



Department of Earth Sciences

Graduate Student Handbook

2016-2017

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WELCOME TO THE DEPARTMENT OF EARTH SCIENCES

Introduction

This document provides an overview of the academic environment and logistical support associated with your tenure as a graduate student in the Department of Earth Sciences, Carleton University. You are a significant part of the Department's character and we want you to have an enjoyable and productive stay. The departments of Earth Sciences at Carleton University and University of Ottawa form the *Ottawa-Carleton Geoscience Centre*, one of the largest graduate teaching and research institutes of earth sciences in Canada. This institutional arrangement facilitates enrolment in courses in either of the departments and access to a diverse suite of research tools.

For more information, please see <http://www.earthsci.carleton.ca/ottawa-carleton-geoscience-centre>

At Carleton University, departmental facilities (offices, classrooms, research laboratories) are distributed between two buildings: Steacie (SC) and the Herzberg Laboratories (HP). In university publications (hardcopy, online) the department's acronym is EARTH.

An Appendix to this document provides a variety of information regarding facilities and their location on the grounds of Carleton University, the utility of the Campus Card, transportation options, and security/safety protocols.

Office Space/Keys/Telephones

Office space for graduate students is assigned by the Department's Space Committee based on availability. Each office room has a telephone available to all grad students assigned to that room.

Keys for offices and laboratories are supplied by the Administrator based on the student's requirements and lab-access permissions by the supervisor of a given lab.

A \$50 key deposit is required, and will be refunded (by direct deposit) at the completion of your degree, upon return of the keys.

Mail

Graduate students are assigned a communal mailbox in the department's Main Office (2115 HP). Please check regularly so that these mailboxes don't overflow.

Computers and network connections

If you are using a computer purchased by Carleton University, through research grant or research contract, it is property of Carleton University.

You can purchase university-licensed software at a discount. See online (CCS) for a list of software, and purchases are made at the CCS Hardware Services office, 1251 HP.

Teaching labs (2110, 2120, and 2130 HP)

Most graduate students will access teaching labs as teaching assistants, but these labs can also be used for presentations, meetings, and laying out of materials when not otherwise in use by undergraduates. Note: priority is given to undergraduate use of these laboratories. You have "swipe access" by using your campus card. Monday to Friday access starts at 8 am.

Please remember:

- 1) computers should be logged out after use (if you are a TA, the next class may want them left on);
- 2) in contrast, the data projector must be turned off use (note: leaving the projector on greatly reduces the working life of the projector (each bulb is ~\$800); if you see a filter-cleaning message from the projector, please contact computersupport@earthsci.carleton.ca immediately.
- 3) teaching lab materials must be put back in storage or located off the benchtops in the labs (if you are temporarily making use of a teaching lab, all non-teaching material must be removed from the room);
- 4) the whiteboards are to be wiped clean after use

Note: card access permits the administration to identify entry of individuals, therefore any damage or mess that is found in the room will be the responsibility of the person(s) in that room at the time.

Electronic Classroom (3120 HP)

Students (graduate and undergraduate) are not permitted in this room without direct faculty supervision. If there is loss or damage to equipment in this room, the users (faculty, students) at the time are held responsible.

Map/Chart/Figure Plotting

Large-scale plotting (e.g., conference posters) is available. Please contact computer support at (computersupport@earthsci.carleton.ca) for information of file type before submitting. Plotter limitations are 44" (111 cm) in any direction. Payment is by eShop submitted to the thesis supervisor for approval or by cash. Cost of each poster will depend on paper type and overall length of the poster. Costs range from \$3.00/linear ft to \$12.00/linear ft.

Research Laboratories

Access to research laboratories is dependent on your research needs. Permission to use any equipment in a laboratory must be obtained from the faculty member responsible for the lab or equipment, not another graduate student. Research labs are not lunch spots, nor offices, and computers are to be used only for research purposes. Personal email must be sent from your own laptop/desktop machine.

