University of Colorado Anschutz Medical Campus

Neuroscience Graduate Training Program

Handbook of Policies and Information

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NEUROSCIENCE GRADUATE TRAINING PROGRAM POLICIES AND INFORMATION

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Co-Directors: Drs. Gidon Felsen and Nidia Quillinan
Program Administrator: Kayla Thomas
Graduate Training Committee (GTC) Chair: Dr. Anthony Peng

Web Address: https://www.cuanschutz.edu/graduate-programs/neuroscience

NEUROSCIENCE GRADUATE TRAINING PROGRAM POLICIES AND INFORMATION

1. Admission to the Program.

Students seeking admission into the program should have an undergraduate degree or its equivalent. Foreign students must also take the Test of English as a Foreign Language (TOEFL). A baccalaureate degree in biological science, chemistry, physics, or engineering is recommended. Applicants are strongly encouraged to take an undergraduate level biochemistry/organic chemistry course. There is no absolute requirement for grade point average above that required by the graduate school, but successful applicants generally have GPAs above 3.0 (A=4.0). Undergraduate research experience is strongly recommended. Students with deficiencies may be admitted on probation, but these must be rectified during the first year. It is the continuing policy and commitment of the Graduate School and School of Medicine of the University of Colorado to provide equal opportunity for qualified students without discrimination with regard to race, color, sex, religion, age, national origin or disability and to welcome such students to make application for admission to its graduate programs.

2. Student Support.

Students accepted in the Ph.D. program are provided full tuition, health insurance, and a stipend of $38,110 per year for living expenses (for the 2024-2025 academic year). Continued support is contingent upon satisfactory academic and research performance by the student. When a student enters a thesis lab, the thesis mentor assumes complete responsibility for the student's stipend, tuition, fees, and associated research costs. Out of state tuition is paid only in the first year. *All students must establish Colorado residency during and by the end of their first year in the program.*

3. Graduate Training Committee (GTC).

Every first-year student is assigned a member of the GTC as a mentor. First-year students should regularly meet with their GTC mentors to update them on their progress. GTC members provide feedback to first year students on choices of rotation and thesis labs. The students also need to rehearse their rotation talks with their GTC advisors. In subsequent years, each GTC mentor may also meet with their mentees to monitor student progress and help resolve any problems that arise. The GTC Chair also acts as a liaison between the students, advisors and thesis committees in order to address, proactively, any scientific or interpersonal issues that might arise during the student's tenure.

4. Training Program.

The goal of the Neuroscience Graduate Program (NSP) is to provide a broad and solid foundation of understanding in neuroscience, and to train critical thinkers, who identify important problems, generate experimentally testable hypotheses, and who draw significant conclusions from results of their ongoing research in a specific area of neuroscience. In addition, we aim to foster development of students who approach research in a responsible, ethical, and professional manner. After the initial period of coursework, students choose their specialty fields from a diverse list of topics. They proceed with research in their specialty areas until the generation and defense of a thesis leads to the award of a Ph.D. in Neuroscience.

4.1 Overview of courses and events year-by-year.

The text below summarizes coursework and various events that occur during each year of a student's tenure in NSP. More extensive descriptions of lab rotations, the two benchmark exams (preliminary and comprehensive), and the thesis research are provided in subsequent sections. Most of the year-by-year summary applies to students who enter directly into NSP. Deviations from this for students who enter into NSP through the Biomedical Sciences Program (BSP) and Medical Scientist Training Program (MSTP) are discussed at the end of this section.

In the brief course listings, we indicate with symbols which are ^{R}required versus ^{E}elective courses, including those ^{EQ}electives that fulfill a 1-credit requirement in Quantitative Neuroscience (see *Year 2 Fall Semester*). The listings below also indicate the two "laboratory research" courses at UCAMC: *NRSC 7650* and *NRSC 8990*. Students must sign up for one of these courses every semester (including the summer) while in graduate school. *NRSC 7650* is generally the pre-comps course, while *NRSC 8990* is post-comps, although there are exceptions to this rule (see descriptions for the summers after Year 1 and Year 2).

YEAR 1: FALL SEMESTER

[R]*NSP Bootcamp*: Prior to the beginning of the Fall semester, students attend a two-week bootcamp geared towards transitioning new students into NSP. Students engage in a number of lab demonstrations and exercises, are introduced to programming (MATLAB and Python), and are introduced to research-supporting Core facilities and to student groups. In addition, faculty interested in taking students into their labs also present their work in short "lightning" talks.

[R]*BMSC 7806 CORE I: Foundations in Biomedical Sciences* (6 credits, Course Director variable). Biomedical survey in biochemistry, molecular biology, genetics and cell biology. The course also focuses on the Scientific method and hypothesis testing. Course typically runs from the start of the fall semester until the beginning of November.

[R]*NRSC 7501 Introduction to Neuroscience* (1 credit, Course Director Dr. Abby Person). In-a-nutshell introduction to core neuroscience topics: Excitable cells, Glia, Synapses, Behavior. This course typically runs from the start of the fall semester through the end of September.

[R]*NRSC 7615 Developmental Neurobiology* (3 credits, Course Directors Drs. Caleb Doll and Santos Franco). Core neurodevelopment concepts, determination, differentiation, migration and pathfinding. This course runs during the months of November and December.

[R]*NRSC 7650 Research in Neuroscience* (Lab rotations, 1 credit each, Course Directors Drs. Gidon Felsen and Nidia Quillinan). Students perform two lab rotations with NSP faculty in the fall, one fully in the fall and a second which spans into the start of the spring semester. Students should register for Sections 001 and 002 of the *7650* course, each for one credit. Each section corresponds to one rotation. Lab rotations are described extensively below (see *Section 4.2*).

[R]*NRSC 7662 Neuroscience Seminar* (1 credit, Seminar Committee Chair Dr. Wonchan Oh). Seminar series designed to present recent important findings in Neuroscience research. First year students are required to attend all seminars and lunches with visiting faculty. Final grade is based upon attendance and participation at these seminars.

[R]*NRSC 7663 Neuroscience Journal Club* (1 credit, Course Directors Drs. Gidon Felsen and Nidia Quillinan). Biweekly journal club run by NSP students. NSP students in Years 2+ present articles, with presentations overseen by a faculty advisor. First year students are required to attend all journal clubs. Final grade is based upon attendance and participation at journal clubs.

YEAR 1: SPRING SEMESTER

[R]*NRSC7600 Cellular and Molecular Neurobiology* (3 credits, Course Directors Drs. Chris Ford and Kate Smith). Electrophysiology of neurons and synapses; ion channel biophysics; control of gene expression in neurons; glial neurobiology; quantitative problem sets. This course runs from early January until early March. The start of the course is typically a number of weeks prior to the official start of the spring semester, so students should plan winter breaks accordingly.

[R]*NRSC 7610 Fundamentals of Neurobiology* (3 credits, Course Directors Drs. Jason Christie and Diego Restrepo). Systems neuroscience spanning sensing, action, and cognition, includes "quantitative" workshops. The course runs from mid-March to mid-May.

[R]*NRSC 7650 Research in Neuroscience* (Lab rotation, 1 credit, Course Directors Drs. Gidon Felsen and Nidia Quillinan). Students perform one lab rotation fully in the spring semester (their third of the academic year). This is done by signing up for Section 001 of the *7650* course, for one credit.

[R]*NRSC 7662 Neuroscience Seminar* (1 credit, Seminar Committee Chair Dr. Wonchan Oh). See Year 1: Fall.

[R]*NRSC 7663 Neuroscience Journal Club* (1 credit, Course Directors Drs. Gidon Felsen and Nidia Quillinan). See Year 1: Fall.

SUMMER TERM between Year 1 and Year 2

The Preliminary Exam for NSP, which is discussed below in *Section 4.3*, takes place in June. Official transfer of students to their thesis labs occurs on July 1. Thesis labs are chosen based on student experiences during the three lab rotations and consultation with GTC mentors. The chair of the GTC and the Program Administrator should be notified on the choice of mentor on or before June 15. Under exceptional

circumstances, a student may be allowed to perform an additional rotation for the express purpose of enhancing the mentor selection process.

[R]*NRSC 8990 Doctoral Thesis* (1 credit, Course Director TBD). All NSP students, including students just completing Year 1, sign up for this course. Students must register for 1 credit of this course in the summer in order to maintain student status, health insurance benefits, etc. While *NRSC 7650* is the laboratory research course that is generally taken by pre-comps students, summer research by all students is conducted under the *NRSC 8990* course heading.

YEAR 2: FALL SEMESTER

Requirement in Quantitative Neuroscience: NSP students in Year 2 or 3 are required to take a minimum one-credit elective course that provides training in quantitative methods in neuroscience. Students can choose from one of six elective quantitative [EQ]courses that are offered in the fall, spring, or summer terms to satisfy this requirement. Some but not all of these courses are offered through NSP; not all courses are offered every year. Students should consult with their thesis mentors to determine the course most suitable for their thesis projects. The courses do not have to be taken prior to a student's Comprehensive Exam. NSP has some flexibility with the courses that satisfy the Quantitative requirement. Students who find an alternate course that could also fulfill the requirement should consult the NSP Program Directors.

[R]*BMSC 7811 Ethics in Research* (1 credit, Course Director Dr. Gidon Felsen). Course is designed to introduce issues around ethics of research, publication, and reviewing of manuscripts and grants. This course must be taken in the fall of Year 2.

[R]*BIOS 6606 Statistics for Basic Scientists* (3 credits, Course Director Dr. Eleanor Cotton). This course provides an overview of applied statistics, probability, hypothesis testing, bootstrap methods, permutation tests, nonparametric methods, regression analyses and analysis of variance. This course can be taken in the fall of Year 2 or 3. It does not have to be taken prior to the Comprehensive Exam.

