



2015-2016

**Department of Chemistry
Graduate Studies
Handbook**

Duke University

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Director of Graduate Studies
Graduate Student Handbook

This information applies to the academic year 2015-2016 and is accurate and current, to the best of our knowledge, as of August 2015. Inasmuch as changes may be necessary from time to time, this handbook and the matters contained therein are not binding on the Department of Chemistry or Duke University, and this handbook should not be construed as constituting a contract between Duke University and any individual. The Department of Chemistry reserves the right to change the program of study, academic requirements, lecturers, teaching staff, the announced calendar, and other matters described in the handbook without prior notice.

NOTE: *In January 2007, the Department of Chemistry moved into a new state-of-the-art research facility, the French Science Center. The move was completed by May 2007. The new building, totaling over 275,000 square feet, is a shared research facility with groups from Biology, Physics, Mathematics and the Medical Center occupying space.*

The move saw an increase for the Chemistry Department for research space, teaching space and instrument support space. Research space will go from approximately 29,250 square feet to 37,000 square feet. Teaching space went from approximately 14,000 square feet to 15,500 square feet and instrument support went from approximately 1,900 square feet to over 2,700 square feet.

To contact the Graduate Studies Office please email the Director of Graduate Studies Assistant, Caroline Morris at caroline.morris@duke.edu.

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Academic Year 2015-2016 Calendar

FALL 2015

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| August 18 | Tuesday. New graduate student orientation begins |
| August 18 | Tuesday. New undergraduate student orientation begins |
| August 19 | Wednesday. 11 a.m. Convocation for new undergraduate students; 4 p.m. Convocation for graduate and professional school students |
| August 24 | Monday. 8:30 a.m. Fall semester classes begin; Drop/Add continues |
| September 4 | Friday. Drop/Add ends |
| September 7 | Monday. Labor Day. Classes in session |
| October 2 | Friday. 5:30 p.m. Founders' Day Convocation |
| October 4 | Sunday. Founders' Day |
| October 9 | Friday. Last day for reporting mid-semester grades |
| October 9 | Friday. 7 p.m. Fall break begins |
| October 14 | Wednesday. 8:30 a.m. Classes resume |
| November 4 | Wednesday. Registration begins for Spring 2016 |
| November 6 | Friday. Last day to withdraw with W from Fall 2015 classes (Undergraduates Only) |
| November 18 | Wednesday. Registration ends for Spring 2016 |
| November 19 | Thursday. Drop/Add begins for Spring 2016 |
| November 24 | Tuesday. 10:30 p.m. Thanksgiving recess begins |
| November 24 | Tuesday. Graduate classes end |
| November 30 | Monday. 8:30 a.m. Classes resume |
| Nov. 30-Dec. 7 | Monday-Monday. Graduate reading period |
| December 4 | Friday. Undergraduate classes end |
| December 5-7 | Saturday-Monday. Undergraduate reading period |
| December 8 | Tuesday. Final examinations begin (9 a.m.) |
| December 13 | Sunday. 10 p.m. Final examinations end |

SPRING 2016

| | |
|----------------------|--|
| January 10-12 | Sunday-Tuesday. Undergraduate Winter Forum |
| January 13 | Wednesday. 8:30 a.m. Spring semester begins: The Monday class meeting schedule is in effect on this day ; Regular class meeting schedule begins on Thursday, January 14; Classes meeting in a Wednesday/Friday meeting pattern begin January 15; Drop/Add continues |
| January 14 | Thursday. Regular class meeting schedule begins |

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| January 18 | Monday. Martin Luther King, Jr. Day holiday: classes are rescheduled on Wednesday, January 13 |
| January 27 | Wednesday. Drop/Add ends |
| February 22 | Monday. Registration begins for Summer 2016 |
| February 26 | Friday. Last day for reporting midsemester grades |
| March 11 | Friday. 7 p.m. Spring recess begins |
| March 21 | Monday. 8 a.m. Classes resume |
| March 30 | Wednesday. Last day to withdraw with W from Spring 2016 classes (Undergraduates Only) |
| April 6 | Wednesday. Registration begins for Fall 2016; Summer 2016 registration continues |
| April 15 | Friday. Registration ends for Fall 2016; Summer 2016 registration continues |
| April 16 | Saturday. Drop/Add begins for Fall 2016 |
| April 20 | Wednesday. Graduate classes end |
| April 21-May 1 | Thursday-Sunday. Graduate reading period |
| April 27 | Wednesday. Undergraduate classes end |
| April 28-May 1 | Thursday-Sunday. Undergraduate reading period |
| May 2 | Monday. Final examinations begin |
| May 4 | Wednesday. Undergraduate reading period (9 a.m. - 2 p.m.) |
| May 7 | Saturday. 10 p.m. Final examinations end |
| May 13 | Friday. Commencement begins |
| May 15 | Sunday. Graduation exercises; conferring of degrees |
| SUMMER 2016 | |
| February 22 | Monday. Registration begins for all Summer sessions |
| May 18 | Wednesday. Term I classes begin. The Monday class meeting schedule is in effect on this day. (Therefore, all summer classes meet this day.) Regular class meeting schedule begins on Thursday, May 19; Drop/Add continues |
| May 19 | Thursday. Regular class meeting schedule begins |
| May 20 | Friday. Drop/Add for Term I ends |
| May 30 | Monday. Memorial Day holiday. No classes are held |
| June 15 | Wednesday. Last day to withdraw with W from Term I classes (Undergraduates) |
| June 27 | Monday. Term I classes end |
| June 28 | Tuesday. Reading period |
| June 29 | Wednesday. Term I final examinations begin |

June 30 Thursday. Term I final examinations end
July 5 Tuesday. Term II classes begin
July 7 Thursday. Drop/Add for Term II ends
July 3 Friday. Independence Day holiday. No classes are held.
August 1 Monday. Last day to withdraw with W from Term II classes (Undergraduates)
August 11 Thursday. Term II classes end
August 12 Friday. Reading period (Until 7 p.m.)
August 12 Friday. Term II final examinations begin, 7 p.m.
August 14 Sunday. Term II final examinations end

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The Graduate Program in Chemistry

I. Introduction

The goal of our graduate course and examination scheme is to emphasize research and research accomplishment at an early stage, and to incorporate appropriate training devices in a flexible manner so that individual needs/goals of both the student and research advisor can be met. The scheme is an attempt to use our best collective wisdom in agreeing upon certain basics of training while at the same time recognizing that individuals and groups often differ in the mode and timing of the research training vehicles. We also recognize that our course and examination scheme must be effective in helping to identify at an early stage students who need additional help or supervision.

The concept of a "major" is not formally recognized. A student's committee, coursework, and his/her path through the examination scheme are individually designed by the student in conjunction with his/her advisor and supervisory committee, and are planned according to the particular research area and topic involved.

The major requirements of the Ph. D. program are:

- 22 Units of Graded Course Work
- 3 lab rotations
- Responsible Conduct in Research Training (12 credits)
- Research Progress Report/Prelim Document
- Preliminary Examination
- Oral Presentation Requirement
- Propositional Examination
- Ph.D. Dissertation and Examination
- Each of these requirements, along with other features of the graduate program, is described in the following sections.

II. Features of the Program

A. Graduate School Requirements

The Graduate School does not require registration for a fixed number of course units for the Ph.D. degree and leaves the specific course requirements up to the individual graduate programs. As a result, the course registration requirements for chemistry students primarily reflect the course requirements for the Ph. D. program in chemistry described in the next section. It should be noted that the M. S. Degree is not a prerequisite for the Ph. D. Degree.

In addition to any course requirements of the department, the Graduate School requires (1) payment of six semesters of full-time tuition or five if transfer credit has been approved, (2) a supervisory committee for the student's program of study, (3) continuous registration, (4) preliminary examination, (5) dissertation, and (6) final examination. All of these requirements are incorporated into the graduate program in chemistry. The Graduate School also requires training in the Responsible Conduct of Research (12 credits) through participation in a series of workshops sponsored by the Graduate School. International students whose native language is not English

must enroll in English language courses offered through the Graduate School, **during their first 3 semesters**, unless formally waived from this requirement by the Graduate School.

Students electing or required to move out of the PhD program and pursue the M. S. degree are required to register for a total of 30 units of graduate credit, and must present acceptable grades for a minimum of 24 units of graded graduate course work (the additional 6 units would normally be research units for chemistry students or English courses for international students). There is also a limit of 6 credits of undergraduate-level courses for a M.S. degree. Of the required 24 graded units, at least 6 units must consist of graduate level course work taken outside of the student's major area of concentration. The course program will be arranged through consultation with the student, the Director of Graduate Studies, and the student's research advisor.

The student is referred to the Bulletin of the Graduate School of Duke University and to the Graduate School for more detailed information concerning general degree requirements:

<http://gradschool.duke.edu/academics/policies/index.php>

B. Teaching Requirement

The Department of Chemistry recognizes that teaching is an important component of the professional development of its doctoral students. Therefore, the normal expectation is that all chemistry graduate students, even those with full outside financial support, will teach at least one-half of a standard Teaching Assistant load for a minimum of two semesters during the first 3 years of graduate student tenure.

C. Course Requirements

Students in the chemistry graduate program are required to complete 22 units of graded course work by the end of Fall term of their second year in the program. During their first semester students register for a **minimum of 12 units of graded courses** (e.g. three full chemistry graduate courses or the equivalent). If a student fails to register for the minimum number of credits required by the program their affiliation into a research lab will be delayed. Students must get approval from the DGS or your faculty research advisor (after affiliation) for their course selection/registration.

In the second semester they take another 6 to 10 units of coursework, as the requirement is the student complete 4.5 full credit science courses by the end of the first year. The department strongly encourages students to complete their course requirements in the first year, if at all possible. In Fall semester of the second year the student should complete any remaining courses as necessary to achieve the total of 22 units (e.g. a total of five and a half chemistry graduate courses or the equivalent). Courses offered outside of chemistry by other departments may be substituted for chemistry courses with the permission of the Director of Graduate Studies. Since many such courses carry a different number of units than the chemistry courses (e.g. 3 units vs. 4 units for a full course), the way these courses count toward the required 22 units, and the way they are counted in the evaluation of the course grade point average (described in Section II. L. below), will be established in advance in consultation with the DGS.

If a student has taken appropriately advanced chemistry or chemistry-related courses before arriving at Duke, he/she may request a waiver of a portion of the 22 credit requirement. The request must be submitted by the end of the first three weeks of the 1st semester of the PhD

program and be accompanied by a written explanation about the course(s) to be counted in place of Duke graduate courses. The DGS will render a decision on the request. Credits may not be counted if they were previously used to satisfy the requirements of another degree (AB, BA, BS, MS, etc.), and no more than 12 credits can be waived.

Students should also register for enough units of graded research (Chem 801) in the second year to give them at least 30 total units of degree credit, typically by taking 6 units of graded research during each semester of the second year. While these do not count toward the 22 units of courses required for the Ph.D. degree, they do count toward the total number of credits required for a M. S. degree, should such a degree become a desirable or necessary alternative to the Ph. D. degree.

