



Department of Statistics

Graduate Student Handbook

(Pending Approval by the Graduate and Postdoctoral Studies
office)

Academic Year 2017-2018

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Chapter 1

Introduction

Welcome to the Department of Statistics! We are glad to have you aboard as you begin your course of study with us.

This guide to graduate study in the Department of Statistics (STAT) contains information about exams, monetary support, required and recommended courses, and regulations and rules for the various degree programs. It is intended to supplement Rice University's *General Announcements* (<http://ga.rice.edu/>) by providing a more detailed description of the STAT graduate program.

This handbook is the result of an ongoing attempt by the faculty to codify and make readily available to students the rules, requirements, and general approach to the graduate education of our department. Please do not hesitate to notify the faculty about areas that need clarification or strengthening.

—Marina Vannucci, Chair
Department of Statistics

Mission Statement

The Department of Statistics is dedicated to the advancement of the scientific discipline of statistics, the innovative application of statistics to meet modern scientific, engineering and societal challenges, the expert education of students in statistics and other disciplines, and statistical leadership in the local, national and international communities.

Research

To achieve this mission faculty maintain leading methodological and computational research programs in modern areas of statistical science that address massive data and complex structures and pursue a range of research interests in applied statistics related to engineering, natural sciences, business, medicine, and social sciences. The Department supports a modern statistics curriculum for students in Statistics and the larger Rice community. Close working relationships between faculty and students provide rigorous training in both theoretical statistics and applied research.

Current research foci of the core Department Faculty include:

- Foundations of statistics both theoretical and computational
- Bayesian methods
- Hierarchical models and social networks
- Statistical and Machine Learning, and Multivariate Analysis
- Functional data, nonparametric methods, categorical and mixed data methods
- Probability, stochastic processes, spatial and temporal processes
- Sampling and experimental design
- Statistical computing, simulation and graphics

History

The Department of Statistics at Rice University, established in 1987, represents a significant and leading presence in the international statistics community. The Department is a community of sixteen core faculty, ten of which are tenured or tenure track, nine joint faculty, and twenty-plus adjunct faculty. The Department hosts a student population of approximately 45 doctoral students, 40 professional master's students and fifty undergraduate students. We regularly host visitors from all over the world and we maintain an active post-doctoral program through NSF and NIH sponsorship.

Department of Statistics, 2014-2015

Marina Vannucci, Chair of Statistics

Core Faculty:

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Research, Post-Doctoral & Visiting Faculty: see the department website <http://statistics.rice.edu>

Joint Appointment and Adjunct Faculty: see the department website <http://statistics.rice.edu>

Administrative Staff:

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Staff Assignments:

Carolyn Duhon is responsible for the overall administration of the Department. Her office is in 2052 Duncan Hall.

Margaret Poon is the Department and Graduate Coordinator. She handles graduate matters such as graduate recruiting, academic, teaching/course related matters, registration, payroll, announcing and administering exams, and providing information on policy, procedure, and required paperwork for Ph.D. candidacy and graduation. Her office is in 2124 Duncan Hall.

Phyllis Guerra is the Administrative & Events Coordinator. In addition to being the STAT Webmaster, Phyllis handles departmental publications and document production. Her office is in 2051 Duncan Hall.

Nancy Lai is the accounting assistant and handles all expense reports and reimbursements. Her office is in 2123 Duncan Hall.

Eric Aune is the information systems administrator assigned to STAT and CAAM. His domain includes the STAT research network (Linux systems and server maintenance and backup) and the office computing equipment. Any hardware and/or software problems with the departmental computer system should be reported to IT helpdesk helpdesk@help.rice.edu .

Kevin Du is the information systems administrator assigned to STAT and CAAM. His domain includes the STAT research network (mostly workstations running Windows) and the office computing equipment. Any hardware and/or software problems with the departmental computer system should be reported to IT helpdesk helpdesk@help.rice.edu .

Fernando Gonzalez is the information systems administrator assigned to STAT and CAAM. His domain includes the STAT research network (Apple platforms). Any hardware and/or software problems with the departmental computer system should be reported to IT helpdesk helpdesk@help.rice.edu .

