ML

MACHINE LEARNING
D E P A R T M E N T

Graduate Student Handbook

This student handbook will inform you of the requirements and policies of each of our programs. Please see the section for the program you are enrolled in.

While this handbook is specific to your academic experience in the department, there are several other resources and offices graduate students are encouraged to consult during their tenure at Carnegie Mellon University. Information about The Word, the student handbook, the Office of the Assistant Vice Provost for Graduate Education, the Office of the Dean of Student Affairs and others are included in Appendix A of this handbook.

Note: The information contained in this graduate handbook template focuses on the resources and locations available at the Carnegie Mellon Pittsburgh Campus.

Last revision date (2018.01.09)

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Mission of the Department

Machine Learning is a scientific field addressing the question "How can machines *learn*, i.e., how to create algorithms and corresponding effective computer implementations capable of automatically analyze data and improve their performance with experience?" We study learning from many kinds of experience: predicting which medical patients will respond to which treatments by analyzing experience captured in databases of online medical records, or building mobile robots that learn models of their environments by gathering navigational experience from their sensors and actively interacting with people, or designing computer aids for scientific discovery that combine initial scientific hypotheses with new experimental data to automatically produce refined scientific hypotheses that better fit observed data.

To tackle these problems, we develop algorithms that discover general conjectures and knowledge from specific data and experience, based on different methods, including sound statistical and computational principles, as well as instruction and self-exploration. We also develop theories of learning processes that characterize the fundamental nature of the computations and experience sufficient for successful learning in machines and in humans.

The mission of the Machine Learning Department is to help lead the development of the discipline of machine learning, by performing leading research in this field, by developing and propagating a model academic curriculum for the field, and by helping society to benefit from the knowledge gained by the field.

We are committed to the principle that students may achieve competence through a variety of methods, including courses, seminars, projects, and independent and guided research. We consider each student's individual strengths, weaknesses, and interests in designing the best method for the student to fulfill these requirements. Our program is unique in that we encourage and expect students to engage in research from their first day in the Department.

Degrees Offered

PhD in Machine Learning
Joint PhD in Machine Learning and Public Policy
Joint PhD in Neural Computation and Machine Learning
Joint PhD in Statistics and Machine Learning
Primary Master's in Machine Learning
Fifth-Year Master's in Machine Learning
Secondary Master's in Machine Learning

University Policies & Department 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:

The Word/Student Handbook: www.cmu.edu/student-affairs/theword/index.html

Academic Integrity Website: www.cmu.edu/academic-integrity

University Policies Website: www.cmu.edu/policies/

Graduate Education Website: http://www.cmu.edu/graduate/policies/index.html

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

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 vice president for campus affairs, Carnegie Mellon University, 5000 Forbes Avenue, Pittsburgh, PA 15213, telephone 412-268-2056.

Obtain general information about Carnegie Mellon University by calling 412-268-2000.

The Statement of Assurance can also be found on-line at:
http://www.cmu.edu/policies/administrative-and-governance/statement-of-assurance.html

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: http://www.cmu.edu/student-affairs/theword/code.html.

Department Registration Process/Procedures

During the during the fall and spring semesters, MS students should normally be registered for at least 36 units and PhD students should normally be registered for 48 units. During the summer, students should be registered for 36 units.

Expected Background

Incoming students must have a strong background in Computer Science, including a solid understanding of complexity theory and good programming skills, as well as a good background in mathematics. Specifically, the first-year courses assume at least one year of college-level probability and statistics, as well as matrix algebra and multivariate calculus. Experience in Matlab/R/scipy-numpy is especially helpful, as is probability/stats, linear algebra, and matrix and tensor calculus. This background should be at least at the level of the following courses:

15-150 Principals of Functional Programming
15-210 Parallel and Sequential Data Structures and Algorithms
36-225 Introduction to Probability Theory
36-226 Introduction to Statistical Inference

We will accept equivalent coursework or experience from outside of CMU for these prerequisites.

Departmental Resources & Personnel

Personnel

- Andrew W. Moore, Dean School of Computer Science (SCS)
- Robert Frederking, Associate Dean for Doctoral Programs, SCS
- Garth Gibson, Associate Dean for Master's Programs, SCS
- Manuela M. Veloso, Department Head, Machine Learning Department (ML)
- Geoffrey Gordon, Associate Department Head for Education,
  Co-Director, Doctoral Programs in ML
- William Cohen, Co-Director, Master's Programs in ML
  Director, ML Minor
- Diane Stidle, Graduate Programs Manager
- Dorothy Holland-Minkley, Master's Programs Coordinator
- [ML Core Faculty](#)
- [ML Affiliated Faculty](#)
- [ML Related Faculty](#)
- Russ O'Lare, Business Manager, ML
- Alison Chiocchi, Employment Processes Manager
- Sharon Cavlovich, Assistant to the Dept. Head, ML

The Co-Directors serve as ombudsmen for graduate students to assist with difficult academic or personal situations where a confidential sounding board and/or an intermediary can be helpful. Examples of situations where students are encouraged to seek advice or assistance include:

- Difficulty in communications with advisor, particularly when those difficulties may lead to considering changing advisors or leaving the program
- Conflict with other group members that is difficult to resolve within the group
- Issues related to diversity or the departmental climate for those in groups who are historically underrepresented in science, or
- Personal concerns that interfere significantly with the ability to make timely progress in research or program requirements. These might be due to health, family or financial challenges.

Upon the student's request, information shared will be kept in confidence, as long as no laws require otherwise. Should help be needed from additional sources, the student would be asked before sharing confidential information.

In the event that a difficulty cannot be resolved within the department, please see the grievance procedures for resolving difficult matters, which are available here: www.cmu.edu/graduate/policies/appeal-grievance-procedures.html.

Additionally, students may confer with the university graduate ombudsman, Suzie Laurich-McIntyre, slaurichmcintyre@cmu.edu, on issues of process or other concerns as they navigate conflicts. Suzie Laurich-McIntyre is the Assistant Vice Provost for Graduate Education.

Students can also confer with Angie Lusk, alusk@andrew.cmu.edu, the SCS Student Affairs contact. Angie Lusk is listed as an emergency contact for all graduate students in SCS, since she serves as a liaison, and students are particularly welcomed to reach out to her with inter-departmental concerns.

Resources

The Machine Learning Department is located on the 8th floor of Gates Hillman Center (GHC).

Location of Printers, available to those with a CS account, and printing etiquette is found here: http://www.cs.cmu.edu/~help/printing/index.html

Copy machines are available in the open study area 8014 GHC, but you will need a code to use them. Please request the code from your Graduate Program Manager.

Information about public computer clusters and printers can be found at: http://www.cs.cmu.edu/~help/printing/index.html

The department's fax machine is located in the Graduate Program Manager's office, 8001 GHC.

Key Distribution: Please see your Graduate Program Manager for a key if you have assigned office space. Primary and 5th-Year MS students can use their CMU student ID to access the Machine Learning Master's Students Lounge in NSH A401.

CS Main Office: We do not have our own Main Office or mail facilities. CS is allowing us to use the following services.

Functions of the CS Main Office:

- Send mail
- Pick up mail/packages
- Send overnight packages

Please do not take any supplies from the CS Main office; office supplies for the ML Department are located in 8004 GHC.

To have packages delivered to you, please use the following address:

> Your Name
> Machine Learning Dept.
> School of Computer Science
> 6105 Gates Building
> Carnegie Mellon University
> 5000 Forbes Avenue
> Pittsburgh, PA 15213

Mailboxes are located on the 6th floor of GHC. A US Post Office is located in the basement of University Center.

Purchasing and Reimbursement Procedures and Policies: The university has detailed and strict policies relating to the purchase of goods, services, equipment, etc., whether using a general ledger account, restricted account, or grant. There are also reimbursement policies, along with tax exempt considerations that graduate students must adhere to.

Seminars

The Machine Learning Department sponsors seminars by researchers from within and outside Carnegie Mellon, which are attended by faculty, staff and graduate students. Students are encouraged to meet and interact with visiting scholars. This is extremely important both to get a sense of the academic projects that are pursued outside of Carnegie Mellon and to get to know the leaders of such projects. That applies not only to seminars directly relevant to a student's research interests: the seminars provide an opportunity to widen one's perspective on the field.

We currently have the following seminars:

[ML Distinguished Lecture Series](#)

[ML Lunch Seminar](#)

[ML Special Seminars](#)

ML Degree Requirements

ML PhD students: 6 12-unit courses + DAP (18 units) + presentation skills + 2 TAs + PhD thesis

ML Master's students: 7 12-unit courses + DAP (18 units)

ML Course Requirements

The five core courses together provide a foundation in machine learning, statistics, probability, algorithms, and AI, while the elective can be used to deepen the student's knowledge in their chosen subfield.

Set Core

All students take **all three** courses from the Set Core.