A list of the graduate courses in chemistry can be found elsewhere in this handbook (Section V) and is also available on the department web site and in the Graduate School Bulletin.

D. Rotations and Research Group Affiliation

Graduate students will participate in 3 short rotations, with an optional 4th, during the fall semester of their first year in order to facilitate the affiliation process.

Following the introduction of students to faculty research, students will fill out their initial rotation request form. On this form, students will rank order three faculty with whom they would like to rotate and they are due to the DGS no later than **August 24, 2015**, the first day of Fall classes. The DGS will then assign the first rotations based on student preferences and lab availability. Students will be allowed to change their rank order requests by contacting the DGS at least two weeks before the start of the respective rotation. The second and third rotation assignments will be made accordingly one week before they are to start.

Rotations will be 4 weeks in length during which time students will be provided a desk in the host lab. Students are expected to attend group meetings of that lab, unless there is a conflict with class or teaching responsibilities, and to spend time in the lab speaking with faculty and graduate students, observing experiments and techniques, etc, as appropriate. Additional expectations, including that for specific hours, if any, should be discussed between the student and PI.

Students will be allowed and encouraged to attend other labs' group meetings and to meet with other faculty and students during any rotation. Students are NOT required to have rotated in a particular lab in order to affiliate with that lab.

At the end of each rotation, the student and the PI will sign a form stating that the rotation was completed “in good standing” based on the previously discussed expectations. This form should be turned in to the DGS on the final day of each rotation. Each student is required to complete three rotations in good standing.

Additional details and dates relevant to rotations will be given during student orientation.

Shortly after the completion of the rotations, students arrange personal conferences with those faculty members whose research is of interest to them. Students are then affiliated with specific research groups by a process of mutual selection administered by the department Chair. These affiliations are usually completed by the beginning of the second semester. The selection procedure will be discussed in greater detail with entering students during the Fall.

E. Supervisory Committee

After a student has affiliated a research director, a supervisory committee is appointed by the Director of Graduate Studies to plan, in consultation with the student, the remainder of his/her doctoral program and, with the approval of the Dean of the Graduate School, to conduct the preliminary and final examinations. Committee assignments are normally made during the Fall semester of the second academic year. At this time, the Director of Graduate Studies will solicit from the research advisor a proposed set of committee members, with the expectation that the advisor will consult with the student regarding the proposed committee. While making every effort to accommodate the proposed committee structure, the Director of Graduate Studies shall be responsible for revising proposed committee compositions in order to balance committee assignments among the faculty in a reasonable manner.

The supervisory committee consists of at least four members, three of which should have a primary or secondary appointment in the Chemistry Department, and is chaired by the student's research advisor. At least one member (referred to by the Graduate School as the minor area representative) should be from a chemical sub-discipline outside of the student's research area, or possibly from another department. In some situations, especially those involving interdisciplinary research programs crossing department boundaries, it may be desirable or necessary to have a five-person committee. The same committee normally administers the final Ph.D. examination, although an appropriate faculty member from another department may replace the minor area representative if desired. If a change in committee members becomes necessary, a committee request change form must be filed through the Director of Graduate Studies Office prior to finalizing the Ph. D. Examination.

F. Preliminary Examination Document

A written prelim document, with copies provided for each member of the supervisory committee, will be submitted by each student to the Director of Graduate Studies Assistant no later than **March 4, 2016** of the Spring semester of year two. If a student's affiliation with a lab is delayed due to not completing the required coursework stipulated in Section C or placement on academic probation due to poor academic performance, the preliminary exam will **not** be deferred.

As well as demonstrating accomplished research and an understanding of the project, this report is to measure (and correct) the student's organizational and technical writing ability, and should be completed with minimal input from the research advisor. The report will be evaluated by all members of the student's supervisory committee, each providing critical comments and suggestions for revisions, both on the prelim document itself and the Chemistry Thesis Assessment Protocol (ChemTAP) worksheets provided. The report and comments will be returned to the student by **March 18, 2016**. A final and updated version of this report will serve as the written document for the preliminary examination and will be considered part of the examination.

The report should normally include several sections, beginning with an **Abstract** of no more than 100 words. The body of the report will include an **Introduction** section that should state the broad goals and specific aims of the research, point to the significance and/or relevance of the research, and should provide sufficient background to place the research in the context of past and ongoing work in the research area, *e.g.* the literature. There should be a brief section outlining relevant **Methods** employed in the research, with expanded experimental details appended outside the body of the document as necessary. The Results section should summarize progress to date,

followed by a **Discussion** section and finally a description of **Future Work**. The body of the document should contain **no more than 2500 words**, not counting figures, references, and any appended experimental details. Students are encouraged to consult the ACS Style Guide and/or research journals in their research area for guidance on matters of style and format.

The preparation and submission of the research report emphasize research accomplishment at an early stage. The report also provides practice in technical writing, an important part of graduate training. Finally, the report serves as a first concrete step toward the preliminary examination, since the revised and updated version will also serve as the written document that guides the examination.

When submitting the final draft of preliminary exam document to the committee the student should also provide a summary of their changes.

**Each Spring semester there are preliminary examination writing workshops organized by Dr. Katherine Franz. Information and sign-up for the workshops will be sent out to students in advance via email.*

G. Preliminary Examination

The preliminary examination will normally be conducted during the Spring semester of year two and will be carried out in accordance with the regulations of the Graduate School as described in the Graduate School Bulletin. **The Chemistry DGSA must file for and receive approval from the Graduate School (signed by Dean John Klingensmith) confirming their Preliminary Exam Faculty Committee members at least 30 days prior to the exam date.** In the interests of consistency and fairness, every effort will be made to schedule all preliminary examinations during a time window in the Spring semester to be designated by the Director of Graduate Studies. (According to Graduate School policy, all preliminary examinations must be held while school is officially in session.) **At least one week prior** to the preliminary exam, the student will distribute to the members of the examining committee (the Supervisory Committee) the final and updated version of preliminary examination document along with the evaluations and comments of the initial report, which will serve as the written document for the examination. A one-page abstract should also be provided to the main office at this time for use in publicizing the seminar.

Just prior to (and considered part of) the preliminary examination, the student will present a brief (no longer than 30 minute) public seminar summarizing the research project and background, work accomplished to date, and projected plans for the future. The rest of the preliminary examination will be conducted in private with the student's the Supervisory Committee, with the goal of determining whether or not the student should be admitted to candidacy for the Ph.D. degree. This portion of the examination will involve questions from the committee aimed at measuring the student's general and specific background, knowledge of the particular research project involved, research results obtained to date, and planning for how the research will evolve into the dissertation. Because the research advisor is familiar with the student, it is expected that the bulk of the questions will come from the other members of the committee so that they can adequately evaluate the candidate. In particular, the advisor will refrain from assisting the student in answering questions. Students should be prepared to provide and discuss materials such as primary data or laboratory notebooks.

At the conclusion of the examination, which should normally take no longer than 2 hours total,

including the brief oral presentation, the committee members will deliberate and each will vote to pass or fail. This decision will be based on material in the written prelim document, performance on the questioning during the exam, and input from the research advisor. Specifically, students will be evaluated on the following:

- Fundamental understanding of the research area;
- Specific understanding of the research project and its significance;
- Productivity and progress to date on the research project;
- Future research plans toward the dissertation; and
- Evidence of and capacity for growth as an independent scientist.

According to Graduate School regulations, passing the preliminary examination requires a passing vote from the chair of the committee, and no more than one negative vote from the other committee members (e.g. at least three passing votes including the chair for a four person committee, or at least four passing votes including the chair for a five person committee; if the chair casts a negative vote the student will not pass the examination).

In the case of failure, the committee has several options. If the committee determines that the deficiencies that led to failure are potentially correctable, then the committee may permit the student to retake the examination, with the second preliminary examination occurring no later than the end of the Fall semester of year three. **The committee must retain its original membership for the retake of the preliminary exam. No professors may be substituted, except in exceptional cases that must be approved by the Dean of the Graduate School.**

If the committee concludes that the student should not be allowed to retake the preliminary examination, or if the student fails the second preliminary examination, then the student may be either excluded from the graduate program altogether, or allowed to write and defend a thesis for the M. S. degree (see the Master's Program section of the Graduate Student Handbook for more details). In the latter case, the committee, in conjunction with the DGS will specify a timeline for completion of the Master's degree. Failure to pass the Preliminary examination by the end of the Fall semester of year three will result in exclusion from the Ph.D. program.

H. Oral Presentation Requirement

The ability to make an effective oral presentation is an essential skill for every Ph.D. chemist, and this skill is best developed through experience. To ensure that Ph.D. students have a sufficient range of such experiences, the department requires that each graduate student give at least two formal, public scientific presentations, with at least one of them oral (as opposed to a poster presentation), during their graduate career. The student should provide the Director of Graduate Studies office with appropriate documentation of these presentations. For example, such presentations might be given at local, regional, or national meetings of the American Chemical Society or other appropriate professional organization, or as part of a seminar program at Duke or other academic institution. To help defray the expense of attending professional meetings Conference Travel Awards are available through the Graduate School to students who have passed the preliminary examination, once per fiscal year (**July 1-June 30**). Details can be found at:

<https://gradschool.duke.edu/financial-support/find-funding/conference-travel>

Students may find the various workshops offered by Duke's Center for Instructional Technology or the Center for Teaching, Learning, and Writing to be of help in developing aspects of their presentation skills. Students are strongly encouraged to attend the departmental seminar series, not just to hear about science, but also to learn by example the art of giving an effective presentation.

The poster printer will be operated by Charles Hendrick (charles.hendrick@duke.edu) for academic year 2015-2016. Contact Charles directly to discuss use of the poster printer.

These two required formal presentations are in addition to presentations at group meetings, to the shorter and more focused presentations given to the examination committees at the preliminary and propositional examinations, and to the public seminar given at the Ph.D. defense. It is hoped that together these various presentations will expose students to the range of presentation types they will encounter in their professional careers.

I. Research Propositional Examination

All Ph. D. students are required to pass a research propositional examination in which they defend an original research proposal in front of a three-member faculty panel during the Fall semester of year four. The preparation and presentation of the research proposal provides the student with a mechanism for developing the ability to conceive, evolve, plan, and defend an original research project independent of the research advisor. The primary intellectual content of the proposal must represent a significant departure from the student's dissertation research, so that it represents an independent intellectual exercise.

