2015 Montreal will host the joint meeting of the American Geophysical Union (AGU), Canadian Geophysical Union (CGU), Geological Association of Canada (GAC), and the Mineralogical Association of Canada (MAC). Profs. Galen Halverson (Local Treasurer and GAC conference co-president), William Minarik (MAC conference co-president), Jeffrey McKenzie (EGU conference co-president) and Don Baker (AGU representative) have been recruited to serve on the local organizing committee.

*Alfonso Mucci*

### **UNIVERSITY OF OTTAWA, Earth Sciences**

The enrolment in our undergraduate programs remained relatively stable while the enrolment in our graduate programs increased by >20%.

- 90 majors and honors undergraduate students in geology programs
- 152 honors undergraduate students in the environmental science program
- 18 PhD and 43 MSc students

Three new professor positions (16 in total) and three new research associates (5 in total).

- Sarah Dare, tenure track position in Mineralogy (August 2014)
- Tom Al, tenure track position in hydrogeology (January 2015)
- Olivier Nadeau, a replacement professor in petrology (September 2014)

There is no change in our support staff (administration: 3; teaching: 2; research: 12).

Following a major renovation of our existing buildings; teaching, research, and administrative functions of the department are now located in three buildings: Advanced Research Complex (only research), Marion Hall (mainly teaching), and FSS Hall (mainly administration with some research). The ARC building is state-of-the-art with respect to the services, ventilation and layout for advanced research laboratories. Our labs in ARC occupy more than 2500 m<sup>2</sup> (+ offices, meeting and seminar rooms, etc.). Marion and FSS halls are temporary locations, but the plans for a short-term relocation are unknown.

External evaluators provided largely positive reports in the evaluation process of our undergraduate and graduate programs. The delivery of a fully bilingual program at the undergraduate level is difficult, but could be solved with additional teaching resources.

Major restructuring of the faculty departments and programs will result into new larger departments in the coming year; including a department of Earth and Environmental Sciences. The transfers of faculty positions or cross appointments are under discussion.

*André Desrochers*

### **CARLETON UNIVERSITY, Earth Sciences**

Our undergraduate population is much the same as last year, leveling off after a period of steady growth since 2003. We presently have ~ 160 undergraduates, 36 graduate students and ~60 minors. We are teaching ~ 2300 students in service and general interest courses this year. In July 2014, we hired Dr. Rich Amos, an Environmental Hydrogeologist, who is cross-appointed with the Institute of Environmental Science. We deliver our programs with 10 full time faculty members (which will be increased by one in Sept 2015 when Banting PDF Dr. Hillary Maddin comes on faculty), one cross-appointed faculty member and several contract instructors. Regarding new space acquisition, the undergraduate student society has been awarded a society room in the new INCO wing adjacent to a lovely river-view undergraduate commons area. In September we just started the first phase of a renovation of ~ 4600 ft<sup>2</sup> of new space and rejuvenation of existing space in the Herzberg Laboratories. Renovations, taking place in a series of stages, will last a year or so. We will add dedicated faculty and grad office, research, student research, teaching laboratory and common meeting space, and we will rejuvenate and expand our main office and revitalize research and graduate student office space. The issue of adequate storage for our collections remains unresolved. The Department is currently in the final stages of a periodic review of our undergraduate program, with a site visit in November, following a new Quality Assurance process defined at the university level. Our joint Ottawa-Carleton Geoscience Centre (OCGC) graduate review, shepherded by OCGC Director Brian Cousens, was completed last year, with a favorable report. Four

professors from GEOG joined the OCGC strengthening our expertise in permafrost, mountain environments, ecosystem function, remotes sensing and climate change. We recently celebrated the 60<sup>th</sup> anniversary of our department with an evening celebration attended by 115 alumni, past and present staff and faculty, Geoheritage volunteers and students. Department spirit, student societies (e.g. undergrad “GeoSoc”, graduate “GraeSoc”, joint CU–U of O SEG chapter), joint Ottawa–Carleton Geoscience Centre (OCGC) events (e.g. annual weekend field trip organized by graduate students, fall OCGC lunch, graduate research seminar, lecture series, Advances in Earth Sciences Research Conference or ASERC) conference, informal discipline specific seminars and alumni relations are strong and vibrant. Thanks to Beth Halfkenny, our department Curator–Outreach Coordinator, and student volunteers we are particularly active in outreach activities such as Geoheritage Day, Teacher Workshops and Seminars, contributions to outreach symposia, visits to schools and visits to our department by school classes. With the University of Ottawa, we will be co-hosting an Alumni and Ottawa–Carleton Geoscience Centre reception at PDAC on March 2, 2015. In research news, Dr. Fred Gaidies installed a X-Ray micro computed tomography instrument and is active in imaging samples from in-house, OCGC and external colleagues.