- 10-701 Introduction to Machine Learning* *or* 10-715 Advanced Introduction to Machine Learning
- 10-702 Statistical Machine Learning
- 36-705 Intermediate Statistics

* To earn a PhD in Machine Learning, 10-715 must be taken. Students may take either 10-701 or 10-715 to earn an MS in Machine Learning.

Menu Core

Students may take their **choice of two** courses from the Menu Core:

- 10-703 Deep Reinforcement Learning *or* 10-807 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 AI
- 15-826 Multimedia Databases and Data Mining
- 36-752 Advanced Probability

Note: The electives must be chosen from two different lines (e.g., if 15-750 Algorithms is taken, then 15-853 Algorithms in the Real World may not be the second elective).

Electives

MS students take **two electives** and PhD students take **one elective**, which may be any course at the 700 or higher level in the School of Computer Science or Department of Statistics (36-xxx), including additional courses from the Menu Core, or other courses by approval. The elective is chosen in consultation with the student's advisor, with courses outside SCS or Statistics also needing approval from the Co-Directors of the program.

Students may petition for a waiver of the second elective for the MS degree if they conduct significant research in machine learning, above and beyond any research required for the DAP or for the classes counted toward the MS degree. The scope of this research should be equivalent to at least 36 units of coursework: e.g., a 25%-time project that lasts three semesters. The work should take place while the student is enrolled as an MS or PhD student in MLD. The research should demonstrate fluency in using the concepts taught in the MLD core courses to produce interesting results or conduct interesting experiments. It is not required to publish a paper about the research, but a paper or paper draft can provide evidence that the work satisfies the above requirements.

Students earning an MS in Machine Learning may also take select 600-level courses, including 10-605 Machine Learning with Large Datasets. Similarly, students earning an MS on the way to a PhD may use one of those 600-level courses for their second elective, while keeping in mind that the elective for their PhD must be at the 700-level and may not be replaced by research.

Note: All courses, including the two electives, must be 12 units or greater. Two 6-unit mini courses can count as a single 12-unit elective.

Course Waiver Policy

Some students will have taken some of the above courses before entering the ML PhD program: for example, as ML MS students at Carnegie Mellon. If students have previously taken the above-named courses at Carnegie Mellon before joining the ML PhD, those may be used to satisfy the requirements and do not need to be repeated. (Note that courses can only be used for single Master's degree.)

Some students will have taken similar courses at other universities before entering the ML MS or PhD program. Based on such equivalent coursework, any student can apply to replace (not reduce) up to two courses with either menu cores or electives. All electives must be supported by the advisor, and will be evaluated by the PhD program Co-Directors.

In addition, students must satisfy all university requirements for the graduate degree:
http://www.cmu.edu/graduate/policies

Cross Registration Program with Local Universities

Carnegie Mellon University offers students the opportunity to take courses for credit through a cross-registration program (see Pittsburgh Council on Higher Education (PCHE) and Cross-registration below) 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 grade. 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.)

Course Add/Drop Policy

Students are able to add or drop a course until the 10th day of class. After the 10th day it is still possible by filling out the Retroactive Add/Drop Petition form on the Enrollment Services website and obtaining signatures.

- Full-time graduate student status, according to the University and the Department is 36 units.
- Dropping below full-time may affect your financial aid eligibility, loan repayment, housing, tax dependency and/or visa status, and varsity sports eligibility.
- Dropping all courses is not the equivalent of leaving the university temporarily (leave of absence) or permanently (withdrawal). A student who wishes to remove him/herself from the university must submit either a Leave of Absence or Withdrawal form.

Course Audit Policy

Auditing is presence in the classroom without receiving academic credit, a pass/fail, or a letter grade. Audited courses will not count towards your degree requirements. The extent of a student's participation must be arranged and approved by the course instructor. A student wishing to audit a course is required to register for the course, complete the Course Audit Approval Form, obtain permission of the course instructor and their advisor, and return the form to the Registrar's Office prior to the 10th day of class.

Any student enrolled full-time may audit a course without additional tuition charges. Part-time students who choose to audit a course will be assessed tuition at the regular per-unit tuition rate.

Practicum Requirements

To earn an MS, either by itself or on the way to a PhD, students must complete a 36-unit practicum. This practicum may be either directed research or an internship related to machine learning. Most students complete the practicum during the summer, and it may be paid or unpaid.

Data Analysis Project (DAP) Requirements

The DAP enables students to learn to use machine learning for real data analysis: to solve a well-targeted research question and report the results.

Both MS and PhD students are required to complete a DAP.

The DAP consists of two parts, totaling 18 units of effort:

Part I (6 units, DAP Prep course):

I.1. Finding a research question and corresponding data set(s) to be analyzed to answer the question. The combination of question-and-data needs to be interesting, while also feasible. This step may require pragmatism given the time-limited nature of the DAP.

I.2. Based on the question and data, the DAP involves:

- representing the data to be ready to be analyzed by a computer program,
- selecting the ML algorithms/tools appropriate for the question and data.

The choice of question and data may iterate with these steps.

Part II (12 units, DAP Research):

II.1. The DAP then develops with:

- implementing the ML system,
- interpreting the output of the ML system

II.2. The DAP concludes with:

- a written report covering the question, data, representation, tools, implementation, results, and lessons learned. This report should be no more than 15 pages.
- a presentation where the student can answer questions about the project.

Organization:

1. The student works with an advisor for the DAP who is current MLD Core or Affiliated Faculty. For PhD students, the DAP faculty advisor may be, but does not need to be, their PhD thesis advisor (who, as such, is MLD Core or Affiliated Faculty). Any student, Master's or PhD, can work with a DAP advisor who is not MLD Core or Affiliated Faculty with prior permission from the program co-directors.

2. The DAP Prep course is taken in the semester that the student begins their DAP, after they have identified an advisor, a data set, and a research question.

3. DAP Research is taken in the following semester, and involves finishing the DAP research, presenting at DAP Day, and writing a DAP paper.

4. The final presentation of the DAP takes place at a DAP Day, and consists of a poster plus a short (~5 minute) spotlight-style oral. DAP Day is held once per semester, 3-4 weeks before the degree certification deadline.

5. The DAP is evaluated by the student's DAP committee. Along with the advisor, the committee must have one more regular faculty member and may also have a third member. The third member can be anyone appropriate, such as an outside faculty member familiar with the data, a senior PhD student, or a postdoc working on a related topic.

6. The student receives letter grades for the DAP Prep course and the DAP Research course (the first assigned by the DAP Prep instructor, the second by the DAP committee).

Directed Research

Research is the fundamental part of the PhD program. PhD students will work on research with their faculty advisor. The advisor has the option to give a letter grade or pass/fail grade for research courses.

Different students, and different advisors, have different ideas of what directed research means and how progress can be demonstrated. It is the responsibility of both the student and their advisor to formulate for each semester a set of reasonable goals, plans, and criteria for success in conducting directed research. Advisors are individually responsible for adequately supervising this portion of the graduate program.

Independent Study/ Directed Reading

The Machine Learning Department allows Independent Study for credit. To count, an Independent Study must be for at least 12 units, must be supervised by a Machine Learning Department core faculty member, and must be approved by the co-directors. To request approval of an independent study, the student should give the department administrator: the number of credit hours sought, an indication of support from the supervising faculty member, a description of the work to be undertaken, and a list of deliverables at the end of each semester.

In rare circumstances, the Machine Learning Department allows students to count courses taken at outside universities while at MLD; these are listed as Independent Study credit, and are not subject to the 12-unit requirement above. The approval process is the same as for other Independent Study courses: the deliverable is the outside course grade, while the supervising faculty member certifies that the course is appropriate for the student and the number of credit hours, and is responsible for recommending a grade threshold to the co-directors at the beginning of the course, as well as verifying the threshold at the end of the course.

Resources and Regulations Governing Research at Carnegie Mellon
Office of Research Integrity & Compliance

Carnegie Mellon University promotes the responsible conduct of research through high standards of ethics and accountability in planning, conducting and reporting research. The responsible conduct of research is demonstrated through behavior that meets generally accepted standards. These standards are set forth by state and federal regulations, institutional policies, professional codes of conduct, and personal convictions. The building blocks of responsible conduct of research include:

- Honesty - conveying information truthfully and honoring commitments,
- Accuracy - reporting findings precisely and taking care to avoid errors,
- Efficiency - using resources wisely and avoiding waste, and
- Objectivity - letting the facts speak for themselves and avoiding improper bias

We may ask graduate students to complete the CITI on-line education course: CITI's website.

Office of Sponsored Research
Intellectual Property Policy
Policy on Restricted Research
Human Subjects in Research Policy

Link to University Policies: http://www.cmu.edu/policies/

Grades and Grading

University Policy on Grades www.cmu.edu/policies/student-and-student-life/grading.html
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.

For Machine Learning students, course work with a grade of C+ or lower is not acceptable toward graduate degree requirements. Students receiving a grade of C+ or lower will either have to retake the course or work with the instructor to do remedial work to prove they have learned the material.

