Graduate Handbook

Neuroscience and Cognitive Science Program
University of Maryland, College Park
Revised 2018
Table of Contents

SECTION ONE
Philosophy of Graduate Program.................................................................................................................. 4
Advisors.......................................................................................................................................................... 4
  Philosophy.................................................................................................................................................... 4
  Requirements.............................................................................................................................................. 4
  Duties.......................................................................................................................................................... 4
  Procedure for Changing Advisors............................................................................................................ 4
  Procedure for Advisor to Drop Student...................................................................................................... 5
  Procedure for Lab Rotations....................................................................................................................... 5
Home Department.......................................................................................................................................... 5
Advisory and Evaluative Committees............................................................................................................ 6
  Philosophy.................................................................................................................................................... 6
  Member Affiliations.................................................................................................................................... 6
  Committee Meeting Schedule...................................................................................................................... 6
    First Year Research Project..................................................................................................................... 6
    Qualifying Exam..................................................................................................................................... 6
    Dissertation Proposal Defense.................................................................................................................. 6
    Dissertation Defense............................................................................................................................... 6
    Meeting Requirement.............................................................................................................................. 6
  Procedure for Changing Committee Composition.................................................................................... 6

SECTION TWO
PhD Degree................................................................................................................................................... 7
  General Information.................................................................................................................................. 7
    Philosophy.............................................................................................................................................. 7
    Participation............................................................................................................................................ 7
    Expected Time to Degree....................................................................................................................... 7
    Registration............................................................................................................................................ 7
    Course Load.......................................................................................................................................... 7
    Teaching Experience............................................................................................................................... 7
    External Funding Applications................................................................................................................ 7
    Completion of Forms............................................................................................................................... 7
    Commencement...................................................................................................................................... 7
  Course Requirements................................................................................................................................. 8
    Core Courses.......................................................................................................................................... 8
    Supplemental Courses.............................................................................................................................. 8
    Dissertation Credits............................................................................................................................... 8
    NACS Course List.................................................................................................................................. 8
  Research Requirements............................................................................................................................... 8
    First Year Research Project..................................................................................................................... 8
    Qualifying Examination........................................................................................................................... 10
    Dissertation Proposal/Advancement to Candidacy.................................................................................. 15
    Dissertation.......................................................................................................................................... 16
    Dissertation Defense.............................................................................................................................. 16

SECTION THREE
MS Degree................................................................................................................................................... 17
Non-Thesis MS Degree

Requirements
Coursework
Research Project
Written Report
Oral Presentation

Thesis MS Degree

Requirements
Coursework
Thesis
Oral Defense

SECTION FOUR
Administrative Procedures

Philosophy
Administrative System
Program Director
Graduate Director
Admissions Director
Graduate Committee
Assistant Director

Academic Problems

Probation
Termination

Resolving Disputes

Leave of Absence

Exceptions
SECTION ONE

Philosophy of Graduate Program

The Neuroscience and Cognitive Science (NACS) Program strives to educate exceptional scientists whose interdisciplinary training will form the basis for significant scientific contributions. This is a research doctoral program designed on an apprenticeship model: students train to become professional scientists by doing independent research and participating in all aspects of the profession under the guidance of faculty.

Much of the benefit for students of the NACS program is the opportunity for daily interaction with other NACS students, postdocs, and faculty over a broad range of interests and experience. We expect all students to be contributing—and benefiting—members of this intellectual community.

NACS graduate student research should be based at the University of Maryland, College Park (UMD) or in external institutions under the guidance of NACS adjunct faculty.

The NACS program is committed to maintaining a culture of diversity, inclusion, and fairness. It does not tolerate discrimination on the basis of race, color, religion, sex, national origin, physical or mental disability, protected veteran status, age, gender identity or expression, sexual orientation, creed, marital status, political affiliation, personal appearance, or on the basis of rights secured by the First Amendment.

Advisors

Philosophy
The graduate advisor is a mentor for all aspects of the scientific and professional education of the student. This implies frequent, substantive interaction with the student. The student is expected, through his/her scholarship, to contribute to the mission of the mentor’s laboratory, research group, and department. However, the philosophy of the NACS program is that the mentor serves the student, not vice versa.

Requirements
The advisor must be a Full Member of the Graduate Faculty at the University of Maryland, College Park and a NACS faculty member. If the advisor ceases to be a member of NACS but remains on the University of Maryland, College Park faculty after matriculation of the student, the student may remain in the NACS program as long as he/she continues to meet all the requirements of the program. If the advisor leaves the University of Maryland, College Park, and the student decides to remain in the NACS program, the student must choose a new advisor willing to accept all the duties listed below. The former advisor can serve as co-advisor or as a committee member, if appropriate.

Duties
The primary role of the advisor is as scientific mentor to the student. The advisor serves as chair of the student’s committee and tracks the student’s progress to insure that requirements of the program and of the student’s committee are completed in a timely manner. Frequent informal evaluation is highly desirable to detect and correct problems before they become major. This is largely the responsibility of the advisor. However, periodic research presentations by the students during informal NACS events can be very valuable and should be strongly encouraged.