FOR EARTH SCIENCES TEACHING ASSISTANTS

Teaching assistants are an important part of the Department's instructional cohort. A separate TA manual is available, but the critical components of that document are reproduced here:

Ensuring student safety: As an instructor, you must be aware at all times of potential danger for students. A First Aid kit is located in the Earth Sciences Main Office and first aid can be summoned from University Safety. Please note anything used from the first aid kit on the sheet inside, including band-aids, so that it can be replenished. After hours, call University Safety at 4444 from an office phone and 613-520-4444 from any other phone.

1. Chemicals

Harsh chemicals are not normally used in teaching labs, other than dilute (10% vol) HCl. There should not be any adverse reaction to using this acid, however students should be advised to wash hands after

handling acids and materials. Any chemical splash in the eye should immediately be treated at the eyewash station.

Eyewash stations are located in all teaching labs or rooms 2110, 2120 and 2130. TAs should familiarize themselves with the operation of these eyewash stations. Alert the Earth Sciences Main Office and/or University Safety if the eyewash station is used.

2. Physical Presence in Labs

Students do move around a lab, but at no time should they be putting themselves or others at risk by climbing/sitting on desks, or moving any large/heavy rock samples around the room (see also **Student Behaviour** below)

In the event of a fire alarm, clear the room and direct students to move out of the building through the main Herzberg entrance, then away from the building. Take the keys to the room with you and ensure the door is closed. Do not re-enter the building until you are advised that it is safe to do so.

Student Behaviour: Students need to be reminded that rocks, sediments, and minerals form the Department's teaching archive, and are as valuable as journals and books in a library. The lab material must be treated with respect, and the equipment handled carefully. Most of the materials are irreplaceable: they have been acquired over time, sometimes at great field expense, often from remote locations, and carried long distances to give students the opportunity to see rocks normally only seen in the field. Equipment should be handled carefully so that it will be available for all lab sections.

Please note and report any issues with materials or equipment to the Earth Sciences Main Office or Beth Halfkenny, Curator of Collections.

Course keys: TA's will sign out course keys from the receptionist in the Earth Sciences' Main Office. A key set has been prepared for each course, and will include a key to a TA cabinet or drawer, and if required for your course, a key for cabinets containing course specimens and a key to access microscopes. The "TA" key will open a cabinet in the corner of the room for 2110, 2120 and 2130.

You must return the key and sign it back in at the end of your lab section, so that TAs for other sections will be able to find it. For lab sections that run after hours (this includes evening labs, labs finishing at 5:30 pm) the key should be put into the drop box outside the main office. For 6:00 pm – 9:00 p.m. lab TA keys need to be signed out before the main office closes at 4:00 p.m.

Note about TA Cabinets: A cabinet/drawer in each laboratory classroom will be used by all TA's for all courses in that room. It will house supplies, including remotes, laser pointers, manuals, white board markers and erasers, acid bottles and mineral ID tools, microscope tools, spare parts and manuals. The rest of the cabinet can be used for things such as lab answer keys, temporary trays for tests, quizzes and lab exams. Any trays that you use for your course should be labeled and materials returned to their original location when the course is finished.

Set up and return of materials: Each course has multiple lab sections and many labs will run immediately after another. Set up and take down time must be built into the 3 hours allotted. Ensure that microscopes are put away properly, other teaching materials are returned to their storage location, and the lab is ready for the next class. **TA's will be required to ensure materials are ready to use at the beginning of term, and reorganized and returned to their original storage location at the end of term.** Time for this task should be built into your TA agreement with the Instructor.

Issues with rooms, materials, equipment: If something is missing, if HCl supplies are getting low, if you are looking for a specimen, if microscopes need adjustment etc., please see Beth Halfkenny, Curator of

Collections in 2115 C HP, or send an email to beth.mclartyhalfkenny@carleton.ca or contact the Office Staff.

SAMPLE PREPARATION LABORATORY

The Department has a laboratory for various types of sample preparation. Graduate students must be trained by Tim Mount, the Laboratory Technician on each piece of machinery. You will be required to complete WHMIS instruction (available online through Environmental Health and Safety; contact Beth Halfkenny for more details) and training for any chemicals used in sample preparation. You will be required to sign in and out of the Laboratory Log Book whenever you work in the lab. All users will adhere to safety requirements of this Laboratory, specifically the use of hearing and eye protection. All users will ensure that their work area is returned to clean condition when finished work. You must plan to do your work when the Laboratory Technician is on site. Working during other times may be accommodated if you have sufficient experience, and will be granted only at the discretion of the Laboratory Technician.

