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1 Preamble

Neuroscientists are applying new technologies to acquire and analyze large data sets, as well as amassing knowledge of neural circuitry in a variety of brain areas. As a consequence, the need for quantitative models to understand the great complexities of neurobiological systems has never been greater, and quantitative methods are centrally important in the field of neuroscience. In some respects, neuroscience has historically been ahead of much of biology in adopting and valuing quantitative approaches. There have been important advances through the use of quantitative methods in neurophysiology, and there has been a continuing stream of related work within applied mathematics and physics. More recently, engineers, computer scientists, and statisticians have contributed to the field, expanding further the definition of computational neuroscience. Nevertheless, the number of investigators with the requisite skills actively engaged in this domain of research is relatively small. There is a widely recognized need for increased training in the application of computational, mathematical, and statistical methods to biology and medicine, and to problems in neuroscience in particular.

The Program in Neural Computation (PNC) trains students with backgrounds in quantitative disciplines in the growing field of computational neuroscience and also provides them the essential background in experimental neuroscience. The training environment of the PNC brings the strengths of the unique neuroscience community of both Carnegie Mellon University (CMU) and the University of Pittsburgh (Pitt). The PNC is administered by the Neuroscience Institute at Carnegie Mellon and benefits from a close relationship with the Center for the Neural Basis of Cognition (CNBC), an integrative center spanning both CMU and Pitt. All PNC students are by extension members of the CNBC. We offer three degrees: a Ph.D. in Neural Computation, a Joint Ph.D. in Neural Computation and Statistics, and a Joint Ph.D. in Neural Computation and Machine Learning. In this document we outline both the course requirements and program milestones that a PNC student in any of the three degree programs must complete during the course of their PhD training.

The PNC program is overseen by the PNC training faculty, the Academic Program Manager, and the Program Co-Directors. Questions about any aspect of the program should be directed either to the Academic Program Manager or the Program Co-Directors:

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2 Ph.D. in Neural Computation

The program consists of the following core activities:

- Coursework in computational neuroscience, quantitative methodologies and experimental neuroscience
- Exposure to experimental approaches through rotations or thesis research
- Training in teaching, scientific presentations and responsible conduct of research
- Successful defense of a Ph.D. Thesis

Additional satellite activities through the CNBC will also foster students’ professional and scientific development.

Course requirements

The course requirements for this program include but extend well beyond the curriculum requirements for the CNBC graduate training program. The coursework is designed to ensure that students are well trained in neuroscience and that they also receive in-depth training in a set of quantitative approaches relevant to the field of computational neuroscience. Because of differences in background and educational goals, course requirements for each student in the program will be adapted to their individual needs, drawing on the many computer science, mathematics, and statistics courses offered both at CMU and Pitt. Students must complete a minimum of 96 units of coursework in addition to units obtained through reading and research courses.

A PNC student’s first year coursework is decided by the student in consultation with the student’s faculty mentor and the program co-directors. The week before the start of each fall term the first year PNC students will attend an orientation session held by the program co-directors, where a listing of all PNC relevant courses offered that term would be given. After the orientation meeting, the first semester course choices for each first year student will be determined in consultation, first with the student and the student’s faculty mentor, and then with one of the program co-directors. Typically, students will take about 2 courses each term of their first year, including at least one computational neuroscience course and two courses covering experimental neuroscience.

By two weeks before start of fall term of a student’s second year, the student must submit a proposed schedule of coursework to the graduate program coordinators, along with a statement from his or her advisor recommending approval. This plan will then be considered by the PNC training faculty which may approve the course plan, or ask for modifications. Approval will be based on meeting program expectations in the following three areas. It is expected that by the end of the third year of the program all coursework will be completed.

CNBC requirement

Students complete the four-course requirement of the CNBC graduate training program, with specific program related guidelines for the computational component. Students will gain graduate level training through coursework in the following three areas: (i) cell and molecular neuroscience/neurophysiology, (ii) systems neuroscience, and (iii) cognitive neuroscience. Recommended courses fulfilling this requirement include

- (i) 03-762 Advanced Cellular Neuroscience (CMU) or NROSCI 2100/2101 Cellular and Molecular Neurobiology (Pitt)
- (ii) 03-763 Systems Neuroscience (CMU) or NROSCI 2102 Systems Neuroscience (Pitt), and
- (iii) 85-765 Cognitive Neuroscience.

Computational Neuroscience

Students are required to take at least three computational neuroscience courses, including mathematical, statistical and computational approaches.

To complete the computational requirement, students must take:

- 36-759 Statistical Models of the Brain (CMU)
- Two additional computational electives selected by the student.
Recommended courses fulfilling the computational elective requirement include:

- 15-686 Neural Computation (CMU)
- 15-883 Computational Models of Neural Systems (CMU)
- 18-698/42-632 Neural Signals Processing (CMU)
- 85-719 Introduction to Parallel Distributed Processing (CMU)
- 86-631 Neural Data Analysis (CMU)
- 86-675 Computational Perception (CMU)
- BIOENG 2650 Mathematical Models of Biological Learning (Pitt)
- MATH 3370 Mathematical Neuroscience

**Quantitative Methods**

Students must take at least two graduate level courses in one quantitative subject (e.g. math, computer science or statistics) to ensure depth of knowledge in this area. Courses listed above under the Computational Neuroscience requirement are not eligible to fulfill this requirement. Under the quantitative methods requirement, we have identified two examples of focus areas:

**Dynamical Systems focus**
- MATH 2940 Applied Stochastic Methods (PITT)
- MATH 2950 Applied Math Methods (PITT)

**Statistics and Machine Learning focus**
- 10-701 or 10-715 Machine Learning (CMU)
- 36-705 Intermediate Statistics (CMU)
- 36-707 Regression Analysis (CMU)

Other foci, including “brain imaging and signal processing” have been discussed and may be added as recommended course sets, subject to approval by the program co-directors. Note that to be eligible to take some of these courses, students might first need to complete course pre-requisites. These pre-requisites would not count towards the two course depth requirement.

**Program Milestones**

Progress in the program is tracked based in part on students’ successful completion of program milestones. A committee selected by the student and approved by the program co-directors evaluates the performance on milestones. Failure to pass a milestone will result in a student being placed on probation. Specific conditions for removal of probation will be specified by the program co-directors along with a set of deadlines for meeting these conditions. Failure to meet these conditions constitutes grounds for dismissal from the program.

**First year research requirement:** By the end of the first calendar year in the program, all students are required to complete a computational project. This project will be evaluated by a committee consisting of at least three faculty, two of whom are not one of the student’s advisors, and of whom at least two are PNC training faculty. The project requires the student to identify a biological problem, understand the data collection process, articulate the goals of building a model or performing a particular kind of analysis and implement this computational approach. In some cases this project may be a precursor to the student's eventual thesis project. This project cannot substantially overlap with a project completed for a class, although it may be on the same topic as a class project, provided that it represents a substantial extension of that work.

Students should begin formally discussing this research project no later than the end of the spring term. Initial steps should include forming this committee and organizing a meeting to discuss/outline the project with your committee. The makeup of this committee should be approved by the program co-directors. At this first meeting the committee should approve the project proposal or indicate steps necessary to identify a new project. Then, before the start of the fall term, students must schedule a committee meeting where they present/defend their results. This meeting should occur before Oct 15. The initial part of this meeting involves a 30 minute presentation by the student, which is open to
the public. This will be followed by a meeting with the committee and the student, during which the committee will ask
detailed questions about the work. Based on this meeting, the committee will evaluate the student’s work and will
decide whether a student passes, fails or needs to revise the project, subject to re-evaluation. Questions about the
content of the presentation should be raised by the student with committee members well before the evaluation
meeting.

**Second year research requirement:** In the second year, students are expected to work on research about 1/3 of their
time during the academic year and full time during the summer. By the end of the second full year in the program all
students are required to complete a deeper computational project. The student’s work on the project should
demonstrate that the student has 1) the ability to analyze and interpret experimental data in a particular area 2) the
ability to develop and implement a computational approach incorporating the relevant level of biological detail and 3)
the ability to organize, interpret and present the results of the computational work. This project should be a body of
work suitable for publication. It is expected that this work will be written up as a manuscript suitable for submission to
a journal in the relevant field; a draft of this manuscript must be submitted to the committee at least a week in advance
of the meeting. In most cases this project will be on an area related to the student’s eventual thesis project.

The evaluation of this milestone is similar to that of the first year milestone described above. The committee makeup
follows the same requirements as for the first year milestone, though it does not have to be the same people. Students
are recommended but not required to organize a meeting to discuss/outline the project with their committee. At this
first meeting the committee would approve the project proposal or indicate steps necessary to identify a new project.
Then students must schedule a committee meeting at which they will present/defend their results. This meeting should
occur before Oct 15 of the third year. The initial part of this meeting involves a 30 minute presentation by the student,
which is open to the public. This seminar must be advertised to the PNC community at least one week prior to the
event. (To advertise, send the talk announcement including the date, time, place, title, abstract, and faculty committee
to the PNC graduate program coordinator.) This will be followed by a meeting with the committee and the student,
during which the committee will ask detailed questions about the work. Based on this meeting, and the submitted
manuscript draft, the committee will evaluate the student’s work and will decide whether a student passes, fails or
needs to revise the project, subject to re-evaluation.

