Carnegie Mellon University

Department of Statistics & Data Science
Dietrich College of Humanities and Social Sciences

Doctoral Student Handbook

Ph.D. in Statistics
Ph.D. in Statistics and Machine Learning
Ph.D. in Statistics and Public Policy
Ph.D. in Statistics and Engineering and Public Policy
Ph.D. in Statistics and Neural Computation

2025 – 2026
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1 Welcome and Introduction

This document provides an introduction to the graduate programs of the Carnegie Mellon University (CMU) Department of Statistics & Data Science. The Department provides a harmonious, non-competitive environment for studying, learning and doing research. We are selective in our admissions decisions, and we admit students with the expectation that they will successfully obtain an advanced degree. The faculty works closely with students to help them achieve their goals, and the programs are adaptable to individual needs. The graduate programs in statistics at CMU are directed towards training students to become statistical scientists. The courses are demanding, and sometimes the work may seem overwhelming, yet through sustained effort students can achieve enormous intellectual and personal growth. Our faculty members also engage with undergraduate teaching, research, and professional activities, but we all get great satisfaction from guiding novice statisticians into the field and we make graduate student education and supervision a top priority.

This Handbook provides general information about the Department, and the conventions and regulations that govern student life. A related source of information is our website; there you can find both the specific courses of study leading to the Master of Science in Applied Data Science (MADS), Master's, and Ph.D. degrees and the general environment a student might expect to find here.

While this handbook is specific to your academic experience in the department, it is just one element of the Graduate Student Handbook Suite. There are several other resources within the suite that you should consult when needed:

- University-Wide Graduate Student Handbook (Office of Graduate & Postdoctoral Affairs)
- The Word Student Handbook

Students should receive these upon their arrival and are encouraged to review them and become familiar with the policies that govern the operation of the University.

Questions concerning any of the topics covered here, or any other matters pertaining to the functioning of the Department, may be addressed to any of the faculty or staff. However, the person most likely to know the answers is often the Director(s) of the Ph.D. Program (Valérie Ventura, Ann Lee, and Alex Reinhart) or the Business Manager (Laura Butler); the Department Head (Rebecca Nugent) is responsible for determining policy through consultation with the Director(s) of the Ph.D. Program and the rest of the faculty. Students who require this handbook in an alternative format should speak to the Director(s) of the Ph.D. Program.

This handbook provides some general information and describes many of the customs and rules of the Department. We hope that the details presented below will not obscure our major message: we are pleased to have you here, and want to support a rewarding experience.

2 Degrees Offered

Our Department offers five interdisciplinary Ph.D. programs, each designed to prepare students for leadership in research, academia, industry, and public service:

Ph.D. in Statistics Provides a strong foundation in statistical theory and methodology, with broad opportunities for applied research across disciplines.

Ph.D. in Statistics & Machine Learning Offered jointly with the Machine Learning Department, this program is aimed towards preparing students for leading academic or industry jobs at the intersection of the fields of statistics and machine learning.

Ph.D. in Statistics & Public Policy A collaborative program with the Heinz College that trains students to apply statistical methods to real-world policy challenges.

Ph.D. in Statistics & Engineering and Public Policy Offered jointly with the College of Engineering, this program focuses on using data and statistical modeling to address societal issues such as energy, environment, risk, innovation, and technology policy.

Ph.D. in Statistics & Neural Computation Developed in partnership with the Neuroscience Institute, this program equips students to apply statistical tools to problems in brain science and cognitive modeling.

Each program offers rigorous training, interdisciplinary collaboration, and individualized mentorship to support students in achieving their academic and professional goals. See § 7.5 Joint Degree Programs for details on the joint programs and their application requirements.

3 General Degree Timeline and Milestones

This list summarizes the basic milestones and deadlines of the Ph.D. in Statistics program. Consult § 7.5 Joint Degree Programs for differences in the joint programs.

Year 1 *Fall*
- Take required courses (§ 7.4 Core Courses).
- Choose ADA project (§ 8.2.2 Advanced Data Analysis (ADA) Project).

Spring
- Take required courses.
- Start ADA project.
- Take the Data Analysis Exam (§ 8.1 Ph.D. Data Analysis Exam)

Year 2 *Fall*
- Register for 36-758, 36-795 (12 units) and one elective/audit. Adding a second elective must be approved by the Ph.D. Director.
- Turn in ADA report draft to ADA advisor by mid-semester.

		* Deliver ADA presentation by end of semester. * Turn in final ADA report by Reading Day at beginning of fall exam period.
	Spring	* Look for thesis advisor.
Year 3		* Work towards thesis proposal and assemble Ph.D. committee (§ 8.3.1 Thesis Proposal).
Year 4	*Fall*	* Proposal expected by 10th day of classes.
Year 5		* Defense expected by end of the spring semester (§ 8.3.4 Thesis Defense and Table 3).

4 Departmental Personnel

The Department of Statistics & Data Science is housed in various suites: Baker Hall (BH) 132, BH 129, BH 232, BH 228, BH 229, FMS, and the 3rd floor of Wean Hall. Faculty, student, and staff offices are interspersed throughout these areas.

Key college personnel include:

- **Dean of Dietrich College:** Richard Scheines, scheines@cmu.edu
- **Associate Dean for Educational Affairs:** Sharon Carver, sc0e@andrew.cmu.edu
- **Associate Dean for Community Impact and Educational Outreach:** Ayana Ledford, ledford@andrew.cmu.edu

Within the Department, key personnel include:

- **Statistics & Data Science Department Head:** Rebecca Nugent, Baker 232G, rnugent@stat.cmu.edu
- **Co-Directors of the Ph.D. Program:** Valérie Ventura, Baker 132E, vventura@stat.cmu.edu, for 1st and 2nd year students; Ann Lee, Baker 228B, annlee@stat.cmu.edu, for later cohorts
- **Assistant Director of the Ph.D. Program:** Alex Reinhart, Baker 232L, areinhar@stat.cmu.edu
- **Ph.D. Program Coordinator:** Christina Vesel-Kleinhampl, Baker 229K, cveselkl@andrew.cmu.edu
- **Business Manager:** Laura Butler, Baker 232J, lfbutler@stat.cmu.edu
- **Assistant Business Manager for Operations:** Jess Paschke, Baker 232D, jpaschke@stat.cmu.edu

- **Associate Director of Academic Programs and Alumni Partnerships:** Samantha Nielsen, Baker 132L, samanthn@andrew.cmu.edu
- **Technical Support Requests** (department servers, networking, etc.): remarks@stat.cmu.edu
- **Facilities Requests** (maintenance, heating & cooling, etc.): remarks@stat.cmu.edu with "FMS" in the subject line
- **Faculty:** https://www.cmu.edu/dietrich/statistics-datascience/people/faculty/index.html
- **Staff:** https://www.cmu.edu/dietrich/statistics-datascience/people/staff/index.html

You can find additional contact information (phone and office location) for the faculty and staff listed above on our website at https://stat.cmu.edu.

5 Departmental Resources

5.1 The DeGroot Library

The DeGroot Library, located in BH 229A, is for the use of Department members only. This is a space where Department members can check out statistics related content. Library books and journals should be used in the library when possible, and if taken out of the library, should be logged in the black folder and returned as soon as possible, certainly within a month.

5.2 Computing Resources

The Department maintains computing resources for the use of graduate students and faculty during their research. These include shared Linux servers that can be used for computing-intensive projects in common languages such as R or Python, a GPU cluster shared with other departments in Dietrich College, and access to the Pittsburgh Supercomputing Center. These resources are introduced during the Department's orientation for new students.

Students receive accounts for these services during Orientation. These accounts are subject to the Department's Account Retention and Data Retention policies, published on the Department website.

These resources are shared, and computing plays a vital role in all graduate students' classroom work and research, so students should try to equitably share these resources.

Documentation describing the computing resources and their use can be found on the department Computing Wiki at https://info.stat.cmu.edu/index.php/Main_Page.

Students also receive university accounts, known as Andrew accounts, for access to email and university services. These accounts are subject to the University's account retention and acceptable use policies, and are disabled roughly 90 days after graduation. Graduates are eligible for alumni email addresses (`@alumni.cmu.edu`).

5.3 Office Supplies

Basic office supplies are provided, such as printer paper and whiteboard markers, for use by graduate students in the course of their teaching and research work. If supplies are needed for teaching or for research with a faculty member, requests may be made to one of the staff.

The Department has three photocopiers. The machine in BH 132 is especially well-suited for double-sided copying, collated copies, and large copy jobs. The machines in BH 129 and 229 should only be used for smaller copying jobs. All copiers are networked, so it is possible to print large numbers of copies directly from a computer, and scanned PDF files can be created on them and sent to you via email.

Statistics graduate students are permitted to use the copiers for Departmental purposes, such as making copies or scanning exams for a course. Occasional personal use is permitted, provided it is limited and does not interfere with other uses.

5.4 Office and Common Space

The Department has a suite of offices and open spaces (with cubicles) for graduate student use. There is one conference room/library in BH 229A, and a lounge and small kitchen in BH 132. These suites are open 24 hours to students using their CMU IDs or keys provided by the Department. Students are assigned to office spaces in a process managed each year by the Student Advisory Committee (§ 5.6 Student Advisory Committee). Students are generally given the opportunity to choose their assigned office in order of seniority.

Out of courtesy to everyone in the Department, all common areas (i.e., kitchen, lounge, and copy rooms) should be kept in good shape. Dirty dishes and utensils should not be left in the kitchen; spills should be cleaned immediately. The refrigerators are for short-term storage only; all items should be removed before any spoilage occurs. Please label any bags or items in the refrigerators with your name or initials. Cleaning the refrigerator in the graduate student offices is the responsibility of the students. All items in the copy rooms should be returned to their proper places immediately after use.

Office space and access to computing facilities must be shared with other students. Students should try to share these facilities as courteously as possible. Within each office students should try to decide among themselves how the office should function. In making this decision, students should keep in mind that the offices are intended as a place for work. Disturbances to a quiet working environment, such as socializing or speaking on the phone for lengthy periods of time, should be minimized. In addition, students often work

together in an office and, while this is beneficial to them, it may disturb other officemates. Exactly how much disturbance is tolerated should be left up to the students in each office: some offices may be filled with people who don't mind disturbances, others with students who require quiet most of the time.