Procedure for Changing Advisors
Students who enter the NACS program must have an advisor and home department already established. Typically, students remain with their advisor and home department throughout their graduate career. However, a student may change advisors at any time. Our experience indicates that this is best done well before the student takes the qualifying examination.
The student may make the change by discussing his/her wishes with both the former and proposed new advisor and submitting a written statement briefly stating the reason for the change to the Graduate Director. For instances in which the student wishes to sever ties with his/her advisor before a new advisor has been identified, the student may prefer to discuss his/her plans with the Graduate Director, who can convey the change to the former advisor. If the student has not made arrangements for a new advisor, the Graduate Director will appoint an interim advisor for a period of no more than four months. It is the student’s responsibility to establish a working relationship with a formal advisor within this four-month period; failure to do so may result in the student’s dismissal from the program.

Approval by the Graduate Director is required for a change in advisor. If the Graduate Director is either the student’s old or new advisor, the Graduate Director should turn over the approval decision to the Graduate Committee. The Committee may require additional information from all parties involved. If the student wishes to challenge the decisions of the Graduate Director or the Graduate Committee about advisor assignment, he/she may address concerns to the NACS Program Director.

The new advisor must indicate to the Graduate Director in writing that he/she is willing to have the student in his/her laboratory or research group and will assume all of the responsibilities of the advisor detailed above and provide funding for the student.

At the point when both student and new advisor want to go forward, the NACS office will notify the Graduate Director of the new home department. After the Graduate Director of the new home department has been notified, the student will form a transition committee. The following three or four faculty will be on the transition committee:

- New advisor
- NACS Graduate Director
- Another faculty member who most likely will be on the student’s committee
- Possibly the old adviser or the NACS Program Director

**Procedure for Advisor to Drop Student**

An advisor may decide he or she no longer wishes to supervise a student. This can be accomplished by a written request to the Graduate Director who will consult with the Program Director. If the request is approved, the advisor will notify the student in writing one month prior to termination. The Graduate Director will then appoint an interim advisor and the student will have four months from termination to find a new advisor.

**Procedure for Lab Rotations**

NACS offers lab rotations to selected first year students who have a serious interest in the research programs of several different faculty. NACS does not require mandatory lab rotations.

Faculty and students who choose to participate in a lab rotation their first year must take responsibility for making satisfactory arrangements (i.e., sequence, length of time, etc.). This requires a serious discussion among and agreement by the relevant faculty, followed by a letter documenting the arrangement and signed by the student and the relevant faculty. This letter is included in the student’s file.

It is important to note that the home department and primary advisor remain the same throughout the rotation year.

---

**Home Department**

The NACS Program is made up of faculty from many departments. Since, it is not itself a department, each NACS graduate student **must** have a home department. This is the department in which the student’s advisor has his/her appointment.
Advisory and Evaluative Committees

Philosophy
At each stage of graduate training and evaluation, a student will work closely with an advisor and a committee. Ideally, committee members will serve for the duration of the student’s entire time in the Program.

Member Affiliations
Committee members must normally be full-time NACS faculty at the University of Maryland, College Park. However, if it is of special advantage to the student, up to two members of the committee can be full-time faculty members of another academic institution or permanent research staff members at a recognized scientific research institution, such as the National Institutes of Health (NIH).

Committee Meeting Schedule

First Year Research Project
The committee is comprised of the student’s adviser, 2 additional NACS faculty (one outside of research area), and a senior NACS student. The committee helps the student plan curriculum, define research interests, and initiate a First Year Research Project. The committee meets twice in their first year. The first meeting must occur by the end of September. The second meeting must occur by the end of February.

As the committee begins to evaluate the student’s progress in the NACS Program, only the faculty members continue to serve. At a third meeting scheduled no later than the end of September of the student’s second year, the student will make an oral presentation of the First Year Research Project to the committee.

Qualifying Exam
Committee composition may grow as the student gets to know more faculty in the program and/or additional expertise is needed. It is recommended that the committee meets during the spring semester of the student’s second year.

The student orally defends the qualifying exam to his/her committee by the end of November of the student’s third year.

Dissertation Proposal Defense
The committee must grow to a minimum of four faculty members for the dissertation proposal. The committee will advise the student on the planning of dissertation research and will provide feedback on research design and pilot data collection and analysis. The dissertation proposal defense typically occurs by the end of the student’s fourth year.

Dissertation Defense
A Dean’s representative is added to the committee before the PhD defense is scheduled. The dissertation defense typically occurs by the end of the student’s fifth year.

Meeting Requirement
Students are required to meet with their committee every 12 months until graduation but may schedule more frequent meetings as needed.

Procedure for Changing Committee Composition
The student may change committee composition at any time. Courtesy and common sense dictate that the student must thoroughly discuss the proposed change with both the former and new members before notifying the NACS Office. The student should briefly state the reasons for the request when notifying the NACS office.
SECTION TWO

PhD Degree

General Information

Philosophy
A major strength of the NACS program is the broad, integrative training it offers graduate students. An important goal of the curriculum is to assure that all NACS students have a core body of knowledge covering the basic concepts across the full range of neuroscience and cognitive science. This must be balanced with a second goal: a doctorate in NACS is a research degree, and the best way to learn the skills and strategies of research is to be immersed in day-to-day laboratory or research group activities and an independent project. Thus, the program should impose the smallest number of required courses consistent with the sufficient breadth of training.

Participation
All NACS students are expected to participate regularly and actively in NACS activities including, but not limited to, NACS Retreat, NACS Research Day, NACS seminars, and other events. This expectation also applies to students who carry out their research at NIH or other off campus venues.