**Ph.D. Thesis proposal:** Required coursework should be completed by the end of the third year. During the fourth year
a Ph.D. candidate should present a thesis proposal to his or her thesis committee and the community. The thesis
proposal should include: a succinct summary of the proposed research problem; the significance of the proposed
research; a review of relevant literature relating to the problem; a review of the candidate’s work leading up to the
thesis, including preliminary results; a clear statement of remaining research; and a tentative schedule for completing
the work.

Advising on scheduling the proposal, and guiding in the formation of the dissertation committee, is the thesis advisor’s
responsibility. The thesis committee should be composed of at least four members, one being an external member and
at least two being PNC training faculty. The external member is typically from outside the two participating Universities.
All thesis committees are subject to approval by the PNC training faculty.

**Ph.D. Thesis Defense:** Normally, the dissertation is completed during the student’s fifth year. The student should set
up a pre-defense meeting with their committee members six months prior to their defense. The final defense is a public
presentation, in accordance with the College and University requirements for the Ph.D. It is the candidate’s
responsibility to ensure that the College and University's guidelines are followed for publicity of the defense and the
availability of the thesis document at least two weeks prior to the defense. Note that the defense must be held at least
21 days before the date the degree is awarded.
3 Joint Ph.D. in Neural Computation and Statistics
The program consists of the following core activities:

- the requirements for the Ph.D. in Statistics
- coursework in computational neuroscience, quantitative methodologies and experimental neuroscience
- exposure to experimental techniques
- training in teaching, scientific presentations and responsible conduct of research
- participation in CNBC activities as a CNBC student
- a Ph.D. thesis on a neuroscientific topic, with joint advisors, one from within Statistics and one from outside—both being CNBC-affiliated faculty members
- Students must complete a minimum of 96 units of coursework in addition to units obtained through reading and research courses.

Additional satellite activities through the CNBC will also foster students’ professional and scientific development.

Course requirements
Students complete the four-course requirement of the CNBC graduate training program, with specific program related guidelines for the computational component. Students will gain graduate level training through coursework in the following three areas: (i) cell and molecular neuroscience/neurophysiology, (ii) systems neuroscience, and (iii) cognitive neuroscience. Recommended courses fulfilling this requirement include

- (i) 03-762 Advanced Cellular Neuroscience (CMU) or NROSCI 2100/2101 Cellular and Molecular Neurobiology (Pitt)
- (ii) 03-763 Systems Neuroscience (CMU) or NROSCI 2102 Systems Neuroscience (Pitt), and
- (iii) 85-765 Cognitive Neuroscience.

To complete the computational requirement, students must take:

- 36-759 Statistical Models of the Brain
  Note that this is not exactly the same as the standard CNBC computational requirement.

To meet the course requirements for the PhD in Statistics, students must take:

- 36-705: Intermediate Statistics (year 1)
- 36-707: Regression Analysis (year 1)
- 36-708: Statistical Machine Learning (year 1)
- 36-709: Advanced Statistics I (year 1)
- 36-710: Advanced Statistics II (year 2)
- 36-750: Statistical Computing (year 1)
- 36-757: Advanced Data Analysis (year 1)

See [http://stat.cmu.edu/phd/requirements](http://stat.cmu.edu/phd/requirements) for details. Any substitutions or exemptions from coursework must be recommended by the student’s advisor and approved by the PNC co-directors and the director of graduate studies in Statistics.

Program Milestones
The milestones listed below are stated as requirements, but some flexibility is likely to be necessary. In individual cases exceptions may be granted by the PNC training faculty and the Statistics faculty. In such cases clear alternative deadlines must be established and communicated in writing to the student.

First year research requirement: By the end of the first calendar year in the program, all students are required to complete a computational project. This project will be evaluated by a committee consisting of at least three faculty, two of whom are not one of the student’s advisors, and of whom at least two are PNC training faculty. The project requires
the student to identify a biological problem, understand the data collection process, articulate the goals of building a model or performing a particular kind of analysis and implement this computational approach. In some cases, this project may be a precursor to the student's eventual thesis project. This project cannot substantially overlap with a project completed for a class, although it may be on the same topic as a class project, provided that it represents a substantial extension of that work.

Students should begin formally discussing this research project no later than the end of the spring term. Initial steps should include forming this committee and organizing a meeting to discuss/outline the project with your committee. The makeup of this committee should be approved by the program co-directors. At this first meeting the committee should approve the project proposal or indicate steps necessary to identify a new project. Then, before the start of the fall term, students must schedule a committee meeting where they present/defend their results. This meeting should occur before Oct 15. The initial part of this meeting involves a 30 minute presentation by the student, which is open to the public. This will be followed by a meeting with the committee and the student, during which the committee will ask detailed questions about the work. Based on this meeting, the committee will evaluate the student’s work and will decide whether a student passes, fails or needs to revise the project, subject to re-evaluation. Questions about the content of the presentation should be raised by the student with committee members well before the evaluation meeting.

**Second year research requirement:** In the second year, students are expected to work on research about 1/3 of their time during the academic year and full time during the summer. By the end of the second full year in the program all students are required to complete a deeper computational project. The student’s work on the project should demonstrate that the student has 1) the ability to analyze and interpret experimental data in a particular area 2) the ability to develop and implement a computational approach incorporating the relevant level of biological detail and 3) the ability to organize, interpret and present the results of the computational work. This project should be a body of work suitable for publication. It is expected that this work will be written up as a manuscript suitable for submission to a journal in the relevant field; a draft of this manuscript must be submitted to the committee at least a week in advance of the meeting. In most cases this project will be on an area related to the student’s eventual thesis project.

The evaluation of this milestone is similar to that of the first year milestone described above. The committee makeup follows the same requirements as for the first year milestone, though it does not have to be the same people. Students are recommended but not required to organize a meeting to discuss/outline the project with their committee. At this first meeting the committee would approve the project proposal or indicate steps necessary to identify a new project. Then students must schedule a committee meeting at which they will present/defend their results. This meeting should occur before Oct 15 of the third year. The initial part of this meeting involves a 30 minute presentation by the student, which is open to the public. This seminar must be advertised to the PNC community at least one week prior to the event. (To advertise, send the talk announcement including the date, time, place, title, abstract, and faculty committee to the PNC graduate program coordinator.) This will be followed by a meeting with the committee and the student, during which the committee will ask detailed questions about the work. Based on this meeting, the submitted manuscript draft, the committee will evaluate the student’s work and will decide whether a student passes, fails or needs to revise the project, subject to re-evaluation.

Note that the second year research requirement also counts to satisfy the Advanced Data Analysis project required by Statistics.

**Ph.D. Thesis proposal:** Required coursework should be completed by the end of the third year. During the fourth year a Ph.D. candidate should present a thesis proposal first to his or her thesis committee and then to the CNBC and Statistics community. The student will have two joint advisors, one from Statistics and the other a CNBC faculty member from outside of Statistics. A thesis committee will be formed and should be composed of at least four members, one of whom is an external member (typically from outside CMU and Pitt); two must be PNC training faculty; two must be Statistics faculty; and at least one CMU or Pitt member must be from a discipline outside of statistics. The thesis committee is subject to approval by the PNC training faculty and the Department of Statistics faculty.

The thesis proposal should include: a succinct summary of the proposed research problem; the significance of the proposed research; a review of relevant literature relating to the problem; a review of the candidate’s work leading up to the thesis, including preliminary results; a clear statement of remaining research; and a tentative schedule for completing the work. It should also conform to the stylistic requirements for thesis proposals in the Department of Statistics. As in the Department of Statistics, the thesis committee must offer its preliminary approval of the proposal following a meeting that is open to other faculty. The student then arranges to present the proposal publicly, so that
CNBC and Statistics faculty and other community members can attend. Formal approval is conferred by the Statistics faculty and the PNC training faculty.

**Ph.D. Thesis Defense:** Normally, the dissertation is completed during the student’s fifth year. The student should set up a pre-defense meeting with their committee members six months prior to their defense. The final defense is a public presentation, in accordance with the College and University requirements for the Ph.D. It is the candidate’s responsibility to ensure that the College and University’s guidelines are followed for publicity of the defense and the availability of the thesis document at least two weeks prior to the defense. Note that the defense must be held at least 21 days before the date the degree is awarded.
4. Joint Ph.D. in Neural Computation and Machine Learning

The program consists of the following core activities:

- the requirements for the Ph.D. in Machine Learning;
- coursework in computational neuroscience, quantitative methodologies and experimental neuroscience;
- exposure to experimental techniques in the form of a lab rotation;
- training in teaching, scientific presentations and responsible conduct of research;
- participation in CNBC activities as a CNBC student; and
- a Ph.D. thesis on a neuroscientific topic; if there is a single advisor, that person should be both a CNBC faculty member and affiliated with MLD; otherwise, the student may two co-advisors who, between them, have CNBC and MLD affiliations.

- Students must complete a minimum of 96 units of coursework in addition to units obtained through reading and research courses.