Policy on Grades for Cross-registration Courses
http://www.cmu.edu/policies/student-and-student-life/transfer-credit-evaluation-and-assignment.html

Carnegie Mellon University offers students the opportunity to take courses for credit through a cross-registration program (see Pittsburgh Council on Higher Education (PCHE) and Cross-registration below) 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 grade. Such courses will not be taken into account for academic actions, honors or QPA calculations.

The Machine Learning Department does not accept transfer credit. While it is rare, requirements may sometimes be waived if students have taken equivalent coursework elsewhere. The Co-Directors of the program will decide whether requirements may be waived based on the accreditation of the institution offering the course, the course description, the learning outcomes of the course, the course syllabus, and student work product. This waiving is rare, and students should not expect to have requirements waived based on courses taken at other institutions. Refer to the Course Waiver Policy section for more information.

Academic Integrity

Please review the University expectations at: http://www.cmu.edu/academic-integrity/
Please review the entire policy at http://www.cmu.edu/policies/student-and-student-life/academic-integrity.html

A first violation usually has repercussions at the course level, such as failure of the course. Depending on severity, however, a first violation may result in program-level repercussions, including dismissal from the program and recommendation for expulsion from the university. Academic integrity on research papers, including a DAP or dissertation, is also enforced strictly; citations are required to avoid plagiarism, including self-plagiarism. A second academic integrity violation usually results in dismissal from the program and recommendation for expulsion from the university.

Violations will be discussed at the End of Semester Review Meeting and the department reserves the right to assess additional penalties to the student, as outlined in the University Policy found at:

http://www.cmu.edu/academic-integrity/documents/academic-disciplinary-actions-overview-for-graduate-students.2013.pdf

Teaching Requirements (if applicable)

For a student to be considered for a Teaching Assistant (TA) position for one of our courses, they should have previously taken that course or a similar course.

If the student's native language is not English, they will be required to take the International Teaching Assistant (ITA) test.

Evaluation and Certification of English Fluency for Instructors

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.

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

The full university policy can be reviewed at: http://www.cmu.edu/policies/faculty/evaluation-certification-english-fluency-instructors.html. The fluency of all instructional personnel will be determined by each department.

The Eberly Center for Teaching Excellence is a resource for TA and instructor training and included in the section *Additional University Resources, Appendix A*.

The responsibilities of a TA vary with different courses. Examples are:

- Help design homework assignments and other instructional materials
- Give recitations
- Grading
- Help with organizing poster sessions (if applicable)
- Advise small groups of student for class projects (if applicable)
- Hold office hours for individual tutoring

Internship Opportunities

You must discuss your plans for an internship with your advisor for approval. The summer semester is the optimal time for an internship.

Register for the practicum course: 10-935 for PhD students or 10-635 for MS students.

International students are required to consult with the Office of International Education for eligibility before seeking an internship/co-op or signing an offer contract. The dates of the internship must be within the dates of the semester, as determined by the university.

Upon completion of the internship you must submit an Internship Survey to the your program coordinator.

Your faculty advisor will assign a grade that will count towards your program research requirements.

Resources to Obtain an Internship
- Department Internship announcements
- University Career Fairs
- [Career and Professional Development Center](#)

Registering for Internships and Directed Research
There are official course numbers associated with both directed research at CMU and internships, and students enrolled in these courses will receive a pass/fail grade. Active students (excludes LOA and ABS status) must enroll in coursework and/or these research or internship courses each semester. Active PhD students are required to complete 24-48 units of Graduate Reading and Research each Fall, Spring and Summer semester unless waived by the Co-Directors. During any semester, students may substitute up to 36 units of Practicum for these research units.

Note that students typically substitute practicum units for research units 3-4 times during their PhD degree program. Substituting more than 4 times requires approval from the Co-Directors. International students must consult with the Office of International Education (OIE) for eligibility before seeking an internship/practicum or signing an offer contract. It is not standard for MS students to substitute practicum units for research units, but it is possible with the approval of their advisor and the program Co-Directors. Note that neither research or practicum units count

towards the coursework requirement of either the PhD or the MS program. Advisors are individually responsible for adequately supervising this portion of the programs.

Student Progress Review

The Machine Learning faculty meet at the end of each academic semester to make a formal evaluation of each student in the program, in a meeting traditionally known as Black Friday. The co-directors and faculty research advisors communicate in written form the assessment from these Black Friday meetings to the graduate students. Additional oral conversations take place, as and if needed.

Evaluation and feedback on a student's progress are important both to the student and to the faculty. Students need information on their overall progress to make long range plans.

At each semi-annual Black Friday meeting, the faculty review the student's previous semester's coursework and research progress and the student's next semester's plans to ensure that the student is making satisfactory progress. The evaluation of a student's progress in directed research often depends on the student having produced some tangible result; examples include the implementation of pieces of a software system, a written report on research explorations, an annotated bibliography in a major area, or, as part of preparation for doing research, a passing grade in a graduate course (beyond the required core courses and electives).

The purpose of having all the faculty meet together to discuss all of the students is to ensure uniformity and consistency in the evaluation by all of the different advisors. The faculty measure each student's progress against the goal of completing the program in a reasonable period of time. In their evaluation, the faculty consider courses taken, directed research, teaching if applicable, skill, development, papers written and lectures.

The faculty's primary source of information about the student is the student's advisor. The advisor is responsible for assembling the above information and presenting it at the faculty meeting. The student should make sure the advisor is informed about participation in activities and research progress made during the semester. Each student is asked to submit a summary of this information to the advisor at the end of each semester; this summary is viewable by all faculty during the Black Friday meeting.

Based on the above information, the faculty decide whether a student is making satisfactory progress in the program. If so, the faculty usually suggest goals for the student to achieve over the next semester. If not, the faculty make more rigid demands of the student.

Ultimately, permission to continue in the program is contingent on whether or not the student continues to make satisfactory progress toward the ML degree. If a student is not making satisfactory progress, the faculty may choose to drop the student from the program.

Terms of progress in Black Friday letters from faculty:

Each Black Friday letter will include a code indicating your current progress. The codes we use are:

SP = In the semiannual evaluation of all our students the faculty reviewed your progress toward the [MS or PhD]. We are happy to report that you are in good standing in the Machine Learning program.

USP = We have determined that your current level of progress is unsatisfactory. The letter will contain specific instructions for how to return to SP standing.

N-2 = We have determined that there are significant problems with your current level of progress. Accordingly, this is an N-2 letter: you are in danger of receiving an N-1 letter at the next Black Friday meeting unless you improve your rate of progress in the program. The letter will contain specific instructions for how to return to SP standing.

N-1 = This is an N-1 letter. You may not be allowed to continue in the program past the next Black Friday meeting unless you satisfy specific conditions that will be given in the letter.

Process for Leave of Absence and Return from Leave of Absence
Students who wish to leave the program temporarily may request a leave of absence by submitting a request to the Graduate Programs Manager (for PhD students) or MS Programs Coordinator (for MS students). Leaves are initially granted for a period of no more than one year, but an extension of up to one additional year may be granted under exceptional circumstances. When an extension is granted, the conditions for return must be negotiated with the advisor and the Co-Directors, prior to returning to the program. The return must typically be at the start of a semester.

Students on leave of absence should contact the Graduate Programs Manager or MS Programs Coordinator two months prior to the end of the leave to indicate their plans for the next year.

Process for Withdrawal from Program
Students who wish to withdraw from the program should first discuss it with their advisor and then notify the Graduate Programs Manager or MS Programs Coordinator.

Additional University Policies/Protocols
Assistance for Individuals with Disabilities
The Office of Disability Resources at Carnegie Mellon University has a continued mission to provide physical and programmatic campus access to all events and information within the Carnegie Mellon community. We work to ensure that qualified individuals receive reasonable accommodations as guaranteed by the Americans with Disabilities Act (ADA) and Sections 503 and 504 of the Rehabilitation Act of 1973. Students who would like to receive accommodations must submit a Voluntary Disclosure of Disability Form to access@andrew.cmu.edu to begin the interactive accommodation process.

For more information please see http://www.cmu.edu/hr/eos/disability/index.html. Students with disabilities are encouraged to self-identify with Equal Opportunity Services by contacting Larry Powell, 412-268-2013, lpowell@andrew.cmu.edu to access the services available at the university and initiate a request for accommodations.

Protocol for Review/Redress of Academic Conflicts

Please see the University Policy:

http://www.cmu.edu/academic-integrity/documents/academic-disciplinary-actions-overview-for-graduate-students.2013.pdf

Summary of Graduate Student Appeal and Grievance Procedures

http://www.cmu.edu/graduate/policies/Summary%20of%20Graduate%20Student%20Appeal%20and%20Grievance%20Procedures.html.