*Sharon Carr*

### **QUEEN’S UNIVERSITY, Geological Sciences and Geological Engineering**

2013/2014 has been a period of positive change for the department, after many difficult years.

We are thrilled with the successes of our sedimentary geology colleagues this year:

- Bob Dalrymple was awarded the Middleton Medal by the Canadian Sedimentology Research Group, Geological Association of Canada; and will be receiving the Twenhofel Medal from the Society for Sedimentary Geology at the 2015 annual meeting of the AAPG.
- Noel James received the Sorby Medal, the highest award of the International Association of Sedimentologists.
- Guy Narbonne will receive the Bancroft Medal, from the Royal Society this fall.

Faculty numbers are stable, after the boost supplied by the addition of Dr. Alexander Braun and Dr. Georgia Fotopoulos to the Department in summer, 2013. A policy developed by the new Dean of Arts and Science means that we may now apply to have positions returned to the Department upon retirement / resignation of faculty members, after many years of whole scale position collapse due to budget cuts. As the average age of our department is quite high, this is very welcome news.

Undergraduate student numbers have dropped slightly, which takes a bit of pressure off our over-crowded labs and field courses. Graduate numbers are less assured, due to declining numbers of applications from domestic students, and uncertainty and decline in NSERC funding. Maintenance of current numbers, or increases, will be important in coming years, when we will be transitioning to an activities based budget model. If the budget model were implemented fully at this time, we would be able to balance our budget. At the moment however, we are quite significantly underfunded due to ‘historical’ budget allocations that did not rise as our student numbers rose. Our base budget allocation provides salaries, and approximately 1/3 of our TA budget, which has been cut back quite significantly.

Our operations are significantly supported by alumni and corporate donations. Our endowed Field Education Fund provides approximately 35% of the cost of undergraduate participation in field studies. Our named TA fund permits us to recognize corporate and individual support for our TAs, and to recognize the efforts of the TAs who are nominated by the students in their classes each term. The Department Head spends a significant amount of time on outreach to alumni and fund raising.

Next efforts include an urgent need for complete replacement of all of the microscopes used in undergraduate teaching, which are currently cobbled together from bits and pieces of the dwindling supply of functional microscopes.

*Jean Hutchison (presented by Vicki Remenda)*

### **UNIVERSITY OF TORONTO, Earth Sciences**

Dr. Zoltan Zajacz (from ETH Zurich) joined us in January 2014 as an assistant professor. His research is on the geochemistry of ore deposits systems which bolsters our group in petrology and ore deposits (Brenan, Mungall, Schulze, Henderson, Spooner). Dr. Zajacz was successful in a \$1.5M CFI/ORF application for a LA-ICPMS and electron microprobe. His addition brings us to a faculty complement of 19 on the downtown St. George campus, and 26 across the three campuses.

Our proposal for an Applied Geophysics position to our faculty Appointments Committee was not successful last year (in this competition ~75 applications went in for 15 available positions in Arts and Science). There are currently four faculty members at UTMississauga and three at UTScarborough within the broader graduate Department of Earth Sciences at U. of T. The stability of the Jack Satterly Geochronology lab continues to be an issue. Despite heavy support from the department--transfer of a new mass spectrometer to the lab, technical support, financial transfers--the lab is on somewhat tenuous financial footing.

