Machine Learning
Graduate Student
Handbook

MACHINE LEARNING
DEPARTMENT

Carnegie Mellon

ML
MACHINE LEARNING
DEPARTMENT

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 (10.19.15)

Table of Contents

Mission of the Department

Machine Learning is a scientific field addressing the question "How can we program systems to automatically learn and to improve 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 how to successfully navigate based on experience they gather from sensors as they roam their environment, 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 sound statistical and computational principles. 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 study. 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 Neural Computation and Machine Learning
Joint PhD in Machine Learning and Public Policy
Joint PhD in Statistics and Machine Learning
Fifth Year Masters in Machine Learning
Masters in Machine Learning
Secondary Masters in Machine Learning

University Policies & Expectations

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

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/documents/SoA.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 academic year, students should be registered for 48 units during the fall and spring semesters. During the summer, students should be registered for 36 units. Students on an internship must register for the Practicum course, 10-935 or 10-635.

Prerequisite Courses
We expect you to have a broad background in computer science and statistics 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 prerequisites.

ML Core Course Requirements

These five core courses together provide a foundation in machine learning, statistics, probability, and algorithms.

10-715 Advanced Introduction to Machine Learning

10-702 Statistical Machine Learning

36-705 Intermediate Statistics

Plus any two of the following courses:

- 10-708 Probabilistic Graphical Models
- 10-725 Convex Optimization
- 15-826 Multimedia Databases and Data Mining
- 15-750 Algorithms or 15-853 Algorithms in the Real World

10-915 ML Journal Club is required for most of the graduate programs.

Electives are chosen in consultation with the advisor and approved by the Co-Directors of the program.

Course Waiver Policy

Requests to have a course waived will be on a case by case basis and must be approved by the course instructor and the program heads. Approval will be only be granted in unusual circumstances.

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.

Directed Research

Research is an important part of our program. You will work on research with your 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 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 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.

Data Analysis Project (DAP) Requirements

Students are required to demonstrate their grasp of fundamental data analysis and machine learning concepts and techniques in the context of a focused project. The project should focus on a substantive problem involving the analysis of one or more data sets and the application of state-of-the art machine learning and data mining methods, or on suitable simulations where this is deemed appropriate. Or, the project may focus on machine learning methodology and demonstrate its applicability to substantial examples from the relevant literature. The project may involve the development of new methodology or extensions to existing methodology, but this is not a requirement.

Machine learning and data mining methods are exemplified by, but not limited to, those covered in the core courses 10-701, 10-702, and 15-826. In particular, the analysis methods should be adequately justified in terms of the theory taught in these courses.

The project is not intended for purely theoretical or methodological investigations, but these may form the heart of a project in appropriate cases. (In such cases, the project should also contain a component of applying the new theoretical or methodological tools to data. This component does not have to contain novel results; instead, its goal is to characterize how well or poorly the tools perform for the given data.) Students are encouraged to seek out a project (co)advisor who can provide access to data or substantive applications, or can use data sets to which they already have access through one of the core courses, through the literature and archives, or through their PhD advisor. Other resources for this purpose include the Immigration Course, faculty home pages, and the ML Research Projects webpage.

The Data Analysis Project is to be carried out under the supervision of a Machine Learning Department faculty member, and possibly under joint supervision of a subject matter expert. It is to be concluded by a written report. The ideal report would demonstrate an ability to approach machine learning problems in a way that cuts across existing disciplinary boundaries. It should demonstrate a capacity to write about technical topics in machine learning in a cogent and clear manner for a professional and scientific audience.

Research for the Data Analysis Project is typically done as part of the Reading & Research course, 10-920.

DAP Committee

Student must form an official DAP committee of three faculty to evaluate the document. The committee will consist of the advisor, the Journal club instructor(s), and one other faculty member selected by the student. The third member is often someone with an interest in the analysis of the data set, and does not have to be an expert in ML or part of the student's thesis committee. The student should form the committee as early as possible during the DAP research process.

2 of 3 DAP Committee members, one of whom is the DAP advisor, must be in attendance for the DAP presentation.

DAP Prospectus

Student must write a 1-2 page prospectus, including the DAP's title, general topic, proposed data source, and a brief summary of proposed analysis methods, and circulate it to the committee. The student should do this as early as possible, preferably when the student forms the committee.