[EQ]*BIOE 5053: Optics and Microscopy in Biomedical Research* (3 credits, Director Dr. Emily Gibson). Principles of optics and fluorescence for applied biological microscopy. Course may be taken in fall of Year 2 or 3.

[EQ]MOLB 7950: Practical Computational Biology for Biologists: R (1 credit, Directors, Drs. J. Hesselberth, N. Mukherjee, M. Lam, S. Jagannathan and M. Taliaferro). Genomic bioinformatics computational analysis with R. Course may be taken in fall of Year 2 or 3.

[EQ]*ELEC 5375: Engineering Neuroscience* (1 credit, Director Tim Lei, Department of Electrical Engineering, UC Denver). Mathematical formulation of neurobiological concepts and tools spanning equivalent circuit of membranes to dimensionality reduction methods. This course takes places on the UC Denver downtown campus. Course, now offered every other year, may be taken in spring of Year 2 or 3.

[R]*NRSC 7650 Section OV3 Research in Neuroscience* (1-5 credits**;** Course Directors Drs. Gidon Felsen and Nidia Quillinan). Laboratory research (pre-comps) with NSP faculty. Students sign up for a variable number of credits, ranging from 1-5. This variability reflects the fact that students must sign up for at least 5 total credits each fall and spring semester in order to maintain full-time student status. If taking courses other than *NRSC 7650*, students will sign up for fewer than 5 credits of *NRSC 7650*, such that the credits from all courses sum to 5. When registering for this iteration of *NRSC 7650*, students should indicate Section OV3.

[R]*NRSC 7663 Neuroscience Journal Club* (1 credit, Course Directors Drs. Gidon Felsen and Nidia Quillinan). Biweekly journal club run by NSP students. NSP students in Years 2+ present articles, with presentations overseen by a faculty advisor. Second year students are required to attend all journal clubs. Final grade is based upon attendance and participation at journal clubs.

YEAR 2: SPRING SEMESTER

[R]*NRSC 7661 Grant Writing Course* (1 credit, Course Directors Drs. Sue Kinnamon, Nidia Quillinan, and Dan Tollin). A practicum in how to read and write NIH grant proposals. Course must be taken in spring of Year 2.

[EQ]*NRSC 7612: Nervous System Modeling with* NEURON (1 credit, Director Dr. Alon Poleg-Polsky). Nervous system modeling with NEURON platform, including independent projects. Course may be taken in spring of Year 2 or 3.

[EQ]*NRSC 7617: The Biophysics of Ion Channels* (1 credit, Director Dr. John Bankston; Spring semester course). Topics include bioelectricity, kinetic analysis of channel gating, thermodynamics, and ion channel structure and pharmacology. Kinetic modeling exercises in MATLAB are conducted. Course may be taken in spring of Year 2 or 3.

[R]*NRSC 7650 Section OV3 Research in Neuroscience* (1-5 credits**;** Course Directors Drs. Gidon Felsen and Nidia Quillinan). Laboratory research (pre-comps) with NSP faculty. The description of this course in YEAR 2: FALL SEMESTER applies for the spring as well.

[R]*NRSC 7663 Neuroscience Journal Club* (1 credit, Course Directors Drs. Gidon Felsen and Nidia Quillinan). See Year 2: Fall.

SUMMER TERM between Year 2 and Year 3

[EQ]*NRSC7657 Workshop in Advanced Programming for Neuroscientists* (1 credit, Directors Drs. Dan Denman and John Thompson). Hands-on workshop to extend programming fundamentals learned in coursework in Year 1 using individual projects. This course is offered in the summer and can be taken in the summer between Years 2 and 3 or a subsequent summer.

[R]*NRSC 8990 Doctoral Thesis* (1 credit, Course Director TBD). <u>All</u> NSP students, including students just completing Year 2, must sign up for this course. See description of this course in the SUMMER TERM between Year 1 and Year 2 for more detail.

The Comprehensive Exam, one of the benchmarks towards graduation, is sometimes taken in the summer between Year 2 and 3 or, more commonly, during the academic year of Year 3. This exam is discussed extensively below (see *Section 4.4*).

YEAR 3 and Beyond

In these years, students are expected to focus primarily on completing their thesis research (see *Section 4.5*). NSP however encourages students to take one elective course per academic year, in Year 3 through the completion of the Ph.D, if the course fits within the objectives of their thesis research. These are in addition to the required thesis hours.

[R]*BIOS 6606 Statistics for Basic Scientists* (3 credits, Course Director Dr. Eleanor Cotton). See description in Fall of Year 2. Required unless already taken in Year 2.

Required course in Quantitative Neuroscience: See course options in Fall and Spring of Year 2 and Summer Term between Years 2 and 3. Required unless already taken in Year 2.

[R]*BMSC 7811 Ethics in Research* (Course Director Dr. Gidon Felsen). NIH requires that students take a Responsible Conduct in Research course at least once every four years. Because NSP students take *BMSC 7811* in fall of Year 2, students <u>who have not graduated by fall of Year 6</u> must once again take *BMSC 7811* during that fall. Students sit in on discussion sessions of the course, but do <u>not</u> attend lectures. In addition, students do <u>not</u> register for the course nor take the course for credit, but instead notify the Office of Research Education of their intent to take the discussion portion of the course as an advanced student.

Students <u>must</u> also sign up for either *NRSC 7650 Section OV3 Research in Neuroscience* (1-5 credits**;** Course Directors Drs. Gidon Felsen and Nidia Quillinan) or *NRSC 8990 Doctoral Thesis* (1-10 credits, Course Director TBD) each fall and spring semester, as well as the summer. The choice depends on whether students are pre- or post-comps at the <u>start</u> of the semester. The number of credits is dictated by the requirement that students must sign up for 5 total credits per fall/spring semester to maintain full-time student status. An additional requirement that impacts the credit number for *NRSC 8990* is that students must have a minimum of 30 credits of *8990* by the time they obtain a PhD. In general, post-comps students sign up for 5 credits in the *8990* course (or fewer if they are taking another course), but the number can be greater than 5 for a student's last semester if he/she needs more credits in *8990* to reach 30. For every summer following Year 3 and beyond, students must sign up for one credit of *NRSC 8990*, with the exception of students defending in the summer term. Students must register for 5 credits during the term of their defense.

<u>Elective Courses</u>. The list below includes electives that have been offered recently, but this list is constantly

evolving. These electives are in addition to the elective course options that can be taken to fulfill the NSP requirement in Quantitative Neuroscience (see above). Students may take more than one of the Quantitative courses. Elective courses are open to students in Years 2 and higher.

[E]*NRSC7614 Biological Basis of Psychiatric and Neurological Disorders* (1 credit, Director Dr. Kristina Legget). Neurobiology of neurological, developmental, psychiatric and substance abuse disorders.

[E]*NRSC 7618/OPHT6610 Biology of the Eye* (1 credit, Director Dr. Joseph Brzezinski; offered as a fall course). Basic and translational research on visual system, including a wet lab anatomy session.

[E]*NRSC 7670 Advanced Topics in Neuroscience* (all 1-credit, Course Directors Drs. Gidon Felsen and Nidia Quillinan) - The offerings under this course number vary from semester to semester. Students are informed by NSP prior to each semester what courses are being offered. Example recent topics have included: a) Glial Biology (Instructor, Dr. Ethan Hughes); b) Neuroethology (Instructors, Drs. Tom Finger, John Thompson, and Abby Person); c) Neurobiology of visceral pain (Instructor, Dr. Anna Malykhina); and d) Communicating Neuroscience (Instructors, Drs. Emily Bates and Tom Finger).

Curriculum for BSP and MSTP Track Students. Students who enter into NSP through the BSP and MSTP tracks have somewhat differing requirements.

BSP students will take the Biomedical Sciences Core Course in the fall semester of the first year. They will be asked to take, in addition, a total of at least 5 credits of didactic neuroscience-related courses prior to their Comprehensive Exam. The 5 credits can be obtained by taking any combination of the following Neuroscience Program courses:

NRSC 7501: Introduction to Neuroscience (1 credit).
NRSC 7615: Developmental Neurobiology (3 credits, fall semester).
NRSC 7600: Cellular and Molecular Neurobiology (3 credits, spring semester).
NRSC 7610: Fundamentals of Neurobiology (3 credits, spring semester).
NRSC 7670: Advanced Topics in Neuroscience (1 credit).

BSP students may also partially fulfill the 5-credit pre-Comps requirement by taking a neuroscience-related course offered by another program (e.g., PHCL 7606 Receptors and Cell Signaling). Students should consult with the NSP Program Directors if they are interested in using a non-NSP course in this manner. BSP students should choose which courses to take based on what they plan for their thesis research and gaps in prior studies. Students should consult with their thesis advisors to determine which courses are most suitable for their thesis research.

MSTP students who have joined NSP must take at least 2 credits from the Neuroscience Program courses listed above prior to their Comprehensive Exam. Requirements for MSTP students are somewhat reduced compared to BSP students, since MSTP students will have taken a substantial neuroscience course as a first-year medical student. This course overlaps significantly with the *NRSC 7610 Fundamentals of Neurobiology* course. Because of this overlap, MSTP students should not take the *NRSC 7610* course to fulfill the 2-credit requirement.

BSP students planning to enter into NSP ideally should take the NSP Preliminary Exam with other NSP students, which is conducted in May/June at the end of Year 1 (see *Section 4.3*). Transfer into NSP is contingent on passing the Preliminary Exam. Passing grades on a Preliminary Exam from another program are however transferrable to NSP. MSTP students must pass the MSTP-specific Preliminary Exam prior to entering into NSP.