Our undergraduate enrolments seem to have plateaued, with similar numbers over the past two years (~165 students in years 2-4 in our Major/Specialist programs). An interesting trend we’ve noticed is a significant student shift from

our Major to Specialist programs--these Specialist programs fulfill the APGO academic requirements, perhaps helping explain the shift. The biggest growth is in our Geophysics specialist program, to 24 this year (from 10 in 2011). Our numbers continue to place a strain on our teaching resources--TA, microscopes, spaces at field camps. We continue with strong emphasis on field/international education: aside from regular field camps and locale class trips to Grenville, Niagara gorge, etc. sites, extra field trips/courses this year include Hawaii (24 students), Newfoundland (10), China (16), St. Lucia (22), Grand Canyon/Death Valley (15).

Our graduate numbers are essentially steady, with a total population of 50 funded students this year. Our real challenge in recruiting seems to be in getting domestic PhD students. We continue to be below our university target in this category (as are many of the physical science units at UofT). The RA component of support for grad students--the only component of student funding that supervisors are required to pay from these funding packages--was decreased to \$7500 for all graduate programs (domestic and international).

*Russell Pysklywec*

### **BROCK UNIVERSITY, Earth Sciences**

This September we reached a psychologically important threshold, with 90 majors- more than at any time since the early 1980's- and a vibrant Geology Club. We also admitted eight new grad students, despite the fact that fewer and fewer of our faculty (currently 3/10) hold NSERC grants. Student morale is relatively high, with many/most of our students getting career-related jobs during and following completion of their degree programs, or moving on to graduate programs. We have also received several large donations from alumni allowing us to purchase 24 teaching microscopes (mostly petrographic, but some palynological microscopes) to augment the many-decades-old equipment they had been using and retire the few units that were beyond repair. These new microscopes will also be needed once our Masters in Mineral Exploration and Mining Geology begins taking in students from China in January 2016. In collaboration with the Departments of Physics and Chemistry, we were also fortunate in obtaining NSERC RTI funding for a much-needed XRD that will assist several of our researchers and graduate and honours students.

Faculty morale is less high, with increasing dissatisfaction with 1) the funding landscape, and 2) administratively mandated exercises in program review and seemingly endless make-work exercises in SWOT analysis, strategic planning, etc., all of which seem to be ignored by an administration that seems uninterested in facts when making decisions. We narrowly escaped losing one of our five staff members to the first phase of review of non-academic expenditures, and we have yet to hear the results of the academic program review (submitted in

August); it is likely, however, that at least one of the programs (BSc Earth Sciences, BSc Environmental geoscience, MSc Earth Sciences) offered by the Department of Earth Sciences will be among the programs in the lower quintile in this exercise, and thus to be intently scrutinised in the next phase of the exercise. Our courses offered to non-majors continue to be very popular, and our courses primarily intended for students in our own programs are mainly at capacity but the age structure of our Department, with only 3/10 faculty members younger than 60 (and only one younger than 50, who is currently on our department's first-ever maternity leave!), makes it a prime target for the cutting block at an institution where retirements are not guaranteed to be replaced even within the same Faculty (or at all...). Even if they simply refused to replace faculty members, it is unlikely that our programs would remain viable for the next years that will comprise my second term as chair, as fewer and fewer of us remain to offer courses. One possibility might be to attempt (again!) to merge the physical geography program with our environmental geoscience program or have it as a third undergraduate program in our department, but it is unclear what cost savings would result from re-assigning the three physical geographers to our department and faculty.

*Francine McCarthy*

### **LAKEHEAD UNIVERSITY, Department of Geology**

In 2014/2015, our enrollment of majors has declined slightly with 114 currently enrolled. 85 are enrolled in the HBSc Geology with the others in Environmental Earth Studies, Water Resource Science and the BSc degree. In addition we currently have 17 MSc students in our program down two from last year. High enrolments in our service courses, particularly for Engineering, are straining our resources both in terms of equipment and graduate assistants. We have just completed our IQAP review and passed with mostly flying colours. The external reviewers identified a number of issues that require additional resources and we are in discussions with the Senior Administration as to how to proceed with these.

We have six faculty and two active emeritus professors and hire two sessionals to cover four courses in order to cover teaching relief provided to offset additional administrative duties. As in previous years we have two full time lapidary technicians and share an administrative assistant with another department. The department is currently the hub for the new Centre of Excellence in Sustainable Mining and Exploration (CESME), an initiative that is receiving strong support from senior administration. Two faculty, and one emeritus professor, currently hold NSERC Discovery Grants and our two new faculty are applying once again this year.