Additional satellite activities through the CNBC will also foster students' professional and scientific development.

Course requirements

Students complete the four-course requirement of the CNBC graduate training program, with specific program related guidelines for the computational component. Students will gain graduate level training through coursework in the following three areas: (i) cell and molecular neuroscience/neurophysiology, (ii) systems neuroscience, and (iii) cognitive neuroscience. Recommended courses fulfilling this requirement include:

- (i) 03-762 Advanced Cellular Neuroscience (CMU) or NROSCI 2100/2101 Cellular and Molecular Neurobiology (Pitt)
- (ii) 03-763 Systems Neuroscience (CMU) or NROSCI 2102 Systems Neuroscience (Pitt), and
- (iii) 85-765 Cognitive Neuroscience.

To complete the computational requirement, students must take:

- 36-759 Statistical Models of the Brain
  Note that this is not exactly the same as the standard CNBC computational requirement.

To meet the course requirements in MLD they successfully complete the 5 ML Core courses, with an average GPA of 3.5 or better. These include:

- 10-715 Advanced Introduction to Machine Learning
- 10-716 Advanced Machine Learning
- 36-705 Intermediate Statistics

Plus any two of the following:

- 10-703 Deep Reinforcement Learning or 10-707 Topics in Deep Learning
- 10-708 Probabilistic Graphical Models
- 10-725 Convex Optimization
- 15-750 Algorithms or 15-853 Algorithms in the Real World
- 15-780 Graduate Artificial Intelligence
- 15-826 Multimedia Databases and Data Mining
- 36-707 Regression Analysis
- 36-752 Advanced Probability

Any substitutions or exemptions from coursework must be recommended by the student's advisor and approved by the program co-directors and the co-directors of graduate studies in MLD.
Program Milestones

First year research requirement: By the end of the first calendar year in the program, all students are required to complete a computational project. This project will be evaluated by a committee consisting of at least three faculty, two of whom are not one of the student’s advisors, and of whom at least two are PNC training faculty. The project requires the student to identify a biological problem, understand the data collection process, articulate the goals of building a model or performing a particular kind of analysis and implement this computational approach. In some cases this project may be a precursor to the student's eventual thesis project. This project cannot substantially overlap with a project completed for a class, although it may be on the same topic as a class project, provided that it represents a substantial extension of that work.

Students should begin formally discussing this research project no later than the end of the spring term. Initial steps should include forming this committee and organizing a meeting to discuss/outline the project with your committee. The makeup of this committee should be approved by the program co-directors. At this first meeting the committee should approve the project proposal or indicate steps necessary to identify a new project. Then, before the start of the fall term, students must schedule a committee meeting where they present/defend their results. This meeting should occur before Oct 15. The initial part of this meeting involves a 30 minute presentation by the student, which is open to the public. This will be followed by a meeting with the committee and the student, during which the committee will ask detailed questions about the work. Based on this meeting, the committee will evaluate the student’s work and will decide whether a student passes, fails or needs to revise the project, subject to re-evaluation. Questions about the content of the presentation should be raised by the student with committee members well before the evaluation meeting.

Second year research requirement: In the second year, students are expected to work on research about 1/3 of their time during the academic year and full time during the summer. By the end of the second full year in the program all students are required to complete a deeper computational project. The student’s work on the project should demonstrate that the student has 1) the ability to analyze and interpret experimental data in a particular area 2) the ability to develop and implement a computational approach incorporating the relevant level of biological detail and 3) the ability to organize, interpret and present the results of the computational work. This project should be a body of work suitable for publication. It is expected that this work will be written up as a manuscript suitable for submission to a journal in the relevant field; a draft of this manuscript must be submitted to the committee at least a week in advance of the meeting. In most cases this project will be on an area related to the student’s eventual thesis project.

The evaluation of this milestone is similar to that of the first year milestone described above. The committee makeup follows the same requirements as for the first year milestone, though it does not have to be the same people. Students are recommended but not required to organize a meeting to discuss/outline the project with their committee. At this first meeting the committee would approve the project proposal or indicate steps necessary to identify a new project. Then students must schedule a committee meeting at which they will present/defend their results. This meeting should occur before Oct 15 of the third year. The initial part of this meeting involves a 30 minute presentation by the student, which is open to the public. This seminar must be advertised to the PNC community at least one week prior to the event. (To advertise, send the talk announcement including the date, time, place, title, abstract, and faculty committee to the PNC graduate program coordinator.) This will be followed by a meeting with the committee and the student, during which the committee will ask detailed questions about the work. Based on this meeting, and the submitted manuscript draft, the committee will evaluate the student’s work and will decide whether a student passes, fails or needs to revise the project, subject to re-evaluation.

Ph.D. Thesis proposal: Required coursework should be completed by the end of the third year. During the fourth year a Ph.D. candidate should present a thesis proposal first to his or her thesis committee and then to the CNBC and MLD community.

A thesis committee will be formed and should be composed of at least four members, one of whom is an external member (typically from outside CMU and Pitt); two must be PNC training faculty; two must be MLD faculty; and at least one CMU or Pitt member must be from a discipline outside of statistics and computer science. The thesis committee is subject to approval by the PNC training faculty and the MLD faculty.

The thesis proposal should include: a succinct summary of the proposed research problem; the significance of the proposed research; a review of relevant literature relating to the problem; a review of the candidate's work leading up
to the thesis, including preliminary results; a clear statement of remaining research; and a tentative schedule for completing the work. It should also conform to the stylistic requirements for thesis proposals in MLD. The thesis committee must offer its preliminary approval of the proposal. The student then arranges to present the proposal publicly, so that CNBC and MLD faculty and other community members can attend. Formal approval is conferred by the MLD faculty and the PNC training faculty.

Ph.D. Thesis Defense: Normally, the dissertation is completed during the student’s fifth year. The final defense is a public presentation, in accordance with the College and University requirements for the Ph.D. It is the candidate’s responsibility to ensure that the Departmental, College and University guidelines are followed for publicity of the defense and availability of the thesis document at least two weeks prior to the defense. Note that the defense must be held at least 21 days before the date the degree is awarded.

Applying to the Joint PNC/ML program

To apply to the Joint-ML/PNC program, a student already enrolled in the PNC program must:

- Take and pass 10715, 10705 and 10716 (10702 will count in lieu of 10716 if taken before Spring 2019). Applicants are expected to have a GPA of 3.5 or higher in these courses.
- Identify an MLD Core Faculty member who agrees to serve as their MLD mentor. The mentor will help guide the ML portion of the student’s research, represent the student at the MLD student evaluation meetings (‘Black Fridays’), become a member of the student’s thesis committee, and generally advocate for the student within MLD.

Applications should be emailed to the MLD PhD Program Administrator (with the PNC PhD Program Administrator cc’d), and must include:

- Student’s CV
- Statement of Research Interests (one page will do)
- CMU Transcripts (unofficial will do)
- A short paragraph of recommendation from the home PhD Advisor (or PhD program Director if advisor has not yet been assigned)
- Brief email from the MLD Mentor confirming their willingness to serve in that role.

The MLD admissions committee may request additional information as needed.

Interested students are encouraged to apply as early as possible in their graduate studies, so that their research direction can be informed by their interactions with their MLD mentor. They should apply as soon as they satisfy the above requirements, typically at the end of the first or else second year of their PhD program. Later applications will also be considered as long as they are made before the student’s thesis proposal.

Applications must be submitted by May 31 to be considered for admission by the immediately following Fall semester.

Once admitted to the Joint-ML PhD program, in addition to being reviewed at their home department, the student’s progress will also be reviewed by the MLD faculty at their regular student evaluation meetings, where the student will be represented by their MLD mentor. The student’s advisor may also be present for this review.
5 Additional Program Information and Requirements

Training in Responsible Conduct of Research (RCR)

All students must obtain RCR training through two distinct training programs.

CTSI RCR seminar series
Before the end of their second year in the program, all students are required to complete a one-semester Responsible Conduct in Research training experience. This will be completed by attending no fewer than 13 of the seminars on offer for that semester by the Clinical and Translational Science Institute at the University of Pittsburgh. Details on those seminars are available at http://www.ctsi.pitt.edu/education-responsible-workshop.html. Students can choose any 13 of the offered seminars that they like, but all should be completed within the semester. Note that registration is required for each seminar individually, and attendance is logged.

CNBC-specific RCR training
The CNBC provides training in scientific ethics and responsible conduct in research through a series of informal “brain bag” presentations. PNC students are expected to attend these brain bag presentations in their third year and they will serve as refresher training for the core ethics training given in years one and two of the program.

Collaboration with experimentalists

One critical aspect of a successful training program for computational neuroscience is to give students a detailed understanding of how the experimental data they are analyzing or modeling are collected. This allows students to appreciate the limitations of the experimental data (such as sources of variability), appreciate what kinds of experiments can and cannot be done and aid in their ability to interact with experimentalists. This also increases the relevance of the student's computational-based research and increases the overall caliber of the student's PhD dissertation.