No rocks will be stored in this lab.

GRADUATE STUDIES

Online Systems for Graduate Students

In the middle of the home page of Carleton University (www.carleton.ca), individual links provide access to a suite of web-based portals: *A-Z, Library, Central, CuLearn, MyCarleton*

MyCarleton – student email, library account, access to Carleton Central <https://students.carleton.ca/>

Carleton Central – Link for administrative material for graduate students: your admission application, register for courses, change your address, view your student record, TA Management System, financial information and much more. <https://central.carleton.ca/>

CuLearn - Access to courses that you are enrolled in, TA'ing, or as principle instructor:
<https://carleton.ca/culearn/>

Graduate Coures

Listings of the graduate courses offered by the earth science departments at Carleton University and University of Ottawa provided by email. The courses offered in any given year are dependent on faculty availability.

Rules and Regulations

The rules and regulations governing the graduate program are extensive and are set out in the Faculty of Graduate Studies and Research Calendar, found online:

<http://calendar.carleton.ca/grad/gradregulations/administrationoftheregulations/>

Graduate Calendar;

<http://www.carleton.ca/calendars/grad/current/>

Student Status

For information on Full-Time, Part-Time and Change of Status, refer to section 7.9 and 7.10 in the 2015-2016 Graduate Calendar. The link is.

<http://calendar.carleton.ca/grad/gradregulations/administrationoftheregulations/>

Continuous Registration in Thesis

Important: Students must register during all successive terms (fall, winter and spring/summer) after initial registration in the thesis EARTH 5909 or EARTH 6909.

If you do not register you will lose your graduate student's status and your funding as stated by sections 7.1, 8.1 and 8.2 in the Graduate

Calendar. <http://calendar.carleton.ca/grad/gradregulations/administrationoftheregulations/>

Time Limits for Program Completion

If it appears that the time limit defined for M.Sc. or Ph.D. studies will be exceeded, an extension must be requested (Section 13.5 of Graduate Calendar):

<http://calendar.carleton.ca/grad/gradregulations/administrationoftheregulations/>

Forms are available on the Faculty of Graduate Studies website

Tuition

<http://www.carleton.ca/studentaccounts/tuition-fees/>

Academic Standing

A grade of B- or better must normally be obtained in each course. Letter grades and grade point equivalents are in section 10.1 of the Graduate Calendar

<http://calendar.carleton.ca/grad/gradregulations/administrationoftheregulations/>

FINANCIAL AWARDS

Graduate Student Funding

Awards granted by the University normally consist of a scholarship and/or teaching assistantship. A research assistantship is commonly provided by the supervisor.

Important: Before a student can receive payment from the University, you must be "documented". Please visit the Human Resources Office, Room 507 Robertson Hall where the necessary forms regarding tax deductions, etc., can be filled out: <http://www.carleton.ca/hr/for-employees/new-employees/>

Payments are issued on the second last working day before the 15th of the month and second last working day before the end of every month.

Note: for the beginning month of each term (September, January and May) there is only one payment at the end of the month.

Teaching assistantships are paid over Fall and Winter terms, whereas scholarships and research

assistantship are paid over Fall, Winter and Spring terms.

Scholarships and Other Awards

All qualified students are urged to apply for internal (Carleton, Departmental) and external scholarships. <http://gradstudents.carleton.ca/awards-and-funding/>

This website lists external (e.g., OGS, NSERC) awards and internal (Departmental, University) awards. However, before applying, please read the eligibility for any award before spending the time to apply. Many of these require reference letters, so it is important to make sure that you are timely in request for letters and on time with your application.

Take advantage of the availability of these awards.

They improve your financial situation, and look good on job applications!

Travel Grants:

Attending and presenting at conferences is a great opportunity for graduate students. Talk with your supervisor if you're interested in attending a conference. Most earth science societies offer support for students, and there are internal (university) grants available for students to attend local, national, and international conferences. It is possible to volunteer at most conferences for reduced or free registration.