In deciding office policy, it is usually best to respect the feelings of those who need quiet. In situations where it is impossible to maintain an effective working environment, students may request an office change through the Student Advisory Committee (SAC) or the Director(s) of the Ph.D. Program.

At orientation, each student is provided with keys to their office, to the main department doors, and to departmental common areas (i.e., lobbies, copy rooms, conference rooms, lounge, and library).

5.5 Security

Although Pittsburgh does not have the crime problems of many major American cities, theft and assault remain occasional threats on or near the CMU campus. Students should be careful with their belongings and should avoid walking alone in poorly lit or remote areas. The university operates a shuttle and escort service; more information can be found at https://www.cmu.edu/transportation/transport/index.html.

For the safety of everyone, and in the interests of protecting our valuable equipment, it is extremely important that all students be very careful about the security of the Department. After the staff have left for the day, the Department is considered closed: the meeting rooms and copier rooms should be locked when not in use and people not affiliated with the Department, including undergraduate students, should not be admitted to the Departmental suites unless accompanied by a Department member.

In particular, office hours cannot be held in Department spaces outside usual business hours (8:30 a.m. – 5:00 p.m.). If strangers are found in the wing after hours, they should be asked to identify themselves and their purpose for being there; if the situation is uncomfortable, University Police should be called (at 412-268-2323).

If you use the audio-visual equipment installed in Department conference rooms, please be sure to properly and completely shut it down once you are finished. These rooms should always be locked when they are not occupied.

5.6 Student Advisory Committee

The Student Advisory Committee (SAC) is composed of current Ph.D. students. Each cohort elects a representative to the committee during orientation. The representatives serve as a formal link between the graduate students and the faculty. The SAC deals with a range of issues such as providing input for changes in the department curriculum, communicating student concerns to the Department, coordinating student office assignments and the use of student spaces, and organizing social events for students.

SAC receives a small annual budget through the Graduate Student Assembly, which it may spend on social events, supplies, and other expenditures for the collective benefit of the students. These funds are managed centrally through GSA.

6 Advising

6.1 Role of an Advisor and Advisor Assignments

New graduate students will be advised by the Director(s) of the Ph.D. Program (see § 4 Departmental Personnel) in their first year. Graduate students need good advice concerning their academic program and should consult regularly with the Director(s). Students may seek advice from other faculty (and students) regarding choices of courses, ADA project, and so forth. Ultimately, however, any plans must be approved by the Director(s) of the Ph.D. Program.

Once students begin their ADA project, their ADA advisor becomes responsible for research advising and feedback. Students should still consult with the Director(s) of the Ph.D. Program about coursework until all required coursework is complete.

After completing the ADA project (and any related joint program requirements), students must find a Ph.D. thesis advisor. Students are **not** expected to independently devise a thesis topic. Instead, they are encouraged to talk with many faculty members about possible thesis topic areas. After these discussions, the student should select a particular faculty member and engage in reading and research in a focused area to collaboratively identify a thesis topic. The faculty member supervising this reading and research will then become the student's academic advisor. The student is responsible for notifying the Ph.D. Coordinator to update the student's record when this occurs.

To prevent delay to the thesis, students should find an advisor within one or two semesters of completing the ADA. If the ADA project is being extended to form a publishable paper, the student should work towards finding a thesis topic in parallel, rather than waiting until the paper is submitted.

The student is not committed to continue on the prospective thesis project. It is possible for a student to change projects and advisors at this stage; however, such changes are relatively rare as it is assumed that the student will carefully select the project.

6.2 Advisor/Advisee Collaboration

The department views the advisor/advisee relationship as a central part of the Ph.D. experience. This partnership should be grounded in mutual respect, open communication, and shared commitment to the student's academic and professional development. While the form and style of advising is expected to vary by faculty member and student needs, we hope that the below expectations can provide a structure through which the advisor/advisee relationship can thrive.

Advising is a collaborative process. Advisors serve as mentors, guides, and advocates, helping students navigate research, coursework, and professional development. Students, in turn, are expected to engage actively in those areas, take ownership of their progress, and seek out support and feedback when needed. The department values transparency, inclusion, and a student-centered approach, with the goal of providing an environment where all students can thrive.

Expectations for Thesis and ADA Advisors

- Provide guidance on advisee's research project and methodology.
- Offer timely and constructive feedback on student work.
- Meet regularly with advisees (at a cadence agreed upon with the student).
- Help students plan and meet program milestones.
- Encourage professional development (e.g., conference participation, publishing).

Expectations for Advisees

- Communicate regularly and openly with their advisor, at a cadence agreed upon with the advisor.
- Take initiative in setting meeting agendas and following up on action items.
- Make consistent progress toward research and degree milestones.
- Be receptive to feedback and willing to revise and improve their work.
- Engage in the broader academic community within the department and CMU (e.g., seminars, workshops).
- Maintain academic integrity and uphold professional standards.

While not required, students are also welcome to complete an individualized development plan (IDP) with their advisor to help to document goals and facilitate communication between advisor and advisee. IDPs are meant to promote professional and personal growth by formally documenting goals and facilitating dialogue, collaboration, and accountability between advisors and advisees. Carnegie Mellon has developed a set of templates that can be used by doctoral students and their advisors to create an Individual Development Plan. You can find the templates here: https://www.cmu.edu/graduate/resources/index.html

6.3 Review/Redress of Academic Conflicts

The Department prides itself on its flexible and non-competitive programs and encourages discussion on all matters of concern. Within particular classes, students are encouraged to discuss difficulties with the instructor. This is helpful to both the instructor and the student. The instructor receives feedback about the class, its level, and its pace, as well as specific difficulties students may be having. On the other hand, if a student is having difficulties in a class because of some gaps in their background, then discussion with the instructor may lead to some changes in the student's program. Such changes are not punitive, but are meant to better support the student's success. If, for any reason, a student feels uncomfortable talking to an instructor, they should bring their concerns to their graduate advisor, the Director(s) of the Ph.D. Program, the Department Head, or the Student Advisory Committee.

The Department encourages open communication among all members of our community, especially between students and faculty. Students are invited to raise academic or personal issues with any faculty member. Nevertheless, there may be situations, such as concerns about the teaching in a particular course, where direct interaction with a particular faculty member is difficult for a student. In such a situation, all graduate students should be aware that a major part of the Department Head's duties is addressing such issues. Furthermore, all such complaints or concerns will be handled in confidence by the Department Head.

In the event that problems or grievances arise that cannot be resolved informally, students can follow the formal grievance procedures specified in the General Grievances section of the University-Wide Graduate Student Handbook. These policies provide for written grievances submitted to the Department Head and describe how students may appeal decisions. You can also find details on these policies summarized at https://www.cmu.edu/graduate/resources/appeal-grievance-procedures.html, which outlines the types of issues that may arise and identifies the appropriate resources for support.

At the college level, two key advocates are available to support Dietrich College graduate students:

- Sharon Carver, Associate Dean for Educational Affairs—Provides guidance and advocacy on academic and educational matters. More information and resources for graduate students in the college can be found here: https://www.cmu.edu/dietrich/students/graduate/index.html.

- Ayana Ledford, Associate Dean for Community Impact and Educational Outreach—Offers support for navigating academic challenges, engaging in meaningful dialogue, and accessing helpful resources. She can provide strategies for difficult conversations and creates supportive spaces where students can build confidence, strengthen connections, and thrive in their academic community—all within a culture of dignity and respect. Learn more here: https://www.cmu.edu/dietrich/about/aoci/

index.html

Students are encouraged to seek support from these college-level resources in addition to following the university's policies and procedures.

7 Doctoral Degree Requirements

7.1 Residency Requirements

CMU requires Ph.D. students to have a minimum of one year in residency on a CMU campus. Statistics & Data Science also requires that students must remain in Pittsburgh if they are receiving a stipend. If any further clarification is needed, please reach out to the Business Manager (§ 4 Departmental Personnel).

7.2 Registration Process

Students are required to register themselves for classes during the registration period prior to the start of each term. Students need to be enrolled in at least 36 units each semester until graduation. To confirm the classes that they should be registering for, students need to consult their advisor and the Ph.D. Program Director(s).

All students follow the University Academic Calendar for add/drop/withdrawal information and deadlines: https://www.cmu.edu/hub/calendar/index.html

Students who spend their Summer working on research projects should enroll in the elective credit-bearing course 36–995 (Reading and Research) under the supervision of one or more faculty. All Ph.D. students receiving summer support that is processed by the Department must be registered for 36 units in the 36-995 Reading & Research course. See § 11.7 Summer Employment and Financial Support.

Students conducting Summer internships should register for the elective, credit-bearing course 36–997 (Practicum in Statistics) with one or more supervising faculty. You can find more details about summer internships in § 11.7 Summer Employment and Financial Support.

7.3 Required Units for Degree Attainment

Students are required to complete the core curriculum and take R&R (reading and research) units until they graduate. They must be registered for at least 36 units every semester, unless they elect to take All But Dissertation – In Absentia (ABS) status after their proposal. It is expected that it will take about five years to attain the degree.

7.4 Core Courses

The core Ph.D. requirements are as follows:

- Passing grades (B- or higher) in the core courses:
  - Intermediate Statistics (36-705)
  - Regression Analysis (36-707)
  - Statistical Computing (36-750)
  - Statistical Methods in Machine Learning (36-708)
  - Advanced Statistical Theory (36-709)
  - Advanced Data Analysis (36-757 + 36-758)
- Pass the Data Analysis Exam (§ 8.1 Ph.D. Data Analysis Exam)
- Satisfy the Area of Strength requirement (§ 8.2.1 Area of Strength Requirement)

Deviation from these requirements will only be allowed in exceptional cases, and with the approval of the Director(s) of the Ph.D. Program.

Requirements for students in joint degree programs differ slightly; see § 7.5 Joint Degree Programs below.

Ph.D. students will also take the required class 36-699 Immigration to Statistics during their first semester. This course introduces each faculty member to new students. This provides students an initial feeling for the research interests of all the faculty members.

In later semesters students continue to participate in the department by attending seminars and taking or auditing further coursework. A variety of minis are offered every semester that cover various topics in the field. Students are also encouraged to take or audit courses in other departments to deepen their understanding of application areas.