All students in the PNC are encouraged to do experimental work and/or to collaborate closely with experimentalists. Students working in different areas will have different needs in terms of the extent of their involvement collecting experimental data. Some students will be in laboratories in which both experimental and computational work is being performed and will gain experience in both approaches throughout their training. Students working in a strictly computational lab are required to do a 10 week rotation in an experimental lab with the intent to begin (or continue) a collaboration with that lab. The goal of this rotation is that students should be sufficiently well trained that they can design and carry out their own experiments. The student is responsible for meeting this requirement, and it should be discussed with the student's advisor not later than by the end of the first year. All students are required to submit a one half to one page proposal detailing the experimental training they intend to receive for approval by the PNC faculty. At the end of this training experience, a one half to one page evaluation statement must be submitted to the training faculty detailing what was learned and accomplished. This document should be written by the student and approved (signed) by the advisor, prior to the approval of the thesis proposal, and preferably earlier. Note that the experimental rotation may serve as a major component of either the first-year or second-year research requirement but that this is not necessarily the case.

Teaching Assistant Requirement

In order to build skills in teaching, mentoring, communication and management skills, each student will be required to serve as a teaching assistant for two courses during their career as a graduate student in the program. The ideal scenario would include one introductory level course and one advanced level course. The time commitment for TA-ship should be roughly 12 hours per week. The student will receive a formal evaluation from the course instructor each semester they serve as a Teaching Assistant. Students must receive a satisfactory evaluation to receive credit for the semester. Note that students in the joint PNC/ML degree program will split their TA responsibilities between CNBC and ML, i.e., students will TA one CNBC course and one ML course. The ML course will be subject to the standard ML PhD teaching assistant requirements.
Graduate students are required to have a certain level of fluency in English before they can instruct in Pennsylvania, as required by the English Fluency in Higher Education Act of 1990. Through this Act, all institutions of higher education in the state are required to evaluate and certify the English fluency of all instructional personnel, including teaching assistants and interns. The full university policy can be reviewed at: https://www.cmu.edu/policies/faculty/evaluation-certification-english-fluency-instructors.html.

The fluency of all instructional personnel will be rated by Language Support in the Student Academic Success Center to determine at what level of responsibility the student can TA.

In addition to administering the International Teaching Assistant (ITA) Test (a mandatory screening test for any non-native speaker of English), Language Support in the Student Academic Success Center helps teaching assistants who are non-native English speakers develop fluency and cultural understanding to teach successfully at Carnegie Mellon. Visit the Student Academic Success Center website for additional information: https://www.cmu.edu/student-success/

Students can satisfy the certification requirement by taking the International Teaching Assistant (ITA) test administered by the Intercultural Communication Center (ICC) or using their TOEFL speaking score. Only those students who receive a Pass or Restricted I score on the ITA test or have a TOEFL speaking score greater than 22 that is certified by the ICC can serve as a TA. Graduate students who do not pass the ITA will be provided with help at the Intercultural Communication Center until they are able to pass. Students who are non-native English speakers may also benefit from completing 99-452: Language and Culture for Teaching (3 units) offered through the Intercultural Communication Center at CMU.

Internship Course Option

PNC students may wish to participate in paid internships at off-campus organizations. Internships must be approved by the student's advisor and the co-directors of the graduate program. Internships are typically undertaken during the summer semester, but can take place at other times with approval. PNC will enroll all students who are pursuing an internship for a 3-unit credit bearing internship course (86-799 Internship for Neural Computation Graduate Students). This internship will appear on a student’s transcript. Internships taken during the summer months will not incur tuition, internship experiences outside of the summer months may require full time tuition. The work for the internship must be appropriate to the goals of the academic program and be approved by the student’s advisor. Eligible international students who are interested in pursuing off-campus internships must meet with departmental and OIE representatives. For additional information, please refer to OIE’s website on Employment Options for international students.

Advising and Student Evaluation

Twice each year, the PNC training faculty reviews the progress of each student in all aspects of the program. The results of this evaluation will be communicated to the student by the co-directors of the graduate program. As part of this process, each student is expected to submit a self-evaluation, stating whether they meet their previous semester’s goals, and also giving their plans for next steps in the program.

Selection and change of thesis advisor: At all times during their graduate training, students will be engaged in research under the supervision of a faculty advisor. This advisor is responsible for the academic and financial support of the student. Students initially will be assigned an advisor upon admission to the PNC, who will guide the student in selecting courses and help form his or her initial research project. By the end of the summer following the first year students must identify a thesis advisor, which in many cases will be the first year academic advisor. Occasionally, a student's faculty advisor may be changed (see below); most often this change occurs because of a change in the student's research interests. If the advisor must change for any reason, it is the responsibility of the student to identify a new advisor who is willing and able to provide academic and financial support. This advisor must then be approved by the program co-directors and the director of the Neuroscience Institute.

A student may voluntarily change advisors with the mutual consent of the new advisor, the program co-directors and the director of the Neuroscience Institute. An advisor may terminate his or her supervision of and responsibility for a student after written notification of the problems, which may include lack of effort, lack of research progress, lack of research aptitude, failure to obey policy or procedures, failure to comply with University regulations, or behavior
detrimental to the laboratory or program. Consideration of this action must be brought to the attention of the student, the PNC program co-directors and the CMU CNBC co-director. A student who no longer has an advisor will be given two weeks to find a new advisor. Students without advisors after this time may be terminated from the program.

**Termination of a Student from the Graduate Program:** Students may be terminated from the Graduate Program for failure to achieve a “B” or better in two required core courses or one of these courses on successive occasions, failure to pass any program milestone, failure to make adequate progress in research, failure to find/maintain an acceptable research advisor, breaches in ethical conduct such as plagiarism or for conduct detrimental to the program. Except for instances involving breaches in legal or ethical behavior, students will not be terminated from the Program without first being notified in writing that they have been placed on probation. This written communication will include a description of the reason(s) for placing the student on probation, and the goals that the student must accomplish in order to regain good standing in the Program.

When a student who is not on probation fails a program milestone, the student will be placed on probation and given a second opportunity to pass that milestone. The student will receive a written communication from the committee that evaluated performance on the exam detailing the deficiencies in performance and what must be accomplished to satisfy these concerns. A second failure of the same milestone constitutes grounds for termination from the Program. When a student who is already on probation fails one of the major examinations, the student may or may not be given a second opportunity to pass that examination, at the discretion of the PNC training faculty.

In all cases, the termination of a student requires a decision by the PNC training faculty and acceptance of a recommendation for dismissal by the co-Directors of the CNBC. Terminations are final.

**Grievance procedures**

**Grievances within PNC**

From time to time students may have complaints about some aspect of their training in the PNC. Graduate students are encouraged to discuss such concerns with any faculty member, especially their advisors or the program co-directors. The PNC tries to solve problems informally, but there may come a time when a problem arises that cannot be resolved through informal procedures. To provide for this situation, there is a formal grievance procedure.

The process will commence when a student files a grievance in writing with the director of the Neuroscience Institute. The grievance will be discussed by a three-person board including the director of the Neuroscience Institute and two PNC faculty members selected by the director. The board will render a written recommendation, with copies sent to the student, the office of the Dean of H&SS, and those against whom the grievance was brought (if specific individuals are involved). No person against whom the grievance is brought will have a role in investigating it. If the director is among those against whom the grievance is brought, then the Dean will be asked to designate another senior faculty member from the Neuroscience Institute to substitute for the co-director on the three-person board.

University policies and agreements governing student, staff, and faculty rights supersede this procedure. If a satisfactory settlement is not reached through the activity of the three-person board described above, the student may bring the grievance to the Dean and, subsequently, to the Provost. In this case the grievance board’s written recommendation will be part of the preliminary background information reviewed by the Dean or Provost or other University official before any action is taken.

The student may withdraw the grievance at any point throughout the Departmental investigation.

**Grievances within Dietrich College**

Any graduate student who has exhausted normal grievance procedures within the Department may present a grievance to the office of the Dean of the College. The Dean may request statements or testimony from other parties involved, and will consider the grievance in an ad hoc committee composed of the Dean, a faculty member from a department not involved in the grievance and a graduate student from a second uninvolved department. The committee will present its decision in writing to all parties involved.

**Other Program Activities**

PNC students will participate with CNBC graduate training program students in the following co-curricular activities.
The CNBC colloquium series is a student-run speaker series that brings eminent scientists to Pittsburgh. Students have played a major role in the selection and hosting of speakers throughout the years; faculty provide input on speaker selection, but the students do all the voting and interact extensively with the speakers during their visits.

The Brain Bag research seminars meet approximately bi-weekly throughout the academic year on Monday evenings. At each Brain Bag, a student gives a brief talk describing research in progress. Students are required to attend 2 Brain Bags per semester. Each student must present a Brain Bag by the end of their third year in the program.

The CNBC Retreat is held annually. The goal of our retreat is to foster scientific and social interactions among faculty, post-docs, and students affiliated with the CNBC. The program includes a full agenda of scientific presentations and discussions, as well as other informational, social, and recreational events. Retreat attendance is a required part of the CNBC program, and the CNBC Education Committee has adopted a policy that students must participate in the retreat each year to remain in good standing. However, we realize that sometimes a scheduling conflict makes attendance difficult, and therefore, each student will receive one "opt-out". That is, a CNBC student may pick one year when they do not attend the retreat. We encourage you to save this for when you really need it, as additional opt-outs will not be available.