The intent is that the Data Analysis Project will be less formal in structure and more flexible in focus than a typical Masters thesis + defense requirement might allow. The Project is a requirement for those in other departments receiving a MS degree in Machine Learning as well as for PhD students in Machine Learning. The requirement will typically be completed during a student's 2nd year in the program.

DAP Requirements:

A public presentation of the work to the Machine Learning community. The presentation stands in lieu of a defense of the Data Analysis Project, and helps to disseminate the work. There will be a limited set of dates available for such presentations and students are encouraged to sign up early. The presentation should be suitable for a general machine learning audience, i.e., it should provide sufficient background for a non-domain-expert to understand the results, and should adequately summarize the relationship of the project to previous work. 2 of 3 DAP Committee members, one of whom is the DAP advisor, must be in attendance.

A stand-alone, single or lead author written paper that is approved by the faculty member(s) advising the Project. The paper should be of high quality, both in terms of exposition of technical details and overall English and organization. It should be suitable for submission to a journal or refereed conference. But, unlike some conference papers, it should be completely self-contained, including all descriptions necessary for a general machine learning audience to follow the theoretical development and reproduce the experimental results. This requirement may (but does not have to) result in the project paper being substantially longer than a conference proceedings paper on which it is based. Although it does not have to be published, publishing the paper may be desirable and helpful to the student. Project papers will be published on the department webpage, become part of the MLD archives, and will serve as examples to future students.

The student must provide a near-final draft of the DAP document (approximately 15 pages) at least one month before the oral presentation to the DAP Committee. Both student and committee must certify that this draft is substantially complete. Within two weeks of submission, the instructor(s) will either approve the project for presentation (at which point the presentation can be advertised to the members of the department), or notify the student that changes will be required before presentation. This approval is for the general topic and content, and not for the final contents of the document. The final version of the paper, incorporating any feedback received at the oral presentation, should be submitted for review no later than one month after the oral presentation.

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
www.cmu.edu/policies/documents/TransferCredit.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. (Note: suspended students may take courses elsewhere; however, they may receive transfer credit only if their college's and department's policies allow this.)

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/documents/Academic%20Integrity.htm

Department Expectations

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)

If you would like to be considered for a Teaching Assistant (TA) position for one of our courses you should have previously taken that course or a similar course.

If your native language is not English you 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 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

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

GuSH Research Funding
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.

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/

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 10-935 or 10-635.
- 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 Graduate Programs Manager.
- 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

Student Progress Review

The faculty meet at the end of each academic semester to make a formal evaluation of each student in the program. The co-directors and faculty research advisors communicate in written and oral form the assessment from these End of Semester Review meetings to the graduate students.

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 End of Semester Review meeting, the faculty review the student's previous semester's research progress and the student's next semester's research 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 96 required units).

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.

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 in their home department and 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 End of Semester letters from faculty:

SP = In the semiannual evaluation of all our students the faculty reviewed your progress toward the Ph.D. We are happy to report that you are in good standing in the Machine Learning PhD 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 End of Semester 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 End of Semester 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. 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.

Students on leave of absence should contact the Graduate Programs Manager 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.

Enrollment Verification

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

Departmental Resources & Personnel

Andrew W. Moore, Dean School of Computer Science (SCS)

Robert Frederking, Associate Dean for Doctoral Programs, SCS

Garth Gibson, Associate Dean for Masters Programs, SCS

Tom M. Mitchell, Department Head, Machine Learning Department (ML)

Geoffrey Gordon, Associate Department Head for Education,
Co-Director, Doctoral Programs in ML

Cosma Shalizi, Co-Director, Doctoral & Masters Programs in ML

William Cohen, Co-Director, Masters Programs in ML
Director, ML Minor

Diane Stidle, Graduate Programs Manager

[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

Mallory Deptola, Administrative Assistant, ML

Sandra Winkler, Administrative Assistant, 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.

Departmental Information

We are located on the 8th floor of Gates Hillman Center (GHC).

Mailboxes are located on the 6th floor of 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 8206 GHC, 9206 GHC, 6107 GHC but you will need a code to use them. Please request the code from your Graduate Program Manager.