Table 1 is a template showing how a student could earn the Ph.D. degree (and also an M.S.; see § 9.3 Process for Completing a Master's Degree en route to a Ph.D) in five years. Reading and research leading toward the selection of a Ph.D. dissertation advisor and the development of a dissertation topic begins in the Spring of the second year at the latest, and is carried on intensively during the following two or three years. Students are expected to present an oral thesis proposal in their third year, preceding the Ph.D. thesis itself. The thesis defense typically occurs in the fourth or fifth year.

Students with less mathematical or statistical preparation may follow an alternative course of study; see § 9.2 Requirements for Those With Less Mathematical/Theoretical Background.

7.5 Joint Degree Programs

The Department of Statistics & Data Science participates in joint Ph.D. programs which focus research and coursework on particular domains in which Statistics plays a crucial role. Note that a student must be admitted into a joint degree program in order to pursue that degree (although most of the coursework and cross-disciplinary research opportunities that comprise the joint programs are available to all of our Ph.D. students).

Year 1	**Fall Semester** 36-699: Immigration to Statistics 36-707: Regression Analysis 36-705: Intermediate Statistics 36-750: Statistical Computing	**Spring Semester** 36-757: Advanced Data Analysis I 36-709: Advanced Statistical Theory I 36-708: Statistical Methods in Machine Learning Begin ADA project
Year 2	**Fall Semester** 36-758: Advanced Data Analysis II Elective, e.g., 36-710, 10-701, 10-715 Oral and written presentations of ADA project	**Spring Semester** Look for a thesis advisor and begin work towards proposal
Year 3	**Fall Semester** Continue work towards proposal	**Spring Semester** Thesis proposal
Year 4	**Fall Semester** Work on thesis	**Spring Semester** Work on thesis
Year 5	**Fall Semester** Work on thesis	**Spring Semester** Thesis defense

Table 1: A typical course of study for students in the core Ph.D. program. Students who are in joint degree programs should be aware of the additional requirements of these programs. See § 7.5 Joint Degree Programs.

7.5.1 Statistics/Public Policy Ph.D. Program

The Department offers a joint program in collaboration with the Heinz College of Information Systems and Public Policy, leading to a Ph.D. in Statistics and Public Policy. This program provides students with comprehensive preparation at the Ph.D. level in both statistics and public policy. Critical to the success of the joint program is the close collaboration among faculty members in Statistics and Heinz College.

The curriculum melds the two sets of Ph.D. requirements into a coherent and useful set of courses, with similar core items. The first four semesters cover the main courses for the Ph.D. in Statistics while simultaneously introducing the student to the core disciplines of the Heinz College. Typically the Advanced Data Analysis (ADA) project (§ 8.2.2 Advanced Data Analysis (ADA) Project) also serves as the Heinz first paper, meets the requirements of both, and is presented jointly to both departments. In special cases, with approval of the Ph.D. Directors, the ADA project can coincide with the Heinz second paper. Table 2 shows a typical plan of coursework and research that would satisfy the requirements for the degree. Students with less mathematical or statistical theory background can substitute the statistics course schedule with that shown in § 9.2 Requirements for Those With Less Mathematical/Theoretical Background, with approval of the Ph.D. Director.

Students in this program are subject to the requirements of the Heinz College Ph.D Student Handbook, including coursework, completing the First and Second Research Papers, satisfying the Candidacy Requirements, and completing a dissertation in accordance with the handbook requirements.

Year 1	**Fall Semester** 36-699: Immigration to Statistics 36-707: Regression Analysis 36-705: Intermediate Statistics 90-908: Microeconomics 90-901: Heinz Ph.D. Seminar I	**Spring Semester** 36-757: Advanced Data Analysis I 36-709: Advanced Statistical Theory I 36-708: Statistical Methods in Machine Learning 90-902: Heinz Ph.D. Seminar II
Year 2	**Fall Semester** 36-758: Advanced Data Analysis II 36-750: Statistical Computing 90-907: Econometric Theory and Methods 90-918: Heinz Ph.D. Seminar III	**Spring Semester** Complete 1st Heinz/ADA paper Heinz curriculum requirement/elective Identify 2nd Heinz paper topic
Year 3	**Fall Semester** Work on 2nd paper Heinz curriculum requirement/elective	**Spring Semester** Explore potential thesis topics
Year 4	**Fall Semester** Work on thesis Complete 2nd Heinz paper at beginning	**Spring Semester** Work on thesis Propose by end of semester or beginning of next
Year 5–6	Thesis work and defense	

Table 2: A typical timeline of coursework and research for the joint Ph.D. in Statistics and Public Policy. Consult the Heinz Ph.D. Handbook for complete coursework and research requirements.

7.5.2 Statistics/Machine Learning Ph.D. Program

This program differs from the standard Statistics Ph.D. program in its emphasis on machine learning (ML) and computer science. Students in this track will be involved in courses and research from both the Departments of S&DS and ML. To see the full joint program curriculum requirements, consult https://www.cmu.edu/dietrich/statistics-datascience/academics/phd/statistics-machine-learning/index.html.

Before applying to the joint program, a student must:

- Take 10-715, 36-705 and 10-716 and earn at least an A- in the first attempt to take each course. Letter grades are required. (Students who took courses before June 2023 will be grandfathered in under the previous requirement of B+ for the courses already taken.)
- Identify a S&DS faculty member who agrees to serve as their thesis advisor.
- Identify an MLD core faculty member who agrees to serve as their MLD mentor. The mentor will help guide the ML portion of the student's research, represent the student at the MLD student evaluation meetings, become a member of the student's thesis committee, and generally advocate for the student within MLD.

  Note that the same faculty member cannot serve both the roles of ML mentor and S&DS advisor.

Applications must be emailed to the MLD PhD Program Administrator by May 31 to be considered for admission by the following Fall semester. Items to include are described at https://www.ml.cmu.edu/academics/joint-ml-phd.html. The MLD admissions committee may also request additional information as needed.

Interested students are encouraged to apply as early as possible in their graduate studies, so that their research direction can be informed by their interactions with their MLD mentor.

Once admitted to the Joint PhD program, in addition to being reviewed at their home department, the student's progress will also be reviewed by the MLD faculty at their regular student evaluation meetings, where the student will be represented by their MLD mentor. The student' advisor may also be present for this review.

7.5.3 Statistics/Engineering and Public Policy Ph.D. Program

The Department also offers a Ph.D. in conjunction with the Department of Engineering and Public Policy (EPP). As stated on their web site, research in EPP focuses on four main areas: energy and environmental systems, information and communication technology policy, risk analysis and communication, and technical innovation and R&D policy. These are areas which clearly require statistical methodology; students in this joint program will focus on developing novel methodology to address such challenges. For more information on EPP, see https://www.cmu.edu/epp/.

Students in this program are not required to take the Data Analysis Exam (unless they want to receive the MS in Statistics). Otherwise they are subject to all of the requirements listed above, plus the following:

- Theory and Practice of Policy Analysis (19-701)
- Quantitative Methods for Policy Analysis (19-702)
- Workshop in Applied Policy Analysis (19-705)
- A "teaching experience" which may be satisfied by
  - EPP Teaching Practicum (19-753)
  - EPP Project Management (19-752)
  - Teaching of a Statistics course
- Complete the EPP Part A Qualifying Exam

Further, students in this program are required to be enrolled in at least six units of courses other than Reading and Research. Students must choose at least two approved Social Science/Policy courses (24 units), including Applied Microeconomics (90-908 or equivalent), over the course of their program.

Students should consult the EPP Doctoral Student Handbook for details on the qualifying exam, teaching experience, and course requirements.

The thesis committee for a student in this program should contain at least two EPP faculty and at least two Statistics faculty.

7.5.4 Statistics and Neural Computation Ph.D. Program

The Department offers a joint Ph.D. in Statistics and Neural Computation with the Neuroscience Institute. The course and research requirements for this program are detailed in the Neuroscience Institute Doctoral Student Handbook.

7.6 Electives

While elective courses are not required for the Ph.D. program, students are encouraged to take advantage of the wide range of options available each semester to broaden their academic horizons, explore new areas of interest, and enhance their research or professional skillset. These courses could be within or outside of the Department. Engaging in coursework beyond core requirements can be a valuable complement to a student's core curriculum, provided they remain on track to meet key milestones such as the proposal and defense. Students should consult with their advisor or Ph.D. Program Director(s) to ensure that any additional coursework supports their academic and research goals without delaying their progress toward the degree.

7.7 Double-Counting Courses

The Department of Statistics & Data Science permits double counting of courses for degree requirements only when courses simultaneously satisfy requirements for our Ph.D. programs and the M.S. in Statistics. Courses may not be double counted for the M.S. or Ph.D. and any other degree offered outside of our department.

7.8 Courses Outside the Department/College

Students are encouraged to take courses in other departments to broaden their training in statistical science. When they take such courses, statistics graduate students typically are treated like other students in the class and thus receive grades determined by the instructor.

7.9 Course Exemptions

Course exemptions will be reviewed on an individual basis. Students who believe they have completed equivalent coursework or have relevant prior experience may petition the Ph.D. Director(s) in writing to be exempted from a required course. The petition should include

a detailed description of the prior coursework or experience, along with any supporting documentation (e.g., syllabi, transcripts, work samples). The petition for an exemption must be sent to the Ph.D. Program Director(s) no later than 30 days prior to the start of the semester in which the course is to be taken. The Ph.D. Program Director(s) will review the request in consultation with the course instructor(s) and determine whether an exemption is appropriate.

7.10 Protocol for Evaluation of Transfer Credit

Our program does not typically accept transfer credits for incoming first-year students, unless they are transfer students (discussed below).

Students wishing to receive transfer credit should submit the request by email to the Ph.D. Coordinator. Such requests need to contain the following information: name of host institution, course syllabus, course description, semester offered, number of credits/units, CMU course equivalent (if applicable), and modality (in-person or online).

The transfer credit request will be reviewed by the Director(s) of the Ph.D. program. When reviewing the request, the following criteria will be considered: the host university's accreditation status, the course content, and the statistical rigor. Online courses will not be accepted.

Transfer courses will be recorded on this transcript indicating where the course was taken, but without grades. Such courses will not be considered for academic actions, honors or QPA calculations.

Students must receive at least a B− in order to receive credit. Successful course completion is established via an official transcript from the host institution.

Students in Joint Programs will need to adhere to the transfer policies of both departments.