6 Training faculty
Any potential PhD thesis advisor must be a member of the PNC approved training faculty. Training faculty will be drawn from Pitt and CMU, and will include both faculty working in computational neuroscience and experimental faculty who have interest and experience in collaborating on computational work. Training faculty from the two campuses will be treated equally in every respect, including availability and cost of students. An up to date list of training faculty can be found at http://www.cnbc.cmu.edu/pnctrainingfaculty.
7 University Policies & Expectations

It is the responsibility of each member of the Carnegie Mellon community to be familiar with university policies and guidelines. In addition to this departmental graduate student handbook the following resources are available to assist you in understanding community expectations:

- Academic Integrity Website: https://www.cmu.edu/student-affairs/ocsi/academic-integrity/index.html
- University Policies Website: www.cmu.edu/policies/
- Graduate Education Website: http://www.cmu.edu/graduate/policies/index.html

Please see Appendix A for additional information about The Word and University resources.

Academic Calendar

The Academic Calendar can be found at https://www.cmu.edu/hub/calendar/index.html and provides information on all deadlines including registration dates, class start dates, add/drop deadlines, exam dates and more.

Academic Integrity Policy

Please review the University Policy on Academic Integrity (https://www.cmu.edu/policies/student-and-student-life/academic-integrity.html). The policy includes the University expectations around academic integrity and provides definitions of cheating, plagiarism, and unauthorized assistance.

A review of the University’s Academic Disciplinary Actions procedures (https://www.cmu.edu/student-affairs/theword/academic-discipline/index.html) is also recommended. These procedures outline the process for investigating, reporting, and adjudicating violations of the University Policy on Academic Integrity. The procedures also outline the appeal process.

Carnegie Mellon University Statement of Assurance

Carnegie Mellon University does not discriminate in admission, employment or administration of its programs or activities on the basis of race, color, national origin, sex, handicap or disability, age, sexual orientation, gender identity, religion, creed, ancestry, belief, veteran status or genetic information. Furthermore, Carnegie Mellon University does not discriminate and is required not to discriminate in violation of federal, state or local laws or executive orders.

Inquiries concerning the application of and compliance with this statement should be directed to the university ombudsman, Carnegie Mellon University, 5000 Forbes Avenue, Pittsburgh, PA 15213, telephone 412-268-1018. Obtain general information about Carnegie Mellon University by calling 412-268-2000.

Carnegie Mellon University publishes an annual campus security and fire safety report describing the university's security, alcohol and drug, sexual assault and fire safety policies, and containing statistics about the number and type of crimes committed on the campus, and the number and cause of fires in campus residence facilities during the preceding three years. You can obtain a copy by contacting the Carnegie Mellon Police Department at 412-268-2323. The annual security and fire safety report also is available online at www.cmu.edu/police/annualreports.

Information regarding the application of Title IX, including to admission and employment decisions, the sexual misconduct grievance procedures and process, including how to file a report or a complaint of sex discrimination, how to file a report of sexual harassment, and how the university responds to such reports is available at www.cmu.edu/title-ix. The Title IX coordinator may be reached at 5000 Forbes Ave., 140 Cyert Hall, Pittsburgh, PA 15213; 412-268-7125; or tix@cmu.edu.

Doctoral Student Status Policy

As outlined in the Doctoral Student Status Policy https://www.cmu.edu/policies/student-and-student-life/doctoral-student-status.html, students will complete all requirements for the Ph.D. degree within a maximum of ten years from original matriculation as a doctoral student, or less if required by a more restrictive department or college policy. Once this time-to-degree limit has lapsed, the person may resume work towards a doctoral degree only if newly admitted to a currently offered doctoral degree program under criteria determined by that program. This policy sets
forth a definition of All But Dissertation (ABD) status, time limits on doctoral candidacy status, a definition of being In Residence and In Absentia for candidates and the tuition and fees charged for candidates in each status. The ABD Status Agreement Form can be found at: https://www.cmu.edu/hub/docs/abd-status-agree.pdf

Under extraordinary circumstances, such as leave of absence, military or public service, family or parental leave, or temporary disability, a school or college may, upon the relevant department's recommendation and with the written approval of the dean, defer the lapse of All But Dissertation status for a period commensurate with the duration of that interruption. Students, who are pursuing the Ph.D. degree as part-time students for all semesters of their program, as approved by their program, may also appeal to their program or department for extension of the time to degree limit.

**Drop/Add/Withdraw procedures**

Students taking undergraduate and Master's level courses must follow the procedures and deadlines for adding, dropping, or withdrawing from courses as identified on the academic calendar. Information can be found at https://www.cmu.edu/hub/registrar/course-changes/index.html There is a separate calendar for doctoral level courses.

**Emergency Student Loans**

Graduate students who find themselves in need of immediate funds for emergency situations should contact the Office of the Dean of Student Affairs (see Appendix A), www.cmu.edu/student-affairs/index.html, to inquire about an Emergency Student Loan.

**Employment Eligibility Verification**

If you are receiving a stipend, are a TA or are you planning to have a position with CMU then Employment Eligibility Verification is Required. Form I-9 must be completed within 3 business days of beginning work for any type of compensation (stipend or employment). Additional details are highlighted below.

To ensure compliance with federal law, Carnegie Mellon University maintains the Employment Eligibility Verification (I-9) Policy covering the university’s I-9 and E-Verify requirements:

- Every individual receiving a stipend from CMU or employed by CMU must comply with the I-9 Policy by completing the Form I-9 within three business days following the first day of stipend start date/employment.
- Individuals who expect to work on a federally funded project are further responsible for submitting an E-Verify Processing Request Form to the Office of Human Resources if required.

For more information, visit the Human Resources Service website to learn more about Form I-9 and E-Verify and to schedule an appointment to complete the Form I-9.

**Transfer Courses & PCHE Policy**

Carnegie Mellon University offers students the opportunity to take courses for credit through a cross-registration program via the Pittsburgh Council on Higher Education (PCHE) and through the receipt of transfer credit from other accredited institutions. The Carnegie Mellon University transcript will include information on such courses as follows: Carnegie Mellon courses and courses taken through the university’s cross-registration program will have grades recorded on the transcript and be factored into the QPA. All other courses will be recorded on this transcript indicating where the course was taken, but without grades. Such courses will not be taken into account for academic actions, honors or QPA calculations. (Note: suspended students may take courses elsewhere; however, they may receive transfer credit only if their college's and department's policies allow this.)

The program co-directors will review petitions for transfer credit on a case by case basis. Courses will be evaluated based on course level, topics covered, grade received, and credits earned. Courses below the graduate level will not be considered. Students must receive a grade of B or better for the transfer credit to be eligible for review. A course syllabus should be submitted as part of the review process.

**University Policy on Grades**


This policy offers details concerning university grading principles for students taking courses and covers the specifics of assigning and changing grades, grading options, drop/withdrawals and course repeats. It also defines the undergraduate and graduate grading standards.
Process for Appealing Final Grades

https://www.cmu.edu/graduate/policies/appeal-grievance-procedures.html

Final grades will be changed only in exceptional circumstances and only with the approval of the instructor and the department, unit or program. Grading is a matter of sound discretion of the instructor and final grades are rarely changed without the consent of the instructor who assigned the grade. The following circumstances are the unusual exceptions that may warrant a grade appeal: (a) the final grade assigned for a course is based on manifest error (e.g. a clear error such as arithmetic error in computing a grade or failure to grade one of the answers on an exam), or (b) the faculty or staff member who assigned the grade did so in violation of a University policy.

Resources and Regulations Governing Research at Carnegie Mellon

- Office of Sponsored Programs, https://www.cmu.edu/osp/
- Office of Research Integrity & Compliance https://www.cmu.edu/research-compliance/index.html
- Policy on Restricted Research https://www.cmu.edu/policies/research/restricted-research.html

Safeguarding Educational Equity

Policy Against Sexual Harassment and Sexual Assault

The University prohibits sex-based discrimination, sexual harassment, sexual assault, dating/domestic violence and stalking. The University also prohibits retaliation against individuals who bring forward such concerns or allegations in good faith. The University's Sexual Misconduct Policy is available at https://www.cmu.edu/policies/administrative-and-governance/sexual-misconduct/index.html. The University’s Policy Against Retaliation is available at https://www.cmu.edu/policies/administrative-and-governance/whistleblower.html

If you have been impacted by any of these issues, you are encouraged to make contact with any of the following resources:

- Office of Title IX Initiatives, http://www.cmu.edu/title-ix/, 412-268-7125, tix@cmu.edu
- University Police, 412-268-2323

Additional resources and information can be found at:

https://www.cmu.edu/title-ix/resources-and-information/resources.html.

Assistance for Individuals with Disabilities

http://www.cmu.edu/education-office/disability-resources/

The Office of Disability Resources at Carnegie Mellon University has a continued mission to provide physical, digital, and programmatic access to ensure that students with disabilities have equal access to their educational experience. We work to ensure that qualified individuals receive reasonable accommodations as guaranteed by the Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act of 1973. Students who would like to receive accommodations can begin the process through Disability Resources’ secure online portal or email access@andrew.cmu.edu to begin the interactive accommodation process.