STAT Advisors:

Ph.D. Advisor: Dennis Cox dcox@rice.edu

M.STAT Advisor: John Dobelman Dobelman@rice.edu

Undergraduate Advisor: Rudy Guerra rguerra@rice.edu

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Katherine Shoemaker kas23@rice.edu

STAT Graduate Student Committee for 2015-16:

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Professional Associations

It is wise to begin your professional career with membership in one of the professional societies; it helps with networking and peer-to-peer recognition. Applicable professional associations include:

The American Statistical Association (ASA). Promotes the practice and profession of Statistics. There are student memberships available (starting at only \$17 per year) which entitle the member access and invitation to lots of useful information, publications and activities. For more information on individual student membership see <http://www.amstat.org/join>.

Houston Area Chapter of the American Statistical Association (HACASA) . For Chapter Officers and activities, see its website <http://community.am.Stat.org/Houston/home>

The Institute of Mathematical Statistics (IMS) is an international professional and scholarly society devoted to the development, dissemination, and application of statistics and probability. The Institute currently has about 4,500 members in all parts of the world. Student membership is **FREE!** <http://imstat.org/membership/student.htm>.

Chapter 2

Note: Professional Master's in Statistics (M.STAT): Procedures and policies for M.Stat students are slightly different than those for the Ph.D. students; please refer to chapter 6 for specific elements of M.Stat guidance.

Getting Started

Arrival: The first thing to do upon arriving on campus is to see Margaret Poon, the Department Coordinator. Her office is in 2124 Duncan Hall. She will explain the process of obtaining an ID card and a parking sticker, set up payroll for Ph.D. students, and otherwise smooth the student's adjustment to campus life.

The Advising System: The Graduate Committee assigns a faculty member to first year students, to act as their interim mentor. Each student meets with the interim mentor at orientation and then again early in each semester to discuss curriculum choices, examinations, and so forth. In addition, once a year each Ph.D. student submits a progress report to the Graduate Committee (see Chapter 4). The faculty interim mentor is present throughout a student's early graduate career. After a thesis advisor has been acquired, typically not later than the end of the second semester of the second year, the advisor takes over the interim mentor's role. In case a change of thesis advisor is needed later on, the current and new advisor will coordinate with the department chair to effect the change. The current interim mentor is Dr. Dennis Cox.

New students register during the 1st week of classes, all other graduate students must register by the fall or spring deadline to avoid paying a late fee. Registration is performed using the Rice University student and faculty self-service system called ESTHER. ESTHER can be accessed by all students and faculty via the web at <http://esther.rice.edu>. Access information for ESTHER will be provided to incoming graduate students prior to their arrival at Rice. *Students are required to discuss their curriculum choices with their interim mentor* to help ensure that the student's choices and plans are in tune with the various requirements for his or her degree program.

Note that courses can be added after the first week - a course can be added for free until the end of the 2nd week. The student will not be able to add classes after the 2nd week. Classes can be dropped until the 7th week of the semester; **consult the academic calendar for EXACT dates**. Therefore, the schedule established in the first week is not chiseled in stone and can be adjusted for quite a while. The semester is only 15 weeks long, so it is encouraged not to take too long in the selection process. The student's interim mentor and the course instructor should approve any drop or add.

Coursework: STAT has a system of required courses and distribution courses to which students must conform. The course system is described in Chapter 4. The Department also encourages students to take graduate-level courses in other departments. Outside courses up to three courses (at the graduate level) will count toward the semester hour requirement of the degree. These restrictions apply to non-thesis ("professional") Masters in Statistics candidates as well, who may count only two courses outside the department toward the degree. See the *General Announcements* and Chapter 6 of this document for more details. Some entering students have acquired enough background that they are not required to take some of the introductory courses. For most students, however, the

introductory courses are worthwhile. An even deeper background coursework is advisable for some students.