In preparation for this examination, the student shall submit a completed pre-proposal form (Appendix VI) of no more than 200 words that succinctly summarizes the proposal. The pre-proposal should state the specific topic to be investigated (hypothesis), the methodology or approach to be employed, and should briefly justify the importance of the work. This pre-proposal will first be submitted to the research advisor for their signature indicating that the proposal is sufficiently removed from the dissertation research of the student. The pre-proposal with the advisor's signed approval should be submitted to the DGSA office by **August 1** of the Summer following academic year three. The DGS will then appoint several three-member faculty panels who will review the abstracts and later carry out the examinations. Each abstract will be reviewed by the members of the appropriate panel, who will each indicate to the student whether they approve of the proposal topic and will provide feedback and comments for focus as appropriate. The student should receive this feedback by **August 15**. If the student fails to receive pre-approval from each of the panel members, the student should revise the proposal or initiate a new one to the satisfaction of the panel, with the revised proposal due **September 1**. Students are encouraged to discuss ideas with their advisor prior to submitting a pre-proposal. All proposals must be pre-approved in this fashion by **September 15** of the fourth year. The goal of this pre-approval process is to ensure that the proposed research topic is generally in keeping with expectations and sufficiently removed from the dissertation research of the student.

The pre-proposal submission form is included as Appendix VI.

The propositional examinations will be administered by the same set of three-member panels during the first two week of November (**November 1-November 15**). The student should submit to the DGSA office by **October 15** a written version of the research proposal to be provided to the

examining panel; the written proposal **should not exceed 1500 words in length, including figures, and references**. The examination itself shall not take more than one hour. At the beginning of the examination, the student will be given **15 minutes** to summarize the proposal topic and its significance, to be followed by questions from the panel. At the end of the examination each member of the panel will vote to pass or fail. At least two passing votes by the panel members are required to pass the examination. Comments regarding the examination shall be passed on to the student as well as the individual grades of pass or fail, and, along with a copy of the propositional report, will be made part of the student's record. Should the student's performance be considered unsatisfactory in any aspect, the examining panel may require additional work by the student, and will set a timetable for the successful completion of such additional work. An unacceptable performance may require resubmission of another proposal, an improved version of the original proposal, or any other action deemed appropriate by the examining panel. The decision by the panel members to pass or fail will be based on the following expectations:

- The proposal should be focused and specific, with the written proposal stating the problem to be addressed clearly and succinctly at the very beginning of the document.
- The proposal should identify and address a single scientific problem or hypothesis and develop it fully.
- The proposal should support and defend the significance and originality of the work.
- The proposal should describe the experiments or methodology that will be employed to address the problem.
- The proposal should discuss possible outcomes and interpretations and significance of results.
- For additional guidance in preparing proposals, students may wish to consult the web-sites of funding agencies that routinely support chemical research, such as NIH, NSF, ACS-PRF, and the Research Corporation. The “Funding Opportunities” section of the Duke Office of Research Support web-site at <http://www.ors.duke.edu> also has links to various “Grant Writing Resources” that can provide additional help.

J. Dissertation

The Ph.D. dissertation in Chemistry is a comprehensive report of a piece of original research done under the direction of a member of the faculty and representing not less than an academic year's work. The dissertation should include a comprehensive survey of the literature on the subject and should be written so as to be understandable without supplementary study by chemists not familiar with this special field.

Ph.D. dissertations are expected to contain new information that will be published in a reputable chemical journal, or the equivalent. All doctoral dissertations will be published electronically through [ProQuest/UMI Dissertation Publishing](#), a comprehensive electronic service for publishing, archiving, and disseminating graduate research. Dissertation and theses will be available on [DukeSpace](#), in addition to [ProQuest](#), once any embargo term placed on the document by the student author has expired

A guide for the preparation of Theses and Dissertations is available at the Graduate School web address: <http://gradschool.duke.edu/academics/theses/index.php>.

K. Final Examination

The final Ph.D. examination is given when the dissertation has been completed to the satisfaction of the research advisor and after the dissertation has received preliminary approval by the Graduate School at the format check meeting. The examining committee is usually the same as for the preliminary examination, although an appropriate faculty member from another department may replace the minor area representative if desired. In addition, a one-page abstract of the dissertation should be given to the DGS Assistant in the main office at least one week before the exam for publicity purposes. Additional arrangements for the final Ph.D. examination are described in the Appendices to this handbook.

The final Ph.D. examination is the culmination of the doctoral program, and consists of a public seminar followed by a closed examination (generally one to two hours in duration) of the candidate and the candidate's dissertation work by the Ph. D. supervisory committee. In the public seminar the candidate has the opportunity to explain the essence of his/her work to the examining committee and the public in general, and in the closed portion to defend the dissertation in more specific detail before the Ph.D. committee alone. The review and examination of the dissertation and the candidate's work is a serious task taken on by the student's committee, and careful and thorough review is expected. So that sufficient time can be had to carefully read the dissertation, **it should be submitted to the examining committee no later than two weeks before the scheduled final examination**; failure to do so may result in the examination having to be rescheduled, possibly to the following semester. Additional details and instructions for preparing the dissertation, for its submission, and for setting up the defense can be found at the Graduate Student web address: <http://gradschool.duke.edu/academics/theses/index.php>.

L. Seminar Program

Departmental seminars are an integral and essential component of graduate studies and of the intellectual and professional life of the department. They provide an opportunity to learn about the latest techniques, theories, methodologies, and exciting research areas. In addition, they present an opportunity to interact and exchange ideas with colleagues and visitors, and another venue for studying the art of giving an effective oral presentation. Thus, it is incumbent upon graduate students to attend as many departmental seminars as possible.

M. Academic Standards for Continuation in the Ph. D. Program

In Fall 2004, the Graduate School formally changed its grading system from E, G, S, F to A, B, C, F and adopted a minimum Graduate Grade Point Average (GPA) of 3.0 as a condition for continuation in a given graduate program. Consistent with this policy, a GPA of 3.0 or better on 22 units of graded courses will be required for continuation in the chemistry Ph.D. program.

| <i>The Graduate School and Engineering Management</i> | |
|---|-----|
| A+ | 4.0 |
| A | 4.0 |
| A- | 3.7 |
| B+ | 3.3 |
| B | 3.0 |

| | |
|----|-----|
| B- | 2.7 |
| C+ | 2.3 |
| C | 2.0 |
| C- | 1.7 |
| F | 0.0 |
| NC | 0.0 |

Note: In the Chemistry Department, full-semester chemistry doctoral-level 500+ are counted as 4 credits and half semester courses as 2. All such doctoral level, and most Master's level, courses in other natural science departments will counts as 4 or 2 toward the doctoral degree's 22-credit requirement, depending on the length of the class. However, the Graduate School counts the courses towards a 30-credit Master's degree solely on the basis of their credit listing in ACES, e.g. a 3 credit graduate biochemistry course will counts as 3 credits for a Master's degree by the Grad School.

To monitor academic progress, the GPA for each student will be determined by the DGS office at the end of each semester of study. If a student's performance at the end of the first semester of graduate study indicates that he/she is unlikely to qualify for continuation in the Ph.D. program unless his/her performance substantially improves, the student will be placed on academic probation. At the end of the first year, a Continuation Committee makes recommendations on all first-year students as soon as possible after course grades become available for the Spring semester. This Committee is composed of the Director of Graduate Studies and four other members of the departmental faculty, appointed to the committee by the Chair of the Department. On the basis of the course record of the student, the Committee typically recommends one of the following: (1) that the student continue with the prescribed doctoral program, (2) that the student remain one additional year to complete a master's degree with an acceptable thesis, (3) that the student is not eligible to continue in a degree program in the department. Recommendations other than continuation are made collaboratively with the Chair of the Department and the Director of Graduate Studies. It should be noted that a GPA of 3.0 or better is not a guarantee of continuation in the Ph.D. Program, although continuation generally is recommended in such cases. In the case of a student who does not complete the required 22 units of course work until the end of the third semester, the Director of Graduate Studies shall review the GPA again following the end of the third semester. If the GPA falls below 3.0, the Director of Graduate Studies shall convene another Continuation Committee to make a recommendation on the status of the student in the program following the procedures described above for the first-year continuation evaluation.

In addition to the academic standards set forth by the department, it is important to be aware of the other academic regulations of the Graduate School, in particular the regulation that "a grade of F in a major course normally occasions withdrawal from a degree program not later than the end of the ensuing semester or term; a grade of F in any other course occasions at least academic probation."

Students approved for continuation in the Ph.D. program at the end of the third semester will be free of any additional grade level requirement. However, the Review Committee that evaluates the progress of advanced students shall take into account a poor grade performance in making recommendations for specific students. In exceptional cases, the Review Committee has the

prerogative of recommending several levels of remedial action including termination of further pursuit of graduate work or termination of departmental support.

N. Review of Professional Progress of Advanced Students

At the completion of the first year of study, each student will receive a letter from the Director of Graduate Studies detailing the student's academic standing. In general this will be based on the student's performance in the academic course work taken during the first year in the program (see Section M). If the student has not achieved the necessary minimum grade point average (3.0) required for good standing, in most instances the student will be placed on academic probation with specific performance expectations for the upcoming academic year spelled out in detail. In rare instances, if the student's academic performance in the first year has been unusually weak, the student's graduate program may be terminated.

The Graduate School requires all graduate students beyond their initial year of study to file annually with the Director of Graduate Studies a written report that details their progress towards the PhD degree. For second year students in chemistry, this report can be the document that was submitted as part of the preliminary examination during the spring semester. At the completion of the second year of study, each student will receive a letter from the Director of Graduate Studies that summarizes the results of the preliminary examination and makes note of any specific recommendations from the student's PhD committee.

All chemistry graduate students in their third year of study and beyond are required to submit an annual progress report, guidelines for the preparation of which are presented below. This report serves as the basis for the department's annual review of the professional progress of its advanced graduate students. By **May 20**, each student should submit copies of this report to his/her research advisor and to the other members of the PhD supervisory committee, with one additional copy being submitted to the DGS office. By **May 20**, the DGS is required to certify to the Graduate School that all reports from advanced chemistry students have been received.

The annual progress report should normally be no more than two pages in length, and should include:

- a description of progress made over the previous year (including a listing of coursework, dissertation research, publications, scientific presentations, completed portions of the dissertation, etc.);
- an approximate target date for the final PhD defense; and
- an indication of future plans after successful completion of the PhD (post-doctoral, university teaching, law school, etc.).

Depending on the academic year of the student, these annual progress reports will be processed in the following different ways:

Third Year Students. For students completing the third year of study, supervisory committee members should alert the research advisor to any concerns they may have. The research advisor will then indicate to the DGS office whether the student's progress has been excellent, good, satisfactory, or unsatisfactory. If the student's progress is deemed satisfactory or better, the research advisor should convey this information to the student, preferably in a one-on-one meeting. If the student's progress is deemed unsatisfactory, the research advisor should indicate to the DGS the nature of the problem and recommend that the student's PhD advisory

committee be convened in the early Fall of the student's fourth year of study. Also, because the Fall semester of the fourth year is also the time for students to present and defend an original research proposal, the research proposal committee can recommend that a student's PhD advisory committee be convened should serious concerns arise during the research proposal defense.