Students with physical, sensory, cognitive, or emotional disabilities are encouraged to self-identify with the Office of Disability Resources and request needed accommodations. Any questions about the process can be directed to access@andrew.cmu.edu, or call (412) 268-6121.

Maternity Accommodation Protocol

https://www.cmu.edu/graduate/programs-services/maternity-accommodation-protocol.html

Students whose anticipated delivery date is during the course of the semester may consider taking time away from their coursework and/or research responsibilities. All female students who give birth to a child while engaged in coursework or research are eligible to take either a short-term absence or formal leave of absence. Students in coursework should consider either working with their course instructor to receive incomplete grades, or elect to drop to part-time status or to take a semester leave of absence. Students engaged in research must work with their faculty to develop plans for the research for the time they are away.

Students are encouraged to consult with relevant university faculty and staff as soon as possible as they begin making plans regarding time away. Students must contact the Office of the Dean of Student Affairs to register for Maternity
Accommodations. Students will complete an information form and meet with a member of the Dean's Office staff to determine resources and procedures appropriate for the individual student. Planning for the student’s discussion with her academic contact(s) (advisor, associate dean, etc.) will be reviewed during this meeting. Doctoral students who receive an academic stipend funded by Carnegie Mellon are eligible to continue to receive stipend funding for up to six (6) weeks during a Short-Term Maternity Accommodation or a Formal Leave of Absence. Continued academic stipend funding may be extended by two (2) weeks, for a total of eight (8) weeks, if an absence longer than six weeks is medically necessary. To receive this support students must be registered with the Office of the Dean of Student Affairs for a Maternity Accommodation.

Consensual Intimate Relationship Policy Regarding Undergraduate Students
This policy addresses the circumstances in which romantic, sexual or amorous relationships/interactions with undergraduate students, even if consensual, are inappropriate and prohibited. The purpose of this policy is to assure healthy professional relationships. This policy is not intended to discourage consensual intimate relationships unless there is a conflicting professional relationship in which one party has authority over the other as in the policy.

The Carnegie Mellon Code

Students at Carnegie Mellon, because they are members of an academic community dedicated to the achievement of excellence, are expected to meet the highest standards of personal, ethical and moral conduct possible.

These standards require personal integrity, a commitment to honesty without compromise, as well as truth without equivocation and a willingness to place the good of the community above the good of the self. Obligations once undertaken must be met, commitments kept.

As members of the Carnegie Mellon community, individuals are expected to uphold the standards of the community in addition to holding others accountable for said standards. It is rare that the life of a student in an academic community can be so private that it will not affect the community as a whole or that the above standards do not apply.

The discovery, advancement and communication of knowledge are not possible without a commitment to these standards. Creativity cannot exist without acknowledgment of the creativity of others. New knowledge cannot be developed without credit for prior knowledge. Without the ability to trust that these principles will be observed, an academic community cannot exist.

The commitment of its faculty, staff and students to these standards contributes to the high respect in which the Carnegie Mellon degree is held. Students must not destroy that respect by their failure to meet these standards. Students who cannot meet them should voluntarily withdraw from the university.

The Carnegie Mellon Code can also be found on-line at:
https://www.cmu.edu/student-affairs/theword/.
Appendix A
2020-2021
Highlighted University Resources for Graduate Students
and
The WORD, Student Handbook

Key Offices for Graduate Student Support

Graduate Education Office
www.cmu.edu/graduate; grad-ed@cmu.edu
The Graduate Education Office provides central support for all Master’s and Doctoral students with a focus on their academic experience at Carnegie Mellon. The Graduate Education Office serves as a hub for connecting graduate students to relevant campus experts and resources to support their academic success, understanding of university level policies and practices and to assist them in advancing their personal and professional development.

Examples of resources offered through the Graduate Education Office include- but are not limited to:

- Website with university resources, contact information for CMU programs and services, calendar of events related to graduate students
- Bi-monthly email to all graduate students with information on activities, resources and opportunities
- Professional Development Seminars and Workshops
- GSA/Provost Conference Funding Grants
- GSA/Provost Small Research Grants (GuSH)
- Consultations on issues related to the graduate student experience

The Graduate Education Office also works with the colleges and departments by informing and assisting in developing policy and procedures relevant to graduate students and working with departments on issues related to graduate students. Additionally we partner with many other offices and organizations, such as the Graduate Student Assembly, to support the holistic graduate student educational experience.

Office of the Dean of Students
https://www.cmu.edu/student-affairs/dean

The Office of the Dean of Students provides central leadership of the metacurricular experience at Carnegie Mellon including the coordination of student support. Vice President of Student Affairs and Dean of Students Gina Casalegno leads the Division of Student Affairs which includes the offices and departments listed below (not an exhaustive list).

Graduate students will find the enrollment information for Domestic Partner Registration and Maternity Accommodations in the Office of the Dean of Students or on their website. This Office also manages the Emergency Student Loan (ESLs) process. Emergency Student Loans are made available
through generous gifts of alumni and friends of the university. The Emergency Student Loan is an interest-free, emergency-based loan repayable to the university within 30 days. Loans are available to enrolled students for academic supplies, medication, food or other expenses not able to be met due to unforeseeable circumstances.

Additional resources for graduate students include College Liaisons and the Student Support Resources team. College Liaisons are senior members of the Division of Student Affairs who work with departments and colleges addressing student concerns across a wide range of issues. College Liaisons are identified on the student SIO page in the Important Contacts list. The Student Support Resources team offers an additional level of support for students who are navigating any of a wide range of life events. Student Support Resources staff members work in partnership with campus and community resources to provide coordination of care and support appropriate to each student’s situation.

The Division of Student Affairs includes (not an exhaustive list):

- Athletics, Physical Education and Recreation
- Career and Professional Development Center (CPDC)
- Center for Student Diversity and Inclusion
- Cohon University Center
- Counseling & Psychological Services (CaPS)
- Dining Services
- Office of Community Standards and Integrity (OCSI)
- Office of Student Leadership, Involvement, and Civic Engagement (SLICE)
- University Health Services (UHS)
- Wellness Initiatives

Center for Student Diversity & Inclusion
https://www.cmu.edu/student-diversity/

Diversity and inclusion have a singular place among the values of Carnegie Mellon University. The Center for Student Diversity & Inclusion actively cultivates a strong, diverse and inclusive community capable of living out these values and advancing research, creativity, learning and development that changes the world.

The Center offers resources to enhance an inclusive and transformative student experience in dimensions such as access, success, campus climate and intergroup dialogue. Additionally, the Center supports and connects historically underrepresented students and those who are first in their family to attend college in a setting where students’ differences and talents are appreciated and reinforced, both at the graduate and undergraduate level. Initiatives coordinated by the Center include, but are not limited to:
- First generation/first in family to attend college programs
- LGBTQ+ Initiatives
- Race and ethnically-focused programs, including Inter-University Graduate Students of Color Series (SOC) and PhD SOC Network
- Women’s empowerment programs, including Graduate Women’s Gatherings (GWGs)
- Transgender and non-binary student programs

**Assistance for Individuals with Disabilities**
http://www.cmu.edu/disability-resources/

The Office of Disability Resources at Carnegie Mellon University has a continued mission to provide physical, digital, and programmatic access to ensure that students with disabilities have equal access to their educational experience. We work to ensure that qualified individuals receive reasonable accommodations as guaranteed by the Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act of 1973. Students who would like to receive accommodations can begin the process through Disability Resources' secure online portal or email access@andrew.cmu.edu to begin the interactive accommodation process.

Students with physical, sensory, cognitive, or emotional disabilities are encouraged to self-identify with the Office of Disability Resources and request needed accommodations. Any questions about the process can be directed to access@andrew.cmu.edu, or call (412) 268-6121.

**Eberly Center for Teaching Excellence & Educational Innovation**
www.cmu.edu/teaching

We offer a wide variety of confidential, consultation services and professional development programs to support graduate students as teaching assistants or instructors of record during their time at Carnegie Mellon University and as future faculty members at other institutions. Regardless of one's current or future teaching context and duties, our goal is to disseminate evidence-based teaching strategies in ways that are accessible and actionable. Programs and services include campus-wide Graduate Student Instructor Orientation events and our Future Faculty Program, both of which are designed to help participants be effective and efficient in their teaching roles. The Eberly Center also assists departments in creating and conducting customized programs to meet the specific needs of their graduate student instructors. Specific information about Eberly Center support for graduate students is found at www.cmu.edu/teaching/graduatestudentsupport/index.html.

**Graduate Student Assembly**
www.cmu.edu/stugov/gsa/index.html

The Graduate Student Assembly (GSA) is the branch of Carnegie Mellon Student Government that represents, and advocates for the diverse interests of all graduate students at CMU. GSA is composed of representatives from the different graduate programs and departments who want to improve the graduate student experience at the different levels of the university. GSA is funded by the Student Activities Fee from all graduate students. GSA passes legislation, allocates student activities funding, advocates for legislative action locally and in Washington D.C. on behalf of graduate student issues and needs, and otherwise acts on behalf of all graduate student interests. Our recent
accomplishments are a testament to GSA making a difference, and steps to implementing the vision laid out by the strategic plan. https://www.cmu.edu/stugov/gsa/About-the-GSA/Strategic-Plan.html.