Some of the internal grants available to Carleton Earth Science students include:

GSA (Graduate Students Association) who offer a maximum amount of \$200
<http://gsacarleton.ca/index.php/>

Travel Grants from the Department of Earth Sciences. The department has a small annual budget (allotted by Graduate Studies), applications are reviewed as received, contact the Administrator for more information. Forms are available at <http://gradstudents.carleton.ca/forms-policies/>, under Grad Student Travel/Research Bursaries.

If travel costs are going to be reimbursed you can fill out a hardcopy or fill out a form online (www5.carleton.ca/travel/) found on the Financial Services website.

Ask your supervisor for support; many include some financial support in their research grants.

Teaching Assistantships

Teaching assistantships are awarded to graduate students as part of their funding packages. The Graduate Supervisor uses the online Graduate TA Management System to assign courses. **In order to highlight your experience and to be selected for specific courses it is important to fill out the online Graduate TA Profile.**

This profile can be accessed by logging into **Carleton Central**, then entering into the **Graduate TA Management System** (Under the heading of Student Support Services). At the beginning of the term in which you TA you will need to accept the duties that are assigned to you by the instructor (Carleton Central/Graduate TA Management System/Graduate TA Assignments). Midway through the term you will need to meet with your instructor and discuss any necessary changes to your duties and accept again on Carleton Central.

Teaching-Assistant Mentor

The TA Mentor helps teaching assistants with discipline-specific support in the teaching and learning duties that they perform at Carleton University. The TA Mentor is supervised by the Graduate Supervisor and Educational Development Centre to coordinate peer observations, help organize departmental events (both social and academic), meet with teaching assistants, and facilitate training sessions.

<http://carleton.ca/tasupport/mentorship-program/earth-sciences/>

Teaching Assistant – Training Opportunities and Paid Training Hours

The Educational Development Centre (EDC – 410 Dunton Tower) provides training opportunities to teaching assistants through various workshops and teaching talks. Teaching assistants in addition to their allotted contract hours, can gain an additional 5 hours of paid training (please talk to your TA Mentor for more information). The EDC also provides certification programs: *Certificate in Teaching Assistant Skills* and *Preparing to Teach*. The EDC is an indispensable resource for gaining valuable teaching experience, and is key to those graduate students interested in pursuing a career in academia. TA's are required to take the Supervisor's Laboratory Training course:

Please see *TA Support* for further information: <http://carleton.ca/tasupport/>

Graduate Students Association (GSA)

The GSA is the autonomous student body that represents 3000+ full- and part-time graduate students at Carleton. One of GSA's primary goals is to promote communication between the graduate body and University administration and departments. It represents the interests and voice of graduate students on university committees.

Graduate students are automatically part of the GSA, and the department should have a representative on the GSA council: <http://gsacarleton.ca/>

The GSA, however, also offers social networking, please visit their website for more information.

Health and Dental Plans

There is a health and dental program offered by the graduate student association (GSA).
<http://gsacarleton.ca/category/news/health-plan/>

M.Sc. PROGRAM REQUIREMENTS

Requirements for the successful completion of a M.Sc. degree in Earth Science:

- 1) 1.5 credit of course work, 0.5 credit of which may be at the senior undergraduate level
- 2) Participation in the Geoscience Seminar Series (0.0 credit). Participation comprises one lecture (open to all members of the OCGC) describing an aspect of the candidate's research study and must be completed within 12-16 months of their registration in the M.Sc. program.
- 3) A research thesis (3.5 credits) defended at an oral examination
- 4) A public lecture, preceding the oral examination, which is based on the thesis research

Estimated Timelines for a Full-Time M.Sc. Student

| <u>Term</u> | <u>Completed</u> |
|----------------------|-----------------------|
| 2 st term | Thesis proposal |
| 4 th term | Geoscience Seminar |
| First 5 terms | Course work completed |

M.Sc. Progress Reports

These reports are complete with your supervisor in order to set goals, and track your advancement. Progress reports for M.Sc. students are to be completed twice a year, usually in November and May. Contact your supervisor, or the Graduate supervisor for additional information.

