Graduate Program in Neuroscience

Student Handbook 2009-2010

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I. INTRODUCTION

Most of the information that students enrolled in the University of Minnesota Graduate School will need is contained in the Graduate School web site. The information presented in this handbook is a supplement to the Graduate School web site. It also gives students specific information about their appointments to the Neuroscience Program, and to the operational and administrative aspects of the Graduate Program in Neuroscience. For more information about Graduate School requirements and procedures, see the Graduate School home page at www.grad.umn.edu. Please be aware of the Graduate School's required forms for graduation. Forms, due dates, and details can be found on the Graduate School website at www.grad.umn.edu/Current_Students/degree_completion/doctoral/index.html.

Program Goals and Priorities

The Neuroscience Graduate Program at the University of Minnesota is an interdisciplinary program; its goal is to promote graduate education and research in Neuroscience, leading to the Doctor of Philosophy degree (Ph.D.).

II. GRADUATE ADVISER

The graduate adviser will be the student's primary source of instruction and advice. Until a student selects a permanent adviser, the Director of Graduate Studies (DGS) will serve as interim adviser. To assist in the selection of a research problem and a research adviser, several activities have been arranged:

Laboratory Rotations

The exposure to new laboratory techniques and participation in active research projects during the rotation allow the opportunity to become acquainted with current research interests of individual faculty members. There will be 4 laboratory rotations, each lasting ½ a semester (approximately 7 weeks). For a more complete description of laboratory rotations, see page 5.

Faculty Curricula Vitae

A collection of the complete curricula vitae and bibliographies of the faculty is available for consultation in the program office. Short descriptions of each faculty member's research can be found in the program brochure and on the Neuroscience Program's website: www.neuroscience.umn.edu./faculty/faculty.html.
In addition, attending seminars (especially the weekly Neuroscience Colloquium) is a good way to become acquainted with faculty research interests.

Selecting your Research Adviser

1. Students are expected to use the laboratory rotations as the major basis for choosing their research adviser. The actual selection will take place during Spring Semester, to allow students time to collect as much information as possible before making a decision. Students should begin work in their chosen labs at the beginning of the summer.
2. Factors to consider when choosing an adviser include: laboratory research interests, laboratory space and equipment, rapport with adviser, and funding availability.
3. Once an adviser has been chosen, both the student and adviser must sign the following contract. http://www.neuroscience.umn.edu/CurStu/contract.pdf

Appointments of Graduate Committee

The formal Graduate Committee is initially appointed in conjunction with the filing of the Degree Program Transmittal (Form GS 89abc) which must be filed with The Graduate School **no later than one term** prior to your Preliminary Oral Exam. Students, in consultation with their advisors, should submit to the DGS a list of suggested faculty for these committees. This committee will generally serve as part of the preliminary oral examination and final defense committee. In addition, this committee will participate in the student's annual research reviews, to monitor progress and provide advice about the thesis project. Degree Program Forms are available in the Program office or can be downloaded from the Graduate School website at www.grad.umn.edu/Current_Students/forms/gs89a.pdf

Each Ph.D. committee is composed of a minimum of four members: three members (including student's adviser) from the major field, and one representing the minor or supporting program fields. The chair of the committee cannot be the student's adviser. The minor or supporting program member must have a graduate faculty appointment **outside of neuroscience** (but can also have appointment in neuroscience - in other words, he or she cannot have a graduate appointment only in neuroscience).

III. REQUIREMENTS FOR THE PH.D. DEGREE

The following requirements and procedures are specified for typical students. Certain exceptions can be made with the consent of the adviser and Director of Graduate Studies. See: www.grad.umn.edu/current_students/handbook/ for a complete description of the Graduate School requirements from initial registration to graduation.

Core Curriculum

First-year students must take the eight core courses listed below, plus the four required laboratory rotations. The coursework schedule for the first year is as follows:

Summer Session:
NSc 5551: Cell & Molecular Neurobiology Lab at Itasca (4 cr)

Fall Semester
NSc 5461: Cellular & Molecular Neuroscience (4 cr)
NSc 5561: Systems Neuroscience (4 cr)
NSc 8334: Lab Neuroscience (variable cr)
NSc 8321: Career Skills and Understanding Responsibilities as a Neuroscientist (.5 cr)
NSc 8320: Neurostatistics

Spring Semester
NSc 5661: Behavioral Neuroscience (4 cr)
NSc 8211: Developmental Neurobiology (3 cr)
NSc 8334: Lab Neuroscience (variable cr)
NSc 8321: Career Skills and Understanding Responsibilities as a Neuroscientist (.5 cr)
NSc 8320: Neuroscience Seminar Series Journal Club (Section 2)

NSc 8320 Course requirement

- All neuroscience graduate students will be required to take two semesters of the journal club. **It is a required "core" course**. First year students will take the course in the Spring term. The remaining semester requirement must be fulfilled in the Spring term of the second or third year of the student's studies.

Additional coursework that may be necessary during the first year includes:

a. At least one semester of Biochemistry and Cell Biology is strongly recommended for NSc 5461
b. A statistics course is required.

Supporting Program or Minor

The Graduate School requires that students complete 12 credits in a minor or supporting program. Typical minors for neuroscience students include cell biology, physiology, statistics, psychology, and medicine; the latter minor is primarily reserved for students in the MD/PhD program. However, the student is not restricted to these topics, and is free to explore other possibilities depending on his/her interests and career ambitions. A supporting program can be designed to fit a student's specific research interests. Courses in the minor or supporting area may be taken concurrently with neuroscience courses during the first year, but are usually taken during the second year. A course in statistics is required. All students are encouraged to become literate in at least one computer language. If a student elects to complete a specific minor, all of the 12 credits must be from a single graduate program and the courses selected must be approved by the DGS of that graduate program. If the supporting program option is selected, the courses may be from different disciplines, but should constitute a coherent program of courses that support the overall interests of the student.