BSP and MSTP students must also fulfill all upper-level course requirements of NSP students. Required courses include *BIOS 6606 Statistics for Basic Scientists*, *BMSC 7811 Ethics in Research*, and one of the courses that fulfill the NSP requirement in Quantitative Neuroscience (see above). In addition, students should register for the appropriate number of credits of Research in Neuroscience (*NRSC 7650)* or Neuroscience Doctoral Research (*NRSC 8990*), depending on whether a student is pre- or post-comps. See description for YEAR 3 and Beyond for NSP students above. Regardless of whether a student is pre- or post-comps, students should sign up for 1 credit of *NRSC 8990* in the summers. It should be noted that neither *BIOS 6606* nor any course taken to fulfill the requirement in Quantitative Neuroscience can be applied to the 5 or 2-credit pre-comps course requirement.

4.2 Laboratory Rotations in the First Year.

Rotations serve several important purposes. First, they enable the student to explore and compare several areas of neuroscience research and aid in the choice of a mentor and project for thesis work. Second, rotation seminars provide intensive training in the craft and art of public presentation, an essential aspect of future career success. Third, they allow program faculty to evaluate the motivation and intellectual preparedness of students to undertake independent research.

Number and timing of rotations. Students must perform 3 rotations, each ~12 weeks in duration, before the start of their second year. Typical dates of the rotations are: Rotation 1, late August to mid-November; Rotation 2, mid-November to late February; Rotation 3, late February to mid-May.

Choice of Mentor/Laboratory***.*** First and foremost, students should choose laboratories and projects that are reasonable possibilities for a student's thesis work. *Students should avoid rotations whose main goal is the acquisition of new techniques;* there will be plenty of opportunity to learn methods informally among the Program laboratories as the need arises. *They should talk to their GTC mentors prior to making rotation decisions.* Students should be aware that mentors and their groups put considerable effort into supervision of rotating students. Thus, some faculty may be reluctant to take on a rotation student if they have extensive travel plans, teaching, grant writing, or if their funding is in jeopardy. *For these reasons, it is important that students arrange for rotations as far in advance as possible.*

Policy on the number of rotation students/lab. Faculty typically only have one NSP student rotating in their lab in a given rotation cycle. However, on occasion, a circumstance arises that requires two NSP students to rotate in the lab at the same time. Prior to accepting two simultaneously rotating students, the faculty member should discuss with the Program Director(s) whether they have the time and capacity to advise more than one rotation student.

Rotation initiation form. Students must fill out a rotation initiation form and have it signed by the faculty rotation advisor before the beginning of the rotation period. Forms are provided and received by the Program Administrator.

Rotation Seminar. At the end of the rotation the student will present a seminar. The purpose of the seminar is to provide intense training in the craft and art of public presentation, an essential aspect of future career success. Rotation seminars are typically 12 min in length, although the expected maximum duration can vary from year to year depending on the size of the first-year class. Each year, the GTC Chair will notify first-year students of the expected duration. *The student will rehearse the seminar with their labs and with their GTC mentors prior to the public presentation.* The dates for the post- rotational talks will be decided by the GTC and are posted on the NSP web site.

Students should consider the following elements when designing their talk: *Introduction*-a short statement of the question or problem addressed by the rotation. *Background* -describe the significance of the question in broad terms for a diverse audience. Describe previous work and its relationship to the project. *Specific aims*-what were the particular experimental goals proposed to address the hypothesis? *Methods and Design*-explain any unusual strategies or techniques employed. *Results and Conclusions*-the results should be presented in a straightforward and logical manner. *Conclusions* should be summarized briefly. *Future directions*-at the end of the talk, the student should provide a brief summary of results and how, in the students' opinion they should be followed upon.

Several other specific suggestions for effective talks include: 1. Students should remember that they are addressing a general neuroscience audience and avoid the use of specialty-specific terminologies and jargon. 2. Avoid reading or memorizing your presentation, if at all possible. Wooden, canned deliveries are dull and very hard for audiences to follow. 3. Prepare and use simple, effective visual aids. Remember that effective communication of data and ideas is your goal! Keep text very brief and do not read directly from the screen (audiences are much faster at reading silently!). 4. Both faculty and students are encouraged to ask questions after rotation seminars. A few of these questions may be intended to probe your understanding of your research rather than illuminate an area of confusion. Consider audience questions carefully. Make sure that you understand the question before answering. Repeat the question or ask for a rephrasing if you need to. Take a moment to formulate a coherent answer. If, after contemplation you don't know the answer, don't be afraid to say so. We all get stumped from time to time!

Expectations for effort. While first year students have a substantial course load, the program expects that sufficient time will be devoted to the rotation project. For professionals in training, it is not appropriate to

require a minimum number of hours for rotation work. Strong self-motivation is an essential characteristic for an independent scientist, and we expect our students to demonstrate this quality throughout their training. In this regard, students should expect to be in the lab beyond the normal working hours from time to time, i.e., in the evenings and on weekends. This commitment of time is especially important when long, complex experiments are being done. A major part of the mentor's rotational assessment (as well as his/her willingness to accept a student) will be based on the degree and quality of lab effort.

The second and third lab rotation periods include the winter and spring breaks. Students should discuss specific expectations with their rotation advisors for effort during these breaks. The winter break in particular is quite long, running from mid-December to late January (according to the Graduate School calendar), and students should expect to be working in the lab during most of this period. Students should always discuss time off with their lab mentors in advance.

Rotation Grading and Evaluation in GAIA system**.** Final grades for rotations will be based on the evaluation of the lab rotation advisor. The rotation advisor also completes a report within the University's GAIA system evaluating the talks. These reports are sent to the student, the Program Directors for NSP, and the chair of the GTC. It is also very important that students meet with their rotation advisors after their rotation talks to discuss strengths and weaknesses in performance during the rotation and suggestions for improvement.

The rotation talks will also be independently evaluated by the GTC. These evaluations from the GTC do not factor into the grading of the rotation but should be considered seriously by the students as they move forward. Students will be expected to show improvement to identified weaknesses in subsequent rotations and seminars. Failing a rotation (B minus or below) will be considered a serious academic deficiency that may require further action by the GTC (see Academic Standards).

4.3. Preliminary Exam.

The Preliminary Exam, taken in the summer after Year 1, provides faculty an important tool to evaluate the students' broad knowledge base obtained from coursework in Year 1, as well as their scientific writing capabilities. The exam committee is comprised of three faculty members, representing the three main first-year neuroscience courses (*NRSC7600, 7610, and 7615*).

Format of Preliminary Exam. The exam includes both written and oral components. The written exam is typically an exercise in which students write a *Journal of Neuroscience* Journal Club-style review of a recent scientific article chosen by NSP faculty. Students are provided the article in late May/early June and are given 10-12 days to write the review. The oral exam, conducted a few days after the written review is turned in, lasts about 45 minutes. Questioning during the oral exam typically starts around the paper on which students have written their review, but examiners typically diverge into broader content from the first-year courses. The examiners may also alter the scope of questioning based on perceived strengths and weaknesses of the student.

Grading of Preliminary Exam. The exam is graded Pass/Fail/Pass with Conditions. If formal conditions or other deficiencies are noted during the exam, the student will develop a plan to address these weaknesses. In some cases, re-examination may be required. In all cases, problems noted during the exam should be addressed by the end of the fall semester of the second year.

Policies for BSP students. BSP students who plan to join NSP typically take the NSP Preliminary exam. Most BSP students will have taken only two of the three main first-year neuroscience courses at the time of the exam. Allowances are typically made for a course not taken by having the exam committee not grade the portion of the exam covering material taught in that course. If a BSP takes a Preliminary Exam offered by a different program (e.g., Pharmacology), NSP will honor the results of that exam.

4.4 Comprehensive Exam.

At the beginning of the second year of study NSP students will begin preparing for the Comprehensive Exam. It is highly recommended that students familiarize themselves on the Comprehensive Exam policies and deadlines, and discuss forms and timelines with the Program Administrator well ahead of the planned examination so all required paperwork can be completed on time. A student must be registered at the time he/she takes the Comprehensive Exam.

Timing and requirements of the Comprehensive Exam. Students are required to take the Comprehensive Examination for admission to candidacy for the Neuroscience Ph.D. *before the end of their third year*. Some recent students have taken the exam in the summer between Years 2 and 3, but it is most often taken during the fall or spring semesters of Year 3.

All students who take the Comprehensive Exam must have passed a Preliminary Exam and also have taken 30 course credits. Students who have joined NSP directly must also have passed all required coursework from Year 1. Students joining NSP from other programs must have taken a specific number of credits of NSP or neuroscience-related courses (see further description above for these students). In fulfilling credit requirements, students may take the Comprehensive Exam in the same semester that courses are being taken that bring students to the required number of credits, i.e, students need not have completed the courses at the time the Exam is taken.

Paperwork for the exam. All students must submit the following forms to the NSP Program Administrator no later than one month prior to the examination date:

1. *Exam Request Form*
2. *Application for Candidacy Form*. Please list all courses chronologically as they appear on your transcript. The *NRSC 7650* courses must be listed in section one of this form.

Official forms can be found under the *Forms* tab in the Resources page of the Graduate School website (https://graduateschool.cuanschutz.edu/forms-resources/resources). When submitting the forms, students should have all required signatures. The Program Administrator can route forms for signatures if requested a week prior to the form due date.

Formation of Comprehensive Exam Committee. The Comprehensive Exam Committee shall consist of a minimum of five Graduate Faculty members. The majority of the members, including the chair, must be from the core training faculty of the Neuroscience Program. The student's dissertation advisor may be on the examination committee but cannot chair the committee. Exam Committees may include faculty member(s) from outside the Program's training faculty, including faculty at other institutions.

