Student and Faculty Handbook

**Behavioral Neuroscience Program
Department of Psychology
Binghamton University-SUNY**

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Program Goals:

The Doctoral program in Behavioral Neuroscience seeks to provide top tier training and professional development for students to thrive in a diverse array of biomedical research positions, including academic, industry, and government positions. To do this, the BNS area has developed a curricular "map" that has identified 4 primary areas for scientific and professional development:

1. **Core knowledge in the field:** including expert-level knowledge in fundamentals of neuroscience and behavioral processes, with implications for understanding Psychology as a whole; and technical proficiency in advanced neuroscience techniques.
2. **Critical thinking skills and abilities:** including critical evaluation of evidence-based literature; proficiency in experimental design and planning; data processing and analytics; and a strong command of innovative technology.
3. **Effective Communication Skills:** including strong public speaking skills within a variety of contexts such as the classroom, scientific meetings, and lay audiences; and effective writing of scientific articles, grants, and lay summaries for the public.
4. **Professional Characteristics:** to foster attitudes and expectations for rigorous, responsible, ethical, and transparent conduct of science; and to embrace a respectful and inclusive environment where all individuals and team members can thrive.

Brief overview of Program Milestones:

Year 1: is the most course-intensive, with coursework focused on Core courses in neuroscience, the full year statistics sequence, and professional development courses (teaching, ethics). Seminars and distribution requirements should be taken where feasible. All students should propose their Master's thesis project by **April 1st of their first year**.

Year 2: is also course intensive, with additional Core courses being completed, including grant writing, seminars, and distribution requirements. Students should strive to be course complete by the end of the second year, and must defend their Master's thesis project by **June 1st of the second year**. Once the Master's Degree is complete, students are eligible and required to teach a course as instructor of record as part of the Ph.D. requirement.

Year 3: students should be course complete and focused on two major milestones: Completion of the Preliminary Exams requirement (review paper with oral evaluation), and the dissertation proposal (NRSA-style grant).

> Preliminary Exams: An outline and topic summary for the review article must be submitted to the committee in mid-June and approved by the committee by **July 15th** for rising 3rd year students; the final review paper is due to the committee by **October 1st**, and the oral evaluation must be completed by **November 1st** in the third year.

> Dissertation Proposal: a NRSA-style predoctoral grant format will be used for the dissertation proposal, which is due to the committee no later than **April 1st** of the third year. With some revisions, the expectation is that a final approved dissertation plan will be in place by the end of the third year.

Year 4: students should have achieved full "ABD" status by this time and should direct all effort toward research, writing, and professional development. There are no additional program milestones in Year 4, though this is a time when most students teach a course as Instructor.

Year 5: students should strive to complete their dissertation work and successfully write and defend their dissertations by the end of Year 5.

Course Requirements:

Core Course Requirements:			
Master's Degree:		**Doctoral Degree:**	
	PSYC 503: Stats & Design I (4 cr)		PSYC 504: Stats & Design II (4 cr)
	PSYC 551: Ethics in Research (2 cr)		PSYC 590: Teaching of Psychology (2 cr)
	PSYC 572: Neurophysiology (3 cr)		PSYC 570: Grant Writing (3 cr)

Neuroscience Electives:			
Course offerings:		**Notes:**	
	PSYC 571: Neuroanatomy (3 cr)	**Master's degree requirement:**	
	PSYC 573: Cellular & Molecular Neurobiology (3 cr)	One additional elective course	
	PSYC 574: Neuropharmacology (3 cr)		
	PSYC 575: Neurobiology of Disease (3 cr)	**Doctoral degree requirement:**	
	PSYC 576: Developmental Neurobiology (3 cr)	Three additional elective courses	

Distribution Requirements and Elective Seminars:			
Master's Degree:		**Doctoral Degree:**	
	Clinical or Cognitive (5XX or 6XX) (2 or 4 credits)		Second Distribution Course* (2 credits)
			PSYC 609: BNS seminar
			PSYC 609: BNS seminar