Registration Requirement

All graduate students are required to register for 6-14 credits in the Graduate School every fall and spring term in order to maintain active status until they have passed the oral preliminary exam and completed 24 thesis credits (NSc 8888). Register for pre-thesis credits (NSc 8666) to achieve a minimum requirement of 6 credits. Students who fail to register annually will be considered to have withdrawn and will have to apply for readmission (application fee: $40.00).

Students are not required to register for courses in the summer, and registration during summer is not required to maintain health insurance coverage. Indeed, NEVER register for any credits during the summer without prior discussion with the program coordinator and your advisor. Please be aware that FICA taxes will be taken from the paycheck during summer. If a student registers for any credits during the summer, student services fees are charged. Furthermore, tuition benefits are not available during the summer. Thus you or your advisor will be responsible for the full tuition and fees incurred during a summer term. [This directive is based on evidence that the amount of FICA tax for the summer period is usually less than the amount of the tuition and student service fees.]

Research and Thesis Credits

Research Credits

After the first year, but prior to completion of the preliminary oral examination, students should continue to register for research credit under NSc 8666. This course reflects research training activity and permits the student to maintain a credit load of six credits required to qualify for a research assistantship and maintain status as a full time student.

Thesis Credits

To obtain a Ph.D. degree, students must register for a minimum of 24 thesis credits (NSc 8888). The Graduate School will not permit students to register for Doctoral thesis credits until the semester after the preliminary oral examination has been completed.

Post Thesis Credits

Upon completion of 24 thesis credits you should register for NSc 8444, which entitles you to full time registration for only 1 credit. Note: Once you register for this you course you can no longer register for any other courses.

Laboratory Rotations

In the first year of graduate studies, students participate in four laboratory rotations. Assignments depend on space availability and the interests of the individual students. Students should discuss their choices for rotation advisers with the DGS prior to selecting each laboratory rotation. Students should make their selections well before the beginning of the semester to allow time for any arrangements that need to be made by the faculty.
Laboratory rotations allow students to experience the broadest possible spectrum of laboratory techniques and to

explore experimental neuroscience in actual research settings. An important program goal is to emphasize the major requirement for a successful graduate education: the ability to plan and coordinate several efforts by balancing coursework and research. Research projects in different labs will be designed as components of current research projects. Consequently, the research results will be weighted equally with the experience gained by the students.

Typically, when not in class, students are expected to be involved in their research projects. It is expected that a minimum of 20 hours per week will be devoted to research projects. First-year students should register for NSc 8334 (section 1) and each project will be graded S/N. The comments by the research supervisor will become a part of the student's file.

Teaching Requirements/Opportunities

Revised TA requirement approved by the steering committee on June 29, 2005

1. Maintain requirement of students in GPN to TA one course, but expand the TA opportunities to include 3 undergraduate Neuroscience courses.
2. List a total of 12 (13) TA opportunities
    a. 8 current (9 requested) slots for undergraduate neuroscience courses
    b. 4 slots for Human neuroscience course with each TA doing each lab twice (e.g., each 2 hr lab, twice, reduces TAs in this course from 8 to 4).
    c. Student preferences for a TA assignment will be considered, but not guaranteed

3. Students still complete the TA requirement in their 2nd year.
4. There may be 2 opportunities for students to TA a second semester if they choose:
    a. Students can arrange a mentorship with one of the course faculty for credit for PFF8102. They will function as a TA in the course and will be mentored in giving 3 lectures (course requirement). They will not be paid.
    b. If TA positions are not filled by students completing the TA requirement and students enrolled in PFF8102, the Department of Neuroscience will offer a "fellowship" ($2000) to students who choose to TA additional semesters and not receive credit in the PFF program.

Seminars

Students are expected to attend the Wednesday noon Colloquia sponsored by the Neuroscience Graduate Program and the Friday noon seminars cosponsored by the Program and the Department. Seminars include professional development seminars as well as research presentations. Students are strongly encouraged to attend seminars in other areas/departments that may interest them.

Examinations

There are three examinations required for the Ph.D. degree: the Written Preliminary Examination, the Preliminary Oral Examination, and the Final Oral Examination with Thesis Defense.

1. Written Preliminary Examination

A qualifying written examination for candidates for the Ph.D. in Neuroscience will be given once during the year. The examination is usually scheduled for mid-June. All candidates will take the written examination after the completion of their first year's coursework. Instructions for the exam as well as a copy of the previous year's exam will be distributed to first-year students in during the spring semester. Spring review sessions are held to assist students in preparation for the exam. Because of the magnitude of work involved in the organization and preparation of this exam, requests for deviation from the above schedule must be submitted in writing by the student to the DGS, and should be considered only for medical reasons or family crises.

Procedures for Grading and Evaluating GPN Preliminary Written Examinations

A. Two graders will independently evaluate each question and assign grades of Outstanding, Pass, or Fail. The final grade for each question will be determined according to the following rules:

1. Two grades of Outstanding–Outstanding, Pass–Pass or Fail–Fail will be assigned the grade of Outstanding, Pass, or Fail for that question.
2. A grade of Outstanding–Pass will be assigned a grade of Pass.
3. A single Fail for a question, rather than both graders giving a question a Fail, requires that the graders consult each other and agree on a grade of Pass or Fail. Sabina will note the discrepancy and will ask them to review the question. If the graders cannot resolve the situation or if they request additional help, the Curriculum Committee will assist in the grading.

B. If student fails a SINGLE question in ONE or MORE SECTIONS of the examination

1. Student passes that particular section(s) of the examination.
2. No further remedial work is required.

C. If student fails TWO or MORE questions in a SINGLE SECTION of the examination.

1. Student fails that particular section of the examination.
2. Subsequent course of action depends on previous academic performance.
3. If student received **grade of B- or better in relevant core course**, then
    a. Student will consult with course director.
    b. Student will independently review entire field of core course.
    c. Student will re-write all failed questions.
    d. Student will also answer those questions previously chosen not to be answered.
    e. All answers must be submitted during current calendar year.
    f. Answers will be evaluated by course director and designated readers.
    g. No subsequent re-writes will be allowed.
    h. If student fails any questions, then student will be given oral examination by course director, designees, and student's advisor.
    i. If student fails oral examination, then the decision of the Steering Committee would most likely result in termination.
4. If the student received a **grade below a B- in the core course** related to failed section, then
    a. Student should be required to retake relevant course.
    b. If student achieves grade of B or better in the re-take then student passes exam.
    c. If student receives a grade below B in retake, then the decision of the Steering Committee would most likely result in termination.