Expected Time to Degree
NACS students are expected to complete their PhD degree within 5 years.

Registration
Students must be registered in each semester until they graduate. Registration is the responsibility of the students until they advance to candidacy. After students have advanced to candidacy, the Registrar’s Office automatically registers students for 6 credits of NACS899 each fall and spring semester until the students graduate.

Course Load
The NACS office recommends that students take no more than 10 credits each semester, which is the number of credits of tuition remission that a student receives if the student has a full research or teaching assistantship appointment provided by UMD.

Teaching Experience
All NACS students are encouraged to teach for at least two semesters during their graduate career. This will normally be as a Graduate Teaching Assistant.

External Funding Applications
Students are expected to submit predoctoral grant or fellowship applications. The NACS program has a Grants Development Specialist who can help students prepare these applications.

Completion of Forms
The student is responsible for completing all required NACS annual committee meeting forms and report forms, and required Graduate School forms and applications, by their specified deadlines. Contact the NACS Assistant Director for additional information about the forms.

Commencement
NACS students typically participate in the commencement ceremony of their home department. Diplomas are mailed to the student after graduation. Degrees are awarded by the University in December, May, and August.
Course Requirements

Core Courses (must be completed by the end of the second year)

- NACS 600 Ethics in Scientific Research
- NACS 640 Foundational Readings (taken in the first semester)

Three of the following five courses (at least one course from each area):

- Cognitive Area
  - NACS 642 Cognitive Neuroscience
  - NACS 645 Cognitive Science

- Neuroscience Area
  - NACS 641 Introduction Neurosciences
  - NACS 643 Computational Neuroscience
  - NACS 644 Cellular and Molecular Neuroscience

Students who have satisfactorily completed graduate courses with comparable content can be exempted from NACS 600, 641, 642, 643, 644, and 645 core course requirements with written permission of their committee and the Graduate Director. This includes students with prior training in neural, cognitive, and/or computational neuroscience and students entering the NACS Program with a Master’s degree in a related field.

Supplemental Courses (must be completed by the end of the fourth year)

In addition to the core courses, NACS students must complete three courses (minimum of 9 credits) that are relevant to their program of research. These courses should be approved by the student’s committee. Credits from core courses beyond the three mandated will count toward the total of 9 credits. The student’s committee may require additional course work to remedy any areas of weakness in the student’s previous training.

Dissertation Credits

The Graduate School requires 12 credits of 899 dissertation research credits before graduation. Students must be registered for at least one credit during the semester they intend to graduate. IMPORTANT: This includes summer sessions. A student who intends to graduate in summer or winter term must be registered for 1 credit during that term.

NACS Course List

This is a list of NACS-related courses that are taught by NACS faculty. The list is emailed to NACS students and faculty each semester. A list of current NACS course offerings can be found on the NACS website.

Research Requirements

First Year Research Project

Overview

NACS students will engage in a research project in their first year that culminates in a written report and oral presentation to their committee members. The project selected must be a new project (students cannot use projects they worked on before they entered the NACS program) and one that can be conceived and completed within the first year. The project will provide an early opportunity for students to receive feedback on written and oral presentations of their work. It will help launch students in their careers as independent scientists.

Lab Rotations

Upon entering the Program, students performing rotations should consult with their advisors as to where the project is to be performed and are encouraged to engage in a project that links their work. Students doing lab rotations will do the write-up of the written project during the summer. The written project can be based on research done in either lab. It is the student’s responsibility to make sure that progress on the project is made within the timelines outlined below for the project.
Committee Meetings

- Students are required to meet with their committee three times in their first year.
- The first meeting must occur by the end of September. The purpose of the first meeting is to have a discussion among the committee on potential projects and the resources needed to accomplish them. It is expected that the student will then begin experimental work towards the first year research project by the end of October.
- The second meeting must occur by the end of February. The purpose of the second meeting is to review the progress that has been made on the research project, discuss the requirements for the written paper, and review the timeline. Two weeks before the scheduled February meeting, the student must submit a one-page written outline of the research project to the committee. The outline should include hypothesis, methods, and specific aims.
- The presentation of the research report will constitute a third meeting by the end of September of the student’s second year.

Written Project

- Projects may involve empirical or theoretical research, and the discipline-specific details are developed by the student, his/her adviser and input from the committee.
- The project must be submitted as a brief journal-style research report in the following format:
  o Not to exceed 6 pages in length (not including references and figures)
  o 12 point Arial font
  o .75 inch margins
  o Single spacing
- It is not intended that the project be exhaustive – a single repeatable experiment with controls would be sufficient. Solid negative results, control experiments or an original analysis of data collected by others may also be permissible, provided that the project elaborates on how those results lay the groundwork for future experiments by the student. Also, the project doesn’t need to be complete. Students can report on what they have accomplished so far.
- The project should not be a literature review, but any references in the report may later become part of the student’s qualifying exam reading list. A copy of the final written report must be submitted to the NACS Office.

Oral Presentation

- An oral presentation to the student’s committee must be scheduled by the student by June 1 of the student’s first year. The actual oral presentation must take place before the end of September of the student’s second year.
- The written report must be submitted to the student’s committee two weeks before that date.