Computers: Access to computers is essential for graduate study in STAT. Every Ph.D. graduate student is provided with a fully networked desktop workstation. In addition, graduate students have access to the various research computing facilities at Rice University. See the Appendix of this document for further information.

On arrival at Rice, every graduate student is assigned an account on the departmental computing system. The STAT system consists of several desktop workstations and file servers in offices; administrative computers (PC's); and peripherals (printers), linked by Ethernet and to the outside world through the campus fiber optic backbone. Wireless connections are also readily available. Software includes R, Matlab, Mathematica, SAS, Maple, Web browsers, T_EX in various forms, alternative compilers (e.g. GNU), and much more.

STAT graduate students have access to various campus wide research computing facilities (see Research Computing at <http://it.rice.edu>). Access to these facilities is typically provided in connection with a faculty sponsored research project.

English proficiency and technical writing: Ability to write and speak English competently is *essential* for successful academic work at Rice, and in fact has become essential for scientific careers worldwide. The Department reinforces its commitment to fostering speaking and writing skills in the following three ways:

1. All non-native English speakers must meet the University's minimum requirement for TOEFL before admission. In some cases, students who met the TOEFL requirement may be asked to enroll in an ESL class for at least one semester at his or her own expenses. If a PhD student is required to take these steps, he or she *must* do so to receive his or her stipend.
2. All first year students must participate in the STAT 600 Graduate Seminar in Statistics course.
3. The Rice Office of International Students & Scholars (OISS) <http://oiss.rice.edu> offers a number of free English and Culture classes. Additionally, Rice's ESL (English as a Second Language) Program <http://esl.rice.edu> offers non-native English speakers the opportunity to improve their language skills. Foreign students are strongly encouraged to take advantage of these opportunities.

Time and Attendance: Students should inform their advisor and the department coordinator when they will be off-campus for an extended period of time such as for conferences, vacation, or sick leave. We will usually work with you on these matters, after you have demonstrated how your other duties will be completed while you are gone. Students working on campus are required to complete a Time & Attendance Form. They should coordinate with Ms. Poon for any time off from working.

Physical and Mental Well-Being: There are many avenues for the student to maintain a healthy body and mind. Graduate studies can be stressful at times, and regular physical activity is very helpful for maintaining wellness and balance. Please check out the facilities and programs in the

[Gibbs Recreation and Wellness Center](#) for more information. Confidential student health services are available on campus by the [Rice Student Health Services](#). Additionally, Student Wellbeing Office, among other programs, coordinates psychiatric assistance through the [Rice Counseling Center](#). Please [see this website](#) for any confidential help you might need.

Rice encourages any student who has experienced an incident of sexual, relationship, or other interpersonal violence, harassment or gender discrimination to seek support. There are many options available both on and off campus for all graduate students, regardless of whether the perpetrator was a fellow student, a staff or faculty member, or someone not affiliated with the university.

Students should be aware when seeking support on campus that most employees are required by Title IX to disclose all incidents of non-consensual interpersonal behaviors to Title IX professionals on campus who can act to support that student and meet their needs. The therapists at the Rice Counseling Center and the doctors at Student Health Services are confidential, meaning that Rice will not be informed about the incident if a student discloses to one of these Rice staff members. Rice prioritizes student privacy and safety, and only shares disclosed information on a need-to-know basis.

If you are in need of assistance or simply would like to talk to someone, please call Rice Wellbeing and Counseling Center, which includes Title IX Support:

(713) 348-3311

Policies, including Sexual Misconduct Policy and Student Code of Conduct, and more information regarding Title IX can be found at safe.rice.edu

Other helpful information on life as a graduate student can be found in the Graduate Student Association (GSA) yellow pages. The URL for GSA is <http://gsa.rice.edu/guide/consumer>

The student will also want to check out the Fondren Library and Valhalla, the graduate student pub. The Rice University Student Handbook also contains a wealth of useful information.

Chapter 3

Note: Professional Master's in Statistics (M.STAT): Procedures and policies for M.Stat students are slightly different than those for the Ph.D. students; please refer to chapter 6 for specific elements of M.Stat guidance.