D. If student misses TWO or MORE questions in TWO or MORE sections of the examination.

1. Student has failed the examination.
2. The student and advisor will petition the Steering Committee for continuation in the GPN.
3. The Steering Committee will consider the petition and decide a course of action based on performance in all classes, rotations and other work.
    a. Student may be required to undertake the courses of action listed in Section B above.
    b. Student may be terminated from the program.
4. If the Steering Committee chooses the first action above, the Committee will decide the deadline for satisfactory completion.

2. Preliminary Oral Examination

Forms are available at: www.grad.umn.edu/Current_Students/degree_completion/doctoral/index.html

a. The oral exam tests three areas:

Oral communication: clarity in articulating a conceptual framework for a hypothesis and responses to questions.

Thinking: logical thinking and the ability to "think on one's feet" in defending the soundness of one's ideas: the rationale for experiments, interpretation of data, and significance of conclusions.

Knowledge: understanding of knowledge within an area chosen by the student (depth component) as well as the relevance of one's research to other areas of neuroscience and biology (breadth component). The scope of questioning in the oral exam is expected to include neuroscience and the minor or supporting field. The student may be asked to discuss other work that validates experimental approaches (may draw on other fields).

b. A research proposal will form the basis of the research discussion of the exam.

The proposal may be aligned with or separate from the thesis, but the program encourages them to be linked. The proposal is not a binding document but an exercise in analytical thinking and problem solving skills that will be tested in the oral examination.

The research proposal describes experiments that will test a hypothesis. The hypothesis answers a question that is posed about the nervous system. The description of the research plan may range in length from10 - 20 pages, double spaced, 1" margins, 12 pt font (the page limit for an NRSA proposal is 10 pages, single spaced). The proposal should include the following (suggested lengths in pages are proportional to the 10 page length):

1. Abstract: 1 paragraph, an overview of the rationale for the hypothesis, statement of the hypothesis, and the experiments that will be conducted to address the hypothesis.

2. Background (up to 6 pages): a summary of the relevant information that provides the rationale for the question that is posed about the nervous system and the hypothesis that will be tested. It is not meant to be exhaustive. This section should convince the reader that the hypothesis is reasonable and important. (This section can provide the foundation for the introductory chapter to the thesis.)

3. Experiments: (2-3 pages) a description of the experiments that will be conducted. It may be useful to think of the experiments as questions that will be answered to accumulate evidence that will support or refute the hypothesis. The design of the experiments should include an outline of the essential controls, the nature of the data that will be analyzed statistically, and how outcomes will be interpreted. A step-by-step description of experimental protocols is not appropriate.

4. Significance: (1 page): This section addresses the importance of the conclusions that may be made based on the data generated in the proposed experiments.

5. Literature cited: Consult the Journal of Neuroscience instructions for authors for a recommended format for citations.

The application may be written **anytime before** the deadline of September 1 (see below). No written description of preliminary data is required. Preliminary data available at the time of the oral preliminary exam may be included in the oral presentation by the student at the beginning of the exam.

The advisor is expected to be involved in discussing the research plan and editing at least one draft of the proposal as part of his/her mentorship. This is not a conflict of interest because passing the oral exam is not dependent on the written document but on the student's performance in defending a hypothesis and how it will be tested (i.e., rationale, experimental design, significance of the research plan).
NOTE: In preparing the research proposal, the student and advisor should consider submitting the proposal for funding by NIH or NSF. The research description for these applications (generally up to 10 pages single spaced) may be used for the oral preliminary exam research proposal. Please consult the following websites for more information:

Ruth L. Kirschstein-NRSA (F31) applications are due April 5th, August 5th and December 5th. See http://grants1.nih.gov/grants/funding/416/phs416.htm for details.

NSF fellowship applications in the life sciences are due the first week in November (e.g., 11/4/2004) no later than the student's second year of graduate studies. See http://www.nsf.gov/pubs/2003/nsf03050/nsf03050.htm for details.

c. All research proposals are due in the graduate program office by **4 PM on September 1st** of the student's third year in the graduate program (i.e., at the beginning of the student's third year). If September 1st falls on a weekend, proposals will be due by 4 PM of the Friday before this date. The following information must be included with submission of the proposal:

Names of the members of the oral prelim committee. Members are proposed by the student and advisor and approved by the DGS before **September 1st or at least 10 weeks before your oral prelim**. The chair of the committee must be a member of the graduate faculty in Neuroscience and may not be the advisor. Other members must include a minimum of 2 members of the neuroscience graduate program and 1 member from the minor/supporting field.

The exam must be completed by December 1st of the student's third year in order for the student to remain in good standing in the graduate program. If December 1st falls on a weekend, the exam must be completed no later than the Friday before this date. A student may petition the director of graduate studies for a waiver of this requirement.

d. Time, date and location of the oral prelim exam.
The time and place of the exam are scheduled by the student, and the student must notify the graduate school. **Three weeks** are required between notification of the graduate school and the date of the exam so that the graduate school can process paperwork for the exam.

e. Role of the Oral Prelim Committee following the exam. (changes to the current process are in italics)
The chair of the oral prelim committee will provide written feedback to the student summarizing committee discussion of the research proposal after the oral exam.

In addition to serving as the examining committee for the oral prelim, it is expected that this committee will be an advising committee for the student during the course of his/her dissertation research *and will meet with the student at least twice/year. Each meeting will be scheduled by the student. The student will write a summary of comments from each meeting with the thesis committee and distribute the summary to the committee members within one week following the meeting.*

3. Final Ph.D. Oral Examination

The Ph.D. Thesis Proposal Form (GS 63abc) should be filed with the Graduate School **no later** than one Semester after a student passes the preliminary oral examination and **at least** one term prior to the Final Oral Exam.