Evaluation and Grading

- The student’s adviser and committee will evaluate the written report and the oral presentation.
- Grading of the entire research project (written report and oral presentation) will occur at the oral presentation and will be as High Pass, Pass, or Retake. The student’s adviser and committee will complete a Report of First Year Research Project form at the oral presentation and submit the form to the NACS office.
- Students who receive a High Pass will be eligible for travel support from the program to present their research at a national conference. The travel support must be used within the 18 months following the date of the oral presentation.
- Students who receive a Retake will have 6 weeks to complete any required work on the written report and give the oral presentation a second time. Grading of the retake will take place at the second oral presentation and will be as High Pass, Pass, or Fail.
- A grade of Fail will initiate a discussion between the program’s director, the graduate director, and the student’s committee as to whether the student should continue in the Program. The student can appeal the outcome of a grade of Fail to the Graduate Director.
Scientific Presentation
Students are encouraged to present their work at a scientific conference or at a NACS event within the student’s second year.

Qualifying Examination
Overview
- The qualifying examination includes two components: A written grant proposal and an oral defense of the grant proposal.
- The written grant proposal is intended as a hypothetical but feasible demonstration of the student’s ability to identify gaps in the research literature and to propose solutions within an area of research that the student and their advisor see as relevant to the student’s eventual Dissertation Proposal. The Guidelines and Grading Rubric encourage a broad proposal with multidisciplinary components that are not necessarily limited to what the student can achieve in their home laboratory or work group. Elements of this written grant proposal can be incorporated into the student’s later Dissertation Proposal, where the emphasis should then be on the feasibility, likely success and significance of experiments to be performed under the guidance of the student’s advisor and on the interpretation of preliminary data.
- The written grant proposal and its evaluation are modeled on those typically used by major funding agencies in the USA, but with a greater emphasis on the background, significance and impact of the proposed work. The Committee will review and evaluate the written grant proposal, making a decision as to whether the proposal is defensible in the oral component.
- The oral defense should place particular emphasis on the student’s knowledge of background material, including relevant coursework, techniques and analytical methods, as well as the historical context and the broad significance of the proposed work.

Guidance for Students
Primary guidance for the development of the grant proposal rests with the student’s mentor(s) and committee members, subject to the guidelines below. The student will also have access to the NACS Grants Development Specialist for discussions and workshops concerning the general format and style of successful grant proposals, keeping within the guidelines below. The student can also seek proof editing help as long as the editing is limited to typos and grammar only (major restructuring of the document or intellectual contributions to it are not allowed).

Written Grant Proposal Guidelines
- The grant proposal should take a broad approach to addressing an important problem or a critical barrier to progress within the student’s research area. It can be related to the research project the student is already independently working on or a submission for external funding. It can contain material that the student has used in a previous grant application to a funding agency, or material that has been developed as part of a grant writing workshop/course.
- The student decides on the topic of the grant proposal. There must be consensus amongst the student, the advisor, and committee members as to the suitability and scope of the topic. The student may have general discussions with his/her mentor or other relevant colleagues, including the NACS Grants Development Specialist, during proposal preparation, but the final full-length version should be written independently. The written grant proposal is an examination and must represent the student’s ideas for development of the research project. The student must follow university guidelines for academic integrity in the preparation of the grant proposal (see www.president.umd.edu/policies/iii100a.html).
- The Specific Aims within the grant proposal should describe a project that can be carried out within two years. No budget needs to be included in the grant proposal.
In writing the grant proposal, the student should pay attention to Evaluation Criteria detailed below. Particular emphasis is placed on the Background and Significance section of the proposal. This section is expanded relative to that in an agency grant application.

Experimental safety, and the use of biomaterials, animals or humans, should adhere to established ethical and safety guidelines, but details of their adherence to those guidelines are not required.

The grant proposal may be eventually incorporated into the student’s dissertation proposal, where the emphasis should be on the likely success of experiments and on the interpretation of preliminary data.

**Format**
The grant proposal should include the following elements:

- **Abstract / Lay Summary** (up to 1 page)
  - Provide a brief summary of the grant proposal (background, specific aims, approaches used, and future goal) that is targeted to a general audience.

- **At Least Two Specific Aims** (1 page)
  - State broad objectives. Do not subdivide specific aims (e.g. Aim 1b etc.). Describe concisely the specific hypothesis to be tested and what the research is intended to accomplish.
  - In addition to following the guidelines above, students should consider the following questions concerning their Specific Aims:
    - What is the fundamental problem that will be addressed?
    - Why is testing the hypothesis, solving the problem, or making these observations important for your field of research?
    - Does the proposed research challenge an existing concept or seek to establish a new idea?
    - What is original about the approach?

- **Background and Significance, and Research Design and Methods** (Not more than 15 pages combined. You can divide these 15 pages between the two subheadings according to your preference, but you should be mindful that all evaluation criteria must be addressed for each subheading)
  - **Background and Significance**
    - Summarize the background to the grant proposal. Critically evaluate the history of relevant work in the research field and the state of existing knowledge. Critically evaluate the history and utility of techniques to be used in the project. Identify gaps in knowledge or techniques that the proposal is intended to fill. Justify the importance of the research described by relating the specific aims to broad, long-term scientific objectives.
    - In addition to following the guidelines above, students should consider the following questions concerning the background and significance of their proposal:
      - How does previous work in your research field inform your proposal?
      - How does work done in fields of research or on societal issues outside of your discipline inform your proposal?
      - What impact does your proposal have beyond your laboratory group?
      - Does your proposal have clinical significance or an impact on society?
      - Are there gaps in current knowledge that the proposal is designed to address?
      - Do your proposed techniques have limitations or distinct advantages compared to others?
  - **Research Design and Methods**
    - Describe the research design and procedures to be used to accomplish the specific aims of the project. Include the means by which the data will be collected, analyzed, and interpreted. Describe any new methodology and its advantages over existing ones. Discuss potential difficulties and limitations of the proposed procedures and alternative approaches to achieve the aims.
    - In addition to following the guidelines above, students should consider the following questions concerning their Research Design and Methods:
• How do your design and its methods achieve your specific aims? Will your anticipated results be clearly and unambiguously interpretable?
• Does the approach overcome existing challenges or barriers in the research field?
• If your methodology is new, what is innovative about your approach?