*Pete Hollings*

## UNIVERSITY OF MANITOBA, Department of Geological Sciences

### 1. Personnel and department direction.

- a. One faculty member resigned in January 2014. Due to budget cuts their position was not retained by the department.
- b. The loss of this position has resulted in a shift in the teaching load and stable isotope laboratory responsibilities.
- c. Geological Sciences continues collaboration with the Northern Manitoba Mining Academy (NMMA) in Flin Flon. It is offering two first-year correspondence courses at NMMA this term and next term it will provide a face-to-face offering of the first-year lab-based Dynamic Earth course.
- d. Due to budget cuts, we are proposing to focus our departmental efforts into three areas: Geochemistry-Mineralogy, Geophysics, and Environmental Geosciences.

### 2. University administration.

- a. The U. Manitoba President is driving a decrease in the number of faculties in the university. The Department is presently located in a small and very dynamic Faculty of Environment, Earth, and Resources. Future options include amalgamation with Physical Geography and Environmental Sciences. Implications for the Department are not yet fully defined, but there will likely be pressure to increase size through amalgamation.
- b. Budget cuts continue to affect the department. We are expected to plan for a 4% budget cut in 2014-2015 and another 4% in 2015-2016.

3. **Student numbers.** Our overall undergraduate numbers in Geological Sciences continue to increase. In the Honors and Majors programs, our undergraduate enrollment is approximately 120 students (Years 2-4), with many more students on the waiting list or in the General, 3 year program. We have recently increased the minimum GPA for the Honors and Majors programs, which resulted in a higher number of students in the general program. We remain close to a cap of two lab sessions per course, for courses involving microscopes, field trips, and geophysical equipment.

4. **NSERC.** Disruptions associated with the Discovery Grant program continue, with the 2013-2014 competition seeing one more faculty member no longer being funded. There is continued success in CRD applications. We have two faculty members that have been unsuccessful in the past re-applying and two faculty members applying for renewals.

*Mostafa Fayek*

## UNIVERSITY OF REGINA, Geology

Our department continues to maintain a high enrollment, with 146 students declaring as Geology majors (not including combined Geology and Geography majors) in the fall semester of 2014. Our Geology program satisfies all the requirements of the Association of Professional Engineers and Geoscientists of Saskatchewan (APEGS), and we have proposed to change our combined Geology and Geography program to Environmental Geoscience so that it will also satisfy all the requirements of APEGS. In the fall of 2014, we have 32 graduate students, including 26 M.Sc., 6 Ph.D. students, and 2 visiting Ph.D. students. Our Ph.D. program was established in 2010.

The Department maintains the same number of faculty and staff, i.e., 9 faculty members (including a term lecturer) and two lab instructors. In addition we have 9 adjunct professors. We have been given permission to hire a tenure-track lecturer and a tenure-track lab instructor, and the recruitment process is currently in progress.

Two of our faculty members currently hold NSERC-DG grants, and other faculty members have continued to obtain funding from the industry, provincial and federal governments and through international organizations. Our 4 research labs including the “Geofluids Characterization and Modeling Laboratory”, the “Geomodeling and GIS Laboratory”, the “Organic Petrology and Geochemistry Laboratory”, and the “Scanning Electron Microscope Laboratory” continue to provide service to our research projects, but a major part of the analytical work still relies on external service providers and collaborations.

*Guoxiang Chi*

## MOUNT ROYAL UNIVERSITY, Earth Sciences

Enrollment F2014	GEOLOGY	GEOGRAPHY
Service and pre-2 <sup>nd</sup> yr courses	421	355
Year 2 (M/F)	11/12 (23)	-
Year 3 (M/F)	17/9 (26)	-
Year 4 (M/F)	16/12 (28)	-
B.Sc. Graduated Spring 2014	17	-

### *Faculty and Staff*

The Department of Earth Sciences continues with 10 tenure and tenure track faculty (6 geology; 4 geography), 1 emeritus professor (geology) and two instructional support technicians. Research expertise among the geologists includes: stratigraphy (J. Cox), sedimentology and ichnology (J. Scott), isotope geochemistry and geochronology (J. Pollock), submarine volcanology and VMS deposits (M. DeWolfe), paleontology (P. Johnston, W. Haglund), metamorphic petrology and tectonics (K. Boggs). The department is currently advertising a one year term faculty position in crystallography/igneous petrology/ore deposits. In addition we

have sessional lecturers filling the equivalent of 7 full-time positions. Our current student (geology majors) to full-time faculty ratio is 12.2 (73/6), which is the highest in Canada (comparing with data from CCCESD). This coming winter the MRU geology program is scheduled for review, as part of a university program monitoring protocol developed by the Campus Alberta Quality Council.