Public computer clusters and printers are 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, 8203 GHC.

Key Distribution: Please see your Graduate Program Manager for a key if you have assigned office space.

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.

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

Your mail will be in the Gates Building, 6th floor.

Please do not take any supplies from the CS Main office; you are to get them from your Graduate Program Manager.

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

US Post Office is located in the basement of University Center.

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/Google Distinguished Lecture Series

ML Lunch Seminar

ML Special Seminars

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.

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 **Ph.D. program ONLY**. Financial aid from the department includes full graduate tuition plus a monthly stipend. 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 be 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 T.A.s 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.

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 students to travel to conferences and workshops to enhance their professional and career development.

Policy: If a 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 student and his or her faculty advisor/research sponsor must first agree that the student should take the trip. Then in advance of the trip the student fill out and print the Student Travel Authorization Form, and get the 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.

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 consist of the PhD & MS Admissions Committees, Speaking Skills Committee, Social Committee

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

PhD Program in Machine Learning

The Ph.D. 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, Psychology to the Tepper Business School.

Program Requirements

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

- Successfully complete the 5 ML core courses
- Successfully complete 36 units of approved electives, (12 units from statistics, 24 units to create a research depth)
- Participate in 24 units of directed research and/or practicum
- Complete the Journal Club course requirement (two 6-unit courses)
- Complete a Data Analysis Project (DAP)
- Serve as a teaching assistant at least twice
- Demonstrate speaking, writing and programming skills
- Write and orally defend a thesis, a significant piece of original research in a specialized area of Machine Learning.

  Note: Students in this program earn a MS degree along the way to the ML PhD. If you have already received a MS degree from another department in the School of Computer Science you will not typically receive the MS degree from MLD, with the exception under "Rules about previously taken courses."

Program Milestones

End of the first year, all students should have completed the Speaking Skills requirement.

End of the third year, coursework 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, www.cmu.edu/policies/DSS.html, students will complete all requirements for the Ph.D. 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 Ph.D. degree as part-time students for all semesters of their program, as approved by their program, may also appeal to their program or department for extension of the time to degree limit.

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 three elective courses 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 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 MLD 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 MLD MS in addition to the outside degree, s/he must take additional courses so as not to count any courses toward both the MLD MS degree and the outside degree.

Proficiencies in Programming, Teaching, Research and Writing Skills:
The programming skill requirement is normally demonstrated during the student's first two years of research, carried out under the supervision of the student's research advisor.

Each Ph.D. 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.

Programming Requirement:
The programming requirement is that a faculty member is able to vouch for the student's ability to build a reasonably sized system with reasonably clean code. This ability includes designing the system well, explaining its operation to others (to the level that they could use it, e.g., via a code release), and if applicable collaborating with others to develop it. The faculty member should have personal knowledge of this ability before certifying it, e.g., based on a code review, or on detailed discussions of the design of the system coupled with observations of a successful code release.

Speaking Requirement:
To satisfy the oral communication skill requirement, each student should give a public talk at Carnegie Mellon. The talk should be accessible to a general SCS audience. The talk is

presented in the Machine Learning Journal Club, and members of the speaking committee attend and evaluate the presentation, as well as provide oral and written feedback to the student.

All members of the speaking committee and the student's advisor should be in attendance. Immediately after the talk, the speaking committee members and the student's advisor confer among themselves (with the student absent) about the presentation. The committee members also fill out a Speaking Skills Review Form. The committee then provides oral feedback to the student, and will give the review forms to the student. After studying their contents, the student submits the review forms to the Graduate Program Manager to receive credit and to have placed in the Student's file.

As with writing, speaking well takes practice. Satisfying this requirement might take a few tries on the student's part, and no stigma is attached to those who have to try more than once. They are, however, encouraged to satisfy this requirement as soon as possible, and should consult with their advisor to choose an appropriate schedule, preferably during the first year.

Directed Research

During a student's first two years, he or she should be doing directed research at least half time; once all coursework is completed, 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 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 Ph.D. program.