Fifth Year and Beyond Students. For students finishing their fifth year of study and beyond, the supervisory committee members and research director will respond to the annual progress reports in the same manner as for third year students. In addition, each advanced graduate student will meet with the PhD supervisory committee early in the following Fall semester (**no later than Nov. 30**). Using the annual progress report as a discussion starting point, it is expected that this meeting will last thirty minutes or less as the committee determines the student's professional trajectory, including developing post-graduation plans. At the conclusion of the meeting the research director will provide the DGS with a summary of any specific recommendations. The research director will also convey the sense of the committee to the student.

From the Chemistry Department's perspective, these annual reviews are meant to create a positive sense of direction for the student, and to enhance communication between the student, research advisor, and supervisory committee. Its purpose is also to prevent potentially bad situations from developing, and to aid and direct the student at all stages of the PhD program. It is one way in which the faculty is able to express to the student what the faculty feels is important in graduate education.

O. Expectations Regarding Responsible Scholarship

Duke University and the Department of Chemistry expect graduate students to adhere to the highest standards of academic and professional conduct in their roles as students, teachers, and researchers. The expectations of the University with respect to standards of conduct and academic integrity can be found on the Graduate School website at:

<http://gradschool.duke.edu/academics/standards/index.php> and at the Academic Integrity Council website at: <http://www.integrity.duke.edu/>

For information on how to properly cite sources and avoid plagiarism students are referred to the Duke University Library website at: <http://library.duke.edu/research/guides/citing/>

Most students are probably familiar with how these issues apply to print materials, but may be less certain in the case of web-based materials or published figures, for example. Students are encouraged to consult the above website for more information and to consult with their research advisor or other chemistry faculty regarding proper guidelines.

To ensure that graduate students have proper training in the Responsible Conduct in Research (RCR), Duke University will require all Ph.D. students to participate in a specified number of hours in RCR training as a formal requirement to obtain the degree. To satisfy this requirement, each Ph.D. student must attend one Fall Orientation RCR Workshop and participate in at least three supplementary RCR Forums within the **first three years** of his/her program. RCR training is a formal requirement of the Ph.D. degree, and students must complete 12 hours. Official transcript credit will appear in student records as GS 710 (campus) or GS 711/712 (RCR Forums) and can be viewed in STORM or ACES. Beyond RCR Orientation, each PhD student must normally complete 6 additional hours of training. This is usually accomplished by attending three separate 2-hour RCR Forums. Please be reminded of the following, and review our RCR web site (links below):

Fall 2015 RCR Orientation Class (Required for all entering PhD students)

Natural Sciences and Engineering (GS 710-02: Campus workshop)

Friday, Aug. 21, 2015, 9:00am-5:00pm

Durham Hilton Hotel, 3800 Hillsborough Road, www.durham.hilton.com

(Continental breakfast and buffet lunch provided)

Welcome letter, schedule and pre-registration information (to be posted after July 1). There is NO pre-registration for RCR Orientation -- Admissions provides a list of matriculants.

Any PhD matriculant who cannot attend (due to visa delays, overseas study, etc) must contact hugh.crumley@duke.edu to request permission for delaying RCR Orientation until the next year. RCR Orientation is not optional -- it must be completed, and the sooner the better. The university has nearly 450 entering PhDs each year that must fulfill this requirement.

The Graduate School will monitor each student's participation in RCR training and the student will receive recognition when this requirement has been met. More information on this requirement and on the various workshops can be found on the Graduate School website at:

http://gradschool.duke.edu/academics/degree_reqs/rcr/index.php

The Duke Community Standard

Duke University is a community dedicated to scholarship, leadership, and service and to the principles of honesty, fairness, respect, and accountability. Citizens of this community commit to reflect upon and uphold these principles in all academic and non-academic endeavors, and to protect and promote a culture of integrity.

To uphold the Duke Community Standard:

- I will not lie, cheat, or steal in my academic endeavors;
- I will conduct myself honorably in all my endeavors; and
- I will act if the Standard is compromised.

Standards of Conduct

Graduate students at Duke University freely choose to join a community of scholarship predicated on the open exchange of ideas and original research. At Duke University, students assume the responsibility to foster intellectual honesty, tolerance, and generosity and to encourage respectful debate and creative research. By accepting admission to Duke University, graduate students pledge to uphold the intellectual and ethical standards of the University, as expressed in the *Duke Community Standard*, to respect the rights of their colleagues, to abide by University regulations, and to obey local, state, and federal laws. The Graduate School and the University specifically prohibit the following:

1. *Lying*: Knowing misrepresentations to gain illicit benefit or to cause harm to others. Examples include misrepresentation in applications for admissions or financial aid, lying during a formal inquiry by the University, and false accusations of misconduct by others.
2. *Cheating*: A dishonest or unfair action to advantage an individual's academic work or research. Such dishonesty would include the falsification of data, plagiarism, and tampering with another person's documents or research materials.

3. *Theft*: Misappropriation of property, services, credentials, or documents. Theft includes the misuse or willful damage of University property, equipment, services, funds, library materials, or electronic networks.
4. *Harassment*: The creation of a hostile, intimidating, disrespectful environment based on race, religion, gender, ethnicity, or sexual orientation, in which verbal or physical conduct, because of its severity or persistence, is likely to interfere significantly with an individual's work or education, or affect adversely an individual's living conditions. Duke University is committed to protecting academic freedom for all members of the university community. This policy against harassment is, therefore, applied so as to protect the rights of all parties to a complaint. Academic freedom and freedom of expression include but are not limited to the expression of ideas, however controversial, in the classroom, residence hall, and, in keeping with different responsibilities, in workplaces elsewhere in the university community.
5. *Sexual harassment*: Coercion through speech or action for sexual purposes. Examples include verbal or written threats, unwanted sexual solicitation, stalking, and the use of a position of authority to intimidate or coerce others. Duke teaching personnel, employees, and graduate students are expected to report *consensual sexual relationships* between individuals in a supervisory or teaching relationship to their superiors. Examples of such supervisory/teaching relationships include: instructor and student; advisor and student; and supervisor and staff member.
6. *Assault*: An attack on another person resulting in either physical or psychological injury.
7. *Possession of illicit drugs on University property or as part of any University activity*: Students are prohibited to manufacture, sell, deliver, possess, or use a controlled substance without legal authorization. The North Carolina Controlled Substances Act defines a controlled substance as any drug, substance or immediate precursor, including but not limited to opiates, barbiturates, amphetamines, marijuana, and hallucinogens. Possession of drug paraphernalia is also prohibited under North Carolina law and University policy. Drug paraphernalia includes all equipment, products and material of any kind that are used to facilitate, or intended or designed to facilitate, violations of the North Carolina Controlled Substances Act.
8. *Refusal to comply with the directions of a University police officer*. Students must comply with the lawful directions of the University police. In addition, *interference with the proper operation of safety or security devices*, including emergency telephones, door locks, fire alarms, smoke detectors or any other safety device is prohibited.
9. *Trespassing*: Students may not enter University property to which access is prohibited.
10. *Possession of explosives, incendiary devices, or firearms on University property*. Students are expected to meet academic requirements and financial obligations, as specified elsewhere in this bulletin, in order to remain in good standing. Failure to meet these requirements and to abide by the rules and regulations of Duke University may result in summary dismissal by the Dean of the Graduate School or the Provost. In accepting admission, students indicate their willingness to subscribe to and be governed by these rules and regulations and acknowledge the right of the university to take disciplinary action, including suspension and/or expulsion, as may be deemed appropriate for failure to abide by such rules and regulations or for conduct adjudged unsatisfactory or detrimental to the university.

Student Grievance Procedures.

It is the responsibility of the director of graduate studies to inform each graduate student of the appropriate channels of appeal. In normal circumstances, the director of graduate studies is the

first to hear a complaint. If the complaint cannot be resolved satisfactorily at this level, the student may address, in turn, the department chair, the associate dean of the Graduate School, and the dean of the Graduate School, who shall be the final avenue of appeal. An appeal must be filed in writing with the next appropriate university officer within ten days after a decision has been formally rendered by any of the university officers mentioned above.

Judicial Code and Procedures

In the spring of 1971, the Graduate School community ratified and adopted an official judicial code and procedures. These procedures were subsequently amended in November, 1998, and in May, 2007.

Graduate School Judicial Code and Procedures

1. A student, by accepting admission to the Graduate School of Duke University, thereby indicates willingness to subscribe to and be governed by the rules and regulations of the University as currently are in effect or, from time to time, are put into effect by the appropriate authorities of the University, and indicates willingness to accept disciplinary action, if behavior is adjudged to be in violation of those rules or in some way unacceptable or detrimental to the University. However, a student's position of responsibility to the authorities and the regulations of the University in no way alters or modifies responsibilities in relation to civil authorities and laws.
2. A graduate student at Duke University stands in a primary and unique relation of responsibility to the faculty in the major department, the faculty upon whose recommendation a graduate degree will or will not be awarded to the student. In matters which involve or may affect the student's intellectual or professional life, the student is directly responsible to this department and its representatives, and such matters should primarily be handled by the department.
3. Actions which appear to conflict with University-wide rules and regulations will fall under the jurisdiction of the University Judicial Board.
4. A student may elect to have the dean of the Graduate School hear matters related to the student's conduct in addition to or instead of faculty members from the student's major department, or may elect to have such matters reviewed and judged by a Judicial Board instead of the dean of the Graduate School or members of the faculty in the major department. (The constitution and procedure of the judicial board are detailed below.)
5. The director of graduate studies or the chair in the student's major department may request that a student's actions be reviewed by the Judicial Board or by the dean of the Graduate School.

The Graduate School Judicial Board

1. *Composition.* The Graduate School Judicial Board shall have five members, serving for a period of two years: two graduate students appointed from the student body by the dean of the Graduate School with the advice of the Graduate and Professional Student Council, two members of the graduate faculty appointed by the Executive Committee of the Graduate Faculty, and one associate or assistant dean appointed by the dean of the Graduate School. The Board shall elect one of its members as chairman. The Board shall have at its service a recording secretary to keep minutes of the hearings and of the Board's actions in a permanent, confidential record book. The Board will be constituted in order to hear cases in which the accused is a student currently enrolled in the Graduate School and in cases in which the accused is a former student but which arise out of activities of the accused while a student enrolled in the Graduate School, and which have been

referred to it by the director of graduate studies or the chair in the student's department, by the dean of the Graduate School, or by the student.