The form is available at: www.grad.umn.edu/current_students/forms/GS63A.PDF

This form specifies the graduate faculty who will serve as examiners for the final oral examining committee. In most cases, this committee will be the same as the Oral Exam Committee. This form also specifies three members who will serve as reviewers of the thesis. Two reviewers, including the adviser, are selected from the major field. One reviewer must also be selected to represent the minor or supporting program. This person must have a graduate faculty appointment outside of the Neuroscience Program. These members read the thesis draft and must sign a form indicating that it is acceptable for defense at least one week prior to the scheduled date of the final oral examination. Again it is up to the student to find an appropriate date and room, and to make sure sufficient time is allowed for the readers to examine the thesis. Graduate school rules specify that all members of the committee must have at least two weeks to read the thesis. This examination is primarily the thesis defense, although the questions and discussion may cover related areas as well. The first portion of all final oral examinations is a seminar given by the student covering the thesis research. This seminar must be publicly announced and all interested faculty and students are invited. Therefore it is important that the student and adviser notify the Neuroscience Program of the defense in a timely manner so that the thesis seminar can be properly advertised. As is stated in the Graduate School Bulletin, the thesis seminar presentation is the part of the oral examination "to which the scholarly community is invited." Following a brief period of questions from the audience, the second portion of the examination will consist of additional questions to the candidate from the members of the examination committee. The second section of the examination is not open to the public.

Questions often arise about the role of the reviewers and the interpretation of the reviewers' actions prior to the oral examination. The reviewers determine whether the thesis is acceptable for defense. If the thesis is judged to be not acceptable for defense, specific reasons will be communicated to the student. If acceptable, the reader has judged that the thesis is ready for oral defense – and only that. The reviewer may have reservations and after the oral examination vote not to pass the candidate for the Ph.D. degree. Again, these reasons should be communicated to the student. The Graduate School Bulletin provides further detailed information 10 regarding the final oral exam. The student should prepare a copy of the bound thesis for the Neuroscience Program files.

Evaluation of Student's Progress

Normal progress toward the Ph.D. degree by full-time graduate students is based on fulfillment of the following general minimum requirements.

1. Selection of the thesis problem and adviser during the first year.
2. Maintaining a minimum GPA of 3.0.
3. Performing satisfactorily on the written preliminary exam.
4. Passing the oral preliminary examination within one to one and one half years after successful completion of the written preliminary exam.
5. Performing all teaching assignments and other program functions satisfactorily.
6. Following the completion of the oral exam, students must meet annually with their Graduate Committee. The meeting must occur by the end of Spring semester each year.
7. Starting the 3rd year students must give a ½ - 1 hour oral presentation during the Wednesday NSc colloquium.

As a general rule, all requirements for the Ph.D. in Neuroscience should be completed in 4 - 5 1/2 years. Although the Graduate School time limit for the Ph.D. degree is five years after the oral preliminary examination, the Neuroscience faculty views this limit as excessive. It is the joint responsibility of the student, the adviser and the Graduate Committee to set goals for completion of each individual's program and to periodically evaluate the rate

of progress and achievement of these goals. It is of particular importance that the student assume an active role in this process and seek assistance from the adviser and Graduate Committee if unforeseen professional or personal circumstances appear to be substantially changing the rate of progress for attaining the Ph.D. degree.

Termination of Graduate Student Status and/or Support

1. Graduation or withdrawal from the program.
   Upon graduation, students should notify the program office of the effective date for termination of student status. Students who decide to withdraw from the program should give written notice to the Director of Graduate Studies as soon as the decision has been made. The notice should indicate the effective date of withdrawal. In instances where students have effectively withdrawn from the program without notice, the department will terminate support retroactive to the apparent date the student ceased to participate in the program.

2. Termination of graduate status
   The Graduate School and Neuroscience Program require that one warning be issued to the student regarding unsatisfactory performance before that student is terminated. The warning must include the specific deficiencies and must outline a mechanism and time limit for correcting them. Students must have a cumulative graduate GPA of 3.0 or higher after 3 semesters of residence in order to remain in the program. Thereafter the cumulative GPA must be 3.0 or higher at the end of the spring semester of each year and prior to graduation. A satisfactory performance on the written preliminary examination is also required for continuation in the program.

3. Academic misconduct
   Academic misconduct (such as cheating on closed book examinations) or violation of course guidelines (which describe the extent of collaboration that is acceptable in responding to take-home examinations, homework assignments or problem sets) is sufficient cause for dismissal from the program. Please refer to the Student Conduct Code for more information on this issue www.fpd.finop.umn.edu/groups/ppd/documents/index/titles.cfm.

Stipend

The stipend for beginning graduate students was $24,000 (2006-2007), and is $24,500 (2009-2010) corresponding to a 50% appointment. In addition to the stipend, students receive full tuition and health benefits. The stipend may be supplemented if a student serves as a Teaching Assistant in a certain courses course, see www.neurosci.umn.edu/employment/job_TA.html

Graduate School Procedures

Active student status: Students must register in the Graduate School the semester in which they are admitted or readmitted. To maintain active student status, students must register in the Graduate School every fall and spring Semester.

Commencement: Graduate School commencement ceremonies are held in fall and spring semesters. Students who wish to participate in commencement should contact the Graduate School one Semester in advance of the ceremony.

Required G.S. Forms:

(These forms are available online at www.grad.umn.edu/Current_Students/degree_completion/doctoral/index.html)

Written Preliminary Examination Report (GS 17):

This form is completed by the program after completion of the preliminary written exam.

Degree Program Forms (GS 89a, 89b, 89c):

Due at least 1 semester before the preliminary oral. The Program will file this form for each student.

Oral Preliminary Examination Report (GS 18):
Due at least one academic semester (**or 10 weeks**) before the final oral examination.

Preliminary Oral Examination Scheduling (GS 12):
The examination must be scheduled at least one week in advance with 316 Johnston.