The Research Matching Process in ML

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 Immigration Course (IC) and after meeting with potential advisors, both ML students and Machine Learning (and affiliated) faculty submit a form, indicating preferences for advisorship relations. 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 she/he will closely collaborate with the faculty member. The advisor is typically the primary person directing the student research, and is also expected to provide financial support (stipend and tuition) for the student.

Ph.D. 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.

Ph.D. 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 15 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 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 hrs. 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 Ph.D. It is the candidate's responsibility to ensure that the College and University's guidelines are followed for publicity of the proposal, and the availability of the thesis at least one week prior to the proposal.

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."

Ph.D. 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 Ph.D. It is the candidate's responsibility to ensure that the College and University's guidelines are followed for publicity of the defense, and the availability of the thesis at least one week 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 weeksbefore 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.

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 Ph.D. 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 Program in Neural Computation and Machine Learning

This Joint PhD program trains students in the application of Machine Learning to Neuroscience by combining core elements of the ML PhD program and the Program in Neural Computation (PNC) offered by the Center for the Neural Basis of Cognition (CNBC).

Program Requirements

To complete the degree of Philosophy of Science in Neural Computation and Machine Learning, we require that each student

- Successfully complete the 5 ML core courses
- Successfully complete the 4 CNBC core courses
- Complete a Lab rotation for exposure to experimental techniques
- Complete a Semester-long data-analytic research project
- Complete a Data Analysis Project (DAP)
- Serve as a teaching assistant at least twice
  (once for CNBC, once for MLD)
- Demonstrate speaking and writing skills
- Write and orally defend a thesis, a significant piece of original research in a specialized area of Neural Computation and Machine Learning.

Note: Students in this program may earn a MS degree along the way to the joint PhD, but if they do they will have to decide if the degree will be from PNC or Machine Learning. There is no joint Masters degree and you are not able to receive it from both departments.

Program Milestones

- End of the first year, all students will be required to complete a data-analytic project.
- End of the second calendar year, all students will be required to complete a deeper computational project, DAP.
- During the fourth year a thesis proposal should be presented to the CNBC and MLD community.
- Fifth year, normally the dissertation is complete and the student gives the final defense

Statute of Limitations

As outlined in the Doctoral Student Status Policy, www.cmu.edu/policies/DSS.html, students will complete all requirements for the Ph.D. degree within a maximum of ten years from original matriculation as a doctoral student, or less if required by a more restrictive department or college policy. Once this time-to-degree limit has lapsed, the person may resume work towards a doctoral degree only if newly admitted to a currently offered doctoral degree program under criteria determined by that program.

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

Proficiencies in Teaching, Research and Writing Skills

- Each Ph.D. 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.

Speaking Requirement

The MLD Speaking skills requirement can be met via the first-year research project and second-year research project presentations. Ideally these presentations would be given, also, within the context of the ML Journal Club, but participation in a CNBC-related journal club may be used as a substitute if approved by the ML Co-directors.

Experimental Training

Students in the program must spend significant time in the lab of one or more experimentalists in order to gain a detailed understanding of how the experimental data are collected. Students working in a strictly computational lab are required to do a rotation of at least 10 weeks in an experimental lab with the intent to begin (or continue) a collaboration with that lab.

The student is responsible for meeting this requirement, and it should be discussed with the student's advisor not later than by the end of the first year. A proposal detailing this cross training experience should be submitted for approval by the student's DAP committee (see below) by the beginning of the second year.

Note: the experimental rotation may serve as a major component of either the first-year or second-year research requirement.

Program Activities

Students will be expected to attend on a fairly regular basis MLD seminars, the CNBC colloquium, Brain Bag research seminars, and, at least when relevant to their interests, journal clubs and occasional additional public events such as thesis proposals. They should also attend the annual CNBC retreat.

First Year Research Requirement

By the end of the first calendar year in the program, all students will be required to complete a data-analytic project. The purpose of the project is to have the student 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 the project may be a precursor to the student's eventual thesis project.

Both written and oral summaries of the project must be presented. The project will be evaluated by a committee consisting of at least three faculty, of whom at least two are PNC training faculty. 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 steering committee.

Second Research Project

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 project, which counts as the Data Analysis Project in MLD, will be evaluated by a committee consisting of at least three faculty of whom at least two are PNC training faculty.