Notes:
Distribution courses for the Doctoral Degree are intended to build breadth of knowledge and or cultivate technical expertise in an area relevant to the student's career trajectory. This distribution requirement can be met by choosing from one of the following choices:
- Out-of-area graduate courses offered by the Clinical or Cognitive areas;
- Graduate courses offered by adjacent departments such as Biology, Biochemistry, Pharmaceutical Sciences, Biomedical Engineering, etc.
- A "short course" in a technologically relevant area such as computer programming (Python, Matlab, etc), Artificial Intelligence, Machine Learning, Data Analytics, Genetic techniques, etc. Some short courses are offered through Watson (https://www.binghamton.edu/watson/continuing-education/data-science/index.html) or other universities/institutes and offer a Certificate of Completion (non-credit bearing) and may incur costs beyond tuition. Students must have advance approval from their faculty mentor and the BNS area coordinator. To receive elective credit, students must register for PSYC 610: Advanced Technology in Science with the BNS Area Coordinator.

Other Degree Requirements:	
Master's Degree:	**Doctoral Degree:**
- Register and participate in PSYC 594: BNS Lunch each semester. - Complete a total of 32 credits, including both coursework and research credits. No less than 18 of these credits must arise from formal coursework (including BNS Lunch). - Completion and successful defense of the Master's thesis is required.	- Must receive Thesis Committee recommendation for continuation to the Doctoral program. - Participate in PSYC 594: BNS lunch each semester. - Complete and pass Qualifying Exams. - Teach a course as Instructor of Record. - Completion and successful defense of the Doctoral Dissertation is required.

A minimum grade of B- is required for all courses. Student GPA must remain above 3.0 to be eligible for NY State funding at all times. See Graduate School guidelines for further information.

Composition of Committees:

Role of the Committee: Primary oversight of research activities is provided by the faculty mentor, with additional oversight and approval from the committee as necessary. Each of the 3 major milestones (Master's, Preliminary Exams, Dissertation) require the establishment of a faculty committee to oversee the student's project. **The primary role for the Committee is to guide the scientific and professional development of each student through design and oversight of an individualized program of study**. In most circumstances, committees will provide insight and critique into completed and ongoing studies, offering suggestion on how to strengthen the scientific rigor, avoid potential pitfalls, and generate alternative solutions to problems that may arise. The Committee can be called upon at any time to consult on ongoing studies, and where possible and necessary, should meet with the student to review progress on an annual basis, or more frequently if necessary.

Composition of the Committee: Committees for the Master's, Preliminary Exams, and Dissertation <u>proposal</u> require a minimum of 3 members. The composition of the Committee can remain the same across all 3 milestones, or may change in order to better meet the evolving needs of the student and their project. Committees are usually selected through conversation between the individual student and their faculty mentor and are comprised of 3 faculty. Most commonly, the faculty mentor will serve as Chair of the student's committee, with the other 2 members selected from the BNS program faculty. In certain circumstances, a faculty member other than the mentor may serve as Chair (eg., such as when the faculty mentor is on extended leave for sabbatical, illness, etc). All tenured and tenure track faculty in Psychology are eligible to serve as Committee members. Research Scientists with appropriate expertise may serve as Committee members with approval of the BNS Area Coordinator, and if they have been approved to serve on Committees by the Graduate School. In addition to scientific expertise, several other factors should be considered during selection of committee members, including but not limited to:

- Personal/professional connections that the student would like to forge with individual faculty, or with whom they have already established a working relationship through coursework, collaboration, etc;
- Representation across experience level (Assistant, Associate, Full Professor), gender, and other demographics to ensure an appropriately representative and unbiased committee;
- Distribution of faculty workload, so individual faculty are not over-burdened with student committee assignments.

External Examiner for Dissertation: When the dissertation work approaches completion, a suitable External Examiner must be selected and approved by the Graduate School. The External Examiner is intended to evaluate whether the quality, scope, and impact of the dissertation work is commensurate with national and international standards for awarding of a Doctoral Degree. For this reason, the External Examiner evaluates the final Dissertation and Defense, but is not involved in the proposal or execution of the dissertation studies. The External Examiner may be a faculty member at Binghamton University so long as they are <u>not</u> a member of the Psychology Department. More commonly, the External Examiner is employed at another academic institution and has demonstrated expertise in the field of inquiry. The Graduate School guidelines must be followed for selection and approval of an external examiner.