• One Future Goal (1 page)
  o Must include broad concepts and technologies outside the student’s own field.
    ▪ Must adopt an interdisciplinary approach (for example a systems-level or computational approach to a cellular neuroscience project or a cognitive neuroscience approach to a cognitive science project). If both specific aims are interdisciplinary, it is not necessary for the future goal to adopt an interdisciplinary approach.

• Literature Cited [unlimited pages]
  o Provide a complete bibliography of literature cited including authors’ names, title of publication, year, journal or book title, volume, and page numbers. Citations must be listed alphabetically in the reference list and as author(s) and year(s) in the text.

• The document should be formatted as indicated below:
  o Up to 18 pages, excluding figures and references.
  o 12 point Arial font
  o .75” margins all around
  o Single line spacing

Evaluation Process
• The student, advisor, and committee must reach consensus on a tentative title for the grant proposal before the end of April in the student’s second year. It is the student’s responsibility to email the title to the NACS Office.
• Each committee member will read the grant proposal and complete a Rubric Form. On the form the committee member will provide a rating score of 1-5 (Poor to Excellent) for 14 criteria and an overall rating score for the entire proposal. In addition, each committee member will complete a Comments Form. On the form the committee member will provide a ½ - 1 page review of the grant proposal, which should include specific feedback to the student in preparation for the Oral Defense (if the grant proposal is acceptable) or a rewrite of the grant proposal (if the grant proposal is rejected).
• The Committee must meet (either in person or through electronic communication) to discuss the rating scores on the Rubric Forms. At the meeting the student’s advisor will transfer the committee members’ rating scores from the Rubric Forms into a Scoring Form and calculate an average for the Total Score, which will serve as the student’s score on the written grant proposal. The student’s advisor will also transfer each committee member’s overall score for the entire proposal to the Scoring Form.
• The student must receive an Overall Score of 3.0 or above in order for the written grant proposal to be accepted. Acceptance indicates that the grant proposal is defensible at the Oral Defense.
• The student’s advisor will forward the Scoring Form and all Comments Forms to the NACS Office. The NACS office will then complete a Decision Form and email it, along with the Comments forms, to the student.
  • Grant Proposal Accepted
    o If the Committee accepts the grant proposal, the student proceeds to the Oral Defense.
  • Grant Proposal Rejected
    o If the Committee rejects the grant proposal, the student will have one month to rewrite the grant proposal. The student must immediately schedule a meeting with his/her mentor(s) to discuss the Overall Score, the comments, and the work needed to re-write the grant proposal, subject to the Guidelines above. The student can rewrite the grant proposal one time only.
    o If the grant proposal is rejected a second time, the student will not be permitted to continue in the Ph.D. program. The student may submit a petition to NACS to complete a terminal Master’s Degree.
Criteria

The Committee will evaluate the written grant proposal on the criteria shown below using a rating scale of Excellent = 5 points, Very Good = 4 points, Good = 3 points, Fair = 2 points, Poor = 1 point for each item. The student must receive an Overall Score (average of each committee member's Total Score) of 3.0 in order for the written grant proposal to be found Acceptable.

<table>
<thead>
<tr>
<th>Background and Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specific Aims, Future Goal, and Research Design and Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>9</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>11</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
</tr>
<tr>
<td>13</td>
</tr>
<tr>
<td>14</td>
</tr>
</tbody>
</table>

Oral Defense Preparation

- Students should pay careful attention to issues raised on the Comments Forms. In addition, students should be familiar with background publications that provide the foundation for their grant proposal, and with current literature that pertains to their specific aims and their future goal. Students should also be familiar with the rationale for any experimental or analytical techniques that they propose. Students may be asked to defend their choice of methodologies, discuss the rationale for and creativity of the proposed research, and discuss strengths and limitations.
Format
- The student is expected to begin the oral defense with a 30 minute presentation that summarizes the written grant proposal.
- The oral defense is expected to be between 1 ½ to 2 hours in length. This includes the student’s presentation and questions from the Committee during and after the presentation.
- At the conclusion of the oral defense, the student is excused from the room so that the Committee can discuss the student’s performance.