2. *Preliminary Procedures.* If a student requests a hearing by the Judicial Board it must be done in writing, allowing its chairman at least seventy-two hours to convene the Board. In addition, the chairman shall not convene the Board until seventy-two hours after being asked to convene the Board. It is the responsibility of the chairman of the Judicial Board fully to inform its members concerning the case and the reasons the case has been referred to the Board; and to prepare a written summary of this information for the Board, the dean, and the student.
3. *Procedural Safeguards for the Hearing.* The accused has the right to challenge any member of the Judicial Board on grounds of prejudice. If the Board decides to excuse one or more of its members for reasons given by the accused, it shall consult with the dean about the need for replacements. The accused may choose an advisor to assist in the hearing. The advisor must be a current Duke student, a current Duke faculty member, or a current Duke employee. The role of the advisor is to assist and support the student through the disciplinary process. The advisor may not address the hearing panel or any witness during the hearing. The accused may also produce witnesses (including no more than two character witnesses), introduce documents, and offer testimony. A person having direct knowledge relevant to a case being heard by the Board is a material witness. The Judicial Board may request the appearance of material witnesses. The Board shall also request, upon written request of the complainant or the accused, the appearance of material witnesses. Witnesses shall be notified of the time, place, and purpose of their appearance. The accused has the right to examine the written statement of any witness relevant to the case at least seventy-two hours before the hearing. The accused has the right to be faced with any witness who has given a statement relevant to the case at the hearing if the witness's attendance can be secured. The hearing will be conducted in private unless the accused requests an open hearing. If any objection is raised to conducting an open hearing in any particular case, the Judicial Board shall decide the issue by majority vote. If the decision is made not to hold an open hearing, the accused shall be informed in writing of the reasons for the decision. The Judicial Board shall consider only the report of the chairman, documents submitted into evidence, and the testimony of witnesses at the hearing in reaching its decisions.
4. *Conduct of the Hearing.* The hearing of any case shall begin with a reading of the charge by the chairman in the presence of the accused. The accused shall then plead guilty or not guilty or move to terminate or postpone the hearing. The accused may qualify a plea, admitting guilt in part and denying it in part. The accused may not be questioned for more than one hour without recess. At any time during the hearing, the accused or the Judicial Board may move to terminate or to postpone the hearing or to qualify the plea or to modify its charge.
Pending verdict on charges (including appeal) against the accused, status as a student shall not be changed, nor the right to be on campus or to attend classes suspended, except that the provost may impose an interim suspension upon any member of the University community who demonstrates, by conduct, that continued presence on the campus constitutes an immediate threat to the physical well-being or property of members of the University community or the property or orderly functioning of the University.
5. *Appeals.* The appellant may submit to the dean a written statement containing the grounds for appeal and arguments. In such cases, the dean should determine if the appeal should be granted, and the dean can hear the case, or refer it to the appropriate faculty in the student's department or to the Judicial Board.
6. *Sanctions and the Verdict.* The Graduate School Judicial Board shall have the power to impose the following penalties: expulsion (dismissal from the University with the recommendation that the

person never be readmitted); suspension (dismissal from the University and from participation in all University activities for a specified period of time, after which the student may apply for readmission); disciplinary probation (placing the student on a probationary status for a specified period of time, during which conviction for violation of any regulation may result in more serious disciplinary action); restitution (payment for all, or a portion of property damage caused during the commission of an offense). Restitution may be imposed by itself or in addition to any of the other penalties. In the case of a student who is not currently at Duke or who has already graduated, such sanctions could include revocation of the degree. The Judgment shall consist of a finding of guilty or not guilty of the charge and, when the accused is found guilty, a statement of the punishment assessed. On all questions, including the verdict and the finding of guilty or not guilty, the Board shall be governed by a majority vote. The Judicial Board may decide to rehear a case in which significant new evidence can be introduced. In addition, the defendant may request an appeal. An appeal shall be granted on the following grounds: procedural error substantially affecting the rights of the accused; incompatibility of the verdict with the evidence; excessive penalty not in accord with "current community standards;" new evidence of a character directly to affect the judgment but on which the original tribunal had refused a new hearing.

P. Appointments and Vacation Periods

The normal appointment period for full-time research assistants and teaching assistants is from September 1 to May 31 in a given academic year. Students are also normally expected to be in residence and carrying out research during the Summer semester. Summer appointments extend from June 1 to August 31. Some research assistants may be on 12-month appointments (September 1-August 31).

All students are expected to be in residence **one week before the beginning of classes** for the Fall and Spring semesters. First year students are expected to be in residence 2 weeks before the beginning of classes for departmental and Graduate School Orientation. For 2015-2016 academic year the first day of Chemistry Orientation is **August 10, 2015** and Fall semester classes start **August 24, 2015**. In addition, students holding teaching appointments during the Summer must be in residence one week prior to the Summer term(s) of their appointment.

Teaching Assistants must complete all of their teaching responsibilities before leaving at the end of a semester and should consult with the Laboratory Managers before making any vacation and travel arrangements.

Arrangements for vacation periods should always be made in consultation with the consent of the research advisor.

Q. Master's Program

Students are only admitted to the Ph.D. program. Students subsequently placed in the M.S. program by choice, or by not making satisfactory progress in the Ph.D. program, are required to complete the registration requirements of the Graduate School, including a total of 30 units of registration, 24 of which must be taken for a grade. Of the required 24 graded units, at least six units must consist of graduate level course work taken in a field (or fields) of chemistry other than the field of specialization. Students who begin in the Ph.D. program would normally satisfy these requirements with the 22 units of graded coursework required for the Ph.D., along with additional units of graded research taken during the second year (Chem 801). A thesis is required for the M.S. degree in chemistry and is defended in an oral examination with a three-member M.S.

supervisory committee assigned according to the regulations of the Graduate School (the committee would normally be a subset of the original Ph. D. supervisory committee). Additional details on these regulations can be found at the Graduate School web address:

http://gradschool.duke.edu/academics/degree_reqs/ma_reqs.php

The final examination for the M.S. degree is oral and is one to two hours in length. The major portion of the examination is on the thesis, but general questions on both chemistry and subjects taken as related work are in order. The Master's thesis should be submitted to the student's committee no later **than two weeks before the scheduled examination**. Additional arrangements for and details of the final Master's examination can be found in the Appendices to this Handbook. The Master's defense consists of a seminar followed by an oral exam. The student has the option of requesting a public or private seminar, but the oral exam is closed, with the student and faculty committee members present only.

R. Fellowship Opportunities

Most students decide to apply for fellowships during the first term on campus. The application process offers one of the most educational, impactful opportunities of a graduate career. *Students are urged to apply to ALL fellowships for which you are eligible* (and willing to engage in associated commitments). Students are eligible for many fellowship applications only during the first term of graduate school, and are therefore encouraged to begin applications on arrival.

Fellowship advice to students:

- (1) Many fellowships require submission of GRE scores, transcripts, and letters of recommendation. Send GRE scores and transcripts to all appropriate fall fellowships once on campus, and to request letters of recommendation once a resume has been polished.
- (2) Peers are among the most valuable resources in starting this process. Find someone who has applied, and look at previous NSF GFRP fellowship applications to get a sense of formatting and content opportunities.
- (3) Seek constructive feedback on resumes and application documents from peers, and then from prospective mentors.
- (4) Consider working on preparation of research proposals with someone you are considering as a graduate advisor.
- (5) Consider requesting a letter of recommendation from someone with whom they consider as a graduate advisor.

An ongoing list of potential funding opportunities can be found at: <http://chem.duke.edu/graduate/financial-aid>.

A more focused list of fellowship opportunities for entering graduate students who are US citizens and permanent residents can be found at: <http://people.chem.duke.edu/~jlr67/fellowships.html>. Among these are the National Science Foundation fellowships, National Defense Science and Engineering Graduate Fellowships, Department of Energy Computational Science Fellowships, Hertz Foundation Graduate Fellowships, Ford Foundation Fellowships, the GEM Fellowships, National Physical Sciences Consortium Fellowships, Smithsonian Institute Fellowships (Material

Science), Department of Homeland Security Fellowships, and NASA Earth and Science Space fellowships, the United States Environmental Protection Agency fellowships. International students are encouraged to work with prospective mentors to identify the most relevant fellowship applications.

III. Normal Timeline for the Ph. D.

FIRST YEAR STUDENTS

Fall:

- Attend RCR Orientation, which takes place week before classes start to complete 6 of the required 12 RCR credits
- Register for Continuation, Chem 701, and 12 credits of graduate science classes
- Complete 3 lab rotations
- Register for any English courses deemed necessary for international students (if student can register for only one, Oral English course recommended first)

Spring:

- Chair's office will finalize formal affiliation with Primary Investigator
- Register for Continuation and 8-12 credits of graduate science classes
- Register for any English course deemed necessary for international students
- Attend RCR Forums when available, each worth 2 credits towards required 12.

Summer:

- Register for Continuation

SECOND YEAR STUDENTS

Fall:

- Register for Continuation
- Register for remaining courses necessary to achieve 22 graduate science credits
- Register for Chem 801 Research, 6 credits
- Complete all required English courses for international students by end of this semester
- PI submits recommendation for supervisory committee. PI may consult with student or make the decision alone. Supervisory committees finalized by DGS office in December
- Attend RCR Forums when available, each worth 2 credits towards required 12.

Spring:

- Register for Continuation
- Register for Chem 801 Research, 6 credits
- Turn in preliminary examination document to DGS office with copies for all supervisory committee members in early March
- Supervisory committee members return preliminary examination document, with comments and evaluation, to DGS office to be passed back to students for revision of document. Mid-March

- Submit finalized prelim document to supervisory committee at least one week in advance of the prelim exam.
- Attend RCR Forums when available, each worth 2 credits towards required 12.

Summer:

- Register for Continuation

THIRD YEAR STUDENTS

Fall:

- Register for Continuation
- Work towards meeting Oral Presentation requirements by this point

Spring:

- Register for Continuation
- Turn in to DGS office Annual Progress Report summing up academic milestones and research completed during that academic year in mid-May

Summer:

- Register for Continuation
- Propositional abstract due to Asst. office Aug. 1
- Prop committee will return approved or unapproved prop abstracts with comments and evaluation to Asst. to DGS to return to student in mid-August
- Submit revised abstract for review by prop committee by Sept. 1
- All RCR requirements should be complete by now

FOURTH YEAR STUDENTS

Fall:

- Register for Continuation
- All propositional abstracts approved by committee by Sept. 15
- Submit finalized written version of the research proposal to be provided to the examining panel by Oct. 15
- Sit propositional exams during first 2 weeks of November

Spring:

- Register for Continuation

Summer:

- Register for Continuation

FIFTH YEAR AND BEYOND STUDENTS

- By this time students have presented often enough to have fulfilled 2 Oral Presentation requirements.
- Turn in to DGS office Annual Progress Report summing up academic milestones and research completed during that academic year in mid-May

- Students should be working toward completing dissertation in the next year.

***** The dept. will no longer support students through department funding as TAs after completing 5.5 year in the program (typically after Fall of the sixth year). Students will only be eligible to receive support only through faculty supported positions such as RA or external funding mechanisms, such as those associated with the IGERT, PSTP, MSTP, SBB, CBIMMS, or other inter-departmental programs.**

IV. Registration Guidelines

A. Registration for Summer and Fall

With the exception of new entering students who register for the Fall on their arrival at Duke, registration for both Summer and Fall semesters is done during the Spring semester. All students need to be sure to register for continuation for both Summer and Fall, and registration for the Summer should be for Summer Term II. Below we give separate registration guidelines for students according to their year as of the Fall semester.