7.10.1 Transfer Students

Any students who wish to transfer into the Department's Ph.D. programs, either from a program within CMU or external to CMU, will need to go through the standard admission process. If admitted, the Director(s) of the Ph.D. program will decide what requirements the student must complete to obtain a doctoral degree. These requirements will be laid out in the admissions letter sent from the Department.

7.10.2 Cross-Registration

While this is rare, students are able to take classes for credit through the Pittsburgh Council on Higher Education (PCHE) process. The CMU transcript will include information on courses taken through the cross-registration program, will have grades recorded on the transcript, and will be factored into the QPA. If a student wants to count this course for

their program, prior to taking a PCHE course, it has to be approved by the Director(s) of the Ph.D. program.

7.11 Teaching Requirements/Opportunities

As part of its education and training requirements, the Ph.D. program requires that students serve as teaching assistants or research assistants. Those duties should require no more than 12 hours per week on average.

TA duties typically involve assisting faculty with grading of homework, holding office hours, proctoring exams, and other instructional duties in support of the course instructor. These duties provide students the opportunity to develop teaching skills. All conduct policies and departmental expectations for Ph.D. TAs are laid out in the StatDS TA handbook. All policies and laws regarding TA appointments are communicated during incoming student orientation.

RA duties vary depending on the research project, and should be discussed with the principal investigator for that project.

Students in joint programs may be required to serve as a teaching assistant for the other department, as detailed in their offer letter.

7.12 English as a Second Language

All graduates from our department will need to have strong English language communication skills to function comfortably as professional statisticians and/or data scientists. Carnegie Mellon University offers extensive resources to support non-native English speakers through the Student Academic Success Center (SASC) from group workshops to one-on-one sessions. Detailed information on these programs is provided below.

Graduate students in the Department of Statistics & Data Science whose native language is not English must be assessed for English proficiency, regardless of their funding source, and are highly encouraged to participate in SASC language support programs.

7.12.1 International Teaching Assistant (ITA) Language Certification Requirement

All graduate students whose native language is **not** English must take the ITA test administered by the Language and Cross-Cultural Support office in the SASC in order to assess their English proficiency. This requirement is separate from the language proficiency requirements needed for admission to the Ph.D. program. Per university policy and Pennsylvania state law, all non-native English speakers must pass the ITA exam to engage in any instructional role (classroom, laboratory, or office). This includes US citizens and permanent residents who attended schools in the US.

The ITA exam ensures compliance with the English Fluency in Higher Education Act of 1990, which mandates that all higher education institutions in Pennsylvania evaluate

and certify the English fluency of instructional personnel. The full university policy can be reviewed at Evaluation & Certification of English Fluency for Instructors.

The SASC will rate the fluency of all instructional personnel to determine their level of responsibility as Teaching Assistants (TAs). You can learn more about what types of TA assignments each proficiency level allows here. **Without this certification, non-native English speakers are unable to serve as a TA.** As students must serve as either a TA or RA (§ 7.11 Teaching Requirements/Opportunities), this may cause the student to be placed on Academic Probation (§ 10.6.1 Academic Probation).

7.12.2 ITA Process Requirements

To comply with PA state law and university policy, the Department of Statistics & Data Science requires all non-native English speakers to take the ITA exam before receiving funding, **regardless of their funding source**. Once a student receives a Pass on the ITA exam, they do not need to retake it in subsequent semesters.

In their first year, students may use TOEFL, IELTS, or Duolingo scores instead (Note: these scores can only be used in **the first year**.) However, if these scores are insufficient for a Pass, the student must continue taking the ITA exam annually until they pass. Failure to take the exam each year may result in not being in good standing, and hence reduced or terminated financial support.

Scoring Requirements. Non-native English speaking students must take the ITA exam to serve as TAs. Once they receive a score of Pass, they no longer have to test. If the TOEFL, IELTS, or Duolingo scores that are submitted in their first year are high enough to earn a Pass, they are not required to test in future years.

Students who do not receive a Pass may still TA with Restricted I (R1) or Restricted II (R2) scores but will have limited TA assignments. Detailed ITA score levels and corresponding TA assignments can be found here. The goal is for all non-native English speaking students to achieve a Pass by graduation.

Timeline for Testing. The SASC conducts ITA testing year-round, with peak times at the beginning and end of each semester. While you can test at any point in the semester, students must take the exam and receive updated test results by the end of the Spring semester each year (i.e. by mid-May). The scores obtained in Spring will then be used to assign TA appointments for the following academic year. As it can take up to two weeks to get an appointment and process scores, students should plan accordingly. Note: The ITA testing center is closed when the university is closed.

Students can attempt the exam at any time, but they are required to have an updated ITA score every Spring until they get a Pass.

If a student does not test each Spring, and has not achieved a Pass, they would not be considered in good standing with the Department which could impact financial support in

subsequent semesters. Standing based on the ITA exam will be clarified in the semester-end letters to Ph.D. students (§ 10.7 Regular Reviews and Evaluations).

SASC Language Support Resources. It is expected that students who do not receive a Pass on the ITA exam will utilize SASC resources to improve their language proficiency. These resources include conversation groups, workshops, recorded materials, individual consultations, and group experiences. To learn more about the resources available to students, click here. Students can sign up for an appointment with the SASC team via this link.

7.13 Research Requirements/Opportunities

The Ph.D. program does not have a minimum number of research units required. Students should enroll in research units as appropriate each semester they are enrolled, as determined through discussions with their faculty advisor and/or the Ph.D. Program Director(s). All research units receive pass/no pass grades.

Resources and Regulations Governing Research at Carnegie Mellon

- Office of Sponsored Programs
- Office of Research Integrity & Compliance
- Intellectual Property Policy
- Policy on Restricted Research
- Human Subjects in Research Policy

7.14 Summer Training and Internships

Students are required to spend a significant portion of each Summer engaged in activities that are directly relevant to the Ph.D. curriculum. Such activities include, but are not limited to, teaching and course development, academic research, or internship in industry or other institutions. Summer is an ideal time to initiate new collaborations and lines of research, to build teaching and mentoring skills, and to further develop professional and academic skills at companies and institutions that may offer research, training and career opportunities not readily available on campus. See § 11.7 Summer Employment and Financial Support for financial and administrative details of summer support.

These Summer activities are an integral component of our Ph.D. curriculum and training, as much as the regular coursework offered during the academic year. Therefore, students are required to discuss their Summer plans in advance with their advisors or the

Ph.D. director. There are opportunities to meet this requirement by serving as a summer instructor or teaching assistant for the Department. Each spring, students will be asked to complete a funding survey to indicate their summer funding needs. This information helps the department plan and allocate available resources as equitably as possible.

Summer Internships. Students conducting summer internships should register for the elective, credit-bearing course 36–997 (Practicum in Statistics) with one or more supervising faculty. In selecting internships, students will work with their mentoring faculty to ensure that the objectives and type of work being conducted fit with the student's academic and long-term goals. Throughout the internship, students will communicate regularly with the mentoring faculty and provide updates on activities and progress. After the internship is concluded, students will write a report describing the nature of the completed work and the results obtained, and will meet with the mentoring faculty members to discuss it in detail and integrate the work into downstream academic and career objectives.

International students planning to take a summer internship position must complete CPT or pre-OPT requirements several months in advance of the summer to ensure they will be legally permitted to work. The Office of International Education provides resources and training for this process, and students should consult these materials early, ideally in the winter preceding their internship.

CPT Authorization. International students who have not yet completed their course requirements, but who have been enrolled for at least one academic year, may take CPT. The internship must contribute to the student's training, but need not be directly connected to the thesis. The student must apply to the Ph.D. Director(s) for approval of the Academic Advisor Recommendation Form. The application should include a description of the internship, employer, and dates, as well as how the internshp contributes to the student's training.

International students who have completed all course requirements may receive CPT authorization **only if the employment is required for the student to collect data or engage in research for the thesis or dissertation**. To verify this, the student must provide the Ph.D. Director(s) with the following:

1. The employer, position title, location, and dates of the internship
2. A brief description of the internship, including the specific work to be completed
3. An email or letter from the employer describing the position. A template letter can be obtained from OIE. The letter must also explain they are aware the employment is for the Ph.D. student's dissertation, and the employment is necessary to access the research/data needed. This document should also state how the internship is connected to the thesis research.

4. A brief statement from the student's thesis advisor, also confirming how the internship is related to the student's dissertation

5. A copy of the CPT Academic Advisor Recommendation Form (provided by OIE) for signature

Once signed, this documentation should be provided to the Ph.D. Coordinator for retention in the student's file. Students in this situation typically receive 1–2 semesters of CPT authorization maximum.

The Academic Advisor Recommendation Form will be reviewed by the the Office of International Education for final approval. CPT authorization is specific to the internship; a new internship or employment opportunity must be reviewed and approved again.

Internships in the Academic Year. The Ph.D. program does not allow for co-op/internship opportunities outside of the summer. Students who decide to pursue an internship during the Fall or Spring semester will need to take a leave from the Ph.D. program for that semester. Students who have completed all of their requirements except for their dissertation can also maintain All But Dissertation – In Absentia (ABS) status, and pursue an internship during the Fall and Spring. Note that the department requires that in order to pursue an internship in ABS status, the student must have completed their proposal. They will be allowed to return the following semester without having to reapply. Prior to taking on an internship, the student should consult with their advisor and the Director(s) of the Ph.D. program to ensure they remain on track to graduate in a timely manner.

8 Dissertation Preparation and Requirements

8.1 Ph.D. Data Analysis Exam

At the conclusion of each Spring Semester the Department administers the Data Analysis Exam, which is designed to test students' ability to apply statistical methods to address a substantive, real problem. The exam is largely built on the content of 36-707, and hence should be taken in the Spring following the completion of that course. Students are given eight hours (from 9am to 5pm) to complete the exam, during which time they analyze the data and write a report to present their analysis and conclusions.

The exam is graded by a committee of faculty appointed by the Department Head. The faculty are realistic as to what can be accomplished during the eight-hour period. In grading the exam, the faculty are looking for a clear presentation of an appropriate analysis of the data. Emphasis is not placed on technical or mathematical sophistication. Students must demonstrate the ability to translate substantive scientific or policy questions into statistical questions, select appropriate statistical methods to answer those questions,

use statistical computing tools to obtain results, and write a report that clearly states conclusions and justifies the methods used.

There are several possible outcomes of the exam:

Pass.