Financial Support for Ph.D. Students

Rice is unusual in that relatively few graduate students support themselves by teaching. Almost all STAT graduate students receive stipends and tuition waivers – either from the university, or from an external research grant awarded to a STAT faculty member, or from Graduate Fellowships awarded to the student. As a result, the main focus of our students is preparing for and learning to carry out research in Statistics.

Departmental funding is available for most incoming Ph.D. students during the first year of studies and a few individuals in later years. This support includes a stipend and tuition. At the beginning of each academic year, the students are required to pay fees. They are required to have health insurance which they may choose to purchase from Rice. They may also choose to pay for parking.

A limited number of teaching assistantships are available to those who wish to acquire teaching experience. Since some evidence of teaching competence is a prerequisite for entry-level academic positions, STAT graduate students who wish to eventually become professors should take advantage of this opportunity to enhance their vitas in this important way. The TA program has grown considerably in the last few years. Each year, several graduate students serve as classroom instructors for some introductory courses. TAs must participate in the teaching workshop organized by George R. Brown School of Engineering around the beginning of every fall semester.

The National Science Foundation, many Government Agencies and Foundations offer Scholarships, Fellowships, and other funding opportunities for graduate students. Some of these opportunities are on the George R. Brown School of Engineering web-page <http://engr.rice.edu> (go to **CURRENT STUDENTS -- GRADUATE STUDENTS** and then **OPPORTUNITIES**). Graduate students are strongly encouraged to seek out these opportunities. The application process is a valuable learning experience. Being awarded one of these prestigious fellowships is a great enhancement to the student's vitae, and many of these fellowships carry a higher stipend level than that offered by the STAT department. Faculty members, especially interim mentor and advisors, will provide guidance and help in the selection of appropriate opportunities and in the application process. Additionally, the Office of Proposal Development is available to assist with proposal applications, see <http://opd.rice.edu/home/>.

The STAT department asks students to perform some service – usually in the form of grading homework and in some cases exams for courses for at least three semesters. At the beginning of each semester, the department chair assigns most graduate students as TAs or graders to various courses. Grading is an *important responsibility and is not to be taken lightly*. Grading is not only a service, but also an important learning experience for graduate students. Failure to perform grading duties adequately may jeopardize future support. If for some reason a student feels unable to grade in the assigned course, he or she should inform the department chair so that he or she can attempt to reassign the student.

Stipends for first year students cover nine months, from August 16 to May 15 of the following year. Students are encouraged to seek internships during their first summer. Department support may also be available. Please inform the department chair of any internship plans. Typically stipends funded by research grants cover the full year and not just the academic year. Graduate study in STAT is usually a full-time year-round activity! Summers are extremely valuable work time, because there is the opportunity to perform research without the distractions of coursework, grading, etc.

Some university funds may be available to support students in subsequent years of graduate study. However, in general, students in the STAT department obtain their support from research grants after the first year. The opportunity to do research is an integral part of graduate training. *Each student is responsible for identifying this opportunity, deciding which of the faculty to work with, and approaching him/her about support (and a project!).* While the department is not in a position to *guarantee* a research assistantship with one of the faculty, STAT has been very successful in placing students with professors throughout its 30 year history. The professors *always* have projects underway; therefore, more often than not, they are looking for research assistants. The coursework over the first two or three years will help familiarize the students with the professors and vice versa. Enthusiastic participation in a student's early classes is by far the best way to find a faculty member (or to have him/her find you) who will direct the student's initiation as a scientist to the mutual benefit of everyone.

As a matter of University policy, Rice does not offer financial support to non-thesis ("professional" or M.Stat) students. Accordingly, transfer from the Ph.D. program to the non-thesis master's program implies repayment of any financial aid received from Rice. This restriction does not apply in case of transfer to the thesis master's program (MA degree). Students who choose to transfer from the Ph.D. program to the MA (master's with thesis) program will not be subject to repayment of previous financial aid.

If financial aid, beyond what the department has arranged, is needed, the student may contact the Financial Aid office for information about loan programs for graduate students.