All students must register for *Continuation* for Fall, Spring and Summer, regardless of how few or how many courses they are enrolled in.

ALL STUDENTS: Continuation for Fall AND Continuation for Summer Term II

Note: Chemistry graduate students normally do not register for courses during the Summer: special arrangements and permission form the Director of Graduate Studies would be required to do so. Since no doctoral level courses are offered during the summer, Ph.D. students typically do not register for classes during summer session. Tuition for any courses taken for the summer must be paid from non-departmental funds, typically at the students' personal expense.

First Year Students: 12 units of graded courses
1 unit of CHM 701 – Research Orientation Seminar

Note: Students wishing to take courses outside the department should obtain prior approval from the Director of Graduate Studies.

First Year International Students: 700-level English courses, as required by assessment tests

Second Year Students: 6 units of CHM 801 – Graded Research

Any remaining graded courses as necessary to achieve the required total of 22 units.

Note: Students wishing to take courses outside the department should obtain prior approval from the Director of Graduate Studies.

Third Year and Beyond Students Continuation every semester

B. Registration for Spring

Registration for Spring semester is done during the Fall semester.

ALL STUDENTS: Continuation

First Year Students: 8-10 units of graded courses

First Year International Students: 700-level English courses, as required by assessment tests

Second Year Students: 6 units of CHM 701 – Graded Research

Third Year and Beyond Students: Continuation every semester

DROP/ADD

Note From the Dean of Graduate Studies Office, Dr. John Klingensmith:

The Graduate Studies office would like to emphasize the importance that all changes in course registrations should take place before the end of drop/add, which is typically 2 weeks after the first day of classes. Any changes thereafter will be treated as course withdrawals and not drops and will thus appear on your student transcript as a W. Moreover, after the end of the drop/add period, we cannot transform audits into courses taken for credit, nor can we do the inverse. The students must make the final decision about the courses he/she are planning to take by the end of the drop/add period.

Students must also take a mandatory sequence of Responsible Conduct in Research credits, consisting of six credits in year 1 and an additional 3 RCR forums. These credits are a Graduate School requirement and completion of these credits will appear on the students' transcript and should be completed by the end of the 3rd year. These credits do not count toward completion of the Master's or Ph.D. degree.

V. Graduate Courses in Chemistry

Provided below are descriptions for of all the chemistry graduate courses that appear in the Bulletin of the Graduate School, with the exception of detailed descriptions for special topics courses that are sometimes offered on an ad hoc basis (the title and synopsis for special topics course offerings will be available on the ACES registration program). Due to staffing and other considerations, not all of these courses are offered every year, and students should contact the DGS office to find out which courses will be offered in a given semester. Note that some of the courses are offered as 4 unit "full" courses, others are offered as 2 unit "half" courses, and still others are offered as "variable credit," meaning that the number of units for those courses varies depending on the instructor and the semester. Students should contact the DGS office to find out how many units they need to designate when registering for variable unit courses.

Graduate chemistry courses at UNC-Chapel Hill can be found at:

<http://www.chem.unc.edu/courses/>

Graduate courses at NC State University can be found at:

http://www2.acs.ncsu.edu/reg_records/crs_cat/CH.html

Duke Chemistry Graduate Course Descriptions:

501. Analytical Chemistry. Fundamental considerations of chemical measurements, optical spectroscopy, mass spectrometry, and separation methods. Instructors: Fitzgerald. 4 units.

506. Biomolecular Mass Spectrometry. Advanced topics in the mass spectral characterization of biopolymers with an emphasis on protein and DNA analysis. Fundamental and practical aspects of the ionization processes and the instrumentation associated with MALDI- and ESI-Mass spectrometry discussed along with applications of these techniques to structural problems in chemistry and biochemistry. Prerequisite: Chemistry 501 or consent of instructor. Instructor: Fitzgerald. 2 units.

511. Chemistry of Biomolecular Interactions. Chemistry of the noncovalent interactions governing biological systems. Topics include: review of biomacromolecules; chemical principles

of non-covalent interactions and the use of model systems; experimental methods to determine binding interactions; interactions responsible for molecular recognition in biological systems; and applications in signal regulation. Recommended precursor to Chemistry 518. Instructor: Hargrove. 4 units.

517. Molecules in Life and Disease. Molecules are an essential component of life as they dictate our development, enable adaptation to our environment, and carry our thoughts. This course explores the roles of molecules in normal physiological functions and disease states ranging from genetic disorders to those caused by deadly toxins, such as anthraxin toxin. Case studies on bacterial pathogenesis, drug resistance and modern drug development are among the topics that will be discussed. Prerequisites: Organic Chemistry and Introductory Biology or consent of instructor. Instructor: Derbyshire. 4 units.

518. Chemical Biology. The application of chemical concepts and methods to solving problems in molecular and cell biology, with emphasis on the use of small molecules to elucidate and control information transfer in biological systems. Provides relevant background on both useful chemical tools and new biological targets. Instructors: Hong, Toone, McCafferty, and Wang. 4 units.

521. Inorganic Chemistry. Bonding and spectroscopy, reactions, transition metal chemistry, main group chemistry, organometallics/catalysis, and solid state. Instructors: Franz and Therien. 4 units.

524. Bioinorganic Chemistry. Topics covered include metal activated enzymes in hydrolysis, oxygen carriers, nitrogen fixation, iron storage and transport, photosynthesis, protein electron transfer, and DNA mediated electron transfer. Instructors: Crumbliss, Therien, and Franz. Variable credit.

526. Inorganic Reaction Mechanisms. A discussion of the mechanism of coordination reactions in solution. Examples include redox reactions and linear free energy relationships. Instructor: Crumbliss. 2 units.

531. Organic Chemistry. Bonding and structure, stereochemistry, conformational analysis, substitution, addition, and elimination reactions, carbon reactive intermediates, concerted reactions, photochemistry, carbon alkylation, carbonyl addition nucleophilic substitution, electrophilic additions, reduction, cycloadditions, rearrangements, main group organometallics, oxidation. Instructors: Baldwin, Craig, Hong, Toone, and Widenhoefer. 4 units.

532. Organic Reactions. Highlights strategic operations that enable selective synthesis of small molecules, including organic ligands, natural products, and molecular probes. Topics include chemical synthesis and retrosynthetic analysis; arrow-pushing mechanisms of polar, radical, transition metal-mediated and pericyclic reactions; protecting groups, oxidation, reduction, enolate reactivity; stereoselective reactions and conformational analysis; cross-coupling transformations. Instructor: Roizen. 4 units.

533. Nuclear Magnetic Resonance. Structural elucidation of organic and inorganic compounds by NMR. Fundamentals of data acquisition (pulse sequences, detection), multidimensional techniques, study of dynamic processes and their application to the determination of structure. Instructors: Baldwin and Widenhoefer. Variable credit.

534. Physical Organic Chemistry. Reactive intermediates: carbocations, carbanions, carbenes radicals, photochemistry. Prerequisite: Chemistry 531. Instructors: Craig and Toone. 4 units.

535. Organic Synthesis. Application of organic reactions to the synthesis of structurally and biologically interesting compounds. Topics include synthetic design, retrosynthetic analysis,

synthetic methods, and total syntheses of natural products. Prerequisite: Chemistry 532 or consent of instructor. Instructor: Hong. 4 units.

536. Bioorganic Chemistry. Basic enzymology, mechanisms of enzymatic reactions, cofactors, oxidoreductases, C1 chemistry, carbon-carbon bond formation, carboxylation/decarboxylation, heme, pyridoxal enzymes, thiamine enzymes. Prerequisite: Chemistry 331 or equivalent. Instructors: McCafferty and Toone. 4 units. C-L: Biochemistry 536

538. Organometallic Chemistry and Catalysis. Introduction to the structure and bonding of organometallic and coordination complexes, stressing the origin of metal-ligand interactions from a molecular orbital theory perspective. Elementary reactions of transition metal complexes and their application to organic synthesis, with special emphasis on catalytic reactions. General concepts of catalysis and the advantages and benefits of catalytic systems. Instructor: Malcolmson. 4 units.

541. Quantum Chemistry. Foundations and approximate methods in quantum chemistry, with an emphasis on their applications to molecular structure and modeling. Instructors: Beratan, Liu, MacPhail, Warren, and Yang. 4 units.

542. Quantum Mechanics. Special emphasis on chemical applications. Topics include: linear algebra, the uncertainty relations, angular momentum, perturbation theory, time-dependent phenomena, molecules in electromagnetic fields, group theory, and electron correlation. Prerequisite: Chemistry 541 or consent of instructor. Instructors: Beratan, Warren, and Yang. 4 units.

543. Statistical Thermodynamics. Introduction to statistical thermodynamics, with an emphasis on ideal systems and selected model approaches to more complex systems, for example, lattice models. Instructors: Beratan, Charbonneau, MacPhail, and Yang. 2 units.

544. Statistical Mechanics. Fundamentals of quantum and classical statistical mechanics using the ensemble approach. Introduction of modern techniques and applications including the renormalization group treatment of phase transitions and linear response theory of time-dependent statistical mechanics. Prerequisite: Chemistry 543 or consent of instructor. Instructors: Beratan, Charbonneau, MacPhail, and Yang. 4 units.

548. Solid-State and Materials Chemistry. Introduction to the structure, physical, and electronic properties of solid-state materials. Instructor: Liu and Wiley. Variable credit.

590. Special Topics in Chemistry. Special topics in chemistry and chemistry-related areas. Content varies by instructor. Instructor: Staff. 4 units.

590-1. Special Topics in Chemistry: Physical Chemistry Tools for Spectroscopy Microscopy of Living Systems. The study of dynamics in biological systems requires ever higher precision and information content from live-cell measurements. As the "jack-of-all-trades", physical chemists have been at the forefront of the development of the next generation of tools which push the spatial, temporal and spectral resolution of these measurements. In this course, we will investigate the application of physical chemistry to live-cell measurements. Topics will include the photophysics of fluorescent and photoswitchable proteins, luminescent nanostructures used as labels in live-cell systems, super-resolution methods for surpassing the optical diffraction limit, and single molecule spectroscopic methods, such as time-resolved fluorescence and Forster Resonance Energy Transfer (FRET) for the interrogation protein dynamics. Assumes exposure to the time-independent Schroedinger equation from an undergraduate physical chemistry course like CHEM 310, or permission of instructor. Instructor: Welsher. 2 units.

601. Biosensors. Theory and applications of biosensors. Basic principles of interactions between analytes and bioreceptors and various transduction techniques: optical, electrochemical, ion-selective electrode-based, voltametric, conductometric, and mass-sensitive techniques as well as novel nanotechnology-based biosensing systems including nanosensors, plasmonic nanoprobe, quantum dots, carbon nanotubes, molecular beacons, and molecular sentinel systems. Applications in chemical, environmental, biological and medical sensing. Paired with Biomedical Engineering 567. Prerequisites: senior or graduate standing or instructor's consent. Instructor: Vo-dinh. 3 units.