Research Expectations:

Successful completion of both the Master's and Doctoral Degrees requires high quality, novel research studies to be conducted, analyzed, and written. These experiments ultimately form the basis of the Master's Thesis and Doctoral Dissertation, respectively. Research training and financial support is provided by the faculty mentor's laboratory, and because of this, <u>all</u> enrolled students are required to have a faculty mentor to ensure appropriate progress in research.

Students and their mentors should strive to make steady and substantial progress in research at all times. The expectations for research productivity will, by necessity, evolve across the academic training period, with research activities being more moderate during the first two years while students are taking classes, and increasing substantially once the student achieves course-complete status. Although there may be some short periods where students are less active in research (eg., during a week with multiple exams, conference travel, planned vacations, etc), students should strive for a consistent, high-level of research productivity across their graduate training. Note, however, that it is not uncommon for students to curtail data collection activities in the last weeks or months of thesis or dissertation writing, respectively, so that effort can be diverted toward writing. Indeed, writing of the thesis and/or articles for publication is considered to be progress in research. Although other lab members (graduate students, post docs, technical staff) may participate in design and execution of experiments using a team-based approach, each student is expected to be the lead scientist on their own project, and is responsible for data collection activities associated with their thesis and dissertation projects.

Productivity metrics: Where appropriate, the program may use standard productivity metrics such as number of poster presentations, peer-reviewed journal articles, and other publications as an indication of general productivity. However, each lab employs a unique approach to their work that may vary in the amount of time to learn individual techniques, sample throughput, and the complexity of approaches utilized and hypotheses being tested. Thus, it can be quite difficult to evaluate productivity based solely on the number of authorships. However, a good rubric would be that each trainee should be sufficiently research active to generate at least one poster/presentation abstract that can be submitted to a professional conference each year. Ideally, the Master's Thesis would be the student's first first-author publication, with one or more additional publications arising from the dissertation. But here again, it is important to emphasize that publications can vary dramatically in terms of the quantity and quality of studies they include. Thus, students, mentors, and committees will need to carefully weigh the apparent numerical metrics of productivity in the light of quality, rigor, and approach.

Annual Review of Student Progress: At the end of each academic year, the program faculty meet to discuss each student in the program. Faculty will discuss all elements of a student's performance, including but not limited to (i) research productivity; (ii) engagement in course material and academic performance; (iii) completion of Teaching Assistant responsibilities; (iv) active participation in BNS Lunch and other program-level events such as seminars, workshops, and colloquia; (v) ability to work respectfully and productively with faculty, staff, and trainees at all levels; and (vi) quality and quantity of service and outreach. This annual review culminates in a formal letter of evaluation each year that provides a brief summary of student strengths, addresses areas of concern, and sets some general goals for the upcoming academic year. This letter becomes a part of the student's permanent file.

Academic and Research Integrity

Academic Honesty: The Behavioral Neuroscience Program expects all trainees to conduct their work with the utmost integrity for all aspects of their training experience, including teaching, research, and service. Trainees are subject to the Academic Honesty Policies provided by Binghamton University and Harpur College of Arts and Sciences (https://www.binghamton.edu/academics/provost/faculty-resources/honesty.html). These policies generally provide guidance on issues such as cheating, plagiarism, and other aspects of student conduct relating to coursework, but may also apply to other program milestones such as Master's Theses, Preliminary Examinations, and Dissertations. Violations of these policies will be considered a breach of Academic Honesty and will be handled through established BU procedures.

Research Integrity: Because most laboratories in BNS are supported by the National Institutes of Health (NIH), trainees are expected to follow the NIH principles for Responsible Conduct of Research (RCR; https://oir.nih.gov/sourcebook/ethical-conduct/responsible-conduct-research-training). The BNS program will provide periodic review of RCR principles through coursework, professional development seminars, in-laboratory training by faculty, discussions in BNS lunch, and through distribution of relevant reading materials. All individuals engaged in NIH-supported projects are required to comply with these NIH requirements for RCR.