Chapter 4

Note: Professional Master's in Statistics (M.STAT): Procedures and policies for M.Stat students are slightly different than those for the Ph.D. students; please refer to chapter 6 for specific elements of M.Stat guidance.

The STAT Ph.D. Graduate Curriculum

Statistics is a rapidly evolving and essentially interdisciplinary field. The most fascinating work in STAT often involves surprising combinations of ideas from various parts of mathematics, statistics, computer science, physical sciences, engineering, as well as many other disciplines.

The department has established a core curriculum, advanced graduate courses, and required professional development courses. These courses are designed to ensure breadth of exposure to all areas of Statistics, as represented by the Rice faculty and depth of preparation in a disciplinary area. Both the core and the disciplinary curricula evolve as faculty and student interests change.

Course of Study: The doctoral program in statistics is designed around a three-year course of study from a bachelor's degree, or two-year course of study from a master's degree in statistics. Comprehensive exams cover master's level material and must be taken at the end of the first year of study or upon entering the program.

It is expected that the first year in the program will be spent mostly on courses, but by year two students should be integrated into a research program. By the end of the third year, successful students will have completed courses and started on full-time research.

Ph.D. students are required to take 36 hours or 12 approved courses of non-thesis credit. With approval three of these twelve courses may come from outside the department or from a selection of masters level courses* within the department, including some joint courses*. The student's plan of study must be approved by the department graduate advisor.

*Master's Level Courses: 518, 519, 605, 606, 615, 616, 682, 684, 685. Joint Listed Courses: 503, 509, 510, 610, 611.

A complete list of available courses can be found on the statistics department webpage (<http://statistics.rice.edu/feed/Courses.aspx>). This is the course list you will find in the General Announcements,

https://courses.rice.edu/admweb!/SWKSCAT.cat?p_action=CATALIST&p_acyr_code=2015&p_sobj=STAT. The current course listing with instructors and schedules is available on the registrar's website at <http://courses.rice.edu/admweb/swkscat.main>. *Students who wish to use non-STAT courses to satisfy these course requirement should seek approval from their advisor in writing before taking the class!* The General Announcements (GA) is the official Rice curriculum. In the event that there is a discrepancy between the GA and any other websites or publications, the GA shall prevail as the authoritative source.

Core Curriculum (required): The core curriculum for the doctoral program in Statistics includes a two semester sequence on the foundations of statistics, at least one course in advanced probability and one course in computing. Specifically the courses required are:

- STAT 532/533 Foundations of Statistical Inference
- STAT 581 Probability Theory or STAT 552 Applied Stochastic Processes
- Demonstrated proficiency in computing such as STAT 605 or an approved course outside the department. Courses taken to fulfill this requirement will be counted toward courses from outside the department or Master's level.

Formally, candidates for the Ph.D. degree in statistics must:

- complete at least 90 semester hours of approved coursework beyond the bachelor's degree and minimum of 60 hours beyond a master's degree,
- perform satisfactorily on preliminary and qualifying examinations, and
- complete an original thesis with a public oral defense.

Professional Development Courses (required): Outside of the 12 courses Ph.D. students are required to participate in professional development Graduate seminar in statistics (STAT 600 and 601) for 6 semesters (or 6 credit hours).

STAT 590 and STAT 591, Independent Study: Provide credit for independent study in the student's selected area of statistical specialization. It is intended for directed reading, for conducting independent research, and documentation of conclusions and application of practical internships. Independent study credit is generally only used in cases where the student and the advisor jointly determine that it is advantageous to engage in independent study research.

All statistics graduate students are assigned a limited amount of teaching and other departmental service as part of their graduate education.

In some cases, these requirements may not be appropriate, because of prior, equivalent course work. The department chair in consultation with the Ph.D. advisor will consider such exceptions as they arise. Our intent is not to construct rigid constraints, but rather to ensure that every STAT Ph.D. student has a broad grounding in applied statistics. The course of study described here should accomplish this goal for almost all STAT students, insofar as it can be accomplished at Rice.