Graduate students will find the Summary of Graduate Student Appeal and Grievance Procedures on the Graduate Education Resource webpage. This document summarizes processes available to graduate students who seek review of academic and non-academic issues. Generally, graduate students are expected to seek informal resolution of all concerns within the applicable department, unit or program before invoking formal processes. When an informal resolution cannot be reached, however, a graduate student who seeks further review of the matter is to follow the formal procedures outlined here. These appeal and grievance procedures shall apply to students in all graduate programs of the University. Students should refer to the department specific information in this handbook for department and college information about the administration and academic policies of the program. Additionally, students may confer with the graduate student ombudsman, Suzie Laurich-McIntyre, slaurichmcintyre@cmu.edu, on issues of process or other concerns as they navigate conflicts.

Safeguarding Educational Equity

Policy Against Sexual Harassment and Sexual Assault

Sexual harassment and sexual assault are prohibited by CMU, as is retaliation for having brought forward a concern or allegation in good faith. The policy can be viewed in its entirety at: http://www.cmu.edu/policies/documents/SA_SH.htm. If you believe you have been the victim of sexual harassment or sexual assault, you are encouraged to make contact with any of the following resources:

Sexual Harassment Advisors, found in appendix A of the Policy Against Sexual Harassment and Sexual Assault;

Survivor Support Network, found in appendix B of the Policy Against Sexual Harassment and Sexual Assault;

Sexual Harassment Process and Title IX Coordinators, found in section II of the Policy Against Sexual Harassment and Sexual Assault;

University Police, 412-268-2323

University Health Services, 412-268-2157

Counseling & Psychological Services, 412-268-2922

Maternity Accommodation Protocol

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 course work 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.

University Financial Aid

Graduate students should consult the graduate student financial aid information found on The HUB website: http://www.cmu.edu/finaid/graduate/index.html. Students will find the Graduate Financial Aid Guide, information about funding options and how to apply for financial aid and other helpful links.

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.

Vacations and Time-Off

Students with graduate assistantships are expected to continue with their research during academic breaks (including the Summer months) with the exception of the official university holidays. A complete list of the official university holidays can be found at the Human Resources website.

Due to federal regulations governing graduate student support, paid time off for personal business and vacations is not provided. A supported graduate student wanting to take a one week break during one of the summer months in which they are receiving a stipend is expected to get approval for that break with their advisor and make up the work during the other three weeks of that month. Supported graduate students wishing to take longer periods of personal time off must do so without pay and must receive advanced approval from their research advisor a minimum of four weeks prior to the requested time off. The advisor must then notify the Graduate Program Manager and Business Manager of this approval so that stipend adjustments can be processed.

Enrollment Verification

Enrollment Services is the only University office that can provide an official letter of enrollment, official transcript, or enrollment verification. Enrollment verification can be requested online through The HUB at: http://www.cmu.edu/hub/records/index.html

Additional Department Policies

"Grandfather" Policy

When policies are changed it is because the department believes the new rules offer an improvement; any such changes will be communicated to the current graduate students. The students currently enrolled whose degree program is affected by a change in policy may choose to be governed by the older policy that was in place at the time of their matriculation. In case degree requirements are changed and certain courses are no longer offered, the department will try to find some compromise that allows those students to satisfy the original requirements.

Tuition and Funding

Current tuition rates and cost of living including books, insurance, activities and technology fees, food and lodging costs can be found at the Enrollment Services website. Graduate fellowships are available to qualified, full-time students in the **PhD program ONLY**, which include full graduate tuition, a monthly stipend, and student fees with the exception of student health insurance. Health insurance is responsibility of the student.

Master's programs are not funded by the department; however, students are welcome to apply for external funding opportunities. Please review the extensive data available on-line: http://www.cmu.edu/fso**.**

Teaching Assistantships

Teaching assistantships are awarded to selected students. Teaching assistant duties include, but are not limited to, holding office hours, conducting recitation classes, and grading. There are minimum English proficiency requirements that must be met in order for a student to accept a teaching assistantship. Pennsylvania state law requires that all students who are not native speakers of English take and pass a state-administered proficiency test. Support for teaching activities can be found through the Eberly Center for Teaching Excellence, located in Warner Hall 425. Students who will be TAs for the department are encouraged to visit the Teaching Center and to take advantage of the information and services located there.

Outside Employment

Students are not allowed to be employed outside of the university during the academic year nor during the summer if they are being supported by the department, except as described in the next section, "Consulting."

Consulting

The department has traditionally granted full-time students the right to devote up to an average of one day (of university time) per week to outside, paid, professional activities, where that activity is consistent with that person's role as a member of the student body and where that activity also enhances the contribution of the student to the university. Such activity benefits both the student and the university. Students must fill out a Student Consulting Agreement, have their advisor sign in agreement, and submit to the Graduate Program Manager for Department Head approval. Please ask your Graduate Program Manager for the Consulting Agreement.

Travel Support

The department encourages PhD students to travel to conferences and workshops to enhance their professional and career development.

Policy: If a PhD student wants to attend a conference or workshop, the student's advisor or research sponsor should support the trip through either a research contract or a discretionary account. Student travel is unlimited as long as there is money available from research contracts and/or discretionary funds of a sponsoring faculty member.

If no such funding is available to the student, then limited departmental funds may be available upon request from the Machine Learning Department. Since departmental funds are limited, the maximum to be reimbursed will be $200 plus the registration fee, if only attending the conference or workshop; $600 plus the registration fee, if presenting a paper. Department funding is only available to the student for one trip per year and will not be transferred to the following year. This funding is only available if the advisor agrees with the student's decision to attend the conference but does not have the funds.

Process: To obtain travel support, the PhD student and their faculty advisor/research sponsor must first agree that the student should take the trip. Then in advance of the trip the student must fill out and print the Student Travel Authorization Form and get their advisor's signature before forwarding the form to the Graduate Program Manager. The faculty member must either (i) indicate the amount of support the student may receive and its source (be sure the charge number is filled in!), or (ii) state on the Comments line that no funds are available from any research or discretional account. Submit form to the Graduate Program Manager.

The university may also be able to help with conference funding, to apply, please see instructions at:
http://www.cmu.edu/graduate/professional-development/conference-funding/index.html

GuSH is a source of small research grant funds provided by GSA and the Provost's Office and managed by the Office of the Assistant Vice Provost for Graduate Education. Students can find more information about the application process and deadlines at: www.cmu.edu/graduate.

Reimbursements
Business Expenses
Previously approved legitimate business expenses can be reimbursed. Receipts must be submitted within 30 days of the expense. Any receipts submitted after 90 days will be considered income and you will be taxed. Your advisor's administrative assistant will help you claim reimbursement provided you have the following:

- receipt indicating item purchased and proof of payment
- business purpose for purchasing item
- account to be charged for reimbursement
- Approval (by faculty) in email, for reimbursement
- Signed expense report

Please consult with your advisor's assistant prior to incurring the expense for additional instruction.

Travel Expenses

Previously approved legitimate travel expenses can be reimbursed. Receipts must be submitted within 30 days of the expense. Any receipts submitted after 90 days of the dates of travel will be considered income and you will be taxed. Your advisor's administrative assistant will help you claim reimbursement provided you have the following:

- Flight receipts must show full itinerary (dates/times), class that was traveled, and last 4 digits of your credit card number.
- Hotel receipts must show a zero balance with proof of payment and your name
- Receipts for meals must be collected, unless you claim per diem meals; both daily meals and per diem meals cannot be claimed for the same travel expense report
- Personal car mileage is calculated at $0.55 per mile; mileage covers gas, but not tolls.
- Business purpose for travel
- Account to be charged for reimbursement
- Approval (by faculty member) in email, for reimbursement
- Signed travel expense report

Conditions:
All receipts must have proof of purchase indicated. For business expenses, tax will not be reimbursed under any circumstance, except for non-travel business meals. To avoid paying tax, see if a staff member can purchase the item for you with a University-provided Procurement Credit Card.

Tax will be reimbursed for expenses incurred due to normal business related travel (hotel, airfare, meals), but NOT for miscellaneous expenses such as the purchase of a replacement mouse for a department laptop, poster board for a presentation, etc., purchased while traveling or preparing for travel. These items should have been purchased through a department approved buyer thus not incurring tax expense.

Department Office/Building Security, Repairs and Services

Please contact Jamie Gregory or Paul Stockhausen for reporting damages, needed repairs, security concerns for routine items. For immediate security concerns, please contact the CMU Campus Police at 412-268-2323

Department Graduate Student Committees

Departmental committees consist of the PhD & MS Admissions Committees, Speaking Skills Committee, and Social Committee.

We also have a student representative for the department for the University Graduate Student Assembly.

PhD Program in Machine Learning

The PhD program is run by the Machine Learning Department which is part of Carnegie Mellon's School of Computer Science. This program builds on ML's world-class faculty, which includes a number of faculty with cross-appointments in diverse areas ranging from Statistics, Language Technologies, Philosophy, and Psychology to the Tepper Business School.