Policy on use of Artificial Intelligence and Machine Learning (AI/ML): The fast-pace changes in generative AI and large-language models (LLM) afford the opportunity for scientists to accelerate progress, and the BNS program is largely supportive of embracing these new technologies to improve learning, strengthen scientific rigor, and enhance scientific impact. Consistent with best practices in academic and research integrity, the BNS faculty offer the following guidance as a starting point for trainees who use such technologies:

- Generally speaking, students are encouraged to make use of any technology, including generative AI tools, to contribute to their understanding of materials from courses and articles, as learning aids, or to help complete assignments. Generative AI might make a useful tool for generating initial outlines, editing written sections, and exploring new literature bases.
- Trainees are encouraged to have transparent and open discussion with their faculty mentors, course instructors, and the BNS area head on program expectations and appropriate use of AI/ML in meeting program requirements.
- Any content produced by an artificial intelligence tool must be cited appropriately in the text. Many organizations that publish standard citation formats now provide information on citing generative AI (e.g., MLA: https://style.mla.org/citing-generative-ai/).
- Students must submit, as an appendix with their assignments, a complete description of any content produced by an artificial intelligence tool, the prompt(s) used to generate the content, and the tool that was used to generate content.

Cautionary Notes on use of generative AI/ML:
- Students should utilize AI/ML tools with healthy skepticism, since most AI/ML systems often report false or incorrect information. In all cases, students will be accountable for the accuracy of all work they submit.
- Preliminary Exams are evaluated based on information accuracy, the ability to critically evaluate the literature, identify gaps in the literature, and forge new paths for the future. No generative AI/ML can do this effectively (yet), nor can AI provide assistance for the oral

evaluation step of Preliminary Exams. Thus, there may be great risk to using generative AI for prelims in particular.

- There are many unresolved copyright and intellectual property (IP) issues with use of generative AI/ML. Simply loading documents/material into AI systems may violate copyright laws, forfeit IP, and will most certainly place documents and information into the public domain. The NIH and most peer-reviewed journals expressly prohibit use of generative AI/ML in the review process because it is viewed as a violation of confidentiality and may forfeit copyright and IP rights.
- A standard requirement in scientific writing is that original references should be acquired and read in their original form. That is, citing articles that have not been fully evaluated is referred to as deceptive referencing, which many scholars consider to be an ethical violation. Use of generative AI/ML without follow-up reading of the literature likely violates this ethical principle.

Given the rapid evolution of generative AI/ML, the BNS area will review any issues or concerns as they arise. Areas of concern or changes to these expectations will be addressed by discussion and voting of the BNS faculty.

Guidelines for the Master's Thesis:

The intent of this section is to provide a general rubric for the Master's proposal, final thesis document, and the Master's defense. Generally speaking, the faculty envision the Master's thesis to encompass roughly the size and scope of a peer-reviewed journal article. Toward this end, the final document should be prepared to meet peer review standards. In recognition that completion of the Master's Degree must be accomplished by the end of second year and projects may lag, additional measures and/or experimental work may need to be added after degree conferral for publication purposes. Nevertheless, the hope is that all Master's theses can transition to peer review within 6 months of degree completion, serving as the first, first-author paper for most students. More specific milestones and expectations are provided below.

Master's proposal:
- The Master's committee should be assembled at the start of the spring semester in the students first year, and the proposal must be approved by the Thesis Committee by **April 1st** of the first year. The proposal document should essentially include the front half of the eventual thesis, including:
  - **Title page** formatted for the graduate school
  - Brief **Abstract** outlining the project (300 words max) is optional for the proposal, but required for the final thesis.
  - **Introduction** (~3 pages, double spaced), that culminates into a clear statement of hypothesis and/or goals of the project.
  - Complete **Methods** section with (i) general methodology; (ii) sufficient rationale to justify experimental parameters, and for the committee to evaluate proposed methodology. Inclusion of an infographic to visually represent the experiment(s) is often useful.
  - Any **Results** and/or data that will be included in the final thesis, or that serve as the basis of the proposed studies. Tables, Figures and Captions should be included as appropriate. More commonly, proposals must include a summary of **Expected Outcomes** for proposed studies.
  - The proposal document should be sent to the committee 1 week prior to the proposal meeting.
- The proposal meeting should include a 10-15 min presentation summarizing the thesis proposal. The remaining time will be for discussion of the project. Students should come prepared to discuss Expected Outcomes for their studies and the Timeline for completion of the work.