Conditional pass. When the exam is satisfactory except for specific issues that can be corrected, the student will be provided feedback in writing and asked to make revisions by a specified date during the summer. The exam committee will review these revisions and, if they are satisfactory, the student will pass the exam.

Failure. If the exam has deficiencies that cannot be corrected with minor revisions or that suggest a lack of mastery of the necessary skills, the student fails the exam.

Students will be informed of their grade in the end-of-semester progress letter after the exam (§ 10.7 Regular Reviews and Evaluations), and the exam committee's evaluation of their performance will inform the faculty's evaluation of their progress. If a student fails the exam or fails to make satisfactory revisions to correct a conditional pass, the student may be placed on Academic Probation (§ 10.6.1 Academic Probation), and the exam committee will recommend remedial steps to the Director(s) of the Ph.D. Program. Remediation may include retaking 36-707, retaking the exam at a later date, or other requirements intended to correct the deficiencies. On approval by the Director(s), the student will be notified in writing of the required remediation and the timeline.

This exam is given on the first "Reading Day" during the final exam period, as scheduled on the University Academic Calendar.

8.2 Criteria for Advancement to Candidacy

8.2.1 Area of Strength Requirement

While students are required to meet a minimum standard of performance in all of their coursework, successfully completing a dissertation in Statistics requires that a student possess some relevant dimension in which their skills far exceed this minimum. Therefore, before a student can begin the process leading to the dissertation proposal, the student needs to demonstrate an "area of strength." Examples of areas of strength include Theoretical Statistics, Applied Statistics, and Computational Statistics. There are multiple ways that a student can satisfy this requirement, including strong performance in coursework or on a research or data analysis project. The faculty exhibit flexibility and fairness in the application of this policy. The motivation is to ensure, to the extent possible, that the student will successfully complete their dissertation. The policy also recognizes the range of strengths and interests of our students, and that the discipline of Statistics needs researchers from across this spectrum.

The area of strength is determined by the Statistics faculty and will be communicated to the student via one of the progress update letters that are sent at the end of each semester (§ 10.7 Regular Reviews and Evaluations). Students who have not demonstrated an area of strength will not be permitted to propose. Failure to establish an area of strength by the end of the fourth semester in the program may result in the student being placed on academic probation (§ 10.6.1 Academic Probation).

8.2.2 Advanced Data Analysis (ADA) Project

Each student identifies a project in the second half of the first semester on which they work for a calendar year, starting in January of their first year. The ADA project is done in collaboration with an investigator from outside the Department, under the guidance of a regular faculty member in the Department. It culminates in a potentially publishable report that is presented orally to the department and in writing at the end of the first semester of the second year. ADA projects come from a wide range of applied disciplines, and originate both from within and outside CMU. All projects are subject to the following guidelines:

1. The project is required to have an "outside advisor" with expertise in the application area and the particular question(s) being investigated. In most situations the outside advisor provides the data and the question(s) of interest. The outside advisor should **not** be an expert in statistics.

2. Part of the objective of the ADA project is to give the student the opportunity to work in collaboration with someone who does not possess prior knowledge of the statistical methods to be employed, and to learn how to communicate with scientists. Students should develop the ability to explain and justify their chosen approaches to data analysis.

3. The project must use real data or realistic simulated data that are comparable to real data in their structure and format, and accepted as scientifically relevant by the domain science advisor.

4. The student should maintain regular (at least monthly) contact with the outside advisor to discuss progress and to ensure that relevant work is undertaken. Some of these interactions can take place remotely, but personal interactions are also needed.

5. The project must also have a faculty advisor from inside the Department of Statistics & Data Science. Students in the Joint Statistics/Public Policy Program must have both a Statistics & Data Science advisor and a Heinz advisor. The student should meet regularly with their advisor(s), usually once per week.

6. The project ends with a written document describing the work together with a presentation to the Department. The first draft of the written document or "ADA lab report"

should be turned in to all advisors at the end of the first half of the fall of Year 2. The lab report is then finalized and turned in to the Department by the Reading Day at the beginning of the fall exam period. The ADA report should be written in the IMRD format (https://www.cmu.edu/student-success/other-resources/handouts/comm-supp-pdfs/imrd-examples.pdf) and should not exceed 15 pages, excluding figures and appendices.

The ADA presentation is 25 minutes in length with additional time allotted for questions and answers. It is scheduled by the Ph.D. Coordinator or Director (§ 4 Departmental Personnel) and is open to all faculty and students to attend.

7. The written and oral portions of the ADA project for the Department should be completed at the end of the fall semester. The completion of the ADA report into a publishable paper is at the discretion of the ADA advisors and the student, and may extend up to one or two additional semesters depending on the scope and nature of the research.

The ADA project is evaluated on the basis of the ADA report and the final presentation. At the end of the ADA presentation, the faculty advisor(s), external advisor, and any other faculty present privately discuss the quality of the work. The advisors and faculty present then determine whether the student passes the ADA project. If the student does not pass, the advisor may require revisions by a specified date, or may refer the project to the faculty at the next end-of-semester faculty meeting to determine remedial actions, including Academic Probation (§ 10.6.1 Academic Probation).

8.3 Ph.D. Thesis

8.3.1 Thesis Proposal

A student's thesis proposal is a critical opportunity for the faculty to guide and shape the dissertation research. The proposal process succeeds when it leads the student to a sound and detailed plan for the dissertation. To ensure students develop this plan and receive feedback early enough, students are expected to complete their thesis proposal by the end of their third year (which is effectively counted as by the 10th day of the beginning of the fall semester of the fourth year). (Students in the joint Public Policy program may take longer due to its additional requirements; see § 7.5.1 Statistics/Public Policy Ph.D. Program.) The faculty should provide the student with constructive criticism on proposed methods and approaches, force the student to question assumptions, and challenge the student's perspective on the problem.

The proposal process described below has been devised with this in mind. It has the following steps:

1. The student, in consultation with their advisor, prepares an abstract and circulates it to the Department with an open invitation for faculty to serve on the thesis committee.

This abstract need not be the final abstract for the proposal. The intention is to find faculty who are interested in the topic, and hence interested in serving on the committee. This email must be sent at least six weeks prior to the formal proposal event. The email should not specify the date and time of the proposal event or any preceding committee meetings, as these should be determined by consulting with the interested faculty members.

2. Interested faculty form the thesis committee. The committee is encouraged to meet two weeks prior to the proposal event to help formulate the research plan. The student and committee should agree on a date and time for the proposal event. The student and advisor may encourage particular individuals to serve on the thesis committee, but cannot do anything that discourages any faculty from serving. See § 8.3.2 Thesis Committee for details on the composition of the committee.

3. The student contacts the Ph.D. Coordinator (see § 4 Departmental Personnel) to book a room for the proposal event and to place the event on the Department calendar. This must be done three weeks in advance of the event, so there is time to book a room, process proposal paperwork, and advertise the proposal to the Department.

4. The student, in consultation with their advisor and committee, prepares a rough draft of the proposal document. See § 8.3.3 The Proposal Document below. Thesis committee members must be given the rough proposal document at least one week before the formal proposal event.

5. The "proposal event" takes place. During this, the student meets with the thesis committee in a scheduled, 1.5-hour session. Although the purpose of this meeting is for the committee to evaluate and guide the thesis proposal, the oral presentation is open to the faculty and students, if they wish to attend. The format of this proposal is the following:

   (a) The student makes a presentation of their research plans and objectives. The duration of the presentation itself, not including questions from the audience, is up to 30 minutes.

   (b) The floor is opened for questions from the committee and then the rest of the audience.

   (c) The committee discusses the proposal privately. (Faculty in attendance may participate in this discussion as well.)

   (d) The student returns to discuss the proposed research in detail. (Faculty who are not on the committee are not expected to stay for this discussion.)

The thesis committee and faculty in attendance are responsible for evaluating the proposal and determining whether the student may progress towards the defense. The committee

may request minor changes and improvements to the proposal before it is approved. If the committee and faculty in attendance determine the proposal is not satisfactory, the advisor will notify the student in writing of this outcome. Students whose proposal is not approved must complete a satisfactory proposal to proceed to their defense, and may be placed on Academic Probation at the next end-of-semester progress meeting (§ 10.7 Regular Reviews and Evaluations) if their research progress is unsatisfactory.

8.3.2 Thesis Committee

The purpose of the thesis committee is to provide feedback on the student's work, offer support when the student has questions in their area of expertise, and judge whether the thesis meets the standards for graduation.

The committee is formed of a minimum of four members, including the advisor and any co-advisors. A regular faculty member of the Department must be advisor or co-advisor. At least two committee members must be regular faculty members of the Department, and there must be at least one external member. The external member cannot be affiliated with the Department, but may be within or outside Carnegie Mellon. All committee members must have a doctoral degree in a field relevant to the thesis, or equivalent education and expertise.

If a committee member's affiliation changes (for example, if the advisor is no longer a regular member of the Department), the committee must be updated to comply with these composition requirements.

The Director(s) of the Ph.D. Program, at their discretion, may request changes to the committee or approve exceptions to these rules.

8.3.3 The Proposal Document

A proposal document should (1) state the basic research question clearly and succinctly, (2) review relevant literature, (3) provide some demonstration of competence to carry out the research plan, and (4) propose specific steps that could be taken to complete the research. These fundamental elements should be clearly evident in the written document. It is usually most convenient to have section headings that identify these components.

Item (3) is the most difficult to formalize. The proposal should occur early in the research process, hence it is not necessary that the student obtain particular results before proposing. On the other hand, it is necessary that the student demonstrates that serious efforts have been made to launch the project. For instance, this section might describe efforts made that failed to solve the problem, provided the student can explain how these efforts helped to illuminate how the problem might be solved.

The document should be of quality comparable to that produced by LaTeX, with an 11 or 12-point font, in a style similar to the LaTeX document style "Article" with single spacing and standard margins. Its length must not exceed 15 pages, together with at most an additional

Semester	Defense deadline	Paperwork deadline
Spring	April 15	May 1
Summer	July 15	August 1
Fall	November 7	December 1

Table 3: Thesis defense and paperwork deadlines for each semester. Listed defense deadlines are intended to leave enough time for revisions, but the revision process **could take longer** if the committee or other faculty members in the department request major revisions. Listed paperwork deadlines are **not negotiable**.