Thesis Proposal Forms (GS 63a, 63b, 63c):
Due the semester after passing the preliminary oral examination and **at least** one term prior to the Final Oral Exam.

Thesis Reviewer's Report (GS 2):
Received when thesis title page is submitted to 316 Johnston **at least two weeks before the final oral examination**. This form is due one week before the final examination. Application for Degree and fee are due the first working day of intended month of graduation.

All other forms are due the last working day of that month.

Additional forms given to the student at this time:
Survey of Earned Doctorates
Microfilm Agreement
Application for Degree Graduation Information

Thesis and Thesis Abstract:
A copy of the thesis **must be submitted** to the Graduate School. Instructions for the preparation of the thesis, including format specifications and adviser's signature requirements, should be obtained from the Graduate School, 316 Johnston Hall.

Furthermore, the Graduate Program in Neuroscience **requires** a bound copy of the thesis.

Neuroscience Minor Requirements for Students Majoring in Other Fields
The program for an individual student is developed by consultation between the student and the DGS of the Graduate Program in Neuroscience. Students are required to take one of the following core courses.

Function/Structure: NSc 5561: Systems Neuroscience (4 credits)
Cellular/Molecular: NSc 5461: Cellular & Molecular Neuroscience (4 credits)

In addition, students are required to take elective neuroscience courses for a total minimum of 12 credits (including the core courses).

Important Note: NSc 5561 requires that you be registered concurrently in NSc 5461, or that you have taken an undergraduate neuroscience course such as NSci 3101.

NSc 5461 requires that you have taken undergraduate courses in cell biology and biochemistry. We recognize that students who lack the prerequisites may nevertheless wish to minor in Neuroscience. If you do not have the undergraduate preparation, it is important that you consult with the DGS early in your graduate career to develop a plan of study. Such a plan would most likely take the following form:

YEAR 1: Fall or Spring Semester - preparatory course (2 or 3 cr)

YEAR 2: Fall Semester - NSc 5561 and/or NSc 5461 (4 to 8 cr), Spring Semester - Electives

IV. FELLOWSHIPS

Students are encouraged to apply for competitive fellowships whenever possible, as a fellowship awards can be a valuable achievement for a student's graduate record. Following are the application dates of a number of different fellowships:

August: NIH Predoctoral (NRSA)
October: NSF Predoctoral
December: NIH Predoctoral (NRSA)
March: Most U of M Graduate School Endowed Fellowships
April: NIH Predoctoral (NRSA)

Application forms for NIH or NSF fellowships are available from SPA (624-0061). It is strongly recommended that an NIH or NSF grant be prepared and submitted during the second year. This serves to focus the thesis plans and outline the introduction to the thesis, and provides both students and advisors with an agreed upon list of objectives. It is also excellent practice for future grant-writing.

Additional information about fellowship programs can be obtained at:
http://www.ospa.umn.edu/OPPOR/spin.htm

V. ADMINISTRATIVE MATTERS

Office space

Upon entering the Graduate Program in Neuroscience, students will have space in the student office in D694 Mayo Building. Keys for this room, as well as for the Program's utility/copy room, will be distributed by the Program Administrator. Students are expected to keep the student office clean. A refrigerator is provided for storing food and beverages. Care should be taken to keep the carpets, chairs, etc. in good condition. Please recycle office paper, bottles, cans, and newspapers in the bins provided by the University.

Upon completion of the first year, the desks and room should be cleaned and all keys should be returned to the Program office.

Accident Reporting

Accidents or injuries that are work related or occur on University property are covered by either State of MN Workers Compensation Plan or liability insurance. All injuries should be treated without delay (see guidelines below) and must be reported to both the department in which the student is currently working and the victim's immediate supervisor as soon as possible (within 24 hours).

1. For an ambulatory victim; render first aid and have the person seek medical treatment at the emergency room at University Hospitals. If the victim is a student and has purchased University Health Insurance as indicated on their fee statement, he or she may go to Boynton Health Service. After hours, these individuals should also go to the emergency room at University Hospitals.

2. For a serious or life-threatening injury, call Emergency 911.

3. All work-related accidents must be reported to the department's Safety Officer as soon as possible so that a "First Report of Injury" form can be filled out. If this report is not received by the University's Personnel Department within 7 days, the department will be fined.

Copying

First-year students may use the copy machine which is located near the Graduate Program office area. After a permanent adviser has been chosen, students should discuss the procedure to be used in the adviser's department.

Mail
First-year students will have mailboxes in the Neuroscience Department mailroom (6-145 Jackson Hall). Mail is delivered once daily. Outgoing and campus mailboxes are in the mailroom. Personal mail must have postage affixed. U.S mail should be in the box by 4:00 to go out that day. There is a U.S. Post Office in Coffman Union.

Paychecks
Students will be on biweekly payroll and will receive paychecks every two weeks (26 checks per year). If the payday occurs on a weekend or holiday, checks will be in the department office the preceding Friday. Checks can be picked up after 12:00 noon. Students who want to have checks directly deposited into their bank account should obtain a form from the office. Direct deposit is more secure and more efficient, and it is strongly encouraged.

Statement on Sexual Harassment
Sexual harassment is against the law. It is prohibited by Title VII of the 1964 Civil Rights Act and by the Minnesota Human Rights Act. Sexual harassment is broadly defined to include behavior that is not considered overtly sexual. Although not specifically prohibited, consenting sexual relationships between faculty and student, or supervisor and employee, are actively discouraged. The University of Minnesota has had a strongly enforced policy on sexual harassment since 1981, and encourages the reporting of violations. Call 624-9547 for additional information.

Vacation/Holidays
Working toward a Ph.D. is a full-time job. Graduate students receive no paid vacation. However, they do receive paid official university holidays (such as Dec. 23, Dec. 24, July 4, etc.). Any other time off will have to be negotiated with the adviser, and students will be expected to make up the time taken off.

Sick Leave
Graduate assistants are entitled to a paid informal sick leave, not to exceed two weeks consecutive pay, for absences caused by illness or injury to yourself, your dependent child, or the dependent child of a registered same-sex domestic partner.