Final Master's Thesis:
- The final thesis should be a more polished version of the proposal document that has been updated with any new literature, findings, and other changes necessary to frame (or re-frame) the project as it was completed. Additional Methods, Results and a 3-5 page Discussion should be added.
- The thesis must be given to the committee 10 business days in advance of the Defense and be posted in the department for public review. The defense should begin with a 25-30 min presentation of the project, including background, key findings, and conclusions. The presentation portion of the Defense must be open to all department faculty, staff and students. Remaining time with the committee will be for discussion of the project and assessment of the student's knowledge base in the area of scientific inquiry. The committee portion of the defense is closed to the public.
- The defense should be scheduled with sufficient time to account for revisions to the document, taking into account the posted deadlines by the graduate school. All graduate

school, departmental deadlines, and formatting requirements must be followed for degree conferral. Successful defense of the Master's Thesis should be completed no later than **May 1st** of the second year, with the expectation that revisions can be finalized in time to meet graduate school requirements for conferral of degree at the end of the second year.

- If students are unable to make this deadline, they must successfully defend no later than July 1st and their degree would be conferred in the Fall of the third year. July 1 should be viewed as a hard deadline because a final approved defense/document is required for students to proceed with Preliminary Examinations (see next section) and the Dissertation Proposal. Note: for summer defenses, the Psychology Department requires a "Summer Defense Waiver" form to be signed by the committee and submitted to the Director of Graduate Studies.
- Upon completion of the Master's thesis, the committee makes a formal recommendation about whether the student may continue towards the doctoral program. This recommendation is on the defense form signed by the committee and required by departmental policy.

Teaching Requirement:

Requirements and Eligibility: All Doctoral students are expected to teach one course as Instructor of Record prior to completion of the Ph.D. Preparation for this requirement is provided through coursework (Teaching of Psychology) as well as through serving as a Teaching Assistant (TA) for at least one semester in the first 2 years of the program. Doctoral students are eligible to teach a course after all requirements for the Master's Degree have been completed, since Harpur College requires a Master's Degree as the minimum credential for all instructors in the College of Arts and Sciences.

Timing: In most circumstances, doctoral students will teach during a winter or summer session, and will be compensated at the standard departmental rate for such teaching. Though teaching as instructor during a regular semester is relatively rare for graduate students, this may be a good option for certain students or in the case of an emergent need of the Psychology Department. Given the program milestones expected for the third year (Preliminary Exams and Dissertation Proposal), it is generally most convenient for students to teach after the third year in the program is complete.

Support: Resources to support instructors are widely available at Binghamton University, including through the Center for Learning and Teaching (CLT), University Center for Training and Development, and various workshops offered periodically by departments to support pedagogical development. Summer and winter teaching by graduate students is also overseen by a designated faculty member, who provides guidance and support to new instructors as needed. Students are encouraged to discuss course planning and other pedagogical issues with their faculty mentor, or with other faculty who have taught the designated course in recent years. This additional mentorship can be a valuable tool for curriculum development, improving student learning outcomes, building confidence in the classroom, and avoiding common pitfalls for new instructors.