### Geoscience Exhibit

Thanks to significant funding from the Association of Professional Engineers and Geoscientists of Alberta (APEGA), the University will be opening a large Cretaceous marine vertebrate exhibit in the halls of the Science wing this winter.

### Geology Students

The Earth Sciences Department currently offers a B.Sc. (geology major) and a geography minor. Students wishing to enter the geology major declare so near the end of their first year of courses. The program currently accepts the top 25 applicants (based on GPA) from a pool of typically about 60 student applications. Beginning in F2015, the University plans to expand the intake of 2<sup>nd</sup> year geology majors to 36. Additionally the university is considering for F2015 direct entry of 1<sup>st</sup> year students into science majors including geology.

### Challenges

- Faculty struggle to advance their research programs with heavy teaching loads (9 undergraduate contact hours per semester)
- With the planned increase in student intake into the Geology Program, the Department is applying for two new faculty positions and a full-time lab instructor, despite significant budget challenges faced by the university.

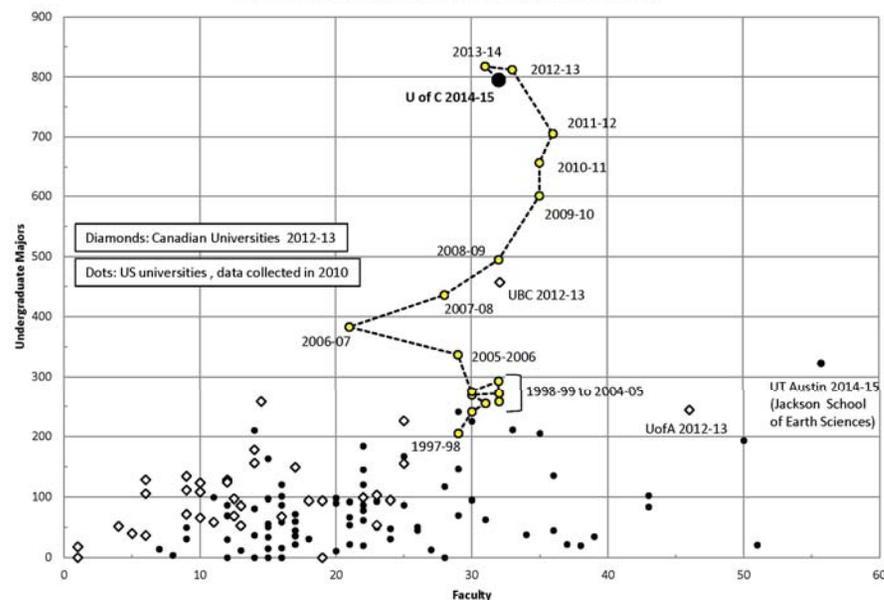
*Paul Johnston*

## UNIVERSITY OF CALGARY, Geoscience

### Student Numbers

Enrollment continues to increase. We have the largest cohort of total undergraduate and graduate students in NA (see graph). We have had unprecedented growth in undergraduate student numbers increasing from 337 (2005-06) to 817 (2013-14) and graduate student numbers from 138 (2005-06) to 222 (2013-14). This success has presented significant stresses for the department. We are currently managing growth through grades and transfer GPAs (83% from high school this year and 3.0 as a transfer). In 2013-14 we had 474 direct Geology majors, 193 direct Geophysics majors, 23 in Applied and Environmental Geology majors, and 127 concentrators (in Earth Science, Environmental Science, and Natural Science). In 2014, 156 Geology and Geophysics students convocated. Our graduate population includes 96 thesis-based MSc, 56 course-based MSc, and 70 PhD students, including 60% males and 66% Canadians. Last year 28 thesis-based MSc, 7 MSc course-based, and 10 PhD students convocated.