Colloquia and Seminars: In addition to the program of course work detailed above, department colloquia and seminars form an essential part of graduate education. *All students are required to attend the regular department colloquia.* These talks, generally given by speakers from outside Rice, describe current research at the frontiers of statistics. Therefore, they give graduate students an overview of the breadth of the field's discipline. Interested students are encouraged to meet individually with the visiting speakers.

All STAT Ph.D students are expected to attend the weekly department colloquium series, and register for STAT 601 for one hour credit. In addition to outside visitors, talks are given by STAT faculty and fellow students, providing opportunities for students to identify potential faculty advisors. In addition, first year Ph.D. students should register in the spring semester for STAT 600, which is a one-hour course whose content may vary from year to year.

Rice has a longstanding relationship with the Houston area chapter of the American Statistical Association (HACASA), which organizes a lecture series in which speakers from academia, industry, government labs, or other institutions give talks on a variety of topics of interest to researchers and practitioners in statistics. These talks provide a good window into life after graduate school and excellent networking opportunities. The purpose of the HACASA is to foster, in the broadest manner, statistics and applications and to promote unity and effectiveness of effort among all groups in the Greater Houston area having an interest in or being concerned with statistics or its application. *All students are strongly encouraged to attend HACASA Meetings; additionally, light refreshments and sandwiches will be served!* Further information and event schedules, etc., are available on the chapter's website <http://community.amstat.org/Houston/home>.

TA Workshop: The George R. Brown School of Engineering conducts teaching workshops around the beginning of every fall semester. These are typically one-day workshops. *All STAT teaching assistants (TA) in the Ph.D. program are required to participate in this teaching workshop.*

Rice Responsible Conduct of Research (RCR): Rice University requires training in the Responsible Conduct of Research (RCR) for all graduate students and postdoctoral scholars, whether or not they are funded on NSF-sponsored grants, as well as undergraduate students supported on NSF sponsored projects submitted (and subsequently awarded) on or after January 4, 2010. RCR training should be completed within sixty (60) days when the individual begins work on an applicable research project. It is suggested that new students take this online course in the summer prior to their matriculation. If an individual is working on an NSF project for a short period of time, such as the summer, RCR training must be completed before the individual's work on the project ends. See http://comp.rice.edu/rcr_instructions/ for necessary information and FAQ's.

Incoming Ph.D. students who do not meet this requirement may not receive payments from Rice.

Academic Progress Review: The Office of Graduate and Postgraduate Studies (OGPS) as well as the SACSCOC requires a written annual review of Ph.D. student progress. This will be conducted by a committee of faculty and will result in a written assessment, which will be accomplished at the end of each second semester.

Each Ph.D. student will submit a progress report (limit 2 pages) once a year; submitted between May 1st and May 10th. In their narrative, students should discuss progress they have made in the following areas since their last report:

1. Courses – transcripts will be provided by office staff and reviewed by the Graduate Committee. *Students in their first and second year should submit a copy of exams from core courses (as an appendix to the report).*
2. Exams completed with date and outcome – i.e. qualifiers, thesis proposal
3. MA in Statistics and Admission to Ph.D. Candidacy
4. Research: Please include

- a. A summary research statement highlighting accomplishments in the past year.
- b. A list of all research products, such as journal or archive papers, conferences papers, workshop and conference presentations and posters, and software development.
5. Awards, scholarships, fellowships or internships – include successes as well as attempts.
6. Any other relevant information that might help their adviser and the Graduate Committee assess the student's progress.
7. Students should also discuss their plans for the next six months and provide an expected Ph.D. graduation date. *First and second year students should discuss progress toward finding an advisor.*

Faculty advisors will review student reports and add brief written comments to the Graduate Committee by May 15th, regarding students' progress and performance.

The Graduate Committee will review all progress reports by Ph.D. students before June 30th. The Graduate Committee will confer with the faculty advisor and the Department chair regarding any student presenting a concern, prior to issuing their written review.