Advising

It is assumed that the student will have a suitable advisor within CNBC and/or MLD for the first year. In the second year the student will typically be supported by a research grant to a faculty member, who would typically become the advisor. In some cases it may be desirable to have another person serve as advisor. In particular, if a student has alternative sources of support, it will remain highly desirable for the student to have a primary research advisor who would also, typically, serve as primary academic advisor. Alternative arrangements may be fine as long as there is a specified faculty advisor who is responsible for reviewing the student's plans and progress by meeting with the student frequently, and at the very least at the beginning and end of each semester. Advising will also be reviewed by the co-directors of both CNBC and MLD.

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 she/he will closely collaborate with the faculty member. The advisor is typically the primary person directing the student research, and is also expected to provide financial support (stipend and tuition) for the student.

The Research Matching Process in ML

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.

For students who are admitted to the joint program after the first year, the student should already have an advisor and the matching process does not apply.

After attending research talks during the MLD Immigration Course (IC) and after meeting with potential advisors, both ML students and Machine Learning (and affiliated) faculty submit a form, indicating preferences for advisorship relations. 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 with an affiliation in both departments, or will be co-advised by two faculty advisors, one from CNBC and one from MLD.

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.

Ph.D. Thesis Committee

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

MLD has the right in unusual cases to alter the composition of the committee to assure appropriate quality and breadth.

Ph.D. Thesis Proposal

Required coursework should be completed by the end of the third year. During the fourth year a Ph.D. candidate should present a thesis proposal first to his or her thesis committee and then to the CNBC and MLD community. The student will have two joint advisors, one from MLD and the other a CNBC faculty member from outside of MLD.

The thesis proposal should include: a succinct summary of the proposed research problem; the significance of the proposed research; a review of relevant literature relating to the problem; a review of the candidate's work leading up to the thesis, including preliminary results; a clear statement of remaining research; and a tentative schedule for completing the work. It should also conform to the stylistic requirements for thesis proposals in MLD.

The thesis committee must offer its preliminary approval of the proposal. The student then arranges to present the proposal publicly, so that CNBC and MLD faculty and other community

members can attend. Formal approval is conferred by the MLD faculty and the PNC steering committee.

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."

Ph.D. Thesis

Normally, the dissertation is completed during the student's fifth year. The final defense is a public presentation, in accord with the College and University requirements for the Ph.D. It is the candidate's responsibility to ensure that the Departmental, College and University guidelines are followed for publicity of the defense, and availability of the thesis document at least two weeks prior to the defense.

The final defense is a public presentation, in accord with the College and University requirements for the Ph.D. It is the candidate's responsibility to ensure that the College and University's guidelines are followed for publicity of the defense, and the availability of the thesis at least one week 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. 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.

Student Progress

Student progress will be evaluated at the end of each academic semester by both the MLD & CNBC faculty. Students will enter information into the 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

Full-time Ph.D. students in the joint program will ordinarily receive full tuition and stipend for a period of 5 years, provided by a mix of training grant, research, fellowship and TA funding. This assumes the student is making satisfactory progress in the program, as determined by both the MLD faculty and the CNBC Education Committee. Students are strongly encouraged to compete for outside fellowships and other sources of financial support.

Joint PhD Program in Machine Learning and Public Policy

The Joint Ph.D. Program in Machine Learning and Public Policy is a program operated jointly by faculty in Machine Learning and the Heinz College (Schools of Public Policy, Information Systems, and Management). Students will gain the skills necessary to develop new state-of-the-art machine learning technologies and apply these successfully to real-world policy domains.

Program Requirements
To complete the Doctor of Philosophy in Machine Learning and Public Policy, we require that each student:

- Successfully complete the 5 ML core courses
- Successfully complete the 5 Heinz core courses
- Successfully complete 36 units of approved electives,
  (12 units from Heinz, 12 units from ML or Statistics, 12 units ML/PP)
- Participate in 24 units of directed research
- Complete a Data Analysis Project (DAP)
- Serve as a teaching assistant at least twice
- Demonstrate speaking, writing and programming skills
- Write and orally defend a thesis, a significant piece of original research in a specialized area of Machine Learning and Public Policy.

Note: Joint ML/PP students are not required to attend the ML Journal Club.