2–3 pages of references and 5 pages of figures and tables. Citations and the list of references should be done according to the style of a standard statistical journal such as the *Journal of the American Statistical Association*. Derivations and proofs should be included only as they are necessary to explain the work being proposed. Appendices or further documents may be used for additional derivations or auxiliary results, but the main document should be understandable on its own.

A LaTeX template is available in a Department GitHub repository: https://github.com/cmustatistics/proposal-template

8.3.4 Thesis Defense

Before a dissertation defense can be scheduled, the thesis committee must agree that the thesis is ready for defense. This does not require an official meeting of the committee members, but instead an agreement from each committee member that the work is likely to be completed in a timely manner. This decision would usually be based upon examining a draft of the thesis. (As a practical matter, a defense date may be reserved prior to this decision, but the defense may not proceed without the full approval of the committee. It can be challenging to find a room for a defense; it helps to do so as far in advance as possible.)

Date of Defense Graduates **must complete their defense and paperwork by the dates listed** in Table 3. Paperwork submission requires that the student has presented their defense, all thesis revisions required by the thesis committee are complete, the student has completed and submitted the necessary forms, and the advisor has signed off on the final thesis. See § 8.3.6 Awarding of the Ph.D. (Paperwork) for the complete list of required paperwork. This process can take several weeks, particularly if the committee requests major revisions. The student should allow adequate time for revisions of the thesis after the defense, prior to the awarding of the degree. (This is another reason why the student must consult with the thesis committee in advance of the defense.)

⚠ If paperwork is submitted past the deadline, the student must graduate at the end of the following semester. As the University requires students to be enrolled in their final semester, the student must either pay tuition or be supported by the Department. Students supported by the Department must meet all program requirements, including serving as a TA or RA, and must be in residence in Pittsburgh.

⚠ The defense, date, time and location should be determined **at least four weeks prior to the defense**. The candidate is responsible for scheduling the thesis defense so that all committee members and a majority of the regular faculty can attend. The candidate should send an email to the Ph.D. Coordinator (§ 4 Departmental Personnel) when the defense time and location are available so an announcement can be sent to the Department, and so you can receive the necessary paperwork for defense and certification.

Defense Event The thesis defense is a public event, open to the university community. If the student elects to livestream the event (e.g., on Zoom), they must complete the livestream consent form (https://www.cmu.edu/es/docs/livestream-consent.pdf) and return it to the Ph.D. Coordinator before the thesis defense.

The format of the thesis defense event is as follows:

1. The student makes a presentation summarizing the main contributions in the thesis. The duration of the presentation is between 30 and 45 minutes, to be decided jointly by the student and the advisors, preferably in consultation with the thesis committee. The duration of the talk is not a criterion used to assess the quality of the defense.

2. The floor is opened for questions.

3. The committee discusses the thesis document and defense presentation privately. Faculty in attendance may participate in this discussion as well. The committee and attending faculty then determine whether the student has passed the defense and whether any revisions will be required.

4. The student returns to discuss any comments, suggestions and corrections from the thesis committee.

5. The student will then edit the thesis document in accordance with the recommendations of the thesis committee.

Each candidate is expected to have a complete version of the dissertation at least two weeks before the thesis defense. This version should be sent directly to the members of the Ph.D. committee.

8.3.5 Dissertation Document

After the thesis defense, the thesis advisor communicates to the Ph.D. candidate the list of required dissertation revisions from the comments of the thesis committee and the faculty members who have either read the thesis or attended the oral defense. In addition, committee members and other faculty may give the candidate lists of typographical errors and other minor changes to be made in the document. The advisor (in consultation with the committee, if necessary) is responsible for determining when the revisions have been satisfactorily completed. When the advisor has approved the final thesis document, the Ph.D. candidate sends the final document to the Ph.D. Coordinator and to the advisor.

A student who does not complete their revisions and provide the required paperwork by the deadline listed in Table 3 may not graduate at that time.

Dissertation Format A LaTeX template is available for theses: https://github.com/cmustatistics/thesis-template

Theses must either use this template or conform closely to its layout and contents.

Data and Code Availability Modern theses in statistics and data science often base results on thousands of lines of code, extensive computer simulations, and large complex datasets. For these results to be reproducible, and to advance open science, the data and code must be accessible to readers whenever possible. In recognition of this, modern academic journals and funding agencies increasingly require public sharing of code and data. Similarly, theses must include a Data and Code Availability appendix. This appendix gives details on where data and code may be found, including references to prior publications or external repositories when appropriate.

Theses that use data already published in an archival repository, such as data previously published in peer-reviewed papers, must give a citation indicating where the data may be obtained. Students using previously unpublished data must deposit the data in an archival repository or include it in the thesis.

Analytic code developed by the student in the course of completing the thesis, and used to generate results in the thesis, should be shared. Small code snippets may be included directly in the thesis document; larger programs should be deposited in an archival repository. The first student to actually read this section can contact the Department Head to receive department swag.

Archival repositories include KiltHub (maintained by the CMU Libraries), Zenodo, Figshare, Dryad, and other permanent repositories. Personal websites, departmental websites, file-sharing services like Dropbox and Google Drive, and GitHub repositories are not considered archival repositories.

If it is not possible to share code or data, for example if the data is from a third-party source that prohibits redistribution or if it contains identifiable human subjects information, this should be noted in the appendix.

Students can consult the Reproducibility Guidelines of the *Journal of the American Statistical Association* for additional guidance.

8.3.6 Awarding of the Ph.D. (Paperwork)

To graduate, students must provide the Ph.D. Coordinator the documents listed below. Some of these documents require signatures. The graduating student must obtain all signatures except those of the head of the department and Dietrich College dean.

- Dissertation Document in PDF format. See § 8.3.5 Dissertation Document regarding the proper formatting of a dissertation.
- Committee Signatures Form.
- Thesis Revisions & Final Graduation Certification Form.
- KiltHub Checklist. Complete the steps detailed here: https://guides.library.cmu.edu/etds
- Doctoral Thesis Completion Semester Form https://www.cmu.edu/es/docs/docfinal-semester.pdf. Note that our department code is STA, not SDS.

8.3.7 Commencement Ceremony

The University hosts one Commencement ceremony per year, in May; students who wish to walk in the University commencement and hooding ceremony must meet the spring semester deadline. Summer and Fall graduates can attend the University commencement ceremony the following May.

9 Department Policies & Protocols

9.1 Withdrawing from a Course

Students cannot drop or withdraw from a required course without permission of the Ph.D. Program Director(s). If withdrawing from a course results in the student failing to complete required coursework in a timely manner, that could result in being placed on academic probation (§ 10.6.1 Academic Probation). Students should consult with their advisor(s) prior to withdrawing from any coursework.

The drop deadline is the Monday after the first six weeks of classes (tuition is not adjusted, which does not affect you). After this deadline students may withdraw from a course up until the Monday after the first ten weeks of classes by completing and submitting a Course Withdrawal Request form. Doctoral students do not receive vouchers or participate in the voucher process. After the withdrawal deadline, if students still wish to make adjustments, they should discuss options with their advisor.

Year 1	**Fall Semester** 36-699: Immigration to Statistics 36-707: Regression Analysis 36-700: Theoretical Statistics 36-750: Statistical Computing	**Spring Semester** 36-757: Advanced Data Analysis I 36-708: Statistical Methods in Machine Learning Mathematics or Statistics Elective Begin ADA project
Year 2	**Fall Semester** 36-758: Advanced Data Analysis II 36-705: Intermediate Statistics Elective, e.g., 36-710, 10-701, 10-715 Oral and written presentations of ADA project	**Spring Semester** 36-709: Advanced Statistics Look for a thesis advisor and begin work towards proposal
Year 3	**Fall Semester** Continue work towards proposal	**Spring Semester** Thesis proposal
Year 4	**Fall Semester** Work on thesis	**Spring Semester** Work on thesis
Year 5	**Fall Semester** Work on thesis	**Spring Semester** Thesis defense

Table 4: A typical course of study for students in the standard Ph.D. program who have less mathematical or statistical backgrounds.

9.2 Requirements for Those With Less Mathematical/Theoretical Background

Students who have less mathematical or theoretical statistics backgrounds will follow the curriculum shown in Table 4, with approval of the Director. For students in joint programs, a similar curriculum will be followed, adapted to include program-specific course requirements.

9.3 Process for Completing a Master's Degree en route to a Ph.D.

Many of our Ph.D. students earn a Master of Science (M.S.) in Statistics on the way to achieving their ultimate degree. The M.S. degree is awarded as a milepost after a certain number of courses and other requirements have been completed. In addition, there are limitations on receiving multiple M.S. degrees from different departments at CMU; you cannot, for instance, receive both an M.S. in Statistics and an M.S. in Machine Learning unless these two degrees are built on disjoint course requirements (§ 7.7 Double-Counting Courses). The M.S. has a framework of requirements, as follows:

- Students must pass the Data Analysis Exam.
- Students must pass Intermediate Statistics (36-705), Regression Analysis (36-707) and Statistical Methods in Machine Learning (36-708).
- Students must complete a collaborative research experience such as Advanced Data

Analysis (36-757 & 36-758) or an independent research project approved by the department.

- Students must also complete additional graduate credits (i.e., 3 courses) chosen from a variety of options. These classes must contain at least nine units from each of the following categories:
  - Statistical computing (36-750) or alternative approved by the department.
  - Statistical methodology (e.g., Statistics & DS methods minis, 10-701).
  - Statistical theory (e.g., 36-709, 36-710, 10-715, 10-716).

There is no thesis requirement for this degree. M.S. recipients can participate in the Department commencement ceremony, held at the end of each Spring semester.

9.4 New Policies / "Grandfather" Policy

When policies are changed it is because the Department believes the new rules offer an improvement. However, 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 the case in which degree requirements are changed and certain courses no longer exist, the Department will try to find some compromise that would allow those students to satisfy the original requirements.

Students who become grandparents while enrolled in the Ph.D. program are entitled to a small cake.

9.5 Time Away from Academic Responsibilities

Work/Life Balance and Time Expectations The Statistics & Data Science Ph.D. program encourages students to maintain a healthy, sustainable work/life balance. Long-term productivity depends on finding a balance that supports productivity without burnout. Students are encouraged to find a schedule that allows steady progress and to have open conversations with their advisors about expectations.