GSA offers an expanding suite of social programming on and off-campus to bring graduate students from different departments together and build a sense of community. GSA is the host of the Graduate Student Lounge on the 3rd floor of the Cohon University Center- a great place to study or meet up with friends. GSA also maintains a website of graduate student resources on and off-campus. Through GSA’s continued funding for professional development and research conferences, the GSA/Provost Conference Funding Program and GSA/Provost GuSH Research Grants are able to run, as managed by the Graduate Education Office. As we move forward, GSA will continue to rely on your feedback to improve the graduate student experience at CMU. Feel free to contact us at <gsa@cmu.edu> to get involved, stop by our office in the Cohon University Center Room 304 or become a representative for your department.

Office of International Education (OIE)
http://www.cmu.edu/oie/

Carnegie Mellon hosts international graduate and undergraduate students who come from more than 90 countries. The Office of International Education (OIE) is the liaison to the University for all non-immigrant students and scholars, as well the repository for study abroad opportunities and advisement. OIE provides many services including: advising on personal, immigration, study abroad, academic, and social and acculturation issues; presenting programs of interest such as international career workshops, tax workshops, and cross-cultural and immigration workshops; international education and statistics on international students in the United States; posting pertinent information to students through email and the OIE website, and conducting orientation and pre-departure programs.

Veterans and Military Community
http://www.cmu.edu/veterans/

Military veterans are a vital part of the Carnegie Mellon University community. Graduate students can find information on applying for veteran education benefits, campus services, veteran's groups at CMU, and non-educational resources through the Veterans and Military Community website. There are also links and connections to veteran resource in the Pittsburgh community. The ROTC and Veteran Affairs Coordinator can be reached at uro-vaedbenefits@andrew.cmu.edu or 412-268-8747.

Carnegie Mellon Ethics Hotline
https://www.cmu.edu/hr/resources/ethics-hotline.html

The health, safety and well-being of the university community are top priorities at Carnegie Mellon University. CMU provides a hotline that all members of the university community should use to confidentially report suspected unethical activity relating to areas below:

- Academic and Student Life
- Bias Reporting
• Environmental Health and Safety
• Financial Matters
• High-Risk Incident
• Human Resource Related
• Information Systems
• Research
• Threat of Business Interruption
• Threat of Violence or Physical Harm
• Title IX

Students, faculty and staff can anonymously file a report by calling 877-700-7050 or visiting www.reportit.net (user name: tartans; password: plaid). All submissions are reported to appropriate university personnel. The hotline is NOT an emergency service. For emergencies, call University Police at 412-268-2323.

Policy Against Retaliation
It is the policy of Carnegie Mellon University to protect from retaliation any individual who makes a good faith report of a suspected violation of any applicable law or regulation, university Policy or procedure, any contractual obligation of the university, and any report made pursuant to the Carnegie Mellon University Code of Business Ethics and Conduct.

Additional details regarding the Policy Against Retaliation are available at https://www.cmu.edu/policies/administrative-and-governance/whistleblower.html

Key Offices for Academic & Research Support

Computing and Information Resources
www.cmu.edu/computing
Computing Services maintains and supports computing resources for the campus community, including the campus wired and wireless networks, printing, computer labs, file storage, email and software catalog. As members of this community, we are all responsible for the security of these shared resources. Be sure to review the Safe Computing (https://www.cmu.edu/computing/safe/) section and the University Computing Policy (https://www.cmu.edu/policies/information-technology/computing.html)

Visit the Computing Services website (https://www.cmu.edu/computing/) to learn more. For assistance the Computing Services Help Center is available at 412-268-4357 (HELP) or it-help@cmu.edu.

Student Academic Success Center
https://www.cmu.edu/student-success/
Student Academic Support Programs

Tartan Scholars
• The Tartan Scholars program was created to provide support for limited resourced students
through an intentional first year undergraduate experience with the goals of enhancing the cohort’s skill and community building through a lens of self-authorship, growth mindset, and a sense of belonging. As part of the Student Academic Success Center, Tartan Scholars are invited to join the University and participate in summer initiatives and pre-orientation activities prior to their first year at the University.

- There are opportunities for graduate students to serve as accountability, learning, or development partners, workshop facilitators, and presenters. Contact Diane Hightower at ddhighto@andrew.cmu.edu for more details.

**Learning Support**

- **Supplemental Instruction:** Supplemental Instruction (SI) is an academic support model that utilizes peer-assisted study sessions. The SI program provides regularly scheduled review sessions on course materials outside the classroom. SI is a non-remedial approach to learning as the program targets high-risk courses and is available in select courses based on data related to past student performance and feasibility.

- **Peer Tutoring:** Weekly Tutoring Appointments are offered in a one-on-one and small group format to students from any discipline who need assistance with a course that may not be supported by our other services. Weekly appointments give students the opportunity to interact regularly with the same tutor to facilitate deeper understanding of concepts. Students can register online through the Student Academic Success website.

- **Academic Coaching:** Academic Coaching provides holistic one-on-one peer support and group workshops to help students find and implement their conditions for success. We assist students in improving time management, productive habits, organization, stress management, and study skills. Students will request support through the Academic Success Center website and attend in-person meetings or meet using video and audio conferencing technology to provide all students with support.

- **“Just in Time” Workshops:** The Student Academic Success team is available to partner with instructors and departments to identify skills or concepts that would benefit from supplemental offerings (workshops, boot camps) to support students’ academic success and learning. We are eager to help convene and coordinate outside of the classroom skill-building opportunities that can be open to any student interested in building skill or reinforcing course concept mastery.

- **Study Partners:** Support for students to create and benefit from their own study groups: The Student Academic Success team assists students in forming and benefiting from peer study groups, whereby all students can reap the benefits of peer-to-peer learning, student agency, and collaboration skill development. Staff from the Student Academic Success Center will be made available to instructors and students to assist with the formation of peer-led study groups. This level of support is open to any course where the instructor requests or agrees such support is appropriate and students are interested in both leading and participating.

**Language and Cross-cultural Support**

More than 60% of graduate students at Carnegie Mellon are international students, and others are nonnative speakers of English who have attended high school or undergraduate programs in the US.
Many of these students want to hone their language and cross-cultural skills for academic and professional success. Students can choose from sessions on

- how to give a strong presentation,
- writing academic emails,
- expectations and strategies for clear academic writing,
- how to talk about yourself as a professional in the U.S.,
- developing clearer pronunciation,
- using accurate grammar,
- building fluency, and more.
- Students can make an appointment with a Language Development Specialist to get individualized coaching on language or cross-cultural issues.

The Student Academic Success Center is also charged with certifying the language of International Teaching Assistants (ITAs), ensuring that nonnative English speakers have the language proficiency needed to succeed as teaching assistants in the Carnegie Mellon classroom. Students preparing to do an ITA Certification should plan to take classes offered by the language support team at the SASC from the beginning of their first semester. Start by contacting the language support team at the SASC website or attend a Language Support Orientation at the SASC or in your department.

University Libraries
www.library.cmu.edu
The University Libraries offers a wide range of information resources and services supporting graduate students in course-work, research, teaching, and publishing. The library licenses and purchases books, journals, media and other needed materials in various formats. Library liaisons, consultants and information specialists provide in-depth and professional assistance and advice in all-things information - including locating and obtaining specific resources, providing specialized research support, advanced training in the use and management of data. Sign up for workshops and hands-on topic-specific sessions such as data visualization with Tableau, cleaning data with OpenRefine, and getting started with Zotero. Weekly drop-in hours for Digital Humanities and for Research Data Research Management are scheduled during the academic year. Start at the library home page to find the books, journals and databases you need; to identify and reach out to the library liaison in your field; to sign up for scheduled workshops; and to connect with consultants in scholarly publishing, research data management, and digital humanities.

Research at CMU
www.cmu.edu/research/index.shtml
The primary purpose of research at the university is the advancement of knowledge in all fields in which the university is active. Research is regarded as one of the university’s major contributions to society and as an essential element in education, particularly at the graduate level and in faculty development. Research activities are governed by several university policies. Guidance and more general information is found by visiting the Research at Carnegie Mellon website.
Office of Research Integrity & Compliance  
[www.cmu.edu/research-compliance/index.html](http://www.cmu.edu/research-compliance/index.html)

The Office of Research Integrity & Compliance (ORIC) is designed to support research at Carnegie Mellon University. The staff work with researchers to ensure research is conducted with integrity and in accordance with federal and Pennsylvania regulation. ORIC assists researchers with human subject research, conflicts of interest, responsible conduct of research, export controls, and institutional animal care & use. ORIC also provides consultation, advice, and review of allegations of research misconduct.