Program Requirements

To complete the degree of Doctor of Philosophy in Machine Learning, we require that each student

- Participate in directed research and/or practicum
- Complete the coursework listed in the ML Coursework Requirements section, including one 700-level elective
- Complete a Data Analysis Project (DAP)
- Serve as a teaching assistant at least twice for Machine Learning Department courses
- Demonstrate professional presentation skills
- Write and orally defend a thesis describing a significant piece of original research in a specialized area of Machine Learning.

Note: Students in this program can earn an MS degree along the way to the ML PhD by completing one additional elective (which may be at the 600-level) or by replacing that elective with research as described in the Electives subsection of the ML Course Requirements section. A student who has already received an MS degree from another department in the School of Computer Science will not typically receive the MS degree from MLD, with the exception under "Rules about Previously Taken Courses."

Program Milestones

By the end of the third year, the coursework, presentation skills, and at least one of either the TA requirement or the DAP requirement should be complete.

During the fourth year, a thesis proposal should be presented to the MLD community.

By the end of the fifth year, the dissertation should be complete and the student should give the final defense.

Statute of Limitations

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 PhD degree within a maximum of ten years from original matriculation as a doctoral student. 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.

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 PhD 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.

Rules about Previously Taken Courses

If a student has taken some of the MLD core courses before joining the MLD PhD program, and has not counted these courses toward any other PhD-level degree, the student may count these courses toward the MLD PhD. In this situation the student will need to take fewer than 5 new core courses to graduate. A student must always take at least one elective course while registered in the MLD PhD program, irrespective of any courses taken before joining the PhD program. Students who took 10-701 in Spring 2014 or earlier (before 10-715 was offered) can use it as a core course, even if they weren't part of the MLD PhD program at the time they took 10-701.

If any courses are counted toward both the ML PhD and a lower-level degree (such as an MS) from another department outside of MLD, the student will not receive an MS degree from MLD. If the student wishes to receive an ML MS in addition to the outside degree, they must take additional courses so as not to count any courses toward both the ML MS degree and the outside degree.

Proficiencies in Teaching, Research, and Writing Skills

Each PhD candidate must participate in two terms of instruction, either through TA duties or serving as the instructor for a class.

Research and writing skills are normally achieved through the Data Analysis Project requirement.

Presentation Skills Requirement:

To satisfy the Presentation Skills requirement, students must give a talk that is at least 30 minutes long and invite members of the Presentation Skills Committee to attend and evaluate it. As preparation for this requirement, the department offers optional workshops on presentation skills from time to time.

Directed Research

During a student's first two years, they should be doing directed research at least half time; once all coursework is completed, they should be doing directed research full time (except when teaching). Different students, and different advisors, have different ideas of what directed research means and how progress can be demonstrated. It is the responsibility of both the student and their advisor to formulate for each semester a set of reasonable goals, plans, and criteria for success in conducting directed research. Advisors are individually responsible for adequately supervising this portion of the PhD program.

Summer Research

During the summer semester, PhD students may choose to either secure a summer internship or continue research with their advisor. A student must discuss their summer plans with their

advisor and register for the appropriate course. A student must register for the Practicum course if they are going on a summer internship. At the end of the internship, the student must submit a written report to their advisor, who will determine their pass/fail grade for the semester. The Practicum course and the Reading & Research course will count towards the program research requirements.

Note: International students must apply for Curricular Practical Training (CPT) with the Office of International Education for immigration authorization for summer internship. The dates of the summer internship must be within the dates of the summer semester, as determined by the university.

The Research Matching Process in MLD

Carnegie Mellon is a research institution. We are strongly committed to scientific excellence, both in research and education. In particular, we believe that a close personal interaction among students, faculty, and staff is of the utmost importance for educating the next generation of leaders in academia and industry. ML students are therefore matched to a faculty advisor in the very beginning of the program who will guide their research and advise them in academic matters.

After attending research talks during the MLD Orientation and after meeting with potential advisors, both ML students and potential advisors submit a form, indicating preferences for advisorships. Based on these forms, the Co-Directors of the ML program will then match students with faculty advisors. Each student either will be assigned to one advisor or will be co-advised by two faculty advisors. A student's advisor may change if the research direction changes and there is no longer a match.

While it must be approved by the Co-Directors of the program, a request to switch advisors is routine and almost always granted for a student in good standing, especially during the early part of the degree program. It often results from an evolution of the student's research interests.

Role of the Advisor

The faculty advisor is a student's primary contact, both in research and in academic matters. Typically, a student has strong interests in the research area of the faculty advisor and will closely collaborate with the faculty member. The advisor is typically the primary person directing the student's research, and is also expected to provide financial support (stipend and tuition) for the student.

PhD Thesis Committee

The thesis committee should be composed of four or more members (including the student's research advisor), at least one of whom is an external member and at least one of whom is a Machine Learning faculty member. The external member is typically from outside the university but could be from another department at Carnegie Mellon if appropriate. The Department has the right in unusual cases to alter the composition of the committee to assure appropriate quality and breadth.

PhD Thesis Proposal

ML PhD students are expected to present their thesis proposal during their third or fourth year. Typically, the proposal is completed by the beginning of the fourth year. Fulfilling the requirement involves writing and orally presenting a proposal, and obtaining advice and approval from the thesis committee. Students should meet with the thesis committee members at least once to discuss the proposed work before the proposal.

Generally, a thesis proposal will be approximately 25 pages plus references, and will include (a) a clear statement of the research problem and proposed research, (b) a discussion of related research and how the proposed work fits into the field, (c) a description of the technical approach, (d) preliminary research results that demonstrate the proposed research is plausible and worthwhile, (e) a discussion of research issues to be pursued, and (f) a tentative schedule for completing the work.

Of course, in a proposal it is impossible to predict precisely which research issues will be solved in the future. Nevertheless, the proposal should include a list of specific research directions and questions that are likely to be addressed, and for each of these an assessment indicating what could be a baseline approach, and a discussion of ideas for pursuing the issue, along with an assessment of what will be easy versus difficult. The student needs to show that the proposed research will be original and interesting, and that it is likely to succeed. During the later thesis defense, the student will *not* be required to show that he or she has done everything that was proposed. In this sense, the proposal is an opportunity to present the student's best current ideas about the thesis research and obtain some useful early feedback from experts in the research area. The proposal need not have answers to every question it raises, but it should bring up a good list of questions that will drive the research.

Students should allocate at least 2.5 hours for the proposal presentation and examination. The presentation by the candidate is normally about 45 minutes. In addition to the student, at least two committee members, one of whom is the Chair, must be physically present at CMU for the proposal; other committee members may attend by teleconference.

The thesis proposal is a public presentation, in accord with the College and University requirements for the PhD. It is the candidate's responsibility to ensure that the College and University's guidelines are followed for publicity of the proposal, including the availability of the draft thesis proposal document at least one month prior to the proposal presentation; committee members may require the document earlier, in some cases. The proposal must be sent to the Graduate Programs Manager at least two weeks before the proposal presentation.

All But Dissertation (ABD) Policy

After the presentation of an acceptable thesis proposal, and satisfying all other requirements except for the dissertation and its oral defense, students are regarded as "all but dissertation."

This has various consequences, which are explained at http://www.cmu.edu/policies/student-and-student-life/doctoral-student-status.html .

PhD Thesis

Normally, the thesis dissertation is completed during the student's fifth year. The thesis must describe a significant piece of original research work. It is evidence of proficiency, high attainment, and ability to do research in a specialized area of Machine Learning.

The final defense is a public presentation, in accord with the College and University requirements for the PhD. It is the candidate's responsibility to ensure that the College and University's guidelines are followed for publicity of the defense, including sending the draft thesis to the Graduate Programs Manager at least two weeks prior to the defense.

Work with the Graduate Program Manager to determine timing so as to avoid department and class conflicts. Contact your thesis committee to get their availability. The date should be scheduled two months in advance. You should send a draft of the thesis to your committee about one month before you plan to defend. Your committee should get back to you with their approval to defend before the announcement goes out, two weeks before your defense date.

Students should allocate at least 3 hours for the thesis defense and examination. In addition to the student, at least three committee members, one of whom is the Chair, must be physically present at CMU for the defense. All committee members must either be in attendance or attend by teleconference.

The presentation by the candidate is normally about 45 minutes. The thesis committee chair (advisor) determines who may ask questions and in what order and brings the discussion to a close at the appropriate time. The question-and-answer period is followed by a closed-door session attended by only the members of the thesis committee and any interested faculty members. If the student passes the oral presentation, the options of the committee are:

- To approve without corrections
- To approve subject to minor changes, to be approved later by the thesis chair only
- To require a resubmission after major changes and re-approval of the entire committee
- Not to approve the thesis

All members of the committee are required to sign a Final Oral Examination card to indicate that the student has passed the thesis oral examination.

In addition, the thesis committee chair, the Department Head, and the Dean sign a final certification sheet after final approval of the thesis by the thesis committee and student has submitted the final version to the Graduate Program Manager.

If the student fails to pass either the oral or the written defense, the faculty will discuss their status by the next end-of-semester meeting.