Preliminary Examination Process and Requirements:

Statement of Purpose: The Preliminary examination process has two central goals: (1) to determine whether students have breadth of knowledge, mastery of concepts, and integrative understanding of CNS function that is commensurate with expectations of a doctoral candidate; and (2) to determine whether students can apply this mastery within a specific area of research inquiry. Students are expected to utilize knowledge gained from prior coursework and independent readings of the literature to demonstrate expertise equivalent or superior to that of a typical faculty member, thereby maturing into research colleagues. Successful completion of the Preliminary Examination is required for admission to Ph.D. candidacy. All aspiring doctoral candidates will be required to prepare a <u>critical review paper with a successful oral evaluation</u>. Planning and preparation should begin immediately after completion of the Master's Defense, as follows:

> **Abstract, outline & initial bibliography:** The specific topic area for the critical review can be selected by the student in any area of neuroscience, though we assume that most students will identify a timely topic area that is directly, or at least tangentially, related to their ongoing research. The topic must be reviewed and approved by the student committee based on the preparation of an Abstract (350 words) and 1-2 page outline that describes the scope and structure of the review article to be written, and an initial list of 20-25 references that will form the basis of the review. Feedback on the abstract and outline may only be provided by the committee on one occasion, and no other pre-submission review or feedback may be provided on the document. The abstract, outline and initial bibliography are due to the committee by mid-June so that these items can be discussed and revisions can be **completed no later than July 15th**.

> **Final review paper:** The final review paper should be 25-30 pages in length (Arial 11 font, double-spaced, 1 inch margins), not including the Title, Abstract, Tables, Figures, or Bibliography. A comprehensive review will likely have at least 50-100 references, though students are cautioned that all literature cited in the review will be eligible for discussion during the oral evaluation. The final critical review paper is due to the committee **no later than October 1st** of the 3rd year. Late submissions will not be accepted.

> **Oral Evaluation:** Upon submission of the critical review, an oral evaluation must be scheduled within 2-4 weeks of paper submission. The oral evaluation is meant to be a <u>constructive conversation among colleagues</u> where faculty can probe the student's working knowledge of the literature, hypotheses presented in the critical review, and other fundamental areas of neurobiology and behavior relevant to the critical review. The oral evaluation will be performed by the committee and is expected to take approximately one hour. No formal presentation from the student is permitted (i.e., no power points), although it may be advantageous to conduct the oral defense in a room with a white board in case that might be helpful for communicating complex concepts. The oral evaluation must be completed **no later than November 1st**.

The critical review should be the student's work, with no feedback other than what is described above, from other faculty, research scientists, or graduate students. See section on Academic and Research Integrity for acceptable uses of generative AI on preliminary exams.

The faculty offer the following guidance for students to consider as they prepare their critical

review paper:

Characteristics of a STRONG critical review include:

- Identifies a timely area for the field that has not been reviewed previously or recently;
- Critically evaluates existing literature, including both strengths and weaknesses of published research findings;
- Provides appropriate depth in summarizing literature and places the work into a historical context when appropriate;
- Identifies gaps in existing knowledge that need to be filled;
- Includes a multi-disciplinary perspective that takes into account relevant neurophysiology, neuroanatomy, neurochemistry, and neuropharmacological perspectives on the topic;
- Generates a novel hypothesis and forecasts potential future directions;
- Includes an organizing schematic illustration to summarize a central hypothesis and proposed mechanism; tables to summarize key literature; or other innovative ways to visually highlight tenets of the review;
- In general, the quality of writing should be appropriate for submission to a peer-reviewed journal.

Characteristics of a NON-critical review include:

- Simple summaries of published findings that accept the conclusions of articles cited without critical evaluation of the methods, results, and conclusions;
- Failure to understand and/or communicate the "bigger picture" of the research topic;
- Rambling, disorganized, and unfocused writing that does not develop toward a common central theme or set of themes;
- Factual inaccuracies that raise questions about understanding of the research topic or fundamental aspects of neuroscience;
- Excessive problems with paragraph structure, grammatical problems, and typographical errors that distract from the scientific premise of the critical review, or that might be indicative of hasty writing and poor editing.

Scoring of Preliminary Exams will be based on the factual accuracy, completeness, and clarity of answers and a demonstrated ability to synthesize, critically evaluate, and integrate information.

High Pass: Distinguished from a Pass by exceptional clarity and synthesis, greater than normal insight into the literature, and a strong grasp of the strengths and weaknesses of the evidence and approaches often used to address the topic area.

Pass: Addresses most but not necessarily all aspects of the topic area; minor details omitted or inaccurate, but the critical review demonstrates general understanding and mastery of key concepts.