Evaluation Process
- After the student has left the meeting room, the committee will decide on a rating score of 1-5 (Poor to Excellent) that represents the consensus of the committee for 7 criteria. Each committee member will also provide an overall score for the entire oral defense. The student’s advisor will enter the rating scores for the 7 criteria into the Scoring Form. This will automatically calculate a Total Score, which will serve as the student’s score on the entire Qualifying Exam. The student’s advisor will also enter each committee member’s overall score for the entire oral defense into the Scoring Form. In addition, each committee member will complete a Comments Form. On the Comments Form the committee member will provide a ½ - 1 page review of the oral defense. The outcome of the QE Decision is explained to the student when the student returns to the meeting room.
- The oral defense is evaluated as “Pass” or “Fail” by the Committee. The student must receive a Total Score of 3.0 or above in order to receive a “Pass” on the oral defense. A “Pass” indicates that the student achieved a high standard of scholarship, and that the student has passed the entire Qualifying Examination.
- Fail: If the Committee assigns a “fail” outcome, the student can repeat the oral defense once. If the Committee assigns a “fail” outcome a second time, the Committee must recommend to the Graduate Director that 1) the student be withdrawn from the program immediately or 2) the student be allowed to complete a terminal master’s degree.
- The student’s advisor will forward the Scoring Form and all Comments Forms to the NACS Office. The NACS office will then complete a Decision form and email it, along with all Comments Forms, to the student.

Criteria
The oral defense will evaluate the student’s knowledge and depth of understanding of the written grant proposal.
The Committee will evaluate the oral defense on the criteria shown below using a rating scale of Excellent = 5 points, Very Good = 4 points, Good = 3 points, Fair = 2 points, Poor = 1 point for each item. The student must receive an Overall Score (average of each committee member’s Total Score) of 3.0 to receive a “Pass” on the Oral Defense. A “Pass” indicates that the student achieved a high standard of scholarship, and that the student has passed the entire Qualifying Exam.

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The student presented a coherent and understandable overview of the proposal.</td>
</tr>
<tr>
<td>2</td>
<td>The visual material presented by the student was well designed.</td>
</tr>
<tr>
<td>3</td>
<td>The student adequately addressed issues raised in the reviewers' comments.</td>
</tr>
<tr>
<td>4</td>
<td>The student adequately answered questions that arose during the Oral Defense that were not raised in the reviewers' comments.</td>
</tr>
<tr>
<td>5</td>
<td>The student's arguments displayed a knowledge of the history of the research field and its associated techniques.</td>
</tr>
</tbody>
</table>
The student’s arguments displayed an understanding of the future of the research field.

The student’s arguments displayed an interdisciplinary appreciation of the research field.

Timetable
All NACS core course requirements must be completed before the date of the oral defense. The qualifying examination process begins in the Spring Semester of the student’s second year in the program and, without re-taking parts of the examination, will be completed before the end of November of the fall semester of the student’s third year in the program.

- The NACS Office distributes a copy of the qualifying exam guidelines and timeline to the students and Committee by the end of February.
- Students must submit a tentative title for their grant proposal, approved by their advisor and committee, to the NACS office before the end of April.
- Students submit the written grant proposal to their Committee by the end of August. They also submit a copy of the written grant proposal to the NACS Office.
- The Committee evaluates the written grant proposal and indicates the outcome by the end of September.
- The Oral Defense takes place by the end of November.
- If the student fails the oral defense, the repeat of the oral defense must occur by the end of January.
- If the Committee rejects the written grant proposal, the student must rewrite and submit the grant proposal to the Committee by the end of November. The Committee evaluates the re-written grant proposal and indicates the outcome by the end of December. If the grant proposal is accepted, the oral defense takes place by the end of January. If the student fails the oral defense, the repeat of the oral defense must occur by the end of February.

Dissertation Proposal / Advancement to Candidacy
Before the end of the student’s eighth semester, the student will defend his/her dissertation proposal at a meeting of his/her dissertation committee. The purpose of this meeting is to assure the following:

- the proposed research can lead to a dissertation that meets the requirements and standards for attaining a doctorate
- the project is feasible
- the student has designed experiments that answer the questions posed
- the student has sufficiently worked out the details of the proposed research
- the student has anticipated possible pitfalls
- the student is thoroughly ready to proceed with the project
- the student has sufficient knowledge in the field to competently interpret and discuss his/her research findings in a broader context

At this point the student must have an approved protocol for the IACUC for animal research, or the student must have the IRB protocol for human research.

While this is an official and required meeting, it is more significantly part of a continuing dialog between the student and the committee that should result in dissertation research of the highest possible quality.

Guidelines for the Written Proposal:

- must contain
  - specific aims
  - background and significance
  - preliminary data
  - research design and methods
literature cited
- typed and double-spaced with 1 inch margins
- at least 30 pages (not including literature cited)
- must be written solely by the student and may not be a reproduction of any other work completed or in progress.
- the student should submit the proposal to the committee two weeks prior to the scheduled oral defense.

The first page of the proposal must include the following:
- title of the proposal
- student’s name and advisor’s name
- date of submission
- signatures of both the student and the faculty advisor confirming the originality of the work.

The Oral Defense
- The format and detail of the oral defense of the proposal is at the discretion of the student’s advisor and committee.
- The oral defense will typically last about two hours.

After the student has passed the oral defense, the student should submit a pdf of the proposal to the NACS office.