**Key Offices for Health, Wellness & Safety**

Counseling & Psychological Services  
[https://www.cmu.edu/counseling/](https://www.cmu.edu/counseling/)

Counseling & Psychological Services (CaPS) affords the opportunity for students to talk privately about academic and personal concerns in a safe, confidential setting. An initial consultation at CaPS can help clarify the nature of the concern, provide immediate support, and explore further options if needed. These may include a referral for counseling within CaPS, to another resource at Carnegie Mellon, or to another resource within the larger Pittsburgh community. CaPS also provides workshops and group sessions on mental health related topics specifically for graduate students on campus. CaPS services are provided at no cost. Appointments can be made in person, or by telephone at 412-268-2922.

Health Services  
[www.cmu.edu/HealthServices/](http://www.cmu.edu/HealthServices/)

University Health Services (UHS) is staffed by physicians, advanced practice clinicians and registered nurses who provide general medical care, allergy injections, first aid, gynecological care and contraception as well as on-site pharmaceuticals. The CMU Student Insurance Plan covers most visit fees to see the physicians and advanced practice clinicians & nurse visits. Fees for prescription medications, laboratory tests, diagnostic procedures and referral to the emergency room or specialists are the student’s responsibility and students should review the UHS website and their insurance plan for detailed information about the university health insurance requirement and fees.

UHS also has a registered dietician and health promotion specialists on staff to assist students in addressing nutrition, drug and alcohol and other healthy lifestyle issues. In addition to providing direct health care, UHS administers the Student Health Insurance Program. The Student Health Insurance plan offers a high level of coverage in a wide network of health care providers and hospitals. Appointments can be made by visiting UHS’s website, walk-in, or by telephone, 412-268-2157.

Campus Wellness  
[https://www.cmu.edu/wellness/](https://www.cmu.edu/wellness/)

At Carnegie Mellon, we believe our individual and collective well-being is rooted in healthy connections to each other and to campus resources. The university provides a wide variety of wellness, mindfulness and connectedness initiatives and resources designed to help students thrive inside and outside the classroom. The BeWell@CMU e-newsletter seeks to be a comprehensive
resource for CMU regarding all wellness-inspired events, announcements and professional and personal development opportunities. Sign up for the Be Well monthly newsletter via https://bit.ly/BeWellNewsletter or by contacting the Program Director for Student Affairs Wellness Initiatives, at alusk@andrew.cmu.edu.

Religious and Spiritual Life Initiatives (RSLI)
www.cmu.edu/student-affairs/spirituality
Carnegie Mellon is committed to the holistic growth of our students, including creating opportunities for spiritual and religious practice and exploration. We have relationships with local houses of worship from various traditions and many of these groups are members of CMU’s Council of Religious Advisors. We also offer programs and initiatives that cross traditional religious boundaries in order to increase knowledge of and appreciation for the full diversity of the worldview traditions. Our RSLI staff are here to support students across the spectrum of religious and spiritual practice and would be more than happy to help you make a connection into a community of faith during your time at CMU.

University Police
http://www.cmu.edu/police/
412-268-2323 (emergency only), 412-268-6232 (non-emergency)
The University Police Department is located at 300 South Craig Street (entrance is on Filmore Street). The department’s services include police patrols and call response, criminal investigations, fixed officer and foot officer patrols, event security, and crime prevention and education programming as well as bicycle and laptop registration. Visit the department’s website for additional information about the staff, emergency phone locations, crime prevention, lost and found, finger print services, and annual statistic reports.

Carnegie Mellon University publishes an annual campus security and fire safety report describing the university’s security, alcohol and drug, sexual assault, and fire safety policies and containing statistics about the number and type of crimes committed on the campus and the number and cause of fires in campus residence facilities during the preceding three years. Graduate students can obtain a copy by contacting the University Police Department at 412-268-6232. The annual security and fire safety report is also available online at https://www.cmu.edu/police/annualreports/.

Shuttle and Escort Services
Parking and Transportation coordinates the Shuttle Service and Escort Service provided for CMU students, faculty, and community. The Shuttle & Escort website has full information about these services, stops, routes, tracking and schedules.

The WORD
http://www.cmu.edu/student-affairs/theword/
The WORD is Carnegie Mellon University’s student on-line handbook and is considered a supplement to the department (and sometimes college) handbook. The WORD contains campus resources and opportunities, academic policy information and resources, community standards information and resources. It is designed to provide all students with the tools, guidance, and insights to help you achieve your full potential as a member of the Carnegie Mellon community. Information about the following is included in The WORD (not an exhaustive list) and graduate
students are encouraged to bookmark this site and refer to it often. University policies can also be found in full text at: http://www.cmu.edu/policies/.

Carnegie Mellon Vision, Mission
Statement of Assurance
Carnegie Code

Academic Standards, Policies and Procedures
Educational Goals
Academic and Individual Freedom
Statement on Academic Integrity Standards for Academic & Creative Life
Assistance for Individuals with Disabilities
Master’s Student Statute of Limitations
Conduct of Classes
Copyright Policy
Cross-college & University Registration
Doctoral Student Status Policy
Evaluation & Certification of English Fluency for Instructors
Final Exams for Graduate Courses
Grading Policies
Intellectual Property Policy
Privacy Rights of Students
   Student’s Rights

Research
Human Subjects in Research
Office of Research Integrity & Compliance
Office of Sponsored Programs
Policy for Handling Alleged Misconduct of Research
Policy on Restricted Research

Tax Status of Graduate Student Awards

Campus Resources & Opportunities
Alumni Relations
Assistance for Individuals with Disabilities
Athletics, Physical Fitness & Recreation
Carnegie Mellon ID Cards and Services
Cohon University Center
Copying, Printing & Mailing
Division of Student Affairs
Domestic Partner Registration
Emergency Student Loan Program
Gender Programs & Resources
Health Services
Dining Services
The HUB Student Services Center
ID Card Services
Leonard Gelfand Center
LGBTQ Resources
Multicultural and Diversity Initiatives
Opportunities for Involvement
Parking and Transportation Services
Shuttle and Escort Services
Spiritual Development
University Police
Student Activities
University Stores

Community Standards, Policies and Procedures
Alcohol and Drugs Policy
AIDS Policy
Bicycle/Wheeled Transportation Policy
Damage to Carnegie Mellon Property
Deadly Weapons
Discriminatory Harassment
Disorderly Conduct
Equal Opportunity/Affirmative Action Policy
Freedom of Expression Policy
Health Insurance Policy Immunization Policy
Missing Student Protocol
Non-Discrimination Policy
On-Campus Emergencies
Pets
Political Activities
Recycling Policy
Riotous and Disorderly Behavior
Safety Hazards
Scheduling and Use of University Facilities
Sexual Harassment and Sexual Assault Policy
Smoking Policy
Student Accounts Receivable and Collection Policy and Procedures
Student Activities Fee
Student Enterprises
Workplace Threats and Violence Policy
Appendix B – Departmental Forms and Guides

- First Year Milestone Form
- Second Year Milestone Form
- Thesis Proposal Form
- Thesis Completion Form
- Thesis Title Page Format
First Year Research Requirement Completion Form

Instructions
The advisor must complete and turn in this form immediately upon the student’s successful completion of the first year research requirement.

Today’s Date __________________________

Student Name (please print) ____________________________________________

Date student completed first year research requirement ________________

Advisor Signature ____________________________________________ Date ________________

Advisor Name (please print) ____________________________________________

Please turn in completed form to Melissa Stupka in MI 116C.
Second Year Research Requirement Completion Form

Instructions
The advisor must complete and turn in this form immediately upon the student’s successful completion of the second year research requirement.

Today’s Date ____________________________

Student Name (please print) ________________________________________

Date student completed second year research requirement _____________________ MM/DD/YYYY

Advisor Signature __________________________________________ Date ___________

Advisor Name (please print) ___________________________________________

Please turn in completed form to Melissa Stupka in MI 116C.
Thesis Proposal Completion Form

Instructions
The advisor must complete and turn in this form immediately upon the student’s successful thesis proposal presentation.

Today’s Date ____________________________

Student Name (please print) ________________________________________________

Date student completed thesis proposal requirements ____________________________ MM/DD/YYYY

Advisor Signature _______________________________________________  Date ________________

Advisor Name (please print) ______________________________________________________

Please turn in completed form to Melissa Stupka in Mi 116C.

________________________________________Office Use Only______________________________

Date doctoral contract submitted to Registrar’s Office  _____/___/_______

Submitted by ________________________________
Thesis Defense Completion Form

Instructions
The advisor must complete and turn in this form immediately upon the student’s successful thesis defense presentation and submission of final dissertation document.

Today’s Date __________________________

Student Name (please print) ________________________________________________

Title of Dissertation __________________________________________________________

Date student completed thesis defense requirements ____________________________
   MM/DD/YYYY

Date student completed final dissertation document ____________________________
   MM/DD/YYYY

Advisor Signature ____________________________________________ Date __________

Advisor Name (please print) ________________________________________________

Department Head Signature ____________________________________________ Date __________

Dean Signature ____________________________________________ Date __________

Please turn in completed form to Melissa Stupka in MI 116C.
Title

Your Name

Month Year

Neuroscience Institute
(If doing a joint program also include that Department/College here)
Dietrich College of Humanities and Social Sciences
Carnegie Mellon University
Pittsburgh, PA 15213

Thesis Committee:
Name, Chair
Name
Name
Name
External Name, University

Submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy.

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