Thesis Proposal

The thesis proposal is an opportunity for the student to describe the question(s) that their research project will address. It must clearly state the nature of the research, data collection methods, proposed analytical methods, and conditions under which study sites or equipment will be available during the period of research. The body of the proposal should be no more than 10 doubled spaced pages, augmented by references (where applicable), and a few key diagrams, figures or maps.

The front page of the document must include the following:

- a) title
- b) student name
- c) names of supervisors (defined as such) and their affiliations
- d) list of names and affiliations of the advisory board

The student and supervisor(s) must initial or sign adjacent to their names on this title page.

Thesis Advisory Committee

An advisory committee is a group of, usually, 3 individuals (one being your supervisor, or represented by co-supervisors) whose expertise cover the discipline(s) involved in the thesis research. The committee should be defined and be included in the thesis proposal. The purpose is to provide the student with the opportunity to access expertise other than what the advisor may provide. The members of the advisory committee other than your supervisor(s) may be from outside of the Department and University. It is very important to make sure that that any individual outside of the Department understands that being on the advisory committee does not equate with co-supervision nor automatically being an examiner at the defense.

Geoscience Seminar (ERTH 5906)

Participation comprises one lecture (open to all members of the OCGC) describing an aspect of the candidate's research study and must be completed within 12 to 16 months (depending on the timing of the start of the research project) of their registration in the M.Sc. program. This presentation is aimed at the general geological community. The Geoscience seminars are typically held at the end of the fall and winter terms, after classes have finished but before exams have begun. Contact either the Graduate Supervisor or the Administrator for more information concerning the dates of the Geoscience Seminars.

It is mandatory to register in EARTH5906 within the first 4 terms of your program.

Thesis Format

The Faculty of Graduate Studies provides guidelines for the format of theses, <http://www5.carleton.ca/fgpa/thesis-requirements/formatting/>, and includes information about preparation and presentation of the thesis.

It is expected that scientific data and ideas will be published in publically available literature. There has been a strong shift in the earth sciences (certainly at the Ph.D. level, and increasingly so for M.Sc. theses) to produce a thesis format that allows easy transport into a document submitted for publication. Supervisors expect graduate students to develop their writing skills.

Thesis Submission and Preparation for Defence

The thesis examination copy is the version of the thesis that has been completed to the satisfaction of the thesis committee, and is certified by the supervisor and advisory committee as being ready for submission to the examining committee for purposes of the defence. The Thesis Supervisor provides the examination committee to the Administrator who will upload the information and create the thesis record. Once this information has been input, the Administrator will authorize the pre-defence copies upload. This will be approved by the thesis supervisor(s) and Chair of the Department. After the upload, the Administrator will send an electronic copy to the committee members. If there are any committee members who wish a paper copy, the student will provide these copies. The pre-defence copies must be uploaded 3 weeks prior to the defence date in order to meet the deadlines for approvals and copies to be sent to the committee members.

Thesis Defence

The M.Sc. Examining Board typically consists of four examiners: the thesis supervisor (or co-supervisors), another member of the Earth Sciences department, and **either** a member of the Earth Sciences department at the University of Ottawa **or** an examiner from Carleton but outside the candidate's department – i.e. normally Biology, Chemistry, Physics, or Engineering. The departmental Chair or designate acts as the Chair of the Examining Board, and ensures an orderly and fair examination.

Format of Thesis Defence

The defence is normally preceded by the public Pre-defence Lecture, commonly 30-40 minutes in duration. After a short break, the candidate leaves the room, and a brief meeting of the Examining Board is held at which time the external examiner will be acquainted with the normal procedures of the examination as conducted in the Department. Upon completion, the candidate will be invited to enter the room. An initial round of questioning will follow with each examiner being allowed ten to fifteen minutes to pose questions concerning the thesis to the candidate. During this round of questioning the other examiners are not expected to interrupt the dialogue between the candidate and the specific examiner.

A second round of questions will follow, again with each examiner being allowed ten to fifteen minutes, but with the understanding that other members of the examining board may interject with comments or with related questions. In both the first and second rounds of questioning, the external examiner will normally be the first member of the examining board to pose questions and the thesis supervisor the last to ask questions. A final question may be solicited from each member of the board if the Chairperson deems it appropriate. The Chairperson will ask the candidate to make final remarks if desired. Following the conclusion of questioning the candidate and any observers will withdraw and the committee will arrive at its decision.