Typical Workload Teaching assistant duties generally require 10–12 hours per week on average. If the TA workload consistently exceeds this, students should contact the Director(s) of the Ph.D. Program or the Department Head.

There will be periods, especially in later stages, when deadlines require additional work. Students are encouraged to take rest time afterward, in coordination with the course instructor, to maintain balance.

Time Off & Holidays Students receive all official CMU holidays and may take 10 additional workdays off per year (including long weekends, religious holidays not on the CMU calendar, or short vacations).

Plans for time off should be discussed with advisors at least **two weeks in advance** (except in emergencies) so plans can be made for project progress.

Additional time off may require a more formal arrangement with the University.

Students are expected to work when the university is open (e.g., Spring Break, summer, and non-holiday weekdays in December/January), though most arrange for longer periods of time off during academic breaks.

Illness & Personal Circumstances Students should stay home and rest for minor illnesses and notify advisors if illness affects progress. No medical documentation is required.

If medical or personal emergencies prevent a student from completing a course, an incomplete grade may be an option, following the policy on incompletes (§ 10.4 Incomplete Grades). Students with serious or chronic illnesses may request accommodations through the Office of Disability Resources.

Bereavement, jury duty, civic obligations, or serious personal issues warrant additional flexibility beyond the 10 annual days.

Struggling or Overcommitted? Students facing challenges should speak with their advisor or the Director(s) of the Ph.D. Program. Options could include adjusting course loads or temporarily reducing research units. International students may not be able to reduce their research units based on OIE/Federal requirements, but additional concessions may be possible.

Leaves of Absence Extended absences must be discussed with the student's advisor and the Director(s) of the Ph.D. Program and may require a formal university leave. Students who take a leave for longer than two consecutive years will need to discuss their status in the program with the Director(s) of the Ph.D. Program.

10 Grading and Evaluation

10.1 Grading Scale/System

The Department follows the grading scale established by the Dietrich College of Humanities and Social Sciences. Detailed information on the grading scale can be found in the University Policy on Grading. As outlined § 7.4 Core Courses, the minimum passing grade for graduate-level coursework is a B-.

10.2 Grades for Retaking a Course

If a student repeats a course, the grades for both instances of taking the course will appear on the official academic transcript and will be included in the student's QPA calculation, regardless of whether the original grade was passing or failing.

10.3 Pass/Fail and Satisfactory/Unsatisfactory Grades

Ph.D. students will receive letter grades by default, but may elect to receive PASS/NO PASS (P/NP) grades instead for any of their courses. To get a P/NP grade, they must submit the approval form https://www.cmu.edu/hub/docs/pass-fail.pdf to their academic advisor before the university P/NP deadline, which can be found in the university academic calendar. (The deadline is the Monday after the first ten weeks of classes and thus changes every year.) Once this is done, it can't be reversed.

⚠ For graduate students, grades B- and above convert to a PASS for classes offered by Dietrich College; grades below convert to NO PASS. Other colleges have different conversion rule; for details, consult the end of the "Grading Standards" section at https://www.cmu.edu/hub/registrar/student-records/transcripts/legend.html

⚠ Students who intend to pursue a joint Stat/ML Ph.D. or a secondary ML MS degree **have to receive letter grades** for courses that are part of the joint curriculum because both programs have GPA requirements. Some fellowships might also have GPA requirements.

10.4 Incomplete Grades

Graduate students may receive an Incomplete (I) grade only when they have completed at least 75% of the total coursework with a passing grade (B-), but were unable to finalize all requirements due to circumstances beyond their control. The instructor must specify the work needed to complete the course and set a default grade that will be assigned if the outstanding work is not submitted. The completion deadline is typically the end of the following academic semester, and if the student fails to submit the work by then, the default grade becomes permanent.

If a student is approved for an incomplete grade, they must fill out the Incomplete Grade Agreement form.

You can find more details on the Incomplete Grade policy at CMU in the University Policy on Grading.

10.5 GPA Requirements and QPA Requirements for Graduation

The Stat & DS Ph.D. Program does not have specific QPA requirements in order to graduate. However, in order to receive a Pass for any course, students must have a final grade of at least a B-.

10.6 Satisfactory Academic Standing

Ph.D. students are expected to make steady academic and research progress throughout the program. In rare cases where a student does not meet expectations, such as failing courses, missing key milestones (e.g., qualifying exams, proposal, defense), or showing insufficient research progress, the department may place the student on academic probation or suspension, following university policy and the processes below.

Students may appeal probation, suspension, and dismissal decisions following the university's policy on Appeal of Academic Actions.

10.6.1 Academic Probation

Students may be placed on academic probation for reasons including:

1. Failing grades in coursework or failure to complete required coursework by the appropriate time listed in the tables in this Handbook
2. Insufficient research progress toward completing the ADA project, thesis proposal, or thesis defense by the times described in this handbook
3. Failure to satisfy the Area of Strength requirement (§ 8.2.1 Area of Strength Requirement) by the end of the fourth semester
4. Failure to engage with faculty on work towards the thesis by the end of fall of the third year (§ 6.1 Role of an Advisor and Advisor Assignments)
5. For students in a joint Ph.D. program, insufficient progress toward completing the joint program requirements at the times described in the applicable handbooks (§ 7.5 Joint Degree Programs)
6. Failure of the Data Analysis Exam (§ 8.1 Ph.D. Data Analysis Exam)
7. Failure of the ADA presentation, thesis proposal, or thesis defense
8. Academic integrity violations (see the University Policy on Academic Integrity) or research misconduct (see the University Policy on Handling Alleged Misconduct in Research)
9. Misconduct or neglect of duties in an assigned teaching, course, or research assistant role (see also the Teaching Assistant Handbook)
10. Failure to take the ITA exam, if applicable (§ 7.12 English as a Second Language)

At each end-of-semester progress meeting (§ 10.7 Regular Reviews and Evaluations), the faculty evaluate these factors when assessing student progress. Any item above is

sufficient to be placed on Academic Probation, but the final determination is made by the faculty through a holistic evaluation of the circumstances and any mitigating factors.

Students placed on academic probation will be informed by the Department in writing, typically in their end-of-semester progress letter (§ 10.7 Regular Reviews and Evaluations). The letter will set out conditions that must be satisfied by a specified date, typically the end of the following semester, to exit probation. These conditions are selected by the Director(s) of the Ph.D. Program, in consultation with the faculty and Department Head, to support the student in correcting the problems and exiting probation. Conditions are hence specific to the student's situation. Example conditions include, but are not limited to, passing specified courses, completing program milestones by specified dates, or presenting satisfactory research progress to the thesis committee (or an ad-hoc committee formed for this purpose) for evaluation. The letter will specify who is responsible for evaluating completion of the conditions.

Students on probation must periodically meet (at a cadence agreed upon by all parties) with the Director(s) of the Ph.D. Program or Department Head to review their progress and ensure they receive any necessary support.

After the deadline, the responsible parties will evaluate whether the student has met the conditions and render a recommendation of next steps to the Department Head. If the student has met the conditions, they may recommend the end of probation and the student's return to normal status. If the student has failed to meet the conditions, they may recommend additional sanctions, including discontinuation of financial support, continued probation, suspension, or dismissal from the program. If a student meets the conditions but violates other program requirements while on probation, the probation may be extended or additional sanctions may be imposed, including discontinuation of support, suspension, or dismissal. The Department Head will review the recommendation and render a decision on the student's status, which will be communicated in writing to the student.

10.6.2 Suspension

Students may be suspended as a consequence of academic probation, as described above. Suspension may also result from disciplinary or administrative issues, such as violations of the university's code of conduct or other non-academic concerns. Students are formally notified of a suspension through a letter from the Department Head, which will detail the reasons for the suspension and the expectations for return. Once the suspension is fully processed, the student will also receive notification from the University Registrar. Students are encouraged to consult with the Ph.D. Program Directors about next steps.

To return from suspension, students must submit a written request to the Department Head and Ph.D. Program Director(s) at least 30 days prior to the semester that the student is hoping to return, outlining how they've addressed the concerns and how they plan to meet program expectations moving forward. Reinstatement is not guaranteed and requires

departmental approval. International students must also coordinate with the Office of International Education (OIE) to ensure visa compliance.

10.6.3 Dismissal

Dismissal from the program may occur if a student fails to meet the terms of academic probation or suspension, repeatedly underperforms, or engages in serious misconduct (e.g., academic dishonesty, ethical violations). Dismissal is formally communicated and may be appealed according to university policy. The Department encourages open communication and proactive advising to help students address issues early and avoid escalation.

10.6.4 In Joint Programs

For students in joint Ph.D. programs, all reviews related to academic standing, suspension, or dismissal will be handled collaboratively between both departments. The student will be formally notified by the primary department, but both programs will be consulted in any review or decision process. Students are expected to meet the academic standards and milestone requirements of both programs, and failure to make adequate progress in either may prompt academic review. In cases of suspension or dismissal, return or appeal processes will similarly involve representatives from both departments. Students in joint programs are encouraged to maintain regular communication with advisors and program directors in both departments to ensure they are meeting the expectations of all affiliated units.

10.7 Regular Reviews and Evaluations

Twice each year, at the end of the fall and spring semesters, the faculty meets to assess student achievement and provide feedback so that each graduate student is aware of their standing, progress toward a degree, any necessary remedial work, and any possible change in financial support. This is known as the end-of-semester (EOS) meeting. Prior to this meeting, students are asked to complete a self-evaluation detailing their progress and any concerns, and to discuss this with their advisor. The faculty then discuss each student's progress based on the reports of their advisors and the self-evaluation.

Each student receives a letter summarizing the results of the faculty discussion. In most cases, the letters provide feedback on the student's progress and guidance for the upcoming semester. If the student is not making satisfactory progress, the letter will explain this and any necessary steps for remediation. If necessary, the letter will inform the student that they have been placed on Academic Probation (§ 10.6.1 Academic Probation).

In addition to offering an evaluation of a student's academic progress, the letter often contains information on financial support for the next academic year (§ 11.9 Requirements for the Continuation of Funding).

For students in joint Ph.D. programs, the joint program leadership is consulted while drafting the letters, so feedback and academic actions in the letters represent the views of both departments.

11 Funding and Financial Support

11.1 Statement of Department Financial Support

Financial support awards are made in the initial offer letter admitting students to the graduate program. The most common award includes tuition and a nine-month stipend. Awards are renewed annually (§ 11.9 Requirements for the Continuation of Funding); stipend for the summer months is arranged separately (§ 11.7 Summer Employment and Financial Support).