Geoscience Majors vs. Faculty (N. America)



### Professors

During the past few months we have hired one instructor, accepted one CAIP Chair, and have a search committee for a geophysics instructor ongoing. Our current complement includes 32 faculty members (5 or 16% female) including 26 professors (16 Full, 8 Associate, 2 Assistant) and 6 instructors (4 Senior). This total does not include emeritus and adjunct professors. We also hired numerous sessional instructors to teach some of our program. Our current \$7M budget is 98% salary and benefits. Our research budget has increased to \$15.6M, of which Discovery Grants equal about 5% (24 of 26 hold grants), but we have considerable success in other NSERC programs and with industry. Emeritus Professor Len Hills passed away in 2014.

### Successes

We opened a new U/Th/He thermochronology laboratory under the leadership of Bernard Guest during the past year. The funding for the instruments in this laboratory is largely the result of a successful CFI application. We also have a new laboratory under the leadership of Marc Strous related to Energy Bioengineering and Geomicrobiology designed to create new bioprocesses for sustainable energy production and mining, with bioreactors being the core equipment.

## Challenges

Faculty numbers, student numbers, space, and aging facilities remain major challenges as does the current budgetary landscape. For example, our first year geology course has 455 students that are taught in 24 separate laboratory sessions every week. We also taught 22 different field schools in the past year including 2 Geophysics, 1 Hydrogeology, 1 senior Unconventional Geology, 9 junior geology field schools and 9 senior geology field schools. Most geology sections contain 16-20 students and travel to various locations from Flin Flon to California. This was the last year in which junior (Gly 337) and senior (Gly 435) sections were both mandatory. Our new Gly 337 offerings will now be delivered over a 16 day (including travel) period in late August/early September and will be mandatory. Gly 435 will be optional, but we expect many students will continue to take this 12 day option. Field school costs are paid through tuition, part of the 2% remaining in our budget, and industrial and individual donations; sustainability of these programs in their current form is a budgetary concern.

*Charles Henderson*

## UBC OKANAGAN, Earth and Environmental Sciences

Twelve tenured, or tenure-track, faculty contribute to delivery of our Earth and Environmental Sciences (EESc) and Freshwater Science (FWSc) degree programs, though some have split responsibilities and also teach courses in Biology, Geography and Chemistry. The “effective” number of faculty is  $\leq 10$ . There have been no new faculty added but a search is on for a new “Head” that will probably be an external hire. Greenough has applied for sabbatical leave for the 2015-2016 Academic year and if successful, a sessional will be required to teach Optical Mineralogy & Petrology (EESc 201) and Igneous & Metamorphic Petrology (EESc 322); prospective names or suggestions are warmly welcome.

Dr. Lael Parrott, who joined us a year ago, has been named director of the Okanagan Institute for Biodiversity, Resilience and Ecosystem Services, and her CFI-supported lab (Complex Environmental Systems) went operational and is supporting a group of 10 HQP. Dr. Craig Nichol (P.I.) has a major grant (~\$1.5 Million) with Agriculture Canada and Dr. Kyle Larson completed building his ~\$300 Thousand structural geology and metamorphic petrology project lab. The Fipke Laboratory for Trace Element Research (FILTER) hobbled along with a single technician looking after 4+ instruments (2 ICP MSs, 1 EXCIMER Laser, 1 Tescan SEM) but we anticipate hiring another full-time technician in the coming year. Several projects moved through the lab that demonstrated our ability to analyze micron-sized native gold for 22 trace elements, adding to the lab’s silicate mineral analytical capabilities. We are looking for projects and/or collaborators from outside UBC Okanagan to maximize utilization of the facility.

Undergraduate enrolment continues to increase to 130 students in 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> year, with ~20 students in graduate studies. There were 3 Ph.D., 3 M.Sc. and 44 B.Sc. (5 honors) graduates over the past year and the B.Sc.s represent a 29% increase over 2013 which saw a >40% increase over the historically-high number in 2012. We encourage you to think of our undergraduates for admission to your graduate-school programs, and hope that your graduates will have a look at UBC Okanagan for M.Sc. and Ph.D. opportunities.