Note: Students in this program earn a MS degree along the way to the joint PhD but will have to decide if the degree will be from Heinz or Machine Learning. The Masters is not a joint degree and you are not able to receive it from both departments.

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, student should present thesis proposal
- Fifth year, student should defend

*One of the papers must fulfill the requirement of the DAP and be approved by the ML faculty, this DAP presentation may be combined with the Heinz paper presentation.

Statute of Limitations
As outlined in the Doctoral Student Status Policy, www.cmu.edu/policies/DSS.html, students will complete all requirements for the Ph.D. degree within a maximum of ten years from original matriculation as a doctoral student, or less if required by a more restrictive department or college policy. Once this time-to-degree limit has lapsed, the person may resume work towards

a doctoral degree only if newly admitted to a currently offered doctoral degree program under criteria determined by that program.

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

Heinz Core Course Requirements

90-901, 90-902, 90-918 Heinz PhD. Seminar

90-908 Microeconomics

Social Science course (e.g., Organizational Behavior, Social Psychology or Political Science. See Heinz Ph.D. Handbook for acceptable courses)

Proficiencies in Programming, Teaching, Research and Writing Skills:
- The programming skill requirement is normally demonstrated during the student's first two years of research, carried out under the supervision of the student's research advisor.
- Each Ph.D. candidate must participate in two terms of instruction, either through TA duties or serving as the instructor for a class. (once in the Heinz School and once in MLD)
- Research and writing skills are normally achieved through the Data Analysis Project requirement.

Programming Requirement:
The programming requirement is that a faculty member is able to vouch for the student's ability to build a reasonably sized system with reasonably clean code. This ability includes designing the system well, explaining its operation to others (to the level that they could use it, e.g., via a code release), and if applicable collaborating with others to develop it. The faculty member should have personal knowledge of this ability before certifying it, e.g., based on a code review, or on detailed discussions of the design of the system coupled with observations of a successful code release.

Speaking Requirement:
To satisfy the oral communication skill requirement, each student should give a public talk at Carnegie Mellon. The talk should be accessible to a general SCS and Heinz School audience. The Speaking Skills requirement for joint ML/PP students may be achieved through the presentation of the student's First and Second Heinz Papers or through a separate presentation.

Directed Research
Students in their first year are expected to spend the majority of their time on coursework, to select research advisors from MLD and Heinz, and to begin working on directed research under

their advisors' supervision. It is expected that Ph.D. students actively engage in research from their first semester; however, the additional coursework requirements of the joint program are likely to lead to a slower initial pace of research. In their second and succeeding years, students are expected to spend at least half of their time on research, and are expected to make continued satisfactory research progress as evaluated by the regular student review meetings in both MLD and Heinz.

The Research Matching Process in ML

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/PP Ph.D. students are therefore matched to a faculty advisor in MLD and Heinz at the very beginning of the program who will guide their research and advise them in academic matters.

After attending research talks during the MLD Immigration Course (IC) and after meeting with potential advisors, both ML/PP students and Machine Learning (and affiliated) faculty submit a form, indicating preferences for advisorship relations. Based on these forms, the Co-Directors of the ML program will then match students with faculty advisors, with input from the Heinz Ph.D. Committee. 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 she/he will closely collaborate with the faculty member. The advisor is typically the primary person directing the student research, and is also expected to provide financial support (stipend and tuition) for the student.

Ph.D. 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 a member of the Heinz faculty, at least one of whom is a Machine Learning faculty member and also an external member. The external member is typically from outside the university but could be from another department at Carnegie Mellon if appropriate. MLD has the right in unusual cases to alter the composition of the committee to assure appropriate quality and breadth.

Ph.D. Thesis Proposal

ML/PP PhD students are expected to present their thesis proposal during their 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 committee members at least once to discuss the proposed work before the proposal.

Students should allocate at least 2.5 hrs. for the proposal presentation and examination. 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.

A quorum for a thesis proposal seminar consists of at least 2n+1 tenured or tenure track faculty members, where n is the size of the student's Advisory Committee. Please see the Heinz School Doctoral Program Student Handbook for full details.

Generally, a thesis proposal will be approximately 15 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 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.

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."