RA assignments with faculty serve as an opportunity to work with faculty on sponsored projects that embark on their own research interests for future job opportunities.

Students may also receive financial support through a faculty member via grants and gifts supporting their research projects. To allow adequate time for course planning, this notice must be received by August 1 for the fall semester and December 1 for the spring semester. The funding must be available by the deadline; funding received after the deadline can be used to support students in a later semester.

Students in joint Ph.D. programs may receive funding from both departments. These arrangements will be detailed in each student's offer letter.

11.2 Stipend

All Ph.D. students in our department receive a stipend as part of their financial support package. The stipend is intended to cover basic living expenses and is provided throughout the 9-month academic year. Details regarding the exact amount and disbursement schedule are shared with students in their offer letters.

Students are paid semi-monthly. All pay is distributed by direct deposit, and payslips are available on-line.

11.3 Health Insurance Requirement

Students are required to have health insurance. One way to do that is to purchase such insurance from the university. If you elect to enroll in CMU's Student Health Insurance Plan (SHIP), the Department and University will cover the premium cost for your individual coverage under SHIP. While you will have the opportunity to purchase partner, spouse or dependent coverage under the SHIP plan, the University's support will be limited to the individual coverage amount. Please note that if you wish to elect the required health

insurance coverage under an alternate plan, you will not be eligible for the University support referenced here.

11.4 Department Fees

All CMU students who enroll for 19 or more units in a semester will see several fees on their student accounts. These fees are covered by the department. Student Activities Fee: the monies generated by this fee are administered by the CMU Student Government organization to support various campus activities. The Graduate Student Assembly (GSA) receives some of this money, and it in turn divides some of its allocation among graduate student departments. Transportation fee: the fee allows you to ride PAT buses by showing your university ID. Technology fee: supports information technology, software licensing, and the Andrew email system.

11.5 Travel/Conference and Research Funding

The Department encourages students to attend and participate in statistics and data science conferences. These conferences give students a chance to meet other researchers and learn of their work. They also provide students the opportunity to present their own work and to make contacts that could lead to employment and future research collaborations.

11.5.1 Department Travel Support

Faculty are expected to budget for conference travel in their grant proposals, and students are encouraged to apply for travel awards and fellowships. Because such funding is not always available, the Department can, in some cases, provide funding to enable a student to attend a conference. There are three prerequisites to getting this funding. Students considering attending a conference should:

1. Request funding from one or more supervising faculty members who have available funding from grants or discretionary funds
2. Apply for funding through the lottery administered by the Graduate Student Assembly
3. Apply for funding sponsored by the organization hosting the conference, if any.

These steps can happen in parallel.

If additional funding is required, students can request Department funding by contacting the Business Manager, who will provide a form. The form requests a short description of the reasons for traveling, including information about the student's professional role in the event (e.g., invited speaker, awardee, participant); a brief budget outlining the costs the student will face; a confirmation that the student fulfilled the prerequisites listed above; and a description of how this conference is relevant to the student's professional goals.

The Business Manager will determine the student's travel funding level, in consultation with the student, Ph.D. Directors, any supervising faculty, and the Department Head. Requests will be prioritized based on several criteria:

- The availability of Departmental funds to support the student. The Department may not have funds to meet all requests for conference funding.

- The availability of other funds to support the student. Departmental funds cannot be combined with GSA funding.

- The seniority of the student. Fourth- and fifth-year students will receive higher priority, as conferences may benefit their job search and professional standing. Conference funding for students past their fifth year, or who have not met the deadline to make their thesis proposal, will be at the Department's discretion.

- The nature of the trip as it relates to the students' professional development. Higher-priority conferences have the student in a central role and are opportunities that are exclusive: giving an invited presentation on one's research, receiving an award, being an invited participant at a limited-attendance conference or workshop that is central to the student's research, or an invitation-only networking or related event. Presentations of the student's work at selective conferences or workshops are also considered relevant for professional development. Presentations at poster sessions, less selective conferences, or conferences not directly relevant to the student's work receive lower priority.

The request form must be completed in advance of the conference to be attended, but can be completed before the student knows their proposed presentation will be accepted by the conference. **The Department will follow the same request deadlines used by the Graduate Student Assembly's conference funding program** (see https://www.cmu.edu/graduate/professional-development/conference-funding/). These deadlines are *several months in advance* of the conference travel to be funded, so students and advisors must plan ahead. The Department will not be able to fund travel if the request was not made in a timely manner.

Students are expected to apply for both GSA and Departmental funding simultaneously (as well as other relevant funding sources, as described above). After the Graduate Student Assembly has decided whether to award funds, the Department will review funding applications, prioritize them based on the above criteria, and notify students of the funding they will receive, if any. High-priority requests, based on the criteria above, will receive a maximum of $750; other requests will receive a maximum of $500. The Department will provide travel support to a student at most once per academic year.

11.5.2 Travel Restrictions

Travel that is supported by grants, fellowships, Department funds, or other University funds must be solely for research, education, or other relevant purposes. Students are advised not to, e.g., purchase tickets or pay registration fees until they know they will receive funding to cover the costs. Students may not combine trips with personal travel, and travel arrangements should be made directly between the origin (Pittsburgh) and the location of the conference or meeting, for dates within 1–2 days of the beginning and end of the event. Exceptions must be approved in advance by the Business Manager.

The Business and Travel Expense Policy contains additional information on allowable expenses, including airfare requirements: https://www.cmu.edu/dietrich/statistics-datascience/resources/business-travel-expense-policy.html

11.6 Additional Sources of Internal and External Financial Support

Students may receive financial support from outside fellowships such as those awarded by the National Science Foundation, the Howard Hughes or Hertz Foundation, or the Office of Naval Research. These external awards typically provide partial tuition support and a partial or full stipend. If the fellowship does not provide full support, the Department is required to cover any remaining tuition and stipend expenses, commensurate with the student's offer letter.

As serving as a teaching assistant is an educational requirement of the program (§ 7.11 Teaching Requirements/Opportunities), fellowships do not automatically fully release students from their TA responsibilities. Typically there is a reduction of TA responsibilities commensurate with the funding level.

The department will share relevant opportunities with students as they become aware of them.

Other notable fellowships include (non-exhaustive list):

- Dietrich College Scholars Fellowship (internal)
- Carnegie Mellon Sports Analytics Center Fellowship (internal)
- AI-SDM Fellowship (internal)
- NSF Graduate Research Fellowship Program (GFRP) (external)
- DoD NDSEG Fellowship Program (external)
- GEM Fellowship Program (external)
- Two Sigma Ph.D. Fellowship
- Bloomberg Data Science Ph.D. Fellowship
- Google Ph.D. Fellowship

11.7 Summer Employment and Financial Support

Students are required to spend a portion of each summer engaged in activities related to their Ph.D. training or research; see § 7.14 Summer Training and Internships for details.

Students who need departmental support for summer funding will be reviewed to hold an instructor or teaching assistant (TA) position. Although the number of instruction and TA positions depends on course/program offerings and enrollment, as well as faculty project needs, we do everything we can to provide summer funding to students who request it, and encourage open communication about individual needs and circumstances.

Please note that, except in special cases, all forms of summer support require that the student be in residence at CMU. You cannot, for example, perform research from another location. Exceptions may be made in cases where the research or teaching is taking place at the remote location. Summer session 1 begins at the end of May and runs for 6 weeks ending at the end of June. Summer session 2 begins at the end of June and runs for 6 weeks ending mid-August.

Students who spend their Summer working on research projects should enroll in the elective credit-bearing course 36-995 (Reading and Research) under the supervision of one or more faculty. All Ph.D. students receiving summer support that is processed by the Department must be registered for 36 units in the 36-995 Reading & Research course. This is necessary for tax reasons; see the Tax Resources page for details.

Non-native English speaking students need to ensure that their language skills are sufficient for holding an instructor or teaching assistant position at CMU; see § 7.12 English as a Second Language. Those students must be certified by the Student Academic Success Center before they will be permitted to teach. Thus, certification may be required for summer support.

11.8 Policy on Outside Employment

The term outside work refers to paid or unpaid activities that are not under the intellectual oversight or purview of the faculty and therefore do not constitute training. The Department's position is that outside paid work is not compatible with full-time Ph.D. student status, as students are expected to devote all their work time to the academic activities required for the completion of their degree. Therefore the Department prohibits outside work within other departments and units at Carnegie Mellon. The Department discourages any outside work beyond CMU. Students who still wish to engage in outside work beyond CMU may do so during their free time and with the understanding that any reduction in the time and effort towards the completion of their degree due to such engagements may jeopardize their good standing in the program.

International students who seek outside employment must contact the Office of International Education to ensure they comply with all visa requirements.

11.9 Requirements for the Continuation of Funding

When the Department admits a student with financial support, it does so with the expectation that this support will last five years, as long as the student is making satisfactory progress toward their degree. Support beyond the fifth year will be considered on a case-by-case basis. Commitments for financial support are usually made in the end-of-semester letter sent after each fall semester (§ 10.7 Regular Reviews and Evaluations).

Support beyond the fourth year for a student who has not finished their proposal will be considered on a case-by-case basis. Continuing support for students in a joint program will be considered on a case-by-case basis.

A domestic student can switch to All But Dissertation, In Absentia (ABS) status if the student is no longer supported by the Department, is not on campus, has completed all coursework, and has completed the thesis proposal. Once on ABS status, a student works to complete the dissertation but does not pay tuition. International students on a student visa, however, must maintain "full-time status" and hence are not allowed to switch to ABS status. Fortunately, for an unsupported student (paying their own tuition), enrollment in five units is sufficient for "full-time status." Students are limited to four semesters in this "reduced" full-time status. Refer to the ABD status chart (https://www.cmu.edu/es/docs/abd-status-detail.pdf) for details.

All students (domestic and international) must be enrolled during the semester in which their dissertation is certified.

The Doctoral Student Status policy sets forth a definition of All But Dissertation (ABD) status, time limits on doctoral candidacy status, a definition of being In Residence and In Absentia for candidates and the tuition and fees charged for candidates in each status. The ABD Status Agreement Form can be found at https://www.cmu.edu/hub/docs/abd-status-agree.pdf.