630. Advances in Photonics: An Overview of State-of-the-Art Techniques and Applications. 3 units. C-L: see Biomedical Engineering 850

701S. Research Orientation Seminar. A survey of departmental research. Required of all entering graduate students in chemistry. Consent of director of graduate studies required. Instructors: All members of the graduate staff. 1 unit.

760S. Seminar. One hour a week discussion. Credit/no credit grading only. Instructors: All members of the graduate staff. 1 unit.

801. Research. Instruction in methods used in the investigation of original problems. Individual work and conferences. 1 to 6 units each. Instructors: All members of the graduate staff. Variable credit.

990-0. Special Topics in Analytical Chemistry. Advanced topics and recent developments in analytical chemistry. Variable credit. 1 to 4 units. Instructor: Staff. Variable credit.

990-1. Special Topics in Biological Chemistry. Advanced topics and recent developments in biological chemistry. 1 to 4 units. Instructor: Staff. Variable credit.

990-2. Special Topics in Inorganic Chemistry. Advanced topics and recent developments in inorganic chemistry. Variable credit. 1 to 4 units. Instructor: Staff. Variable credit.

990-3. Special Topics in Organic Chemistry. Advanced topics and recent developments in organic chemistry. Instructor: Staff. Variable credit.

990-4. Special Topics in Physical Chemistry. Advanced topics and recent developments in physical chemistry. Variable credit. Instructor: Staff. Variable credit.

995. Graduate Training Internship. Designed to allow graduate student in Chemistry to engage in internship lab work and doctoral study with external agencies and institutions for credit, when determined necessary for degree completion. Laboratory work and analysis can be conducted at external institution with permission of immediate faculty supervisor. Permission of instructor required. Instructor: Staff. 1 unit.

VI. Useful Web Links for Graduate Students

A. General Links

The Graduate School

<http://www.gradschool.duke.edu>

Graduate Student Affairs

<http://www.gradschool.duke.edu/gsa>

Graduate and Professional Student Council

<http://gpsc.duke.edu/>

Standards of Conduct

<http://gradschool.duke.edu/academics/standards/index.php>

Academic Integrity Council

<http://www.integrity.duke.edu>

Responsible Conduct in Research

http://gradschool.duke.edu/academics/degree_reqs/rcr/index.php

Citing Sources and Avoiding Plagiarism

<http://library.duke.edu/research/plagiarism>

Guide for the Preparation of Theses and Dissertations

<http://gradschool.duke.edu/academics/theses/index.php>

Career Center

<http://www.studentaffairs.duke.edu/career>

Registrar's Office

<http://registrar.duke.edu>

Bursar's Office

<http://finance.duke.edu/bursar/>

Bursar's Office: Payroll Deduction

<http://finance.duke.edu/bursar/Payments/index.php#pd>

Housing Administration

<http://studentaffairs.duke.edu/hdrl>

Safety

<http://www.safety.duke.edu>

Duke Student Health Service

<http://www.studentaffairs.duke.edu/studenthealth>

B. Links for International Students

International House

<http://www.studentaffairs.duke.edu/ihouse>

Visa Services

<http://www.visaservices.duke.edu/>

English for International Students

<https://gradschool.duke.edu/academics/english-international-students>

C. Interdisciplinary Programs and Centers

Bioinformatics & Computational Biology

<http://www.genome.duke.edu/CBB/certificate/>

Bioinformatics and Genome Technology

<http://www.genome.duke.edu/>

Biomolecular and Tissue Engineering

<http://bme.duke.edu/research/biomolecular-tissue-engineering>

Computational Science and Engineering

<http://www.cs.duke.edu/>

Integrated Toxicology and Environmental Health Program

<http://sites.nicholas.duke.edu/envhealth/>

Nanoscience and Nanoengineering

<http://nano.duke.edu/>

Pharmacological Sciences (PSTP)

<http://pharmacology.mc.duke.edu/grad/pstp.html>

Structural Biology and Biophysics

<http://sbb.duke.edu/>

APPENDIX I

Registration Procedure and Information

The Assistant to the Director of Graduate Studies will manually open your registration each semester, once you have emailed a request to her office. It must be manually open for you each semester. You can access ACES at the URL: <http://registrar.duke.edu/registration>. Instructions on how to register for courses can be found on the chemistry website at: <http://chem.duke.edu/graduate/registration>.

Make sure you have emptied your book bag.

DROP/ADD Rules

It has been emphasized the importance of making all course registration changes before the end of the drop/add period. The Dean's office will be very strict in respecting the drop/add cutoff date which is **September 4, 2015 at 5:00 p.m.** for the Fall 2015 semester. All changes in course registrations should take place before the drop/add. Any changes thereafter will be treated as course withdrawals (W) and not drops and will thus appear on the student's transcript. Moreover, after the end of the drop/add period, you cannot transform audits into courses taken for credit, nor can the Dean's office do the inverse. Students must make their final decisions about the courses they are planning to take by the end of the drop/add period on **September 4.**

Late Registration Fee:

You will be charged a \$25.00 late fee if you do not register by the deadline.

APPENDIX II

Scheduling for a Ph. D. or Master's Examination in Chemistry

1. At the start of each semester the Asst. to the DGS will have a meeting to go over all scheduling and policies related to Doctoral and Master's Examination for that semester.

In the event you *must replace or change a committee member*, you should first consult with your Research Advisor and obtain approval from both the advisor and the substitute committee member. You should then submit to the DGS office a letter explaining the reasons for the change and indicating the professor who has agreed to serve as a substitute on your committee. The DGS office will then submit a Change of Committee Request form to the Graduate School for approval by the Associate Dean of the Graduate School

2. To schedule a room for your seminar, contact the DGS Assistant office Caroline Morris at caroline.morris@duke.edu or 919-660-1503 to request a room reservation.

3. The Director of Graduate Studies office coordinates reservations for conference rooms. The Assistant to the Director of Graduate Studies will assist you in reserving one of the conference rooms for the question/answer part of your examination. (3 hours needed)

4. The DGS Asst. will then send an e-mail confirming your examination with your committee and will complete and submit the necessary announcement to the Graduate School. If you have a change in committee, you must notify the DGS office in writing at least two weeks prior to your exam or before your dissertation can be approved by the Graduate School. Failure to do so could possibly void the examination.

5. You must file for Degree Completion on ACES early in the semester during which you plan to complete degree requirements:

http://gradschool.duke.edu/academics/grad_deadlines.php

If there are any questions, please contact Dean John Klingensmith's office at the Graduate School.

The Director of Graduate Studies Office will submit the formal announcement of the Final Examination Ph.D. or the Master's to the Graduate School after the student's PI has confirmed, via email, the student's dissertation/thesis is ready for defense. Both the DGS formal announcement and the PI email attesting to readiness are required in order to get your Ph. D. or Master's signature card. (The signature card is given to the student upon having his/her dissertation's format checked at the Graduate School).

Upon leaving Duke Chemistry Department you must go to complete a check-out form, provided to you by the Asst. to the DGS. This form is also found in the back of the Use of Research Facilities Handbook.

***NOTE: So that the committee members will have sufficient time to read the dissertation carefully, it must be submitted to the examining committee no later than two weeks before the scheduled final examination.**

APPENDIX III

A Statement Concerning Ph.D. Dissertations in Chemistry

The Duke University Graduate Bulletin describes the Ph.D. dissertation* as a mature and competent piece of writing, embodying the results of significant and original research. Other material available from the Graduate School and items from Chemistry Department files indicate that the style of a dissertation should be that of a recognized chemical journal such as the Journal of the American Chemical Society.

It is conspicuous that these sources avoid any prescription as to content, length, and broad organization of a dissertation. It can be argued with some force that such a statement would be superfluous. A well-honored understanding about the broad outline and general content of a dissertation already exists because the educational aims of writing it are widely accepted. Indeed, the consensus on this point is a very old one and can be assumed to be as international in scope as the Western scholarly community. Thus, the Graduate School finds the phrase "a mature and competent piece of writing" sufficient to recall the common understanding.

Was the tradition not viable and enduring, a detailed description of a dissertation in chemistry and other fields would probably be desirable to guide the student.

Considering the situation in chemistry, a comparison with the quite different situation that prevails with regard to the graduate chemical curriculum is instructive. The curricula and the accompanying requirements for a Ph. D. reflect the changing nature of chemistry; differences in educational preparation of entering graduate students, and even changes in educational philosophy.

By implication, the dissertation is a constant factor in the Ph.D. program. Should it be? Can the function presently served by the writing of a dissertation be better performed in other ways? It will be argued that in only exceptional cases will other paths be equally fruitful.

Of the educational goals to be realized by the writing of a dissertation two stand out:

1. Education of the student in the area of organizing questions, ideas, and data relating to a particular problem in a fashion that will: (a) facilitate the candidate's critical appraisal of his/her experimental data and methods, (b) assist him/her in developing an understanding of the new ideas and understandings implicit in his/her work, (c) help him/her to identify the logical steps to be taken next to extend the grasp of the subject already won.
2. Collection in a permanent document, for the education of scholars who will follow, a detailed account of the research and study of the candidate that presents: (a) the background of his/her problem, (b) the student's experimental strategies and procedures and (c) his/her data (d) the conclusions drawn from the investigations and study, insights developed, and such speculative comments as seem desirable.

The rapid pace of scientific communication today encourages preparation of journal papers at as early a stage of research as seems justified. How should such documents relate to the dissertation requirement? If the candidate prepares such papers, the first goal listed above will be met. To meet the second goal it is proposed that accepted manuscripts or reprints may properly be considered a part of a dissertation.

- Conventional usage will be followed. Thus, a “dissertation” is a document prepared by a Ph.D. Candidate and a “thesis” is the document in which a M. S. candidate describes the research he/she has completed.

The Graduate School requirements concerning style must, of course be followed. It may often still be desirable to add an introductory section and to expand the discussion tersely presented in the paper(s). It would be essential to report all “unpublished” data and to discuss experimental procedures and designs in sufficient detail that a clear account is left for others who will follow.

Finally, it should be noted that the route of paper writing is undoubtedly reserved to the select few. Research directors write most research papers, a process that in no way meets the goals set forth for the dissertation. It also seems likely that one or a set of student written theoretically oriented papers might well be a dissertation. In this case addenda might well be superfluous.

APPENDIX IV

Payment of Fees and Payroll Deduction

Graduate students serving as teaching assistants are supported with funds from the university and their fees (continuation, health, etc) and tuition are paid by the department directly to the university and are not included as part of the monthly “living” stipend check. Students supported on research assistantships are usually funded through federal research grants, which cover both the “living” stipend and funds to pay continuation and other fees. Some minor fees such as parking or other bills on your account should be paid through payroll deduction. More information and forms for setting up payroll deductions are available at the Bursar’s Office web-site at <http://finance.duke.edu/bursar/Payments/index.php>.