In the case of repeated absences due to illness, the appointing authority may request a health provider's certification verifying your inability to work.

Graduate Assistant Insurance
Students who choose to receive the health coverage provided by the University will be covered by the Graduate Assistant Insurance Plan (currently under a Blue Cross Blue Shield policy). This coverage is administered through the Graduate Assistant Insurance Office (GAIO) at 625-6936. Coverage for dependents is also available. A word of warning: after students graduate, they must contact the GAIO to cancel their insurance. Otherwise the office may continue to bill for coverage after the graduation date.

Details are available at http://www.bhs.umn.edu/insurance/twincities/ga/index.htm

Dental Coverage
Boynton Health Service Dental Clinic provides dental care for students on the Graduate Assistant Health Benefit Plan. Please identify yourself as a Graduate Assistant Health Benefit Plan member and have your student ID number ready when making appointments for yourself or your dependents to assure that you receive appropriate discounts on services.

Details are available at http://www.bhs.umn.edu/insurance/twincities/ga/index.htm

VI. COURSES OFFERED - GRADUATE PROGRAM IN NEUROSCIENCE

The following is a list of the courses offered by the Neuroscience Program. Please see the Graduate School Bulletin for a complete description of each. There are several relevant courses offered through other departments as well.

Course #	Title	Core/Elective	# Credits
NSC 5031W	Perception (CLE - Writing Intensive)	**Elective**	3
NSC 5201	Computational Neuroscience	**Elective**	3
NSC 5202	Theoretical Neuroscience: Systems and Information Processing	**Elective**	3
NSC 5461	Cellular and Molecular Neuroscience	**Core**	4
NSC 5462	Neuroscience Principles of Drug Abuse	**Elective**	2
NSC 5540	Advanced Survey of Biomedical Neuroscience	**Elective**	2
NSC 5551	Itasca Cell and Molecular Neurobiology Laboratory	**Core**	4
NSC 5561	Systems Neuroscience	**Core**	4
NSC 5661	Behavioral Neuroscience	**Core**	3
NSC 5770	Neurobiology of Disease	**Elective**	2
NSC 8026	Neuro-Immune Interactions	**Elective**	3
NSC 8207	Seminar: Psychopharmacology	**Elective**	1
NSC 8211	Developmental Neurobiology	**Core**	3
NSC 8216	Selected Topics in Autonomic and Neuroendocrine Regulation	**Elective**	1
NSC 8217	Systems and Computational Neuroscience	**Elective**	2
NSC 8221	Neurobiology of Pain and Analgesia	**Elective**	3
NSC 8222	Central Regulation of Autonomic function	**Elective**	3
NSC 8247	Anatomy and Physiology of Hearing and Balance	**Elective**	3
NSC 8248	Directed Readings in Auditory Physiology	**Elective**	1-2
NSC 8248	Directed Readings in Auditory Physiology	**Elective**	1-2
NSC 8320	Readings in Neurobiology, Sec 1-16 Sec 1: Readings in Systems Neuroscience **(E)** Sec 2: Mind/Brain Journal Club **(E)** Sec 3: Visual Motion Processing Journal Club **(E)** Sec 4: Autonomic/Neuroendocrine Journal Club **(E)** Sec 5: Synaptic Plasticity Journal Club **(E)** Sec 6: Developmental Neurobiology Journal Club **(E)** Sec 9: Biological Basis of Behavior Journal Club **(E)** Sec 10: Ion Channel Journal Club **(E)** Sec 11: Pain Journal Club **(E)** Sec 12: Glia Journal Club **(E)** Sec 13: Neurostatistics **(C)** Sec 14: Neuroscience Seminar Journal Club **(C)** Sect 15: Seminar in Neurobehavioral Development **(E)** Sec 16: Computational Aspects of Learning and Memory **(E)**	**Elective**	1-4
NSC 8321	Career Skills and Understanding Responsibilities as a Neuroscientist – Sec 1 and Sec. 2 (1st year GPN and 2nd year GPN students, respectively)	**Core**	.5
NSC 8334	Laboratory Neuroscience – Lab Rotations (1st year)	**Core**	1-3
NSC 8411	Teaching in Neuroscience	**Elective**	1

VII. COMMITTEES OF THE GRADUATE PROGRAM IN NEUROSCIENCE

Steering Committee

The steering committee is the principal governing body of the Neuroscience Graduate Program. The composition of this committee includes the heads of the major committees, the course masters for the core graduate courses. Principal Investigators of Neuroscience Training Grants and three members elected by the faculty of the Neuroscience Program. The terms of the three elected members shall be for three years. Presently, this membership is as follows:

(1) Current Director of Graduate Studies (DGS)
(2) Former DGSs (Ex Officio)
(3) Chair of Faculty Status Committee
(4) Chair of Curriculum Committee
(5) Chair of Seminar Committee
(6) Chair of Admissions Committee
(7) Course Director, Itasca
(8) Course Director, System Neuroscience Course
(9) Course Director, Cell and Molecular Neuroscience
(10) Course Director, Developmental Biology
(11) Course Director for Behavioral Neuroscience
(12) Course Director, Career Skills and Understanding Responsibilities as a Neuroscientist
(13) PI's on NIDA, IGERT and Eye Institute Training Grants
(14) 3 elected representatives
(15) 2 Student Representatives

The election of the DGS takes place one year prior to the expiration of the DGS' term. Upon election, the DGS-elect becomes a member of the steering committee**.** The Steering Committee meets on a regular basis, under the guidance of the DGS, to consider the evolving issues of program development. The Senior Administrator of the program serves as the secretary of the Steering Committee. The decisions of the Steering Committee are binding and do not require approval by the general faculty membership.