*John Greenough*

## UNIV. BRITISH COLUMBIA, Earth, Ocean & Atmospheric Sciences

EOAS is in transition in 2013-2014. In fall of 2013 – spring 2014 a self-study was prepared in anticipation of the department external review, which took place in March. The review was largely positive, although highlighted concerns for small-enrollment programs and the need for more strategic planning. In July 2014, Greg Dipple stepped down after five years of outstanding service as Head and was succeeded by Roger Beckie, a geological engineer and hydrogeologist.

## Infrastructure

In fall 2013, EOAS occupied the new \$75 M Earth Sciences Building, which houses approximately one half of our teaching, research and administration space. While our research spaces at UBC are high quality, our field schools are in need of rejuvenation. Our second-year geology field school is at capacity, constraining the number of new students that we can take into our Geological Engineering and Geology programs. Our 3rd year geology camp in Oliver BC is in critical need of renewal; several buildings were demolished in the fall of 2014. Similarly, we are searching for a new location for our hydrogeology field school after our well field was destroyed by the expansion of the adjacent BC Hydro substation. Field schools are our number one fundraising priority.

## Undergraduate Education

Overall EOAS program enrollment is up 63 students (+13%) from 503 to 570 undergrads. Geological Engineering and Environmental Sciences are our two largest programs, each with approximately 170 students. Our Geology and EOS Majors programs grew the strongest last year, by 39 % and 38%. On the other hand, our Atmospheric Sciences program, jointly managed by the Geography Department in the Faculty of Arts, is struggling with 11 students. We continue to be considered leaders in the faculty and across campus in the investigation and implementation of evidence-based teaching methods. These efforts are supported by two newly hired Science and Teaching Learning Fellows whose mission it is to implement an extension of the Earth & Ocean Sciences Science Education Initiative (EOS-SEI; <http://eos.ubc.ca/research/cwsei/>). In 2013, EOAS created undergraduate study and clubroom space in what was earlier the geology library.

The space has been catalytic, fostering tighter integration of the various undergraduate programs within the department.

### **Research**

There are approximately 200 graduate students in EOAS, evenly split between masters and PhD. Our total research funding is the highest of departments in UBC's Faculty of Science at just under \$12M in 2014.

### **Faculty**

Two CRC II assistant professors arrived at UBC in 2014: Sean Crowe, a geomicrobiologist and cross appointment with microbiology and Matthijs Smit, a geochronologist. In addition, Peter Winterburn arrived as the ACME Industrial Research Chair in Exploration Geochemistry. We are in the process of applying for an NSERC Executive Industrial Research Chair to support Dr. Winterburn. EOAS now has 46 research faculty and 7 instructional faculty. Three faculty have declared their intention to retire before 2016, and several others have suggested that they will be leaving or converting to emeritus status within a few years.

### **Staff**

Over the last several years, growth in administrative staff has not kept pace with undergraduate and graduate enrollments and research activity in the department. Larger research groups within EOAS have hired dedicated administrative staff, which has both relieved the main office but also established a confusing reporting and approval structure for payments and appointments. We are facing retirements in key technical and research infrastructure positions. EOAS is debating whether to reallocate resources from faculty to staff support, or whether to tweak our internal fee for service model to provide more resources for technical services.

### **Budgets**

After several "fat" years we are entering a period of restraint. UBC is relying on a growth of international students and entrepreneurial activities such as professional masters and distance education programs to address shortfalls in government and domestic tuition revenue. International tuition now represents 1/3 of all tuition revenue on campus. The new Vantage College is designed as the home for first year international students, easing their transition to UBC. One EOAS instructor was hired in August to serve 2/3 in Vantage College. Similar to UBC as a whole, EOAS's budget is also under pressure. We have a modest debt accrued during the renovation of older lab space and are running a small deficit at the moment. Budget planning is confounded by uncertainty in revenues. Indeed, while expenses are explicit and largely under our control, revenue from the university is not clearly linked to course enrollments, which are a key driver in the "bums in seats" budget model used at UBC. We are presently engaged in a strategic planning process to set our department priorities and future hiring areas.