Student Progress

Student progress will be evaluated at the end of each academic semester by the MLD faculty. Students will enter information into the MLD online system to inform the faculty of the goals for the semester and if they were achieved. The student will also enter the plans for the next

semester. After the faculty meet, the assessment of the student's progress will be communicated via the same online system.

Financial Support

The Machine Learning Department is committed to providing full tuition and stipend support for the academic year, for each full-time ML PhD student, for a period of 5 years. Research opportunities are constrained by funding availability. The funding commitments assume that the student is making satisfactory progress in the program, as reported to the student at the end of each academic term. Students are strongly encouraged to compete for outside fellowships and other sources of financial support. The department will supplement these outside awards in order to fulfill its obligations for tuition and stipend support.

Joint PhD Programs

There are three Joint PhD Programs with Machine Learning. Each student will have one Home Department, which is the department the student entered first (either Machine Learning or the department for the other program in the Joint PhD).

The Joint PhD Program in Machine Learning and Public Policy is a program for students to gain the skills necessary to develop new state-of-the-art machine learning technologies and apply these successfully to real-world policy issues. Students are expected both to make fundamental contributions to the science of machine learning and to address core problems in one or more policy domains. Further information can be found at http://www.heinz.cmu.edu/school-of-public-policy-management/doctoral-program/phd-ppm/curriculum/index.aspx

The Joint PhD Program in Neural Computation and Machine Learning trains students in the application of machine learning to neuroscience by combining core elements of the Machine Learning PhD program and the PhD in Neural Computation program offered by the Center for the Neural Basis of Cognition. Further information can be found at http://www.cnbc.cmu.edu/training/pnc/curriculum/pncml/

The Joint PhD Program in Statistics and Machine Learning is a program aimed at preparing students for academic careers in both CS and Statistics departments at top universities. Further information can be found at http://www.ml.cmu.edu/academics/joint-phd-statml.html

Joint PhD Requirements

Joint PhD students complete the requirements for the PhD in Machine Learning, with the following exceptions:

- The 5 Machine Learning Core Courses must be completed with an average GPA of 3.5 or better
- The Data Analysis Project (DAP) should be satisfied within the student's Home Department, but must still contain one Machine Learning Core or Affiliated faculty member and must be announced to the MLD community
- The speaking and writing skills requirements should be satisfied within the Home Department
- The student still needs to TA twice, but one Teaching Assistantship must be in MLD and the other must be in the other program
- The PhD thesis will be a contribution to the combination of Machine Learning and the other field, and the Joint PhD thesis committee must include one MLD Core or Affiliated Faculty Member, with both the thesis proposal and defense announced to the MLD community
- Student progress will be evaluated at the end of each academic semester by the Home Department

Students in a Joint PhD program may earn a MS degree along the way to the PhD, but if they do they will have to decide which one of the two MS degrees to earn. There is no joint MS degree and a student is not able to receive an MS from both departments.

The additional requirements specific to each PhD program are described below.

Joint PhD Program in Machine Learning and Public Policy Requirements

- Successfully complete the 5 Heinz core courses:
    - 90-908 PhD Microeconomics
    - 90-906 PhD Econometrics I
    - 90-907 Econometric Theory and Methods
    - Social Science (e.g., Organizational Behavior, Social Psychology, or Political Science. See Heinz PhD Handbook for acceptable courses)
    - 90-901 PhD Seminar I
    - 90-902 PhD Seminar II
    - 90-918 PhD Seminar III
- Successfully complete 36 units of electives (12 units from Heinz, 12 units from ML or Statistics, 12 units ML/PP)
- Complete two Heinz research papers, one of which must fulfill the requirements of the DAP

Program Milestones

- End of second year: Presentation of the First Heinz Research Paper
- End of third year: Completion of courses and presentation of the Second Heinz Research Paper
- Fourth year: Presentation of the thesis proposal
- Fifth year: Defense of the dissertation

Joint PhD Program in Neural Computation and Machine Learning Requirements

- Successfully complete the 5 CNBC core courses
    - One Cellular & Molecular Neuroscience course: 03-762 Advanced Cellular Neuroscience (at CMU) or NROSCI 2100/2101 Cellular and Molecular Neurobiology (at Pitt)
    - One Systems Neuroscience course: 03-763 Systems Neuroscience (at CMU) or NROSCI 2102 Systems Neuroscience (at Pitt)
    - One Cognitive Neuroscience course: 85-765 Cognitive Neuroscience
    - Two Computational Neuroscience courses: [36-759 Statistical Models of the Brain (at CMU) or Math 3375 Computational Neuroscience (at Pitt), which are the same class with different course numbers] AND [Math 3370 Mathematical Neuroscience (at Pitt) or a CMU course number to be determined]
- Complete a lab rotation for exposure to experimental techniques
- Complete a semester-long data-analytic research project, described below
- Complete the DAP in accordance with the Second Research Project requirements described below

Note: For the Joint PhD Program in Neural Computation and Machine Learning, 36-707 Regression Analysis may be used as one of the ML Menu Core courses.

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, 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 committee must consist of at least two PNC training faculty and one MLD core or affiliate faculty. 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. Students who wish to enter the joint program from MLD after their first year may be able to waive this requirement with the permission of the PNC training faculty.

Second-Year Research Requirement

All students will be 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 the research will be written up as a paper to be submitted to a journal in the relevant field. 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. In most cases this project will be on an area related to the student's eventual thesis project, and in most cases it should be completed by the end of the student's second calendar year in the program. In addition, the results of the project will be presented publicly in the form of a seminar. This seminar must be advertised to both the PNC and ML communities 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 ML and PNC graduate program coordinators.) This project, which counts as the Data Analysis Project in MLD, will be evaluated by a committee consisting of at least three faculty, two of whom are PNC training faculty and one of whom is ML faculty appropriate to the topic.

Program Milestones

- End of the first year: Completion of a data-analytic project
- End of the second calendar year: Completion of the Data Analysis Project (DAP)
- Fourth year: Presentation of the thesis proposal
- Fifth year: Defense of the dissertation

Joint PhD Program in Statistics and Machine Learning Requirements

- Successfully complete Statistics core course
  - 36-699 Immigration to Statistics
  - 36-707 Regression Analysis
  - 36-750 Statistical Computing
  - 36-752 Advanced Probability Theory
  - 36-755 Advanced Statistical Theory
- Complete the Advanced Data Analysis (ADA 36-757 and 36-758) and Data Analysis Project (DAP 10-821 and 10-910) requirements, which can be through a single project

Note: Joint Stat/ML students are not required to take the Statistics MS & PhD exams, although the Data Analysis Exam is required to earn an MS in Statistics.

Program Milestones

- End of second year: Presentation of the ADA project
- End of third year: Completion of the DAP, speaking, and writing skills requirements
- Fourth year: Presentation of the thesis proposal
- Fifth year: Defense of the dissertation

Primary Master's Program in Machine Learning

This highly selective program consists primarily of coursework, with a very limited research component, and typically takes three to four semesters to complete. Students in this program take the same set of courses as students receiving a PhD in Machine Learning, and also complete a Data Analysis Project and a practicum.

Program Requirements

To complete the degree of Master of Science in Machine Learning, we require that each student:

- Complete the ML Course Requirements, including 3 Set Core, 2 Menu Core, and 2 Elective courses
- Complete a Data Analysis Project (DAP)
- Complete a practicum, as described in the Practicum section above and Summer Internships for MS Students section below

Double-Counting Courses

Any course counted toward another master's-level or bachelor-level degree may not be counted toward the Primary Master's in Machine Learning.

Program Milestones

There are no official milestones that a student must pass. However, most students follow the following timeline:

- By end of the first month: Choose a DAP advisor
- By end of the first semester: Complete 3 courses
- By end of the second semester: Complete 2-3 courses plus the DAP Preparation course
- By the end of the first summer: Complete the practicum
- By the end of the third semester: Complete the final 1-2 courses plus the DAP

Statute of Limitations

As outlined in the Master's Students Statute of Limitations, http://www.cmu.edu/policies/student-and-student-life/masters-students-statute-of-limitations.html , students who have matriculated at Carnegie Mellon beginning Fall 2012 or later will complete all requirements for the master's degree within a maximum of seven years from original matriculation as a master's student, or less if required by a more restrictive department, school or college policy. Once this time-to-degree limit has lapsed, the person may resume work towards a master's degree only if newly admitted to a currently offered master's degree program under criteria determined by that program.

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 (or designate), defer the lapse for a period commensurate with the duration of that interruption. Students who are pursuing a master's 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.

Directed Research

During a student's time in the MS program, they should be doing directed research with a faculty advisor that will lead to a Data Analysis Project. Different students, and different advisors, have different ideas of what directed research means and how progress can be demonstrated. It is the responsibility of both the student and their advisor to formulate for each semester a set of reasonable goals, plans, and criteria for success in conducting directed research.