Successful defense of the dissertation proposal is the formal requirement for advancement to candidacy. The outcome of this meeting should be reported in writing to the Graduate Director and to the Graduate School. Students should complete the application for advancement to candidacy form found on the Graduate School’s website. **NOTE: If the student does not advance to candidacy by the end of the tenth semester, he/she must request a one-year time extension from the Graduate School by filling out a “Request for Time Extension” form available on the Graduate School’s website.**

**Dissertation**
The PhD must be the result of original, independent research; the dissertation is the report of that research. Students are encouraged to use their published papers in their dissertation. **Students should adhere to the Graduate School guidelines when writing and formatting the dissertation.**

**Dissertation Defense**
Graduate School regulations stipulate that the doctoral degree, including the dissertation defense, must be completed within four years after admission to candidacy or within nine years after matriculation, whichever is greater. Specific procedures for scheduling and administering the dissertation defense are given in the Graduate School Catalog on the Graduate School’s website.

The dissertation defense will consist of two parts:
- Part 1 will be a public presentation by the candidate on the main aspects of the research reported in the dissertation. This seminar must be advertised accordingly well beforehand. The seminar will normally take place immediately before the formal examination.
- Part 2 will be a formal examination of the candidate by the Dissertation Examination Committee. This part will be open only to the Dissertation Examination Committee and members of the Graduate Faculty. During Part 2, only members of the Dissertation Examination Committee will be permitted to ask questions.

The outcome of the dissertation defense will be determined by the student’s doctoral examination committee, and the results will be reported to the NACS Graduate Director and the Graduate School.

The NACS program requires one electronic copy of the dissertation. The Graduate School requires electronic submission of the dissertation; the on-line submission process is outlined at the Graduate School’s website.
SECTION THREE

MS Degree
The NACS program offers both an optional non-thesis MS degree and an optional thesis MS degree. Students who wish to earn one of the two MS degrees (non-thesis or thesis) in route to the PhD can apply for the MS degree. Students who, for one reason or another, need to leave the program before completing the doctorate can also apply for the non-thesis MS degree or the thesis MS degree.

Non-Thesis MS Degree
Requirements
The requirements for the non-thesis MS degree include a total of 31 credits (16 credits in core courses; 12 credits in elective courses; and 3 research credits), and the completion of a written Research Project, and an oral presentation of the Research Project.

Coursework
Students will take 3 credits of NACS 798 non-thesis research credits. The 28 credits in coursework must be in NACS or NACS-related areas, and of these, at least 20 must be at the 600 level and above, and no courses may be below the 400 level. Students must maintain a cumulative grade point average of 3.0.

All MS students must take the following two courses (4 credits):
- NACS640: Foundational Readings in Neuroscience and Cognitive Science (2 credits)
- NACS600: Ethics in Scientific Research (2 credits)

They must also take three of the following 4-credit NACS courses (12 credits). At least one course must be taken from each area.
- Cognitive Area
  o NACS642: Cognitive Neuroscience
  o NACS645: Cognitive Science
- Neuroscience Area
  o NACS641: Introduction to Neuroscience
  o NACS643: Computational Neuroscience
  o NACS644: Cellular and Molecular Neuroscience

In addition, they must take 12 credits in elective courses approved by NACS and the student’s committee.

Research Project
Students are required to complete a research project. Projects may involve empirical or theoretical research, and the discipline-specific details are developed by the student, his/her advisor, and input from the committee.

Written Report
The research project includes a written report that must be submitted as a journal-style research or review paper around 20-25 pages in length (not including reference list and figures). The student’s adviser and committee will evaluate the written report. An electronic copy of the written report must be submitted to the NACS office.

Oral Presentation
Students are required to give an oral presentation of their research project. The student’s adviser and committee will evaluate the oral presentation and complete a Report of Research Project form at the oral presentation.
Thesis MS Degree

Requirements
The requirements for the thesis MS degree include a total of 31 credits (16 credits in core courses; 12 credits in elective courses; and 3 research credits), and the passing of an oral defense of an original thesis.

Coursework
Students will take 3 credits of NACS 799 thesis research credits. The 28 credits in coursework must be in NACS or NACS-related areas, and of these, at least 20 must be at the 600 level and above, and no courses may be below the 400 level. Students must maintain a cumulative grade point average of 3.0.

All MS students must take the following two courses (4 credits):
- NACS640: Foundational Readings in Neuroscience and Cognitive Science (2 credits)
- NACS600: Ethics in Scientific Research (2 credits)

They must also take three of the following 4-credit NACS courses (12 credits). At least one course must be taken from each area.
- Cognitive Area
  - NACS642: Cognitive Neuroscience
  - NACS645: Cognitive Science
- Neuroscience Area
  - NACS641: Introduction to Neuroscience
  - NACS643: Computational Neuroscience
  - NACS644: Cellular and Molecular Neuroscience

In addition, they must take 12 credits in elective courses approved by NACS and the student’s committee.

Thesis
Students must conduct an independent research study on a topic selected by the student and his/her committee, and write a formal research paper (thesis) describing this research study. At minimum, the thesis should be a manuscript organized in a style that is typical for a peer-reviewed journal within the student’s research area and should be of a quality and significance suitable for publication in such a journal. The thesis should be based on completed experiments, including a complete description of the methodology used and results obtained, which may be more in-depth than typical journal publications. The thesis should also contain an expanded literature review and theoretical framework, as well as an expanded discussion relating these findings to the existing literature.

An electronic copy of the thesis must be submitted to the NACS office.

The thesis can be an extension of the first year project, with additional experimentation and write-up.

The dissertation can include the thesis project as part of the background research and be built upon it, but the dissertation would need to substantially expand this topic with multiple additional experiments.