Selection of committee members should be done at least ~2 months prior to when students would like to take the Comprehensive Exam. The student should discuss with his/her thesis advisor an appropriate group of faculty, then contact the faculty members to determine their interest. Often faculty like to meet with the student to discuss the project prior to committing to being on the committee. Once a student has a group of interested faculty, he/she should submit the faculty list to the chair of the GTC for approval. *The GTC must approve the composition of the Comprehensive Exam committee prior to scheduling the examination.*

Format of Comprehensive Exam. The examination will have as its focus a thesis research proposal written by the student using the format of an NIH NRSA grant application. Although preliminary data collected by the student is helpful, it is not essential for the proposal. The written proposal – the Specific Aims page plus the Research Strategy sections -- should not exceed seven pages and be provided to the Comprehensive Examination Committee at least two weeks prior to the examination.

The examination will consist of a 30 to 45-minute seminar by the student to the program, general questions from the audience, and then a closed exam with the Comprehensive Examination Committee. The student must adequately demonstrate the scientific knowledge and ability to defend this proposal. The Comprehensive Exam "will test your mastery of a broad field of knowledge, not merely the formal course work completed." Sometimes a student consults with his or her committee members prior to the exam as to the subject areas they expect the student to have mastered.

Grading the Comprehensive Exam and Evaluation within GAIA. The exam is graded Pass/Pass-with-conditions/Fail. With the Pass-with-conditions grade, the Exam Committee outlines remedial actions to be taken by the student and a time-line. The Exam Committee also completes an evaluation of the student's performance within the University's GAIA system. Within this report, the Committee scores the student in a variety of different areas, including knowledge of concepts and the quality of the oral presentation. The Committee typically also provides constructive scientific feedback on the proposed project. These reports are made available to the student, the Program Directors for NSP, and the chair of the GTC.

Additional Information. Additional information about the Comprehensive Exam can be found in *Appendix 1: Standards and Practices of NSP Comprehensive Exam.* Some information in this document overlaps with the above description, but additional information is provided especially in the area of grading and evaluation.

4.5 Ph.D. Thesis.

After passing the Comprehensive Exam, the student enters Ph.D. candidacy. During the following years, students perform research towards a thesis defense. Most of a student's guidance during this period is provided by his/her thesis advisor.

Thesis Advisory Committee. In addition to a student's thesis advisor, the Thesis Committee plays a vital role in guiding a student's research. The make-up of the Thesis Committee is most often the same as the Comprehensive Exam Committee, though occasionally one or two members are replaced. As with the Comprehensive Exam Committee, the committee may also include the thesis advisor.

Thesis Committee meetings. A student meets once every 6 months with his/her Thesis Committee. Prior to each Thesis Committee meeting, students typically provide their committee with a report outlining progress since the prior meeting. The exact requirements of this report and when it should be submitted is determined by the chair of the Thesis Committee. At the meeting itself, students provide their committee a semi-formal presentation of their research progress. These presentations typically last ~1.5 hours. Students should not expect committee remembers to remember the rationale for the project, and so the presentation should include background relevant to the project. Thesis committee meetings should begin with a short ~10-minute period in which the student and advisor take turns describing progress with the other party out of the room. This provides a mechanism for both parties to discuss potentially sensitive matters with the committee.

After the meeting, the chair of the Thesis Committee submits a written summary of the outcome of the meeting through the University's GAIA system. These reports are then made available to the student, their thesis advisor, the Program Directors for NSP, and the chair of the GTC.

Thesis update talks. Once every academic year, each post-comps student in the Neuroscience Program gives a formal talk to the Program at large outlining progress of his/her thesis research. These talks should be relatively brief, ~20-25 minutes in duration, with 5 minutes of questioning afterwards. Typically, two such talks are scheduled back-to-back during the normal Tuesday noon-1 PM NSP seminar time. Each student is introduced by their thesis advisor.

Thesis Defense. Upon completion of an appropriate body of original research, students will write a Ph.D. thesis containing this information, and defend this document at an oral examination scheduled by the Graduate School. NSP's minimum requirement for a student to defend their thesis is that they will have submitted for publication at least one first-author manuscript on research that is core to their thesis topic. However, a student's thesis committee may place additional requirements, recognizing that one first-author manuscript may not be sufficient. Broadly speaking, a student's research must constitute a significant contribution of new knowledge to the field of Neuroscience. The thesis committee has discretion to determine what that is for any given student.

Obviously, it is important that a student be in active discussions about completing the thesis with their thesis committee significantly before, perhaps as much as a year prior to, when the student expects to complete their thesis. In the final stages, students should expect to receive explicit guidance from the thesis committee about their expectations for the student in thesis committee meeting(s) and associated GAIA report(s).

A student must receive approval from the thesis committee prior to moving forward to schedule a defense date. The thesis committee has discretion to determine what students must provide, and when, prior to giving approval. A determination may be made based on one of the following: (1) a student's presentation at a final thesis committee meeting; (2) an outline of the student's thesis that is e-mailed to the thesis committee at least 6 weeks in advance of when a student would like to defend; or (3) a student's complete written thesis that is sent to the committee at least 6 weeks in advance of when a student would like to defend. The third option is typically reserved for when there are questions about the sufficiency of a student's work for a Ph.D. that cannot be adequately addressed by a thesis outline. Whether option 1 or 2 is used is typically unrelated to a student's performance but rather has more to do with the timing of a final thesis committee meeting with respect to thesis completion. Often a final thesis committee meeting occurs a few to several months prior to the anticipated thesis completion and the committee may determine that a written outline of the thesis (rather than a full meeting) is sufficient for determining whether a student may move forward to schedule a defense. It is the responsibility of the committee to provide timely feedback to the student if they have submitted materials to the committee for determining whether the student is ready to defend. If an outline has been sent (option 2), the committee must provide feedback within one week. If the complete thesis has been sent (option 3), the

committee must provide feedback within two weeks. In all cases, students should schedule a defense date at least 6 weeks in advance of the anticipated date. This is required to ensure attendance by committee members.

Students must send their final written thesis to their thesis committee a minimum of two weeks in advance of the scheduled defense date. Also, students must be registered for a total of 5 credits, at least one of which must be *NRSC 8990,* in the semester in which they plan to defend.

All students must submit the following forms to the NSP Program Administrator no later than one month prior to the examination date:

1. *Exam Request Form*
2. *Biosketch Form* (Note: this is not the NIH Biosketch)

Official forms can be found under the *Forms* tab in the Resources page of the Graduate School website (https://graduateschool.cuanschutz.edu/forms-resources/resources). When submitting the forms, students should have all the required signatures. The Program Administrator can route forms for signatures if notified a week before forms are due. Deadlines for obtaining the Ph.D. in a specific semester are provided on the *Graduation Deadlines Thesis (2023-2024), Anschutz* resource information sheet that can be found under the *Deadlines* tab on the same Resources page. This information sheet also provides a link to useful information about how to prepare the correct forms and upload the thesis.

The written thesis for NSP students typically consists of several chapters. These include a description of the background that provided the basis for the project (Chapter 1), one or more data chapters, and a final chapter that discusses how the student's body of work fits with other work in the field and some ideas for future research directions. A data chapter may be one of the research publications on which the student is an author or incomplete work that did not result in a paper but that can nevertheless serve a basis for future studies. In cases in which a publication is used as a data chapter, it is important that the student outline the contributions of the different authors of the paper, including those of the student (e.g. in a paragraph at the end of the introduction to that chapter). It is highly recommended that students look at Ph.D. theses from prior NSP students prior to writing his/her thesis. This can be useful, for example, to get guidance on how broad the scope should be for the background provided in Chapter 1. A guide for correct formatting of the thesis is provided in the *Format Guide for Theses and Dissertations* document, under the *Policies* tab of the Resources page of the Graduate School website (see above for link).

Additional Information. Additional information about the Thesis Committee can be found in *Appendix 2: Standards and Practices of NSP Thesis Committees.* Some information in this document overlaps with the above description, but additional information is provided especially about the preparation for Committee meetings and the evaluation of students at the meeting.

4.6. Training enrichment activities

NSP believes that a crucial part of the training of students to become leaders in neuroscience lies in activities that are outside of the realm of formal course work or thesis research. The Program has a variety of such "enrichment" activities in which students participate.

Neuroscience Seminars. NSP has a robust seminar series, with talks held at noon-1 PM on Tuesdays. Speakers include invited guest speakers from other institutions, along with CU Anschutz faculty and NSP students (who give thesis update talks). The seminar slots during the academic year (September through May) are occupied twice every month by external speakers. Students will be invited to luncheons or discussion sessions with external speakers and are encouraged to take advantage of these opportunities to interact with top scientists from around the world. It's a great chance to understand more deeply what went into their science and to get practical advice about both science and careers.

Attendance at NSP seminars, along with participation in speaker lunches, is required for all first-year NSP students. First-year students receive course credit for attendance at seminars through the NRSC 7662 Neuroscience Seminar course (see above). *All other NSP students are expected to attend at least 50% of the seminars*. Such an attendance rate will certainly mean that students will attend seminars that are outside of their research area, but NSP believes that continued exposure to a variety of different areas of neuroscience is critical for a student's scientific growth. Such exposure can both inform students' on-going

research in unexpected ways and also provide ideas for new research directions after a PhD. Attendance at student thesis update talks is itself helpful in a variety of ways, by exposing students to different research areas, by providing examples of how to give effective talks, and by being a mechanism to show support for fellow students.