Guidelines for Fast Tracking M.Sc. students to Ph.D. Program

If a student who was admitted to the M. Sc. program is interested in pursuing the Ph. D. program, the student can be “fast tracked”. Funding will be revised for the new program.

A written recommendation should be submitted by the student's supervisor to the Graduate Supervisor. The recommendation must specify that the student's academic and research performance is adequate (a minimum of A- average in M. Sc. courses) for transferring to Ph.D. If the student recommendation is approved, then the student must successfully pass the Ph.D. comprehensive examination BEFORE the commencement of the first term as a new Ph.D. student. To change programs, a new admission must be processed. Students must apply for the new program through the Ontario University Application Centre (OUAC).

PH.D. PROGRAM REQUIREMENTS

Requirements for the successful completion of a Ph.D. degree in Earth Science

- 1) 1.0 credit of course work at the graduate level. The thesis advisory committee may prescribe additional courses
- 2) A comprehensive examination conducted by the thesis advisory committee. The comprehensive examination includes the presentation of a thesis proposal and involves three areas of geoscience specialization chosen by the student's advisory committee and approved by the Director of the Ottawa-Carleton Geoscience Centre
- 3) Participation in the Geoscience Seminar Series (0.0 credit). Participation comprises one lecture (open to all members of the OCGC) describing an aspect of the candidate's research study and must be completed within 16 months of their registration in the Ph.D. program.
- 4) A research thesis (9.0 credits), defended at an oral examination before an examination board that includes an external examiner
- 5) A public lecture, preceding the oral examination, which is based on the thesis research

Estimated Timelines for a Full-Time Ph.D. Student

| <u>Term</u> | <u>Completed</u> |
|-----------------------|---------------------------|
| 3 rd term | Thesis proposal |
| 3 rd term | Comprehensive examination |
| 4 th term | Geoscience Seminar |
| First 5 terms | Course work completed |
| 12 th term | Thesis defended |

Residence Requirement

The residence requirement for the Ph.D. degree is at least four terms of full-time study.

Progress Reports

These reports are to be done with your supervisor in order to set goals, and track your advancement and to check that milestones have been met. Progress reports for Ph.D. students are to be completed twice a year, usually in November and May. Contact your supervisor or the Graduate Supervisor for additional information.

Thesis Proposal

The thesis proposal is an opportunity for the student to describe the question(s) that their research project will address. It must clearly state the nature of the research, data collection methods, proposed analytical methods, and conditions under which study sites or equipment will be available during the period of research. The body of the proposal should be no more than 10 doubled spaced pages, augmented by references (where applicable), and a few key diagrams, figures or maps.

The front page of the document must include the following:

- a) title
- b) student name
- c) names of supervisors (defined as such) and their affiliations
- d) list of names and affiliations of the advisory board (note: this is not necessarily the same as the Comprehensive Examination Board)

The student and supervisor(s) must initial or sign adjacent to their names on this title page.

Thesis Advisory Committee

An advisory committee is a group of, usually, 3 individuals (one being your supervisor, or represented by co-supervisors) whose expertise cover the discipline(s) involved in the thesis research. The committee should be defined and be included in the thesis proposal. The purpose is to provide the student with the opportunity to access expertise other than what the advisor may provide. The members of the advisory committee other than your supervisor(s) may be from outside of the Department and University. It is very important to make sure that that any individual outside of the Department understands that being on the advisory committee does not equate with co-supervision nor automatically being an examiner at the defense.

Ph.D. Comprehensive Examination

The Ph.D. Comprehensive Examination is held to determine whether or not the student is adequately prepared for doctoral research in the chosen fields of study. The examination is normally taken within the first twelve months of study. The examination is conducted mainly at the senior undergraduate level. At least one of the fields must be within the scope of a typical core curriculum in Geology. The examination is conducted orally by an assembled board of three persons, which includes the student's supervisor and members of the advisory committee, and is chaired by the chairman of his department or his deputy. The composition of the board shall be communicated to the student by the end of the first term of registration in the program, and the student shall be responsible for consulting the members individually before the examination, for their advice. At the beginning of the examination, the student should give a short (~20 minute) presentation on the Ph.D. thesis proposal. This presentation is then followed by the question-and-answer oral examination. Following the examination, the board will judge the candidate's performance as satisfactory or unsatisfactory.