Oral Defense
Students must pass an oral examination defending the thesis and covering all course material. Approval of the thesis and the defense is the responsibility of the student’s Examining Committee.
SECTION FOUR

Administrative Procedures

Philosophy
The goal of the program administration is to facilitate all activities of the graduate program while insuring that all rules and regulations are followed. A certain amount of bureaucracy is necessary, but it should never interfere with the intellectual activities of the students and faculty. The administration should also continually work to improve the graduate program.

Administrative System

Program Director
The Program Director works with the Executive Committee to generate and evaluate proposals for changes and improvements in NACS Program policy.

Graduate Director
The Graduate Director advises in any problems concerning NACS students and works with the NACS leadership to improve the Graduate Program. In the summer of each year, the Graduate Director will review all NACS graduate students with the NACS Assistant Director. This provides further assurance that each student is making satisfactory progress and meeting necessary deadlines.

Admissions Director
The Admissions Director works with the Admissions Committee to evaluate applications and make recommendations for acceptance to the program. The Admissions Director works with the NACS Program Director in putting together offers of financial support for incoming NACS students.

Graduate Committee
The Graduate Committee rules on requests for leaves of absence, special exceptions to policies, issues of probation and termination of students not meeting program requirements, and other student issues.

Assistant Director
The administrative activities of the program are managed by the Assistant Director.

Academic Problems

Probation
Probation is a formal warning to the student that there are serious deficiencies in his/her performance. Failure to correct those deficiencies can lead to termination from the program.

A student will be put on probation when one or more of the following events occur:
- the student fails to maintain a cumulative grade point average of 3.0 (required by Graduate School)
- the student fails to meet the deadline for completing the qualifying examination or dissertation proposal defense
- the student’s committee recommends probation because of a pattern of performance below the accepted standard for the NACS program. In this case, the committee must submit a written report detailing and documenting the problems to the Graduate Committee, and the Graduate Committee will determine if probation is warranted.

When placed on probation, the student will be informed in writing of the requirements for being removed from probation and the deadline by which those requirements must be met.
A student will be removed from probation when performance in courses improves to meet Graduate School requirements, or the Graduate Committee determines, based on reports from the student’s committee and advisor, that the student has satisfactorily corrected the deficiencies that resulted in probation.

**Termination Procedure**
- The Graduate School will terminate the admission status of any student whose cumulative grade point average falls below 3.0 for three consecutive semesters of enrollment.
- The decision to terminate a student from the program for any other reasons must be made by the Graduate Committee after careful consideration of the circumstances and all pertinent information.

**Grounds for Termination**
- A student who has been placed on probation and fails to meet the requirements for removal from probation by the stated deadline will be terminated from the NACS program.
- A student who fails the qualifying examination and is not granted a reexamination will be terminated from the PhD program.
- A student who fails the qualifying examination and also fails a re-examination will be terminated from the PhD program.
- The student is responsible for finding an advisor. The University is not responsible for providing an advisor. A student who does not have an advisor (other than an interim advisor) for more than four consecutive months will receive a warning that he/she will be terminated from the program if he/she does not have an advisor in the following two months. Thus, if a student goes without an advisor for a period of six consecutive months, he/she will be terminated from the NACS program.
- A student who has not completed the dissertation defense by the deadline established by the Graduate School will be terminated from the NACS program.
- A student who has violated accepted scientific ethical standards will be terminated from the NACS program.

**Resolving Disputes**
Every effort should be made to handle disputes between the student and his/her advisor or between the student and his/her committee informally. Students who have a grievance against their advisor that cannot be settled through direct discussion and/or negotiation with the advisor should consult the Graduate Director.

If all reasonable attempts at informal resolution fail, the parties involved should present their cases in writing to the Graduate Director who will take the issue to the Graduate Committee for consideration. In difficult cases, the student, the advisor, or the Graduate Director may choose to ask for the assistance of the Ombuds Officer for Graduate Students for mediation or take other action.

**Leave of Absence**
Requests for a leave of absence should include an explanation, the date of anticipated return to registration, and a letter of support from the advisor. Decisions on granting leaves are made by the Graduate Director.

A leave of absence may not be for longer than one year. The student may, however, submit a second request that will be considered by the Graduate Director. The Graduate Director may then petition the Graduate School for an extension for a student who has had a leave of absence.

A leave of absence ‘stops the clock’ with respect to NACS graduate program deadlines. When the student returns to enrollment, the clock resumes where it stopped. The clock for some Graduate School deadlines does not stop with a leave of absence. Failure to comply with such deadlines may necessitate reapplication for admission to the Graduate School.
Exceptions
Unusual circumstances may arise that are not explicitly covered by the rules and regulations or that warrant exceptions to the rules. We intend the system to be flexible enough to accommodate any situation as long as the spirit of the regulations, the well-being of the student, and the standards of NACS are not compromised.

A request for a special exception, including an explanation and justification, should be made in writing to the Graduate Director. The request should include a letter of support from the advisor. The Graduate Director will review the request and decide if an exception will be granted.

A separate written request and a review by the Graduate Committee is required for each exception, even if the situation is identical to an earlier one for which an exception was granted.

An exception applies to a single student in a single situation and does not imply that other students will automatically be granted the same exception.

The fact that an exception has been granted does not change rules or regulations.

Multiple requests for exceptions by an individual student (for instance, more than one request to extend the deadline for the qualifying examination) are likely to indicate serious academic problems that need to be addressed by the student and his/her advisor.