Neuroscience Annual Retreat. NSP holds a two-day retreat during the academic year that includes lectures, poster sessions, workshops, and opportunities for informal discussions during meals and free time. The event provides an opportunity for faculty members to present research being conducted in their labs, and for students to present posters and talks describing their own research. Each retreat also includes a Keynote Speaker, who is invited from another institution to give a lecture and participate in other retreat activities. For the workshops, the themes vary from year to year. Recent themes have included Diversity, Equity, and Inclusion, mental health, and alternative science careers. NSP covers the cost of the retreat for all Neuroscience students. In the 2024-2025 academic year, the Retreat will be conducted on October 24-26 at the YMCA Center of the Rockies near Estes Park.

Attendance at the Retreat is required for all NSP students. NSP students are also expected to present their work, in either posters or short talks. Reasons for the required attendance include:

- The Retreat is the single most important event in the year that exposes students to the variety of neuroscience research being conducted at CU Anschutz.
- The event provides a comfortable, informal venue in which to present your research and discuss science with faculty, post-doc, and student colleagues. This can be great practice for presentations at national conferences later in the year.
- It helps build community and a culture of connection. These are aspects that are all-the-more important following Covid disruptions.
- It provides an unusual opportunity to have extensive interactions with a top neuroscientist (the Keynote Speaker) from another institution.
- Participation in Retreat workshops provides training in areas not covered by coursework, e.g., in DEI or science careers.

Occasionally, the Retreat can be associated with poor weather, which makes driving difficult. In these instances, students may be excused from attending all or part of the Retreat.

Student Journal Clubs. There is a regular student-run journal club that is held every other week during the academic year. When papers being discussed are related to the Tuesday seminars, the journal club will be held on the day of the seminar. The invited speaker will attend these journal clubs.

First and second-year NSP students are expected to attend all Student Journal Clubs, with substantial continued attendance expected for more senior students. *Students in their second year are also expected to present once during the academic year, with other slots filled by more senior students*. First and second year students receive course credit for attendance at journal clubs through the NRSC 7663 course (see above).

Student Journal Clubs provide training opportunities in several key areas, including continued broad exposure to neuroscience, informal scientific discussions, community-building with fellow students, and discussing science with leading experts (for Journal Clubs attended by seminar speakers). The Journal Clubs also provide an important training mechanism in the areas of experimental rigor and reproducibility, which are discussed at each Journal Club. Close attention to experimental rigor and reproducibility is being increasingly emphasized by scientific journals in which students may wish to publish their research.

Monthly lunches with Program Directors. Once a month, typically on the last Friday, NSP Program Directors host a lunch for all NSP students. These lunches fulfill a number of functions, including providing an opportunity for social interactions and student check-ins with the Program Directors. Many lunches also feature external participants, for example alumni of NSP who have pursued different careers. Interactions with these alumni provide an excellent opportunity to hear about their chosen careers, including the pathways taken. Some lunches feature a mental health professional from the CU Anschutz campus, to help with common problems.

Rocky Mountain Regional Neuroscience Group (RMRNG) and Front Range Neuroscience Group (FRNG). The RMRNG and FRNG are chapters of the Society for Neuroscience dedicated to promoting communication and interaction among area neuroscientists. The RMRNG is based in Denver and the FRNG is based in Fort Collins (CSU). You automatically are a member of the other group if you are a member of one. You do not

have to be a member of the Society for Neuroscience in order to join the RMRNG or FRNG.

Program Outreach Efforts. The Neuroscience Program has a robust outreach program that includes visits to schools, bi-annual exhibition at the Denver Museum of Nature and Science etc.

5. Academic Standards for NSP Students.

Applicants to NSP are highly screened and rigorously evaluated for their potential to become creative and independent scientists. This means that each student in the Program was admitted with the Faculty's full confidence in their ability to complete training requirements for the Ph.D. Thus, the Program does not operate to weed out students during training. Rather, we regard any dismissal or withdrawal as a serious detriment to the success of our program, and a situation that we will do our best to avoid. However, it infrequently happens that a student will fail to satisfy the Program standards and expectation for academic performance. Given the importance and intensely competitive nature of biomedical research, as well as our commitment to the future of our students, such instances invoke serious concern from the Program. Students should be assured that in an initial instance of failure the Program will do its best to help the student to remediate failure. However, multiple deficiencies indicate a poor prognosis for future success and demand close examination of a student's tenure in the Program.

The GTC is charged with maintaining the academic standards and with evaluating the ability of students to continue with the training in cases of failure. The Academic Standards of the Program are described below, as well as the procedures used by the GTC to address performance deficiencies.

General Graduate School Standards. The minimal standards of the Graduate School must be satisfied. These are: 1. Maintenance of a 3.0 GPA at all times. Less than a 3.0 cumulative GPA puts the student on a two-semester probation. During this time, the student must raise the overall GPA to 3.0 while achieving a 3.0 GPA for each probationary term. Failure to satisfy this requirement may result in dismissal from the Program. 2. Passing grade on the Comprehensive Exam. A grade of "Fail" on either the Comprehensive or Dissertation Defense exams results in dismissal.

Additional Standards for NSP Students

1. Students must achieve grades of B or better in each required course that is offered by the Neuroscience Program. *Grades of B minus or lower are failing for Neuroscience courses.*

2. Students must achieve grades of B minus or better in all other courses (e.g., Biomedical Sciences Core Course).

3. A student must not receive more than one failing grade for all required courses during the entire training program.

4. Students must pass the preliminary and comprehensive exams.

5. Remedial and disciplinary actions related to coursework. Failure to satisfy these conditions will result in a thorough review of the student's entire performance in the Program, with a recommendation for dismissal a possible outcome. A single failing grade (of B minus or below for a required Neuroscience course) may be remediated at the discretion of the GTC, in accordance with conditions developed in consultation with the course director. Usually this will consist of independent study by the student followed by a make-up exam. A grade lower than a C or the unavailability of satisfactory means of remediation will absolutely require the student to retake the course. In the case of remediation, no change of grade will be given. However, the student must achieve a passing grade (B or better for a required Neuroscience course) for any make-up exam. In addition, the course cannot be retaken if the student fails the make-up exam. Failure to remediate a course successfully, or to pass a course on the second attempt, will likely be cause for a recommendation of dismissal by the GTC to the Graduate School.

6. Remedial and disciplinary actions related to thesis research. Unsatisfactory progress in dissertation work is cause for serious concern for NSP. The Thesis Committee for each student, which meets with the student and mentor every six months, will assess progress. If the Thesis Committee deems progress inadequate, the student and thesis mentor will meet with the Program Directors, the Thesis Committee chair, and the GTC to ascertain whether the student is capable of continuing in the program. A recommendation of dismissal is a possible outcome of these deliberations. If the student is allowed to proceed further, an additional unsatisfactory assessment of thesis work will be cause for a mandatory recommendation for dismissal to the

Graduate School without further review, subject only to appeal by the student (see below).

7. Guidelines for use of AI and related technologies. AI and related technologies have potential benefits for NSP's training mission, including accelerating the writing process and reducing barriers to non-native English speakers. Major potential drawbacks also exist, however, including the potential for false or inaccurate information, breaches of confidentiality, plagiarism, and depriving students the critical tasks of working through problem sets that reinforce core didactic material. NSP has a developed a set of guidelines for both appropriate and inappropriate use of AI, as outlined in *Appendix 3*. Failure to follow these guidelines is a potential ground for course failure.

Further Conditions. All students are expected to complete their academic requirements according to the schedule as outlined in the Handbook. Unexcused inability to complete any requirement on time will be seriously considered by the GTC as a reason to recommend dismissal to the Graduate School.

In rare cases, the GTC may allow a student an additional opportunity to reverse deficiencies when otherwise they would be recommended for dismissal. In exchange for such consideration, the GTC may impose any additional academic requirements that they deem appropriate. Naturally, failure to satisfy these additional requirements will very likely result in a recommendation of dismissal to the Graduate School.

Continuing financial support by the Program is contingent on satisfactory academic progress as defined above. The Program and its faculty will normally support students on Graduate School probation or undertaking to correct academic deficiencies. However, support will automatically terminate 30 days after a recommendation of dismissal to the Graduate School.

Due Process. A student will have 7 days to appeal any decision of the GTC that affects them. Such appeals must be in writing and delivered to the Program Office. The GTC will respond to appeals within 7 days of receipt. Students will be given the opportunity to meet in person with the GTC to discuss their appeal if they so desire.

Further Appeals. Unchallenged decisions or decisions after appeal to the GTC regarding the correction of academic deficiencies are final. Decisions regarding recommendation for dismissal to the Graduate School may be appealed to the Dean of Graduate Studies.

Illness or Personal Problems. Students are encouraged to bring any problems that might affect their academic performance to the attention of the Program Directors or a GTC member. This must be done as soon as possible, preferably before such problems result in academic difficulties.

6. Neuroscience Program Promotion and Recruitment Activities

Publications and Acknowledgments. All student publications, including abstracts, journal articles, and theses, should acknowledge the Neuroscience Program along with other University acknowledgments. Students supported by the Neuroscience training grant should acknowledge the grant number in all publications. This is our best form of advertisement for our Program. Since we want our Neuroscience Library to include copies of all theses by our students, please be sure and provide one bound copy of the final version of your thesis to the Neuroscience Program at the same time you turn it in to the Graduate School. The Neuroscience Program will cover the costs of the one bound copy required for the program.

After you leave the University, we want to keep up with your progress as a scientist. Please keep the Program informed as you continue with your postdoctoral work. From time to time, we may request that you send us your complete CV. This will help us document the success of our students for future grant proposals and renewals.

Participation in Recruitment Functions**.** Around February of each year, prospective student applicants visit our program for interviews. It is in the Program's best interest to attract and retain the best of these prospective students. To do this we need the help of current students and Neuroscience faculty who can convince these individuals that our Program is the place to be! When asked, please be willing to spend some time with prospective students during dinners or other functions. NSP can flourish with your help.