Low Pass: Moderate deficiencies that suggest an incomplete understanding or misunderstanding of key concepts in the literature; answers at oral defense did not address all aspects of the questions, but were deemed minimally passable. A low pass requires remediation and would be accompanied by written critiques from the committee that must be addressed in a revised document and submitted to the committee within 30 days of receiving feedback. Only one document revision is permitted. Failure on the second attempt will lead to automatic dismissal from the program as described below. Oral defenses cannot be remediated.

Fail: Key aspects of the critical review are logically flawed or inaccurate; the manuscript is poorly reasoned and/or inconsistent with the preponderance of evidence in the field; gaps in knowledge are substantial and question whether the student has graduate-level understanding of the topic area; weaknesses in the document were mirrored by inadequate or incomplete understanding of the field during the oral defense. <u>Preliminary examinations judged as Fail lead to Dismissal from the program.</u>

<u>**Dismissal**</u> from the program occurs when:
- A committee judges the student to have failed the oral evaluation;
- The attempt to remediate a Low Pass by performing document revisions (described above) yields <u>any</u> score lower than Pass.
- Students may Appeal the dismissal using the process below.

<u>**Appeal Process:**</u> Any student who is dismissed from the program due to failure of Preliminary Examinations may submit a written Appeal to the BNS faculty requesting continuation in the program. The Appeal must be submitted within 10 business days from notice of Dismissal and may include the following:
- Plans for mitigating knowledge gaps evidenced in the Failed portions of the Preliminary Exams;
- A brief statement on research productivity and service activities while in the program;
- A brief summary of any unusual circumstances that may have adversely influenced the success in the evaluation portion of the Preliminary Exams;
- An updated Curriculum Vita may also be provided;
- An unofficial copy of academic transcripts.

Appeals will be reviewed and voted by all members of the BNS faculty, with a final decision provided within 10 business days. The simple act of appealing does not guarantee continuation in the program, and in many cases, appeals may be denied. The faculty vote on any appeal is final.

Medical Withdrawal and Leave of Absence during Preliminary Exams: The Behavioral Neuroscience Program follows Binghamton University policies on Medical Withdrawal and Leaves of Absences (see Graduate School policies). Withdrawal or absence during Preliminary Examinations can be particularly disruptive because preparation of the review paper and oral evaluations are a time-locked, qualifying examination process with required milestone dates. In these cases, the student will be required to re-start the Prelims process from the beginning with a new review topic upon return from leave. Any exceptions to this approach must be approved by a vote of the full BNS faculty and approved by the BNS Area Head.

Guidelines for the Doctoral Dissertation:

Dissertation Proposal:

        A major objective of the doctoral program in Behavioral Neuroscience is to cultivate professional skills in scientific writing and prepare trainees for a competitive career in the neurosciences. After completing the Preliminary Exams, the last remaining hurdle toward achieving "All But Dissertation (ABD)" status is completion of the Dissertation Proposal, which outlines a prospective set of experiments that will be conducted in order to meet requirements for the doctoral dissertation. Thus, to achieve these objectives, Dissertation Proposals will be expected to follow the NRSA F31/F32 format guidelines and must include the following sections:

        Specific Aims: A 1-page overview of the project outlining the background, approach, and experimental objectives of the project.

        Research Plan: This section is 6 pages in length and must address all major tenets of a NIH-style grant application, including Significance, Innovation, and Approach. Preliminary data should be provided in the Research Plan to support either the feasibility of the approach or to establish proof-of-concept for the central hypothesis.

        Training Plan: Also 6 pages in length, this section addresses the applicants research background and training; outlines plans for techniques, approaches, or skills that will be learned during the training period, as well as the mechanisms (conferences, workshops, co-mentorship, etc) that will be used to achieve those training goals; a substantive plan for professional development activities; and how all training-related activities will enable the student's career goals.