If judged unsatisfactory, the candidate will either

- a) be permitted to repeat the examination once, or
- b) pass conditionally or performing supplementary work to the satisfaction of the board, or
- c) be required to withdraw from the program.

Procedures

The supervisor will select the fields of examination and examiners in consultation with the student, which are recorded on the Comprehensive Examination Form, but the supervisor will invite the examiners to participate

The Graduate Supervisor/Chair/Director of the Centre will confirm the Comprehensive Examination form, approving the chosen fields and examiners.

The student should talk to members of the approved examination board to understand the expected breadth of understanding needed for the specific examination topic, and obtain signatures from the examiners indicating their involvement in the examination. This can occur well before the proposed date, but must occur six (6) weeks prior to the proposed date. Six weeks prior to the proposed date, the student will provide each member of the examination board with a copy of the proposal. The members have two weeks to inform the Graduate Advisor on the acceptability of the proposal.

In summary, the Comprehensive Exam Form should be handed directly to Sheila Thayer, Graduate Studies Administrator, four weeks before the examination date along with a copy of the thesis proposal signed by the supervisor and approved (via signatures) by the committee members.

Geoscience Seminar (ERTH 5907)

Participation comprises one lecture (open to all Members of the OCGC) describing an aspect of the candidate's research study and must be completed within 12 to 16 months of their registration in the Ph.D. program. This presentation is aimed at the general geological community. The Geoscience seminars are typically held at the end of the fall and winter terms, after classes have finished but before exams have begun. Contact either the Graduate Supervisor or the departmental Administrator for more information concerning the dates of the Geoscience Seminars.

Thesis Format

The Faculty of Graduate Studies has guidelines for the format of theses. For further information on format, preparation and presentation of the thesis, additional details are available on-line.

<http://gradstudents.carleton.ca/thesis-requirements/>

In academia, it is expected that scientific data and ideas are published in publically available sources. **It is expected that the Ph.D. candidate will have at least three manuscripts ready to submit, submitted to, accepted for, or published in a scholarly journal (or edited book) at the time of the thesis defence.** The thesis content includes the bodies of these manuscripts, each as a chapter, along with chapters of Introduction, and Conclusions, that provide a coherent framework linking the three manuscripts.

Thesis Submission and Preparation for Defence

The examination copy is the version of the thesis that has been completed to the satisfaction of the thesis committee, and is certified by the supervisor and advisory committee as being ready for submission to the examining committee for purposes of the defence. The Thesis Supervisor provides the examination committee to the Administrator who will upload the information and create the thesis record. Once this information has been input, the Administrator will authorize the pre-defence copies upload. This will be approved by the thesis supervisor(s) and Chair of the Department. After the upload, the Administrator will send an electronic copy to the committee members. If there are any committee members who wish a paper copy, the student will provide these copies. The pre-defence copies must be uploaded 5 weeks prior to the defence date in order to meet the deadlines for approvals and copies to be sent to the committee members. (5 weeks prior for Ph.D.)

Thesis Defence

The Ph.D. Examining Board typically consists of five examiners; the external examiner, the thesis supervisor (or co-supervisors), another member of the department, an examiner from the University of Ottawa, an examiner from outside the candidate's department – i.e. normally Biology, Chemistry, Physics, Engineering, and the Chair of the Examining Board, appointed by Graduate Studies. The Graduate Supervisor must approve the external examiner.

Format of Thesis Defence

After a brief meeting of the Examining Board at which time the external examiner will be acquainted with the normal procedures of the examination as conducted in the Department, the candidate will be invited to enter the room and to present an introduction to the thesis. This summation will normally be ten minutes in length. An initial round of questioning will follow with each examiner being allowed ten to fifteen minutes to pose questions concerning the thesis to the candidate. During this round of questioning the other examiners are not expected to interrupt the dialogue between the candidate and the specific examiner.