7. Vacation and Leave policy

Policies for vacation and leave for NSP students are the same as for other students at CU Anschutz. These

are outlined on the Resources page of the Graduate School website (https://graduateschool.cuanschutz.edu/forms-resources/resources), under the *Policies* tab. Briefly, the vacation policy is that students are allowed up to 14 calendar days per year and are also given all University holidays. Once students have joined a lab, they should discuss vacation time with their thesis advisors.

8. Policy on external employment

Graduate students admitted to ORE Programs receive an annual stipend, health insurance coverage and full tuition. They are considered full time students and, per NIH policy, are expected to devote a minimum of 40 hours to their PhD training. Students may wish to take on additional paid employment for financial reasons or to gain experience in teaching, industry or explore other career opportunities. This may be complementary and beneficial to their training and professional development in University of Colorado graduate programs.

Graduate students paid by NIH grants are subject to NIH policies that state:

"NIH recognizes that student or postdoctoral trainees may seek part-time employment coincidental to their training program to further offset their expenses. Fellows and trainees may spend on average, an additional 25% of their time (e.g., 10 hours per week) in part time research, teaching, or clinical employment, so long as those activities do not interfere with, or lengthen, the duration of their NRSA training."

In accordance with the above policies, graduate students, **in good academic standing**, may, **with appropriate approval**, work up to approximately **10 hours per week** in external employment. Such employment must **be approved in advance,** by the Office of Research Education (ORE), the student's Program Director for first year students, and by the Program Director and Thesis advisor for those students who have entered a laboratory or who transfer or are directly admitted to a laboratory. External employment must not conflict or interfere with any required elements of a student's PhD training. Examples include but are not limited to: laboratory research, classes, assessments, seminars, journal clubs, lab meetings, retreats and other required program or ORE activities. Students **must remain in good academic standing** in order to continue their external employment. Failure to disclose external employment, falsely reporting, or willfully exceeding approved hours will be grounds for disciplinary action and possible dismissal from the PhD program.

External employment refers to any paid (or compensated in kind) work or work product outside of a student's PhD training program and the Office of Research Education. **Good academic standing** means: maintaining a minimum of a B grade in all classes, rotations and thesis work; passing Preliminary and comprehensive exams; meeting other Program requirements, as described in Program Handbooks; demonstrating satisfactory and timely progress toward the PhD, as determined by the Student's Thesis Committee.

Students may appeal denial or rescinding of approval for external employment, on the basis that policies were not followed or applied fairly. Appeals will be reviewed by the Associate Dean for Research Education and their decision will be final.

Students receiving other types of extramural support (non-NIH) for their PhD are subject to the requirements and policies of those funding entities and may not be eligible for external employment.

9. Information for New Students

Program Contact Information

Kayla Thomas, MA
kayla.2.thomas@cuanschutz.edu
www.cuanschutz.edu/neuroscience

Housing. The Office of Student Affairs (Education II North, 3200. 303-724-2866, email: StudentAffairs@cuanschutz.edu) can provide apartment directories, rents, a computer search for available units, and roommate matching. They also have other resources available on campus life and student organizations. The link to their web site is https://www.cuanschutz.edu/student/resources/housing and on our Neuroscience web site under the Resources tab.

Colorado Residency. If you are a U.S. citizen and not already a Colorado resident, you will need to change your residence status *prior* to fall semester of your second year. The Neuroscience Program will only pay out-of-state tuition during the first year. Please stop by the Registrar Office *during the first few weeks of*

school in your first year to ask for instructions on changing your residency or you can check the webpage https://www.cuanschutz.edu/registrar/residency for instructions. Normally you must be able to establish physical presence in the state for a **full** year before being granted in-state status.

Payroll Paperwork**.** Before you can receive your stipend, you must fill out the appropriate paperwork with the Neuroscience Program and the Office of Research Education/Human Resources. Note: An original social security card is required before you can be entered in the University payroll system. If you do not have an original card, you must apply for one immediately after you arrive. Be sure to get a letter from the clerk in the social security office stating that you have applied for a new card. A copy of this letter must be given to the Human Resources Payroll and Benefits liaison before you can be paid. When your new card arrives, bring your card to the payroll liaison so a photocopy of your card can be kept in your file.

Health Insurance. Every student who joins NSP can receive health insurance through the University Student Health Insurance Program, which is free of charge to students. In Year 1, health insurance fees are paid by the Office of Research Education, while, in subsequent years, the student's thesis mentor pays for it. The Student Health Insurance coverage is effective until July 31st each year. For more information on the University Student plan and what it covers, contact Student Insurance, studentinsurance@cuanschutz.edu or visit their website https://www.cuanschutz.edu/student/health-wellness/student-health-insurance.

While students do not pay for health insurance obtained through the University Student Health Insurance Program, they are required to complete a number of administrative steps in order to receive it. First, students must be registered for at least 5 credits of courses each semester (and at least 1 credit in the summer) in order to be considered a full-time student and hence eligible for University Student Health Insurance coverage. Second, each student must actively sign up for the University Student Health Insurance Program once every year through the Student Insurance office. Before fall semester each year, you will receive a form to fill out, where you can select the University Student Health Insurance Program or waive it.

Students may waive the University Student Health Insurance Program but only if they have comparable coverage through another program. All students are required to be covered by health insurance. Students who waive the University plan must specifically do so when they receive the form from the Student Insurance office asking about coverage prior to the start of each fall semester (see above).

ID Cards. You will receive a University ID Card at the Neuroscience Program orientation. You will need this card for library privileges and building access after-hours and weekends. For floor and building access please consult with your mentor and request access from the Director of Finance and Administration of the appropriate Department/floor.

Course Registration. Registration is completed online in your CU System student portal (accessed at https://passport.ucdenver.edu/login.php). You must register for at least 5 credits each semester to be considered a fulltime student. You must register for at least 1 credit in the summer in your first and above years. The current year's course book showing course numbers and details can be found at: https://catalog.ucdenver.edu/cu-anschutz/courses-a-z/. You can see the Neuroscience courses under *Neuroscience (NRSC).*

Note: You are responsible for knowing registration and drop/ add deadlines each semester, and making sure you have registered on time. The Academic Calendars can be found on the Graduate Schools website https://graduateschool.cuanschutz.edu/forms-resources/resources Late registration results in a $60 fine. The Neuroscience Program will not pay any late charges assessed because of missed deadlines. You will be responsible for paying any of these charges yourself.

Parking. Most students either walk, bike, or take the bus. To find out where to park at the Anschutz Medical Campus, go to the Parking Office in Building 500 on the first floor by Root and Sprig. There are bicycle racks located conveniently to most of the buildings; however, you need to supply your own lock. You may also look at the Parking and Transportation website located at https://www.cuanschutz.edu/offices/facilities-management/transportation-parking-maps/parking.

*********** END OF HANDBOOK ***********

This handbook does not constitute a contract with the University of Colorado, School of Medicine, either expressed or implied, and the University reserves the right at any time to change, delete, or add to any of the

provisions at its sole discretion. Furthermore, the provisions of this document are designed by the University to serve as guidelines rather than absolute rules, and exceptions may be made by the School of Medicine on the basis of particular circumstances.

Appendix 1: Standards and Practices of NSP Comprehensive Exam

This document describes in more detail the Comprehensive Exam for NSP. Its main focus is on the mechanics of the exam and the evaluation criteria that should be applied by the exam committee. Detailed information on the steps leading up to the exam, for example on the formation of the Exam Committee and completion of the required forms, is provided in the NRSC Handbook (see NSP website). It is up to the students to carefully read the section in the handbook on the Comprehensive Exam.

This document should be updated and sent annually by the Program Administrator to all NSP students and faculty at the start of the fall semester (along with other Program-specific documents). It should also be distributed to the student, the student's mentor, and all members of the Comprehensive Exam committee when a student's Exam Committee has been approved by the GTC. Also, a copy of this document should be placed in the student's file folder to be given to the Exam Committee chair just prior to the exam.

1. Composition of Comprehensive Exam Committee

The Exam Committee shall consist of a minimum of five Graduate Faculty members. The majority of the members, including the chair, must be from the core training faculty of the Neuroscience Program. The student's dissertation advisor may be on the committee but cannot chair the committee. Exam Committees may include faculty member(s) from outside the Program's training faculty, including faculty at other institutions.

2. Preparation of NRSA-style exam proposal

The examination will have as its focus a thesis research proposal written by the student using the format of an NIH NRSA grant application. Although preliminary data collected by the student is helpful, it is not essential for the proposal. The written proposal – the Specific Aims page plus the Research Strategy sections -- should not exceed seven pages and be provided to the Comprehensive Exam Committee at least two weeks prior to the examination.

NSP expects that a student will engage significantly with his/her thesis advisor in the preparation of the exam proposal. Back-and-forth discussions around the science in the proposal are considered to be central to the training objective of the Comprehensive Exam. The writing of the proposal however should be that of the student, with only broad-strokes suggestions offered by the thesis advisor. NSP is open to having a specific Exam Committee operate with different expectations, but the committee chair should first consult with the PDs.

3. Mechanics of the Comprehensive Exam

The exam will begin with an oral presentation by the student, lasting 35-45 minutes, in which the background and significance of the project are described, specific aims are presented, along with the experimental results that have already been obtained. The student's thesis advisor will briefly introduce the student prior to his/her oral presentation.