Ph.D. 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 Ph.D. It is the candidate's responsibility to ensure that the College and

University's guidelines are followed for publicity of the defense, and the availability of the thesis at least one week 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. 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.

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 Heinz School and Machine Learning Department are committed to providing full tuition and stipend support for the academic year, for each full-time ML/PP Ph.D. 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.

Joint PhD Program in Statistics and Machine Learning

Exciting research is being done at the boundary between Machine Learning and Statistics. This is reflected at Carnegie Mellon by the strong ties between the Machine Learning Department and the Department of Statistics. The Joint Ph.D. 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.

Program Requirements
To complete the Doctor of Philosophy in Statistics and Machine Learning, we require that each student:

- Successfully complete 4 of the 5 ML core courses
- Successfully complete Statistics courses
  (36-752, 36-755, 36-757, 36-758, 36-707), 36-750 recommended
- Participate in 24 units of directed research
- Complete the Advanced Data Analysis (ADA 36-758) and Data Analysis Project (DAP) requirements
- Serve as a teaching assistant at least twice
- Demonstrate speaking and writing skills
- Write and orally defend a thesis, a significant piece of original research in a specialized area of Statistics and Machine Learning.

Note: Joint Stat/ML students are not required to take the Statistics MS & PhD exams.

Note: Students in this program earn a MS degree along the way to the joint PhD but will have to decide if the degree will be from Statistics or Machine Learning. The Masters is not a joint degree and you are not able to receive it from both departments.

Note: The ADA and DAP projects can be combined and presented at the same time to the faculty in MLD and Statistics, if approved by the co-Directors of the program.

Program Milestones
- End of second year, student should present ADA project
- End of third year, student should fulfill the DAP, speaking, and writing skills requirements.
- Fourth year, student should present thesis proposal
- Fifth year, student should defend

Statute of Limitations
As outlined in the Doctoral Student Status Policy, www.cmu.edu/policies/DSS.html, students will complete all requirements for the Ph.D. degree within a maximum of ten years from original matriculation as a doctoral student, or less if required by a more restrictive department or college policy. Once this time-to-degree limit has lapsed, the person may resume work towards

a doctoral degree only if newly admitted to a currently offered doctoral degree program under criteria determined by that program.

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

Proficiencies in Teaching, Research and Writing Skills:
Each Ph.D. 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.

Speaking Requirement:
To satisfy the oral communication skill requirement, each student should give a public talk at Carnegie Mellon. The talk should be accessible to a general SCS audience. The talk is presented in the Machine Learning Journal Club, and members of the speaking committee attend and evaluate the presentation, as well as provide oral and written feedback to the student.

All members of the speaking committee and the student's advisor should be in attendance. Immediately after the talk, the speaking committee members and the student's advisor confer among themselves (with the student absent) about the presentation. The committee members also fill out a Speaking Skills Review Form. The committee then provides oral feedback to the student, and will give the review forms to the student. After studying their contents, the student submits the review forms to the Graduate Program Manager to receive credit and to have placed in the Student's file.

As with writing, speaking well takes practice. Satisfying this requirement might take a few tries on the student's part, and no stigma is attached to those who have to try more than once. They are, however, encouraged to satisfy this requirement as soon as possible, and should consult with their advisor to choose an appropriate schedule, preferably during the first year.

Directed Research
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.

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 Ph.D. program.

The Research Matching Process in ML

The Stat/ML PhD students are typically matched to a research advisor in the first or second year. After attending research talks during the MLD Immigration Course (IC) and after meeting with potential advisors, both ML students and Machine Learning (and affiliated) faculty submit a form, indicating preferences for advisorship relations. 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 with an affiliation in both departments, or will be co-advised by two faculty advisors, one from Statistics and one from MLD. 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 she/he will closely collaborate with the faculty member. The advisor is typically the primary person directing the student research, and is also expected to provide financial support (stipend and tuition) for the student.

Ph.D. 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.

Ph.D. 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 committee members at least once to discuss the proposed work before the proposal. 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.*

Students should allocate at least 2.5 hrs. for the proposal presentation and examination. 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.

Generally, a thesis proposal will be approximately 15 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 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.

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."