Advisors are individually responsible for adequately supervising this portion of the MS program: in particular, they need to identify a project that involves a substantial data analysis component and otherwise satisfies the requirements of the DAP project. In choosing the project, advisors should be aware of MS student's other academic requirements and of the fact that, unlike PhD and secondary MS students, the primary MS is of a relatively short duration.

Students have primary responsibility for finding a DAP advisor and should consult with the Director of the MS Program if they are unable to do so by the end of their first year in the program.

Summer Internships for MS Students

During the summer semester, Master's students need to secure a summer internship. An exception may be granted if the student and advisor would prefer that the student continue research during the summer at Carnegie Mellon. You must discuss your summer plans with your advisor and register for 36 units of the appropriate course: 10-635 Practicum for an internship or 10-697 Reading and Research for research at Carnegie Mellon. At the end of the practicum, you must submit a short, written report to your advisor, who will determine your pass/fail grade for the semester. The Practicum course and the Reading & Research course will count towards your program requirements.

Note: International students must apply for Curricular Practical Training (CPT) with the Office of International Education for immigration authorization for internships before committing to an internship. The dates of your internship must be within the dates of the semester, as determined by the university.

Student Progress

Student progress will be evaluated at the end of each academic semester by the MLD faculty. Students will enter information into the MLD online system to inform the faculty of the goals for the semester and if they were achieved. The student will also enter the plans for the next semester. After the faculty meet, the assessment of the student's progress will be communicated via the same online system.

Financial Support

The MS program does not offer any type of financial support. Tuition for this program is the responsibility of the student.

Fifth-Year Master's in Machine Learning

The 5th-Year Master's in Machine Learning allows CMU undergraduates to complete a MS in Machine Learning in one additional year, by taking some of the required ML courses as an undergraduate. Students in this program take the same set of courses as students receiving a PhD in Machine Learning, and also complete a Data Analysis Project and a practicum.

Program Requirements

To complete the degree of Master of Science in Machine Learning, we require that each student:

- Complete the ML Course Requirements, including 3 Set Core, 2 Menu Core, and 2 Elective courses
- Complete a Data Analysis Project (DAP)
- Complete a practicum, as described in the Practicum section above and Summer Internships for MS Students section below
- Be enrolled full-time (at least 36 units per semester)

Note: A student may use one 400- or 500-level elective taken as an undergraduate if its requirements are identical to a cross-listed graduate-level course, as indicated by the course syllabus or an email from the instructor.

Double-Counting Courses

In order to graduate in one year with this MS degree, you will have to have successfully completed 10-701 and two other required courses during your undergraduate years at Carnegie Mellon. These courses may be double-counted toward the 5th year master's degree. No other courses may be double-counted.

Program Milestones

There are no formal milestones for this one-year program. The progress of students in the program will be assessed by the faculty at the end of each semester. However, most students follow the following timeline:

- By end of summer after senior year: Complete the practicum
- By end of the first semester of fifth year: Complete 2-3 courses plus the DAP Preparation course
- By end of the second semester of fifth year: Complete the final 2 courses plus the DAP

Statute of Limitations

As outlined in the Master's Students Statute of Limitations, http://www.cmu.edu/policies/student-and-student-life/masters-students-statute-of-limitations.html , students who have matriculated at Carnegie Mellon beginning Fall 2012 or later will complete all requirements for the master's degree within a maximum of seven years from original matriculation as a master's student, or less if required by a more restrictive department, school or college policy. Once this time-to-degree limit has lapsed, the person may resume work towards a master's degree only if newly admitted to a currently offered master's degree program under criteria determined by that program.

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 (or designate), defer the lapse for a period commensurate with the duration of that interruption.

Directed Research

During a student's time in the MS program he or she should be doing directed research with a faculty advisor that will lead to a Data Analysis Project. Different students, and different advisors, have different ideas of what directed research means and how progress can be demonstrated. It is the responsibility of both the student and his or her advisor to formulate for each semester a set of reasonable goals, plans, and criteria for success in conducting directed research.

Advisors are individually responsible for adequately supervising this portion of the MS program: in particular, they need to identify a project that involves a substantial data analysis component, and otherwise satisfies the requirements of the DAP project. In choosing the project, advisors should be aware of MS student's other academic requirements, and of the fact that unlike PhD and secondary MS students, the 5th year MS is of a relatively short duration.

Student Progress

Student progress will be evaluated at the end of each academic semester by the MLD faculty. Students will enter information into the MLD online system to inform the faculty of the goals for the semester and if they were achieved. The student will also enter the plans for the next semester. After the faculty meet, the assessment of the student's progress will be communicated via the same online system.

Financial Support

The MS program does not offer any type of financial support. Tuition for this program is the responsibility of the student.

Secondary Master's Program in Machine Learning

The MLD Secondary Master's program in Machine Learning is designed to train PhD students, faculty, and staff in other disciplines to become tomorrow's leaders in the rapidly growing area of machine learning. This program will build on Carnegie Mellon's Machine Learning Department which has assembled a multi-disciplinary team of faculty and students across several academic departments, dedicated to producing the next generation of machine learning methods.

Program Requirements

To complete the degree of Master of Science in Machine Learning, we require that each student:

- Complete the ML Course Requirements, including 3 Set Core, 2 Menu Core, and 2 Elective courses
- Complete a Data Analysis Project (DAP)
- Complete a practicum

Double-Counting Courses

Any course counted toward another master's-level or bachelor-level degree may not be counted toward the Secondary Master's in Machine Learning. If a course is counted toward the student's PhD degree it may also be counted towards the Secondary Master's in Machine Learning, so long as such double-counting is permitted by their PhD department.

Double-Counting the DAP

Students pursuing a PhD in Statistics may petition the Co-Directors to have their Advanced Data Analysis (ADA) project count to satisfy the Data Analysis Project (DAP).

Double-Counting the Practicum

Students pursuing a PhD may petition the Co-Directors to have research in their home department count to satisfy the practicum, if such research contains significant machine learning content.

Note: International students should be aware that the Secondary MS does not qualify them for CPT/OPT.

Program Milestones

The requirements for the ML MS degree must be completed before the end of the student's primary degree; there is no provision for remaining in the ML MS program beyond the end of the student's primary degree.

Statute of Limitations

PhD students must graduate from this program before or concurrent with their PhD degree.

As outlined in the Master's Students Statute of Limitations, http://www.cmu.edu/policies/student-and-student-life/masters-students-statute-of-limitations.html , students who have matriculated at Carnegie Mellon beginning Fall 2012 or later will complete all requirements for the master's degree within a maximum of seven years from original matriculation as a master's student, or

less if required by a more restrictive department, school or college policy. Once this time-to-degree limit has lapsed, the person may resume work towards a master's degree only if newly admitted to a currently offered master's degree program under criteria determined by that program.

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 (or designate), defer the lapse for a period commensurate with the duration of that interruption.

Directed Research

During a student's time in the MS program, they should be doing directed research with a faculty advisor that will lead to a Data Analysis Project. Different students, and different advisors, have different ideas of what directed research means and how progress can be demonstrated. It is the responsibility of both the student and their advisor to formulate for each semester a set of reasonable goals, plans, and criteria for success in conducting directed research. Advisors are individually responsible for adequately supervising this portion of the MS program.

Students must have an endorsement from their proposed DAP advisor before applying to the Secondary MS in Machine Learning. While it must be approved by the Co-Directors of the program, a request to switch advisors is routine and almost always granted for a student in good standing, especially during the early part of the degree program. It often results from an evolution of the student's research interests.

Student Progress

Student progress will be evaluated at the end of each academic semester by the MLD faculty. Students will enter information into the MLD online system to inform the faculty of the goals for the semester and if they were achieved. The student will also enter the plans for the next semester. After the faculty meet, the assessment of the student's progress will be communicated via the same online system.

Financial Support

The MS program does not offer any type of financial support. Tuition for this program is the responsibility of the PhD home department or, in the case of faculty or staff, may be paid by the university's tuition benefits.

Appendix A

Highlighted University Resources for Graduate Students and The WORD, Student Handbook

Key Offices for Graduate Student Support

Office of the Assistant Vice Provost for Graduate Education

www.cmu.edu/graduate; grad-ed@cmu.edu
The Office of the Assistant Vice Provost for Graduate Education, AVPGE, directed by Suzie Laurich-McIntyre, PhD, Assistant Vice Provost for Graduate Education, provides central support for graduate students in a number of roles. These include: being an ombudsperson and resource person for graduate students as an informal advisor; resolving formal and informal graduate student appeals; informing and assisting in forming policy and procedures relevant to graduate students; and working with departments on issues related to graduate students and implementation of programs in support of graduate student development.

The Office of the AVPGE often partners with the division of Student Affairs to assist graduate students with their Carnegie Mellon experience. Senior members of the student affairs staff are assigned to each college (college liaisons) and are often consulted by the Assistant Vice Provost for Graduate Education and departments on an individual basis to respond to graduate student needs.