The Steering Committee has two major functions. One is to approve all rules and changes in regulations initiated by the Director of Graduate Studies. Approval by the Steering Committee is also required for course/curriculum changes as proposed by the curriculum committee. Approval of any initiative considered by the Steering Committee, including changes in the bylaws, requires a majority vote of the attending steering committee membership, provided that a 2/3 majority of the committee is in attendance at the time. If an insufficient number of members are in attendance for any deliberation, all absentee members can be polled by the secretary to determine their position on the issues at hand. A second function of the steering committee is to meet in the each term to evaluate the progress of each student and make recommendations, if necessary, to help facilitate student progress in a timely, orderly manner and to assist students in promoting career decisions.

Members of the program committees will be appointed to 4 year, renewable terms. Nominations for membership will be solicited whenever a vacancy arises. Criteria for appointment to a program committee include: service to the Graduate Program, distinction in research and graduate training, and the need for diversity in faculty representation.

Admissions and Recruitment Committee

This committee oversees the application and admissions process for bringing new students into the Neuroscience Graduate Program. These responsibilities include the evaluation of applicants, communication with prospective students and applicants, and their recruitment into the program. A major component of this process is to plan and execute the campus visits for each prospective student, to facilitate successful recruiting.

Awards and Fellowships Committee
This committee oversees the allocation of currently existing award prizes, travel funds or other symbols of recognition of merit bestowed by the Graduate Program in Neuroscience as a whole. This includes soliciting nominees, selecting winners from among the nominees, and arranging for the formal conferring of the awards, and exploring possibilities of funding awards with outside organizations.

Curriculum Committee
This committee oversees the educational composition of the Neuroscience Graduate Program. These functions include the programmatic features of graduate education in the Neurosciences, which include courses, seminars, and other components of the educational process, such as lab rotations. Recommendations from the Curriculum Committee are passed to the Steering Committee, where final decisions on programmatic changes are determined.

Faculty Status Committee
This committee evaluates applications for membership
in the Neuroscience Graduate Program and makes recommendations to the Neuroscience Faculty, whose majority vote determines membership in the program. The Faculty Status Committee also evaluates continued participation in the program for those members whose terms are scheduled for expiration.

Seminar Committee
This committee is responsible for coordinating and organizing seminars to enhance the Graduate Program in Neuroscience. The functions of this committee will include a determination of invited guest speakers from outside the University, based on recommendations polled from the membership of the Graduate Faculty. In addition, seminars internal to the program (Neuroscience Colloquium) and special events, such as the Neuroscience Grass Lecture Series, will be organized by the Seminar Committee.

Community Outreach Committee
This committee is charged with overseeing and developing community outreach activities, such as those associated with Brain Awareness Week, exhibits at the State Fair, etc. The function of this committee is to enhance the visibility of neuroscience and the graduate program within the community, to foster a better understanding of neuroscience and to encourage K-12 students to consider higher education in science.

VIII. FACULTY & GRADUATES OF THE NEUROSCIENCE PROGRAM

List of Faculty
The current members of the graduate faculty, along with the department in which they hold their appointment, are listed below:

	First Name	Last Name	Status	Rank	GPN Rank
1.	Mustafa	al'Absi	Current	Professor	Senior Member
2.	Bagrat	Amirikian	Current	Assistant Professor	Member/Advising
3.	John	Anderson	Current	Associate Professor	Senior Member
4.	James	Ashe	Current	Professor	Senior Member
5.	Karen	Ashe	Current	Professor	Senior Member
6.	Vincent	Barnett	Current	Assistant Professor	Senior Member
7.	Alvin	Beitz	Current	Professor	Senior Member
8.	Dale	Branton	Current	Associate Professor	Member/Advising
9.	David	Brown	Current	Professor	Senior Member
10.	Dwight	Burkhardt	Current	Professor	Senior Member
11.	Marilyn	Carroll	Current	Professor	Senior Member

	First Name	Last Name	Status	Rank	GPN Rank
12.	Matthew	Chafee	Current	Assistant Professor	Senior Member
13.	Lihsia	Chen	Current	Assistant Professor	Member/Advising
14.	H. Brent	Clark	Current	Professor	Senior Member
15.	Bianca	Conti-Fine	Current	Professor	Senior Member
16.	John	Day	Current	Professor	Senior Member
17.	Richard	Di Fabio	Current	Professor	Senior Member
18.	Janet	Dubinsky	Current	Professor	Senior Member
19.	Timothy	Ebner	Current	Professor	Senior Member
20.	Robert	Elde	Current	Professor	Senior Member
21.	Esam	El-Fakahany	Current	Professor	Senior Member
22.	William	Elmquist	Current	Associate Professor	Senior Member
23.	William	Engeland	Current	Professor	Senior Member
24.	Carolyn	Fairbanks	Current	Assistant Professor	Senior Member
25.	Patricia	Faris	Current	Associate Professor	Senior Member
26.	S. Hossein	Fatemi	Current	Professor	Senior Member
27.	Janet	Fitzakerley	Current	Associate Professor	Senior Member
28.	Martha	Flanders	Current	Professor	Senior Member
29.	Jurgen	Fohlmeister	Current	Associate Professor	Senior Member
30.	William	Frey	Current	Professor	Senior Member
31.	Michael	Georgieff	Current	Professor	Senior Member
32.	Apostolos	Georgopoulos	Current	Regents Professor	Senior Member
33.	Jonathan	Gewirtz	Current	Associate Professor	Senior Member
34.	Geoff	Ghose	Current	Assistant Professor	Senior Member
35.	Glenn	Giesler	Current	Professor	Senior Member
36.	Boyd	Hartman	Current	Professor	Senior Member
37.	Sheng	He	Current	Associate Professor	Senior Member
38.	Bin	He	Current	Professor	Senior Member
39.	Christopher	Honda	Current	Professor	Senior Member
40.	William	Iacono	Current	Professor	Senior Member
41.	Paul	Iaizzo	Current	Professor	Senior Member
42.	William	Kennedy	Current	Professor	Senior Member
43.	Daniel	Kersten	Current	Professor	Senior Member
44.	Paulo	Kofuji	Current	Associate Professor	Senior Member
45.	Juergen	Konczak	Current	Associate Professor	Senior Member
46.	Michael	Koob	Current	Assistant Professor	Senior Member
47.	Catherine	Kotz	Current	Associate Professor	Senior Member
48.	Naoko	Koyano	Current	Assistant Professor	Senior Member
49.	Lorene	Lanier	Current	Assistant Professor	Senior Member
50.	Alice	Larson	Current	Professor	Senior Member
51.	Gordon	Legge	Current	Professor	Senior Member
52.	Paul	Letourneau	Current	Professor	Senior Member
53.	Arthur	Leuthold	Current	Assistant Professor	Member/Advising
54.	Allen	Levine	Current	Professor	Senior Member
55.	Scott	Lewis	Current	Assistant Professor	Member/Advising
56.	Dezhi	Liao	Current	Assistant Professor	Senior Member
57.	Kelvin	Lim	Current	Professor	Senior Member
58.	Walter	Low	Current	Professor	Senior Member