Ph.D. 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 Ph.D. It is the candidate's responsibility to ensure that the College and University's guidelines are followed for publicity of the defense, and the availability of the thesis at least one week 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. 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.

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. MLD will coordinate with Statistics in the assessment.

Financial Support
The Statistics Department and Machine Learning Department are committed to providing full tuition and stipend support for the academic year, for each full-time Statistics/ML Ph.D. 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.

Primary Masters 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 core courses as students receiving a Ph.D. in Machine Learning, and also complete a Data Analysis Project.

Program Requirements

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

- Successfully complete the 5 ML core courses
- Successfully complete 24 units of approved electives,
  Participate in 18 units of directed research.
- Complete a Data Analysis Project (DAP).
- Complete the Journal Club course requirement

Double Counting Courses

Any course counted toward another master-level or bachelor-level degree may not be counted toward the primary Masters in Machine Learning.

Program Milestones

There are no official milestones that a student must pass. However, students typically complete two core courses the first semester, two or three core courses the second semester, and choose a DAP advisor by the end of the first year. The progress of MS students will be assessed by the faculty at the end of each semester.

Statute of Limitations

As outlined in the Master's Students Statute of Limitations, http://www.cmu.edu/policies/documents/MastersStudentStatuteLimitations.html, students who have matriculated at Carnegie Mellon beginning Fall 2012 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 he or she should be doing directed research with a faculty advisor that will hopefully 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 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.

Internships

Masters students need to secure a summer internship. An exception may be granted if the advisor would rather the student continue research during the summer at Carnegie Mellon. You must discuss your plans for an internship with your advisor and register for the appropriate Practicum course. At the end of the internship you must submit an internship survey 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 research requirements

Note: International students must apply for Curricular Practical Training (CPT) with the Office of International Education for immigration authorization for internships. 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.fth Year Masters Program in Machine Learning

Fifth Year Masters in Machine Learning

The 5th Year Masters 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 core courses as students receiving a PhD in Machine Learning, and also complete a Data Analysis Project.

Program Requirements

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

- Successfully complete the 5 ML core courses
- Successfully complete 24 units of Data Analysis Project (DAP)
  MS DAP Research (normally 24 units over 2 semesters, but can be reduced if the student plans for an extra elective or increased if another core course was taken during the BS).
- Complete the Journal Club course requirement
- Total of 108 units, 48 units of core courses, 24 units DAP, 36 units of applicable courses as an undergraduate.
- Students must be full time (at least 36 units per semester).

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 electives during your undergraduate years at Carnegie Mellon. These courses may be double-counted toward the 5th year master's degree.
[List of MS approved electives](#)

Note: if other core courses (in addition to 10-701) have been taken as an undergraduate, then approved electives must be substituted for a total of 48 units to be counted as core courses.

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.

Statute of Limitations

As outlined in the Master's Students Statute of Limitations, http://www.cmu.edu/policies/documents/MastersStudentStatuteLimitations.html, students who have matriculated at Carnegie Mellon beginning Fall 2012 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 hopefully 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 time is very short.

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 Masters Program in Machine Learning

The MLD Secondary Master's program in Machine Learning is designed to train Ph.D. 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:

- Successfully complete the 5 ML core courses
- Successfully complete 36 units of approved electives,
- Complete a Data Analysis Project (DAP)

Double Counting Courses

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

Program Milestones

Second semester, must have a MLD DAP advisor

Final year of primary degree: satisfy DAP oral and written requirements.

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

Statute of Limitations

For Ph.D students, you must graduate before or concurrent with your PhD degree from this program.

As outlined in the Master's Students Statute of Limitations, http://www.cmu.edu/policies/documents/MastersStudentStatuteLimitations.html, students who have matriculated at Carnegie Mellon beginning Fall 2012 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 hopefully 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.

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 Ph.D. home department or in the case of a faculty or staff would be paid by the university 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, Ph.D., 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:

Career and Professional Development Center

Counseling & Psychological Services (CAPS)

Housing & Dining Services

Orientation & First Year Programs *(note: for undergraduate students)*

Office of International Education (OIE)

Student Activities

Student Life.

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 the Dean of Student Affairs 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
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.

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)
www.studentaffairs.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.

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.

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.

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

Last updated: June 10, 2015

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

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