The closed-door questioning portion of the exam, happening immediately after the oral presentation, will include:

a. With the student out of the room*, the thesis advisor will provide the Exam Committee with his/her assessment of the student's progress to date. This may include a discussion of the process of putting together the Comprehensive Exam proposal. At this time, the Exam Committee chair will also summarize the student's academic progress to date (obtained from the student's file) and also present to the rest of the committee the different criteria on which the evaluation of the student will be based (see *Evaluation Criteria* below)**.

b. For a period lasting 1.5-2 hours, faculty on the Exam Committee will ask the student questions. Typically, faculty take turns asking questions for periods of time determined at the start of the meeting.

c. After the questioning period, the student will leave the room. The committee will then explicitly discuss each of the criteria, apply a rating in each area, and then decide whether to give the student an overall score of Pass, Pass with Conditions***, or Fail.

d. The packet that the NSP Administrator will provide the Exam Committee chair prior to the exam will include a form indicating whether or not a student has passed the exam. All Committee members will sign the form. The Exam Committee chair will return the signed form to the Program Administrator after the exam (together with the entire packet).

f. After the exam, the Committee chair will complete a report in the GAIA system (https://gs.ucdenver.edu/gaia/pprog/frm_sel_stu.php).

*Comprehensive Exams deviate from Thesis Committee meetings in this respect. While Thesis Committees begin with both the student and thesis advisor taking turns leaving the room, Comprehensive Exams start with only the student leaving the room. If a student believes that there are issues that should be discussed in the absence of his/her thesis advisor, he/she should meet individually with Committee members or wait until the first Thesis Committee meeting to discuss them.

**The discussion of Evaluation criteria at the start of the closed-door meeting reflects a significant departure from historical NSP practices. In the past, different evaluation criteria were addressed in the evaluation form that is completed by the committee chair in the GAIA system after a Pass/Fail score has already been given to a student. However, NSP believes that the criteria should be formally applied *before* a Pass/Fail score is given.

***A score of Pass with Conditions should be considered to be an acceptable score. Presently, it appears that there is a negative stigma attached to the score – and so the score is rarely given – but this need not be the case. A score of Pass with Conditions offers the potential for improved training, if students are required to correct deficiencies.

4. Evaluation Criteria

Students will be evaluated with respect to specific criteria that are listed below, with ratings of 1, 2, or 3 (1 is best). Statistics, quantitative analysis, and rigor, the understanding of which is a key component of the NSP training program, should be considered as a fundamental part of the evaluation.

1. Knowledge of neuroscience concepts 1 2 3

- Does the student display sufficient knowledge of the literature relevant to the specific project?
- Does the student have a grasp of the broader neuroscience concepts?
- Are the proposed experiments well-justified and feasible?
- Does the student understand the methods to be used?

2. Quality of written proposal 1 2 3

- Was the writing stylistically clear?
- Was the format and content appropriate for an NIH-style grant proposal?

3. Quality of oral presentation 1 2 3

- Were the background and rationale clear?
- Were the proposed experiments and preliminary results clearly described?
- Were the slides clear and easy to understand?
- Did the student have a good presentation style (eye contact, etc)?
- Did the student respond appropriately to questions from the audience?

4. Statistics, quantitative methods, and rigor 1 2 3

- Were appropriate methods outlined for quantifying results?
- Were appropriate statistical tests described?
- Were steps described to ensure unbiased analysis, such as blinding?

After scoring the student in each of the areas, it will generally be up to the Exam Committee to determine how the rating applied to each criterion affect the overall score (Pass, Pass with Conditions, or Fail). The one exception is if a score of 3 is given in any one area. NSP believes that such a score is indicative of a significant deficiency, warranting an overall score of Pass with Conditions (or worse).

Appendix 2: Standards and Practices of NSP Thesis Committees

This document describes in more detail the functioning of Thesis Committees for the Neuroscience Program (NSP), including the timing and mechanics of Thesis Committee meetings, mechanisms of student feedback, and the Committee's role in the thesis defense.

This document should be updated annually and distributed by the Program Administrator annually to all NSP students and faculty at the start of the fall semester (along with other NSP-specific documents).

1.Composition of the Thesis Committee

Like the Comprehensive Exam Committee, the Thesis Committee must consist of at least five Graduate Faculty members. One of the members may be the thesis advisor. Most commonly, the composition of the Thesis Committee is the same as the Comprehensive Exam Committee, but this need not be the case. Sometimes, new faculty are substituted. It is also acceptable if the Committee composition changes between when the committee is first formed and a student's defense. Infrequently, such changes do occur.

2. Frequency and duration of Thesis Committee meetings

Thesis Committee meetings should occur once every six months and last 1-2 hours. As a student approaches the completion of his/her thesis research, it may be appropriate to have more frequent meetings. The Thesis Committee chair will indicate when a subsequent meeting should occur in the GAIA report (see Chair duties below). This will also automatically generate an e-mail message to the student when the time approaches to organize such a meeting. However, the student and student's advisor are primarily responsible for ensuring that the meetings occur at the appropriate time.

3. Written outline of student accomplishments

At least two days prior to the meeting, the student should send the Thesis Committee members an outline of progress since the last committee meeting (or Comprehensive Exam). The outline should be 1-2 pages in length. The document should outline the following:

- An agenda for the meeting, including what the student hopes to get out of the meeting. An agenda should help focus the discussion.
- The objectives of a student's research project, as outlined in the original aims of the comprehensive exam proposal or in revised aims.
- Progress toward the research objectives.
- Activities related to the development of professional skills, such as presentations at conferences, attendance at workshops, fellowship applications, and the writing of manuscripts.
- Activities pertinent to career development, including whether a student has discussed his/her Individual Development Plan with his/her thesis mentor.

The Thesis Committee chair may provide other, more specific guidelines.

4. Oral presentations at Thesis Committee meetings

Students should plan to give a full presentation at the meeting, beginning with what they expect to get out of it (i.e., the agenda). Students should also explain the background, rationale, and results of their research project. Some of the research described may be work in progress, and students should also use committee meetings to discuss technical problems that they have encountered. Hence, parts of the committee meeting presentation may be more informal. Students should also update committee members on their progress in the development of professional skills and in career development.

It is up to the student to decide whether he/she wants to couple a Thesis Committee meeting with a Thesis Update talk. It is sometimes difficult to couple the two and adhere to a schedule of having a Committee meeting once every six months. The Thesis Update talks and Thesis Committee meetings also serve two distinct purposes, one to provide training to students in giving formal presentations and the other to get feedback on the science from the Thesis Committee.

5. Review of progress with student/mentor out of the room

Thesis Committee meetings should begin with the student and thesis mentor each providing a brief update of progress with the other party out of the room. This mechanism is intended in part to allow students and faculty to talk openly about mentee/mentor relations. If the committee includes a spouse of the thesis advisor, it is recommended that the spouse should accompany the thesis advisor when he/she leaves the room. This should facilitate a more open discussion.

6. Evaluation of student progress at Thesis Committee meetings

Thesis Committee meetings are primarily designed as a mechanism for students to get feedback on their science from experts. The committee conveys this information both during the meeting as well as after the meeting, when the committee chair completes an evaluation of student progress in the GAIA system (https://gs.ucdenver.edu/gaia/pprog/frm_sel_stu.php). Within the GAIA report, the committee chair will assign scores (1-3) in several research-related areas, such as the student's overall progress, his/her knowledge of the literature, and oral communication. The GAIA report also allows for much more detailed written feedback. It is recommended that the Thesis Committee chair examine the GAIA form prior to the meeting.

Following guidance from NIH, NSP has two new areas of emphases in the evaluation of students at Thesis Committee meetings. The first is in statistical and quantitative methods and scientific rigor. The goal is to have concepts that students have been taught in their coursework in these areas reinforced and integrated into their later years of training. A second area of emphasis is in professional and career development. While numerous mechanisms exist that can in principle help train students in professional and career development, NSP would like Thesis Committees to be more involved in ensuring that students are adequately trained.

NSP is seeking to have these new areas covered in a campus-wide student evaluation system (GAIA or GAIA-like), although, at the present time, they are not. In the meantime, Thesis Committees should address the following additional points in their detailed written evaluation:

- Were appropriate methods outlined for quantifying results?
- Were appropriate statistical tests described?
- Were steps described to ensure unbiased analysis ("rigor")?
- Have students engaged in activities to further their professional development, such as the writing of manuscripts and presentation of results at conferences?
- Are students being adequately trained in career development? For example, have the student and his/her thesis mentor discussed an Individual Development Plan in the past year?

7. Role of Thesis Committee in the final stages of a student's dissertation work

As a student approaches the end of his/her thesis work, the Thesis Committee plays an especially critical role. It is the job of the Thesis Committee to determine whether a student's research meets the standards for a PhD. NSP's minimum requirement for a student to defend their thesis is that they will have submitted for publication at least one first-author manuscript on research that is core to their thesis topic. However, a student's thesis committee may place additional requirements, recognizing that one first-author manuscript may not be sufficient. Broadly speaking, a student's research must constitute a significant contribution of new knowledge to the field of Neuroscience. The thesis committee has discretion to determine what that is for any given student.

Obviously, it is important that a student be in active discussions about completing the thesis with their thesis committee significantly before, perhaps as much as a year prior to, when the student expects to complete their thesis. In the final stages, students should expect to receive explicit guidance from the thesis committee about their expectations for the student in thesis committee meeting(s) and associated GAIA report(s).