US citizens and permanent residents may be eligible to take advantage of certain education-related tax deductions or credits, like the Lifetime Learning Credit, which may significantly reduce or even eliminate any tax burden associated with stipends. More information about these tax issues can be found at the Bursar’s Office web-site at <http://finance.duke.edu/bursar/TaxInfo/index.php>.

Paychecks

If you are a Research Assistant you will receive a paycheck on the 25th of the month. Most Teaching Assistants receive a portion of their stipend on the 25th and the remainder on the last business day of the month. If you are on a fellowship provided by Chemistry or any other department at the University you will receive a paycheck on the last business day of the month. Due to the various pay dates, depending on position an individual pay schedule will be given to each student at the start of each semester that details exactly how much they will receive each month and on which pay date.

APPENDIX V

Master's Program General Information

General:

Although the department does not consider applications from potential graduate students seeking a Master of Science as the terminal degree, M.Sc. degrees are typically granted in the department each year. Students enter the Master's program by one of two general routes. The first is by the action of the department, and as such is an indication that there are serious reservations on the part of the faculty concerning the likelihood that a student will successfully complete the requirements for the Ph.D. Such a decision may occur at the end of the student's first year in residence and as such would be based largely on performance in the first year course work. It is also possible that based on a student's performance at one of his/her oral examinations, usually the Preliminary Examination, a student's supervisory committee might conclude that placement in the Master's program is an appropriate action. Alternatively, a graduate student may voluntarily decide to withdraw from the Ph.D. program and be placed in the Master's program. Reasons for such a decision are varied, but may include a change in career plans or any variety of non-professionally related personal reasons.

A departmental decision to place a student in the Master's program will usually include a recommendation that the student pursue either a terminal Master's degree, with no possibility for reinstatement to the Ph.D. program, or in rare instances a non-terminal Master's degree, with a final decision concerning reinstatement being deferred until after the Master's thesis defense, and usually dependent on several conditions previously established by the student's supervisory committee, the DGS, and the grad school.

Program and Registration:

Specific Graduate School requirements for the Master's degree can be found in the Bulletin of Duke University, Graduate School, and should be read with care by all students entering that program. A key feature of the MS degree is that a minimum of 30 units of registration be obtained before completion of the degree. Of these, at least 24 must be taken for a grade. There are often questions concerning the most appropriate way for a Master's student to obtain the required 24 units of graded work. Most students should have completed 20 to 22 units of graded coursework during the first year as part of the Ph. D. program, and the remainder of the required units can normally be made up through graded research credits in the second year. Any student contemplating a voluntary switch to the Master's program should anticipate these particular Master's registration requirements and carefully plan his/her various semester registrations. For this reason the department recommends that all students register for 6 units of graded research (CHM 801) in the Fall semester of his/her second year and 6 units of graded research (CHM 801) in the Spring semester of his/her second year. Nothing is lost by this action although some later difficulties may be avoided.

Support:

Any departmental action, which places a student in the Master's program, is usually accompanied by a recommendation concerning future financial support. For instance, a student placed in the Master's program at the end of the first year may be offered support (tuition, fees, stipend) through the second year of residence. It is expected that this support will be sufficient to complete the course work, research, and thesis defense for the Master's degree. Students placed in the Master's program after the end of the first year may expect to be supported for up to one additional year

from the time of the departmental action, sufficient time to complete the necessary requirements. Any student who voluntarily enters the Master's program before the end of his/her second year of residence will continue to receive support through August of his/her second year but not thereafter. It is thus important that students contemplating such a change plan their course registrations in such a way as to maximize the available support. The support of any student voluntarily entering the Master's program after his/her second year will be terminated as soon as practicable, but certainly not later than the end of the semester in which the decision was made. This action is not intended to be punitive. Rather, it is consistent with the department's central mission, the training of Ph.D. level chemists, a policy reflected in initial departmental admissions decisions.

APPENDIX VI
Fourth Year Propositional Examination
Pre-Proposal
(Due August 1)

Student Name: _____

Advisor Name: _____

Reviewer Name: _____

Working Title:

Hypothesis/Topic (~75 words):

Methodology/Approach (~100 words):

Significant/Importance (~25 words):

Research Advisor Approval: I have reviewed the above pre-proposal and verify that it is sufficiently removed from the student's dissertation research.

Signature

APPENDIX VII

Chemistry Department Accident Insurance Policy and Medical Coverage

As per Graduate School policy, injuries incurred during the course of TA responsibilities are covered by Worker's Compensation. Injuries incurred during the performance of any other student activities (research, studying, etc.) are covered by the student's insurance, including the required Health Fee as well as supplemental health insurance for injuries that cannot be fully treated through the Duke Student Health Center. All full-time students and part-time degree candidates are required to enroll in this supplemental insurance policy unless they show evidence that they are covered by other generally comparable insurance. See the Graduate School Bulletin for further details on the Student Health Program and Health Insurance.

For more details go to: <http://www.studentaffairs.duke.edu/studenthealth>

APPENDIX VIII

Duke University Graduate School Childbirth and Adoption Accommodation Policy for Ph.D. Students at Duke University Revision Date: September 29, 2008

Purpose

To allow the primary caregiver of a newborn child or a newly adopted child the possibility to devote full time care to an infant or an adopted child in the first weeks after birth or adoption. This policy guarantees PhD students *a minimum level of accommodation* during the transition to parenthood and reflects the Graduate School's ongoing commitment to supporting graduate students parents and a healthy academic work/family live balance.

Individual departments and degree programs have the discretion and are encouraged to exceed these guidelines where possible and appropriate. It is clear that the variety of PhD student academic requirements and responsibilities in different degree programs will have an impact on how those programs structure any accommodation beyond the minimum level required by the Graduate School. Programs have the flexibility to devise accommodation arrangements that correspond to what is possible and necessary in a given degree program context, provided the minimum accommodation is afforded.

Policy

The designated primary caregiver will be relieved of full-time graduate studies and duties for up to seven weeks after the birth or adoption of a child. If need be, up to two of those weeks may be situated before the projected birth or adoption date. The non-primary care giving parent may be relieved of one week of full-time graduate studies and duties in order to provide additional support to the primary caregiver.

Eligibility

In order to be eligible for accommodation, the designated primary care giver or the parent who is not the primary caregiver must

- 1) have been matriculated into a PhD program at Duke University;
- 2) be in good academic standing.

Note: If both parents are Duke PhD students, they may discuss with their respective degree programs and the Graduate School a feasible proposal for dividing up the eight week accommodation period in a different way if they so wish.

Accommodation Principles

1) **Enrollment Status:** PhD students benefiting from accommodation will remain registered as full-time students, and thus their eligibility for graduate student benefits remains intact (insurance, housing eligibility, student services, and the like). Eligible students who are also receiving stipend support would continue to receive that support.

2) **Suspension of Academic Requirements and Duties:** PhD students benefiting from accommodation are relieved of full-time academic and program responsibilities, such as the following: teaching assistant or research assistant duties, official academic examinations (qualifying examinations or preliminary examinations), research deadlines, coursework.

- a. Any scheduled coursework or examinations should be rescheduled as appropriate to avoid conflicts with the accommodation period and to provide reasonable time to complete these academic requirements.
 - b. The department or degree program will develop a plan to replace necessary duties and responsibilities, such as teaching and research. The Graduate School expects that the department or program will demonstrate the maximum flexibility possible.
- 3) The Graduate School will work with the department or degree program to determine expenses associated with the accommodation period and an appropriate cost-sharing arrangement with the Graduate School.
- 4) **Accommodation is not a leave of absence**, and the expectation is that the PhD student benefiting from accommodation will remain engaged in her or his academic and research work even if at a reduced level (assuming the good health of the student and the infant or child).

Funding

Eligible students who are receiving stipend support would continue to receive that support during the accommodation period. If a student is funded through a training or research grant the external sponsor will be expected to continue to pay the stipend to the extent allowable by the granting agency.

The department or degree program will develop a plan to replace necessary duties and responsibilities, such as teaching and research. Any additional costs incurred by the department or program due to replacement of compensatory work will be funded through the Graduate School. However, accommodations for students in Arts & Sciences and Engineering departments that have a surplus in their carryover bank will be funded through the bank.

Procedure

Requesting Accommodation

PhD students seeking accommodation should inform their department or program (normally through their Director of Graduate Studies) and the Graduate School office **in writing** no later than one month prior to the semester during which birth or adoption is expected to take place so that departments and programs can have adequate time to plan any necessary replacement needs.

The written request must indicate the 'expected' birth or adoption date.

Students will be expected to obtain the signature of their Advisor and Director of Graduate Studies, prior to submitting this form to the Senior Associate Dean, Academic Affairs for final approval.

If funding source changes are required, the Senior Associate Dean for Academic Affairs will notify the Office of Budgets and Finance to adjust student funding source accordingly.

Related Links

NIH Parental Leave Policy for Ruth L. Kirschstein NRSA Awards

<http://grants1.nih.gov/grants/guide/notice-files/NOT-OD-08-064.html>

Request for Childbirth and Adoption Accommodation

Students who wish to enact the provisions of the Childbirth and Adoption Accommodation Policy are asked to complete the following form. Upon approval from the Dean of the Graduate School, students will be entitled to maintenance of full-time student status, suspension of academic responsibilities, and continued stipend support.

Please submit this form at least one month prior to the beginning of the academic semester in which you will begin the leave period.

Completed forms should be submitted to the Senior Associate Dean, Academic Affairs, Graduate School, Box 90065, 2121 Campus Drive or faxed to 919-684-2277.

(Please estimate the start of your requested accommodation period and then adjust/confirm after the actual birth/adoption. Students are eligible to begin the accommodation period up to two weeks prior to birth or adoption date if they wish.)

Last Name: _____ First Name: _____ Middle: _____

Address: _____
(street apt. city, state, country postal code)

Phone: _____ Unique ID: _____ Department: _____

Admit Term: _____

I am requesting policy coverage beginning _____
(month/day/year)

Stipend funding source (To be completed by the Directory of Graduate Studies)

Advisor (indicating that the student has discussed revised completion schedule)

Signature: _____ Date: _____

Director of Graduate Studies (departmental approval indicating good academic standing)

Signature: _____ Date: _____

Senior Associate Dean, Academic Affairs, Graduate School

Signature: _____ Date

APPENDIX IX

Graduate Chemistry Council (GCC)

GCC provides numerous academic and social activities for the entire chemistry department, including graduate students, undergraduate students, post-docs and faculty, in order to facilitate interdepartmental interactions and collaborative scholarship. Some examples of GCC activities include lectures by invited academic and professional speakers, department picnics, town hall meetings, outdoor Summer activities, and recruitment and orientation of new graduate students.

The primary goal of GCC is to continuously improve the graduate school experience in the chemistry department at Duke, and so we invite you to bring any questions or concerns to 2014-2015 Officers:

| | |
|----------------|-----------------|
| President | Melanie Short |
| Vice-President | Chris Eubanks |
| Treasurer | Robert Carden |
| Secretary | Patrick Flowers |