Expectations: As with all dissertation proposals, the research and training plans should be developed with extensive discussion with, and feedback from, the student's primary mentor. Where appropriate, students may also have a co-mentor to strengthen the research and/or training plans. Upon approval by the committee, student will be considered "ABD" and will be free to move forward with conducting studies as proposed. Once the dissertation proposal has been approved, an ABD form must be submitted to the Director of Graduate Studies for submission to the Graduate School. We expect that most projects will require some changes as data are collected, necessitating changes to the dissertation plan. These inevitable revisions should be reviewed and approved through meetings with the dissertation committee, or through short summaries of proposed changes that are communicated to, and approved by, the dissertation committee.

Format and Timeline: All sections of the dissertation proposal should be single-spaced; meet the page length requirements described above; follow margin guidelines of 0.5 in on all sides with 11 point Arial font; and be submitted to the committee as a single MS Word document. The dissertation proposal must be submitted to the student's doctoral dissertation committee by **April 1** of the 3rd year in the graduate program, with the expectation of having an approved dissertation proposal by the end of the 3rd year.

Final Dissertation:

        The doctoral dissertation is expected to provide a substantive and novel contribution to the literature in the trainee's given field. In addition to meeting requirements for the doctoral degree, the dissertation is meant to serve as a conduit for eventual publication of scientific findings. As such, students and their committees are encouraged to envision and plan a final dissertation document that can move seamlessly to publication. Each lab and each student has a unique project and approach that requires individual tailoring of the final dissertation document, and the

final composition of the Doctoral Dissertation is determined by the student and their faculty mentor, with approval by the dissertation committee. One of two formats are generally expected by committees and commonly used for the final dissertation:

Chapter-based dissertation (most common): For many students, the doctoral dissertation will include several datasets that will eventually be published in separate peer-reviewed journal articles. In this case, each peer-reviewed journal article can be included in the doctoral dissertation as a chapter, and bracketed by a General Introduction (10+ pages) and General Discussion (10+ pages). In these cases, the General Introduction and General Discussion should take a broader perspective than the corresponding sections within individual manuscript chapters and avoid duplication where possible. However, it is recognized that certain sections (eg., methodology in common between two manuscript chapters, etc) might be repeated. Again, the intent here is to facilitate the transition of individual data chapters into peer-reviewed publications expediently, since many students may have 2 or more publications arise from their dissertation work, depending on their field of study and the type of work they conduct.

Traditional dissertation format (less common): In cases where a series of experiments are expected to be published as a single, peer-reviewed publication, the final dissertation can simply follow the format guidelines outline by the graduate school with an Introduction, Methods, Results, and Discussion. With this approach, the program expects that the Introduction and Discussion sections will substantially exceed the typical length requirements of a peer-reviewed journal article. This is necessary because most peer-review journals only permit 3-4 pages (750-1000 words) of Introduction and about the same length for a Discussion. For a traditional dissertation format, the Introduction and Discussion should be ~10+ pages each to provide the level of literature integration and breadth of overview expected for a doctoral degree.

Format and Timeline: Rules governing the final format of the dissertation are largely dictated by the Department of Psychology and the Graduate School at Binghamton University. Students are encouraged to read these instructions and requirements carefully, as some things change each year. The doctoral dissertation must be given to the dissertation committee **3 weeks** prior to the defense. The Defense must be publicly announced and the Dissertation available to the Department of Psychology faculty at least **10 business days** in advance of the defense. Posting of the document and defense announcements to the Department are done by the Graduate Secretary. Note: for summer defenses, the Psychology Department requires a "Summer Defense Waiver" form to be signed by the committee and submitted to the Director of Graduate Studies.

Dissertation Defense:

Defense of the dissertation document requires a formal presentation to the department that provides a substantive overview of the dissertation project, study outcomes, and perspectives for the field. This public presentation is usually 40-50 min in length and followed by a period of open questions from the public. Immediately afterwards, the defense will move to a closed session with the doctoral candidate and the dissertation committee, during which time the dissertation committee will further probe the candidate with questions before making a recommendation for revisions to the document (minor or major; re-review and certification by the Chair of the dissertation committee; re-review by the whole committee, etc). Once revisions (if required) are completed, the doctoral dissertation can be submitted to the Graduate School along with appropriate paperwork for awarding of degree.