	First Name	Last Name	Status	Rank	GPN Rank
59.	Angus	MacDonald III	Current	Assistant Professor	Member/Advising
60.	Patrick	Mantyh	Current	Professor	Senior Member
61.	Linda	McLoon	Current	Professor	Senior Member
62.	Steven	McLoon	Current	Professor	Senior Member
63.	Paul	Mermelstein	Current	Associate Professor	Senior Member
64.	Karen	Mesce	Current	Professor	Senior Member
65.	Robert	Miller	Current	Professor	Senior Member
66.	Yasushi	Nakagawa	Current	Assistant Professor	Senior Member
67.	Eric	Newman	Current	Professor	Senior Member
68.	Teresa	Nick	Current	Assistant Professor	Senior Member
69.	Duane	Nykamp	Current	Assistant Professor	Senior Member
70.	Michael	O'Connor	Current	Professor	Senior Member
71.	John	Ohlfest	Current	Assistant Professor	Senior Member
72.	Harry	Orr	Current	Professor	Senior Member
73.	John	Osborn	Current	Professor	Senior Member
74.	Hans	Othmer	Current	Professor	Senior Member
75.	J. Bruce	Overmier	Current	Professor	Senior Member
76.	Jose	Pardo	Current	Professor	Senior Member
77.	Giuseppe	Pellizzer	Current	Associate Professor	Senior Member
78.	Richard	Poppele	Emeritus	Emeritus	Emeritus
79.	Philip	Portoghese	Current	Professor	Senior Member
80.	Laura	Ranum	Current	Professor	Senior Member
81.	Raghavendra	Rao	Current	Assistant Professor	Senior Member
82.	A. David	Redish	Current	Associate Professor	Senior Member
83.	David	Rottenberg	Current	Professor	Senior Member
84.	Peter	Santi	Current	Professor	Senior Member
85.	Ronald	Sawchuk	Current	Professor	Senior Member
86.	Paul	Schrater	Current	Assistant Professor	Senior Member
87.	Scott	Selleck	Current	Professor	Senior Member
88.	Virginia	Seybold	Current	Professor	Senior Member
89.	Donald	Simone	Current	Professor	Senior Member
90.	John	Soechting	Current	Professor	Senior Member
91.	Peter	Sorensen	Current	Professor	Senior Member
92.	Stanley	Thayer	Current	Professor	Senior Member
93.	David	Thomas	Current	Professor	Senior Member
94.	Mark	Thomas	Current	Assistant Professor	Senior Member
95.	Kamil	Ugurbil	Current	Professor	Senior Member
96.	Govind	Vatassery	Current	Professor	Senior Member
97.	Catherine	Verfaillie	Current	Professor	Senior Member
98.	Neal	Viemeister	Current	Professor	Senior Member
99.	Martin	Wessendorf	Current	Associate Professor	Senior Member
100.	Kevin	Wickman	Current	Associate Professor	Senior Member
101.	George	Wilcox	Current	Professor	Senior Member
102.	W. Gibson	Wood	Current	Professor	Senior Member
103.	LiLian	Yuan	Current	Assistant Professor	Senior Member
104.	Lance	Zirpel	Current	Assistant Professor	Senior Member

IX. HISTORY OF THE GRADUATE PROGRAM IN NEUROSCIENCE

In the early 1980's, research in various areas of neuroscience was being actively carried out in several dozen laboratories scattered throughout the University of Minnesota. However, there was little interaction between faculty members except within single departments or specialized areas. At that time about a dozen faculty members began to informally seek ways to coordinate and expand interdisciplinary teaching and research in neuroscience. Those efforts gained much impetus when the University of Minnesota Medical School made a conscious decision in the late 1980's to enhance neuroscience research and teaching. This was initiated to complement an already strong representation in neuroscience in basic science departments and was supported by the perception that neuroscience was rapidly becoming a dominant research focus in biology.

Neuroscientists were recruited to head two basic science departments in the Medical School (physiology and pharmacology) and six endowed chairs were established for neuroscience. At about the same time, The Graduate Program in Neuroscience was established and is now regarded as the most outstanding interdisciplinary graduate training program in the entire University. The creation of the Department of Neuroscience in the Medical School in 1999 has further increased the visibility of the Graduate Program

Directors of Graduate Studies, Graduate Program in Neuroscience, 1987 to present:

1986 – 1987 Dr. Richard Poppele (Directed Neuroscience minor prior to certification for the PhD Program)
1987 – 1989: Dr. Robert P. Elde, Dept. of Cell Biology & Neuroanatomy
1989 – 1992: Dr. Robert F. Miller, Dept. of Physiology
1992 – 1995: Dr. Alice A. Larson, Dept. of Veterinary PathoBiology
1995 – 1998: Dr. Timothy J. Ebner, Dept. of Neurosurgery
1998 – 1999: Dr. Esam El-Fakahany, Dept. of Psychiatry
1999 – 2002: Dr. John F. Soechting, Dept. of Neuroscience
2002 – 2005: Dr. William C. Engeland, Dept. of Surgery
2005 – 2008: Dr. Paul C. Letourneau, Department of Neuroscience
2008 – Present: Dr. Virginia S. Seybold, Department of Neuroscience