A second round of questions will follow, again with each examiner being allowed ten to fifteen minutes, but with the understanding that other members of the examining board may interject with comments or with related questions. In both the first and second rounds of questioning, the external examiner will normally be the first member of the examining board to pose questions and the thesis supervisor the last to ask questions. A final question may be solicited from each member of the board if the Chairperson deems it appropriate. The Chairperson will ask the candidate to make final remarks if desired. Following the conclusion of questioning the candidate and any observers will withdraw and the committee will arrive at its decision.

APPENDIX A

Ottawa-Carleton Geoscience Centre

Established in 1982, the Centre is one of the largest graduate teaching and research institutes of Earth Sciences in Canada, and represents the combined expertise of the Departments of Earth Sciences at Carleton University and University of Ottawa. This arrangement simplifies the process of taking courses at both universities and access to additional analytical techniques.

<http://www.earthsci.carleton.ca/ottawa-carleton-geoscience-centre>

Map of Carleton University and University of Ottawa;

The campus maps, which shows the names and locations of buildings, parking lots, and the tunnel system.

<http://www2.carleton.ca/campus/>

<http://www.uottawa.ca/maps/>

Carleton Campus Card

During your duration as a student at Carleton University, your Carleton Campus Card will be the single most important piece of student identification you possess! It provides access to library materials, photocopying, shuttle bus, and can be used as a debit card at certain campus outlets. Visit the campus card website for more information. <http://www2.carleton.ca/campuscard/>

Transport

U-PASS

Undergraduate student union, and the graduate student association (GSA) have a contract with *OC Transpo* who operates the bus and O-train network in Ottawa. As part of this arrangement, undergraduate and graduate student fees support the transportation network, and students are issued a bus pass. If you don't wish to have a bus pass, you may be exempt from having to pay. Information about the pass, potential exemption, and where to pick up your U-PASS card can be found at the U-PASS website:

<http://www2.carleton.ca/upass/>

The Campus Card does not work as your U-PASS.

OC Transpo

See the OC Transpo website for routes and schedules: <http://www.octranspo1.com/?from=splash>

Parking

Carleton University offers pay parking during the week and is strongly enforced. Visit the parking services website to determine the parking solution that suits you best. <http://www2.carleton.ca/parking/>

Libraries

Carleton University has one primary library, MacOdrum Library. Books and articles can be checked out using your campus card. Also, using the online program "RACER", documents not held at Carleton University can be requested from other universities. Each department has a library representative, and through that person, faculty, staff and students can request certain books be purchased. The library

representative for Earth Sciences is Brian Cousens.

Security / University Closure / Cancellation of Classes

Through Carleton Central, you should provide up-to-date information of address and telephone information; emergency contact information, should the University need to contact someone with regard to your health; register for the Emergency Notification System that provides information from Campus Safety regarding any emergency on the university grounds; and Service Disruption Notification that provides alerts to unplanned service interruption (e.g., water main breaks, road closures, etc.)

As a graduate student, you have access to the university grounds 24/7. At night, on weekends, and during holidays, buildings on campus may be locked for security reasons. If you require access to a building during these periods, visit the Security Office at Robertson Hall prior to the time you need entry.

If you are working late in the HP and Steacie buildings or are in a lab on the weekend, it is important to establish a personal safety protocol: e.g., let someone know that you are in the department; notify Security that you are in a specific lab until a certain time, etc. Safety measures are defined online:

<http://carleton.ca/safety/protect-yourself/>

The university does not close down due to weather (i.e. there are no snow days) but on occasion it has closed early due to bad weather.

ATHLETICS / EXERCISE

Carleton University has great indoor and outdoor athletic facilities available to the entire university community. See <http://www2.carleton.ca/athletics/facilities/>.

In addition, there is ample opportunity to take a walking/running break alongside the canal in non-Winter months, and skating on the canal in the Winter months. Don't stay indoors all day!

Graduate students of the Earth Science department often enter teams into intramural leagues (e.g., GSA Baseball); ask around if you're interested!

<< Please advise Prof. George Dix (Grad. Supervisor) of errors, omissions, or needed additions >>