A student must receive approval from the thesis committee prior to moving forward to schedule a defense date. The thesis committee has discretion to determine what students must provide, and when, prior to giving approval. A determination may be made based on one of the following: (1) a student's presentation at a final thesis committee meeting; (2) an outline of the student's thesis that is e-mailed to the thesis committee at least 6 weeks in advance of when a student would like to defend; or (3) a student's complete written thesis that is sent to the committee at least 6 weeks in advance of when a student would like to defend. The third option is typically reserved for when there are questions about the sufficiency of a student's work for a Ph.D. that cannot be adequately addressed by a thesis outline. Whether option 1 or 2 is used is typically unrelated to a student's

performance but rather has more to do with the timing of a final thesis committee meeting with respect to thesis completion. Often a final thesis committee meeting occurs a few to several months prior to the anticipated thesis completion and the committee may determine that a written outline of the thesis (rather than a full meeting) is sufficient for determining whether a student may move forward to schedule a defense. It is the responsibility of the committee to provide timely feedback to the student if they have submitted materials to the committee for determining whether the student is ready to defend. If an outline has been sent (option 2), the committee must provide feedback within one week. If the complete thesis has been sent (option 3), the committee must provide feedback within two weeks.

In all cases, students should schedule a defense date at least 6 weeks in advance of the anticipated date. This is required to ensure attendance by committee members. Students are generally required to submit their final thesis to the Thesis Committee at least two weeks prior to the defense date.

8. Thesis defense

The thesis defense consists of a ~50-minute oral presentation by the student, which is followed by a 1-2-hour closed-door meeting with the Thesis Committee. The student's thesis advisor introduces the student prior to the oral presentation.

The closed-door defense begins with the Thesis Committee Chair outlining the goals and mechanics of the meeting. Typically, the meeting consists of faculty taking turns asking questions. Based on the written thesis document, the oral presentation, along with interactions at the defense, the Thesis Committee will assign a score of Pass, Pass with Conditions, or Fail to the defense.

After the defense, the Thesis Committee Chair will also complete a final GAIA report in which he/she will briefly provide highlights of the defense and outline deficiencies if these were found.

Most commonly, a student will Pass his/her defense, although Thesis Committee members may have specific points that they would like a student to address in the written thesis document. These are conveyed either in writing or in one-on-one meetings. In cases in which there are more significant deficiencies in the thesis, the Thesis Committee may assign a score of Pass with Conditions. When this occurs, the Thesis Committee chair will provide a time-line for the student to address the concerns in a revised thesis document. This time-line must be within constraints imposed by the Graduate School. According to Graduate School policy, the final, formally approved dissertation must be submitted to the Graduate School within 60 days of the thesis defense unless an extension is approved by the Graduate School.

Note: Students are required to register for 5 credits during the term they defend. This can incur additional tuition costs if the student has a summer term defense.

Forms related to the Thesis Defense: At the thesis defense, there are two forms that may be signed by Committee members. The first is the Defense Report, which is the form on which Committee members indicate the score of Pass, Pass with Conditions, or Fail. The Program Administrator will provide the Defense Report form to the Thesis Committee Chair prior to defense, and it is the job of the Committee Chair to return the form to the Administrator after the defense. At no point, should the student have handled the Defense Report form.

A second signature form at the thesis defense is the Thesis Dissertation Form. This is the form that the student will submit to the Graduate School along with their completed and approved thesis. This form should only be signed by the Thesis Committee if the student receives a Passing score at the defense or if the student has met all Conditions, if he/she received a Pass with Conditions score. It is the responsibility of the student to bring this form to the defense meeting and secure signatures (either at the meeting or at a later date).

Several weeks prior to the defense, students must complete a number of other forms, as outlined in the NSP Handbook (see NSP website). It is up to students to read the Handbook and complete the required forms and understand all requirements.

9. Summary of the responsibilities of Thesis Committee chair

The following provides a brief summary of the duties of the Thesis Committee Chair. These include:

- The Chair should complete a GAIA report after each Thesis Committee meeting. He/she is responsible for writing the initial report, placing the report in Collaboration mode (to get feedback from other committee members), and submitting the final report. Within the report, the Chair will also indicate a date by which the next committee meeting will be conducted. This date will typically be six months later, although a shorter time-line is sometimes preferred near the end of a student's dissertation period.
- After each Thesis Committee meeting, the Chair should e-mail the thesis advisor feedback about mentorship issues that came up during the meeting. If no issues came up, the Chair should e-mail the thesis advisor with a note indicating such.
- At the Thesis Defense, the Committee Chair will be responsible for securing the student's academic file and the Defense Report from the Program Administrator and returning these documents to the Administrator after the meeting.
- The Committee Chair will complete a GAIA report after the Thesis Defense.
- Throughout a student's dissertation period, the Committee Chair will serve as the primary conduit of information between the student and committee members.

Appendix 3: Guidelines for the Use of AI and Machine Learning Tools in NSP Courses

The recent emergence of freely accessible Artificial Intelligence (AI) platforms that use large language models and other generative algorithms necessitates new guidelines to ensure that students understand when and when not to use these tools. Their benefits include enhancing scientific writing, accelerating the writing process, and reducing barriers to non-native English speakers. Major potential drawbacks also exist, however, including the potential for false or inaccurate information, breaches of confidentiality, plagiarism, and depriving students the critical tasks of working through problem sets that reinforce core didactic material. Thus, improper use of AI tools has the potential to undermine the learning objectives of the program.

This policy establishes a simple set of guidelines for acceptable and unacceptable use of AI language model tools in NSP courses. Our goal is to promote acceptable use of new technology while maintaining our overall goals and standards for training. Failure to follow these guidelines may result in course failure. Any questions regarding this policy and its implementation should be directed to the Course Directors and/or Program Directors.

Please note that these guidelines are minimum expectations and in cases where guidance is stricter, these policies are superseded by any specific guidelines provided by Course Directors (i.e. you must attend to any guidance provided by Course Directors and instructors for those relevant courses); Principle Investigators (as a member of a laboratory group, you must respect the wishes of use by your PI); or any other guiding entity (e.g. thesis committees).

Generally acceptable use

1. *Language and grammar checks*. Except for course exams (see below), AI tools can be used to check or edit your original text drafts for grammatical errors. This provides an opportunity for you to learn rules and best grammatical practices.

2. Coding help. AI tools can help translate code between computer languages, explain code structures and principles, and teach you to code as a tutor might. These methods can be problematic if too many errors creep in, but in general, you may find it helpful to design your own tutorials driven by your own questions and curiosity that AI tools can help with.

If you use AI tools for these purposes, you must be transparent about their use. Citation of any use should be included in the bibliography of your written assignments, and include the name of the specific tool (and version) and how it was used. *Ex: ChatGPT, v4 was used to make evaluate the grammar in this proposal. Suggestions from this evaluation were included in the final draft.*

Generally unacceptable use

1. *Answering test questions for courses*. Exams in NSP courses are intended to challenge you to think and translate that thought into original answers that are then evaluated by the course directors. **During course exams, AI tools cannot be used at all, even to make suggestions to improve grammar and clarity in the writing**.

2. *Deriving answers and generating new text for homework and writing assignments for courses*. While AI tools can be used to evaluate the grammar of your own, original written content, and make suggestions to improve grammar and clarity, they cannot be used to generate new content for homework assignments. Also, **verbatim use of sentences generated by AI tools will be considered plagiarism.**

3. *Identifying topics/potential experiments and generating new text for comprehensive exam proposals*. These exams are intended to evaluate your ability to identify important scientific problems and experiments that address them, as well as to translate this knowledge into a written grant proposal. While AI tools can be used to evaluate the grammar of your own, original written content, and make suggestions to improve grammar and clarity, they cannot be used to generate new written content in comprehensive exam proposals. **Verbatim use of sentences generated by AI tools will be considered plagiarism.** In general, you should be able to defend every sentence you write with knowledgeable discourse.

4. *Drafting peer review summaries*. You may not use AI tools to generate summaries or reviews of your classmates' work. Peer review is an excellent opportunity to sharpen your critical thinking and evaluate

alternative ideas on a topic, and provides a unique opportunity for practicing concise written communication. Use this opportunity to consider the proposal from your peer and provide your own perspective. Using AI tools to generate summaries or reviews denies you this opportunity, and denies your peer from gaining your perspective. Furthermore, uploading content from another individual's proposal to an AI tool may violate confidentiality, as the uploaded content may be disseminated or used for other purposes and without your consent. NIH has recognized this threat recently adopted a policy that prohibits the use of generative AI technologies for the peer review process.

In general, you should follow the principles outlined below as you navigate the use of AI in your graduate work:

Developed collaboratively with Campus Health Sciences Faculty Committee

We, as members of the AMC Community, strive to be innovative and curious in our approach to the use of new technology. Especially, given our commitment to improving health and biomedical research, we are responsible to approach the use of these tools with integrity and professionalism.

1. Never enter identifiable patient data/information into third party tools.
2. If using tools to assist with clinical decision-making, ensure these are approved by the health system and based on best available evidence.
3. Familiarize yourself with the pitfalls of various tools such as bias, hallucinations, incorrect information. In particular, for our PhD students, all should be aware of the tendency for LLM chatbots to fabricate fake citations and other information.
4. Be vigilant about the presence of biases in work generated by AI/ML; strive to mitigate the dissemination of these biases.
5. Avoid use of AI/ML to replace successful, evidence-based study strategies given concern these tools may negatively impact learning. For example, work through problem sets on your own or with classmates rather than leaning on AI tools. The goal in a PhD program is for you to learn, not to check boxes.
6. Critically evaluate any AI/ML generated responses with knowledge from course work and other resources.
7. Be honest and transparent about the use of AI and ML tools in curricular work such as studying and assignments. Citation of use should include name of the specific tool (and version) used and how it was used (e.g. editing first draft for grammar; syntax help in Python code). *Ex: ChatGPT, v4 was used to edit my first draft for clarity and brevity.*
8. Failure to cite use of outside tools may be considered plagiarism and will be addressed in the same way other academic professionalism lapses would be.
9. Approach new technology and tools with curiosity but always maintain intellectual integrity.

v.1 2024, sources CSD guidelines, Campus Guidelines, NSP directors