The Office of the Assistant Vice Provost for Graduate Education (AVPGE) offers a robust schedule of professional development opportunities. Some are geared towards a specific population (master's students, PhD students at the beginning of their program, graduate students seeking tenure track positions, etc.) and others are open to all graduate students (time management, balancing, staying healthy). A full schedule of programs can be found at: http://www.cmu.edu/graduate/.

The Office of the AVPGE also coordinates several funding programs, and academically focused seminars and workshops that advise, empower and help retain all graduate students, particularly graduate students of color and women in the science and technical fields. The fundamental goals of our programs have been constant: first, to support, advise and guide individual graduate students as they work to complete their degrees; second, to contribute to the greatest degree possible to the diversification of the academy.   Visit the Graduate Education website for information about:

- Conference Funding Grants
- Graduate Small Project Help (GuSH) Research Funding
- Graduate Student Professional Development: seminars, workshops and resources
- Graduate Women Gatherings (GWG)
- Inter-university Graduate Students of Color Series (SOC)

Office of the Dean of Student Affairs
www.cmu.edu/student-affairs/index.html

The Office of the Dean provides central leadership of the metacurricular experience at Carnegie Mellon. The offices that fall under the division of Student Affairs led by Dean of Student Affairs Gina Casalegno, include (not an exhaustive list):

- Athletics
- Career and Professional Development Center
- Cohon University Center
- Counseling & Psychological Services (CaPS)
- Dining Services
- Housing Services
- Office of Community Standards and Integrity
- Office of Student Leadership, Involvement, and Civic Engagement
- University Health Services
- Wellness Initiatives

Graduate students will find the enrollment information for **Domestic Partner Registration** and **Maternity Accommodations** in the Office of the Dean of Student Affairs and on the website. The Office of the Dean of Student Affairs also manages the **Emergency Student Loan** (ESLs) process. The Emergency Student Loan service is made available through the generous gifts of alumni and friends of the university. The Emergency Student Loan is an interest-free, emergency-based loan repayable 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. The Office of Integrity and Community Standards also provides consultation, support, resources and follow-up on questions and issues of Academic Integrity: www.cmu.edu/academic-integrity.

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 and programmatic campus access to all events and information within the Carnegie Mellon community. We work to ensure that qualified individuals receive reasonable accommodations as guaranteed by the Americans with Disabilities Act (ADA) and Sections 503 and 504 of the Rehabilitation Act of 1973. Students who would like to receive accommodations must submit a Voluntary Disclosure of Disability Form [pdf] to access@andrew.cmu.edu to begin the interactive accommodation process.

For more information, please see http://www.cmu.edu/education-office/disability-resources/. Students with disabilities are encouraged to self-identify with Equal Opportunity Services by contacting Catherine Getchel, 412-268-6121, getchell@cmu.edu to access the services available at the university and initiate a request for accommodations.

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

Support for graduate students who are or will be teaching is provided in many departments and centrally by the Eberly Center for Teaching Excellence & Educational Innovation. The Eberly Center offers activities for current and prospective teaching assistants as well as any graduate students who wish to prepare for the teaching component of an academic career. The Center also assists departments in creating and conducting programs to meet the specific needs of students in their programs. Specific information about Eberly Center support for graduate students can be found at: www.cmu.edu/teaching/graduatestudentsupport/index.html.

Carnegie Mellon Ethics Hotline

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 financial matters, academic and student life, human relations, health and campus safety or research.

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 will be reported to appropriate university personnel.

The hotline is NOT an emergency service. For emergencies, call University Police at 412-268-2323.

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

The Carnegie Mellon Student Government consists of an Executive Branch and a Legislative Branch. This is the core of traditional student government, as governed by the Student Body Constitution. The Executive Branch serves the entire student body, graduate and undergraduate, and consists of one president and four vice-presidents. The Legislative Branch for graduate students, The Graduate Student Assembly (GSA) passes legislation, allocates student activities funding, advocates for legislative action in locally and in Washington D.C. on behalf of graduate student issues and needs, and otherwise acts on behalf of all graduate student interests. GSA also contributes a significant amount of funding for conferences and research, available to graduate students through application processes. GSA also plans various social opportunities for graduate students and maintains a website of graduate student resources on and off-campus, www.cmu.edu/stugov/gsa/resources/index.html. Each department has representation on GSA and receives funding directly from GSA's use of the student activities fee for departmental activities for graduate students. The department rep(s) is the main avenue of graduate student representation of and information back to the graduate students in the department.

Intercultural Communication Center (ICC)
www.cmu.edu/icc/
The Intercultural Communication Center (ICC) is a support service offering both credit and non-credit classes, workshops, and individual appointments designed to equip nonnative English speakers (international students as well as international students who attended high school in the U.S.) with the skills needed to succeed in academic programs at Carnegie Mellon. In addition to developing academic literacy skills such as speaking, reading and writing, students can learn more about the culture and customs of the U.S. classroom. The ICC also helps international teaching assistants (ITAs) who are non-native English speakers develop fluency and cultural understanding to teach successfully at Carnegie Mellon and provides ITA testing, required testing indicating a nonnative speaking student has a language proficiency required before being allowed to work with undergraduates in classes, labs or individual meetings.

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. Office of International Education (OIE) is the liaison to the University for all non-immigrant students and scholars. OIE provides many services including: advising on personal, immigration, academic, social and acculturation issues; presenting programs of interest such as international career workshops, tax workshops, and cross-cultural and immigration workshops; supporting international and cultural student groups such as the International Student Union and the International Spouses and Partners Organization; maintaining a resource library that includes information on cultural adjustment, 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 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 veteran education benefits, campus services, veteran's groups at CMU, non-educational resources and international military service information through the Veterans and Military Community website. There are also links and connections to veteran resource in the Pittsburgh community. The Naval ROTC and Veteran Affairs Offices are located at 4615 Forbes Avenue, uro-vaedbenefits@andrew.cmu.edu, 412-268-8747.

Key Offices for Academic & Research Support

Computing and Information Resources
www.cmu.edu/computing
Computing Services provides a comprehensive computing environment at Carnegie Mellon. Graduate students should seek Computing Services for information and assistance with your Andrew account, network access, computing off-campus, campus licensed software, email, calendar, mobile devices, computer security, cluster services and printing. Computing Services can be reached at it-help@cmu.edu.

The Carnegie Mellon Computing Policy establishes guidelines and expectations for the use of computing, telephone and information resources on campus. The policy is supported by a number of guidelines graduate students should know. The policy and guidelines are available at: www.cmu.edu/computing/guideline/index.html.

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

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, intellectual property rights and regulations, and institutional animal care & use. ORIC also consults on, advises about and handles allegations of research misconduct.

Key Offices for Health, Wellness & Safety

Counseling & Psychological Services
www.studentaffairs.cmu.edu/counseling

Counseling & Psychological Services (CAPS) affords the opportunity for students to talk privately about issues that are significant for them in a safe, confidential setting. Students sometimes feel confused about why they are feeling upset and perhaps confused about how to deal with it. An initial consultation with a CAPS therapist will clarify options and provide a recommendation to the appropriate mental health resource at Carnegie Mellon or the larger Pittsburgh community. CAPS services are provided at no cost. Appointments can be made in person or by telephone, 412-268-2922.

Health Services
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 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. Graduate students should contact UHS to discuss options for health insurance for spouses, domestic partners and dependents. Appointments can be made by visiting UHS's website or by telephone, 412-268-2157.

Campus Wellness
http://www.cmu.edu/student-affairs/wellness/

At the university, we believe our individual and collective well-being is rooted in healthy connections to each other and to campus resources. There are a wide variety of resources,

opportunities and people that 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. To sign up for the e-newsletter, text BEWELLATCMU to 22828 and share your preferred email address.

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, Room 199 (entrance is on Filmore Street). The department's services include police patrols and call response, criminal investigations, shuttle and escort services, fixed officer and foot officer patrols, event security, and crime prevention and education programming. Visit the department's website for additional information about the staff, escort and shuttle, emergency phone locations, crime prevention, lost and found, finger print services, and annual statistic reports.

Shuttle and Escort Services
University Police coordinates the Shuttle Service and Escort Service provided for CMU students, faculty, and community. Full information about these services, stops, routes, tracking and schedules can be found online at: http://www.cmu.edu/police/shuttleandescort/

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 www.cmu.edu/police/annualreports.

Student Affairs College Liaison
http://www.cmu.edu/student-affairs/wellness/Contact%20Us/index.html

Angie Lusk, the Assistant Director of Student Life, is the SCS liaison for graduate students. She can provide guidance and recommend other resources for a variety of academic, social, and psychological issues.

Graduate Student Initiatives
http://www.cmu.edu/graduate/programs-services/

Jamie Rossi, the Assistant Director of Graduate Student Initiatives, can also provide guidance for graduate students who are seeking resources outside of SCS.

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
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
              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
       Student's Rights
       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
       SafeWalk

Survivor Support Network
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
Statement of Assurance