*Roger Beckie*

## **UNIVERSITY OF VICTORIA, School of Earth and Ocean Sciences**

### **Enrolment**

- Undergraduate enrollment, after climbing continuously since 2004, appears to have stabilized at about 2000 students: 804 students enrolled in first year SEOS courses; 369 in second year; 560 in third year; and 262 in fourth year courses.
- 246 students are pursuing BSc degrees in SEOS (the number of declared Major and Honours students). This number is a minimum because a significant number of students do not declare their degree until well into their final year. Of these, 160 are pursuing Earth Science degrees, 17 joint SEOS-Physics degrees, 15 joint SEOS-Chemistry degrees, 26 joint SEOS-Geography degrees, and 28 joint SEOS-Biology degrees.
- Field Schools continue to be a challenge. Enrolment in our Introductory Geology Field School, taught at the end of 2<sup>nd</sup> year, remains steady at about 60 students, requiring us to teach two sections of 30 students each. Enrolment in our fourth year Advanced Field School (a transect of the Cordillera), dropped from 29 students (the maximum we could accommodate in 3 vans) last year to 21 students this year. We suspect that a number of students delayed taking EOS 400 in order to participate in the 2015 course which will consist of a transect of the Troodos ophiolite in Cyprus.
- Currently 57 graduate students are enrolled in SEOS, including 21 MSc, 34 PhD, and 2 visiting graduate students. 3 new students are scheduled to join SEOS in January (1 PhD and 2 MSc) and 6 students (4 PhD and 2 MSc) are scheduled to defend prior to Christmas. Our graduate student numbers peaked at just above 80 students in 2011. The return to our historical average of about 60 students is thought to reflect in part a drop in the number of faculty. Specifically, two of our three geophysicists have retired over the past 3 years. Geophysics students typically make up more than a quarter of our graduate student population, and the loss of two professors has resulted in a drop in the number of geophysics graduate students.

### **Program / Course Changes**

Course offerings remained unchanged over the past year. We have been unable to offer a Hydrogeology course for 3 years now and this represents a significant gap in our undergraduate program. We are currently discussing revising our undergraduate offerings in an effort to provide a full undergraduate program in Ocean and Atmospheric sciences. Such a program would include a dedicated 'Ocean & Atmosphere' field school. It is unclear at this point if we can accommodate such a program given our faculty numbers and a fixed budget.

### **Faculty / Staff**

Last year saw us lose Prof. George Spence (geophysicist) to retirement leaving us with one geophysicist (Stan Dosso). We were, fortunately, able to hire a replacement geophysicist, Dr. Lucinda Leonard, however her position is a 5-year term position that cannot be converted into a tenure track position. We subsequently received permission to hire a Tier II CRC in Geophysics. A copy of the advertisement is appended to this report. The competition for our Geophysics position closes October 15<sup>th</sup>.

Dr. Kristin Morell joined SEOS in January 2014. Kristin was a research fellow at the University of Melbourne. Her Ph.D., undertaken at Pennsylvania State University, focused on the tectonic evolution of Central America as constrained by topography and basin development. Kristen's current research involves exploration of the interactions between geomorphology and tectonics, and involves research projects in the Himalayas, East Timor and, closer to home, the Olympic Peninsula.

Our staff contingent remains unchanged. Three office staff remain responsible for all administrative activities. We have 3 senior laboratory instructors, and a single technical staff member (0.8 of a position) who fills the dual roles of ICP-MS Manager and Geochemical Lab Manager. To say that we are lacking in terms of technical support would be a significant understatement.

### **Issues / Challenges**

Although our undergraduate student numbers appear to have stabilized, we remain stretched to (beyond?) capacity. Three geology faculty members taught 'above load' again this past year in order to accommodate all the students. One of our Geologists was denied his application for study leave as the absence of one more geologist would have left us unable to offer our undergraduate program in the Earth Sciences. Even with the addition of Dr. Kristin Morrell we remain incapable of teaching our undergraduate program without calling upon at least 2 professors a year to teach above their required load.

Our student growth has been almost entirely in either geology or geophysics. Attracting students into our Ocean and Atmospheric programs is necessary to balance the department, hence our efforts at crafting an attractive Ocean and Atmosphere undergraduate program.

*Stephen Johnston*