Satisfactory Course Performance: For a satisfactory performance in their course work, graduate students enrolled in the STAT Ph.D. program are expected to maintain a B (3.00) average in the STAT required core and advanced statistics courses. Not maintaining the 3.0 GPA average will result in departmental action and a performance improvement plan may need to be generated for the student. In addition, Rice's rules specified in the [General Announcements](#) apply. The General Announcements (GA) is the official Rice curriculum. In the event that there is a discrepancy between the GA and any other websites or publications, the GA shall prevail as the authoritative source. The procedures for academic and judicial discipline, including academic probation, dismissal, disciplinary probation, suspension and expulsion, termination of financial support, and degree revocation, are found in the University General Announcements at http://ga.rice.edu/GR_dismissal/.

Probation, Dismissal and Appeals: A student who receives an Unsatisfactory assessment from the Graduate Committee will be placed on academic probation. If a student is placed on probation, they must submit an updated progress report by December 10th. If there is insufficient progress the student will be dismissed immediately from the Ph.D. program. Any student who receives two Unsatisfactory annual May assessments will be dismissed from the Ph.D. program.

Any student who is dismissed can request a review of the decision by the faculty of the Department of Statistics.

Chapter 5

Note: Professional Master's in Statistics (M.STAT): Procedures and policies for M.Stat students are slightly different than those for the Ph.D. students; please refer to chapter 6 for specific elements of M.Stat guidance.

Qualifying Examinations and Admission to Ph.D. Candidacy

The path to earning a Ph.D. requires:

- completion of required course work.
- satisfactory performance on a written and an oral Qualifying Examination. In some cases the oral examination may be waived.
- completion and defense of a Ph.D. thesis proposal. Although not a public defense, outside people may attend. After successful completion of the Ph.D. thesis proposal the student will be classified as a "Candidate."
- completion and defense of a Ph.D. dissertation.

The Qualifying Exam: The exam is aimed at testing basic knowledge in applied and theoretical statistics and probability. It consists of one written exam, followed by an oral exam as needed. It covers masters level statistical material as represented by the list of topics given below. The exam will be administered the Friday before the first week of classes in the fall semester (assuming a Monday start to the fall semester). It is required by all students entering the 2nd year of the doctoral program. The exam may be taken by qualified doctoral students before their 1st semester of study.

Students will be informed of their performance on the written exam the week following its conduct. At that time, the necessity for a follow-on oral exam will be determined. Students performing inadequately on the exam may be asked to leave the program, retake the exam, or perform remedial work to improve their knowledge of the basic material. The exam retake will have the same structure as the original exams.

A Committee of faculty will participate in the design of the exams, but the end product and students' performance evaluation will be done by the entire faculty.

To pass the exam, a student is expected to demonstrate knowledge of the topics listed here* at the level of *Statistical Inference* by Casella and Berger which is used in Stat 518/519.

*Currently under review by the Faculty; contact Margaret Poon for an updated list (draft study guide)

Probability: Axioms of probability; Independence and conditional probability; Univariate and multivariate random variables; Multivariate Normal Distributions; Expectation; Generating functions (moment, characteristic); Transformations; Common families of distributions; Sampling distributions; Limit theorems (modes of convergence, laws of large numbers, central limit theorem).

Statistics: Applications and basic theory; Principles of data reduction; Point Estimation; Hypothesis Testing; Interval Estimation; Introductory Bayesian Inference; Basic Decision Theory; Large sample theory (asymptotic optimality of estimators, large sample methods for testing and confidence intervals); Randomization methods such as the bootstrap and permutation tests.

The Ph.D. Thesis Proposal: After the student has been working with an advisor on a research topic, the Ph.D. thesis proposal will be next on the horizon. Ordinarily the proposal will be a separate document and its defense a separate exam. A doctoral thesis committee will be reviewing the proposal and presiding at its defense, which is an oral presentation with the student's entire thesis committee.

The thesis proposal is a written summary of research progress up to that point and future research plans. The document should not exceed 10 pages and should contain (at a minimum) the following sections:

- Abstract (not to exceed 250 words)
- Background and literature survey
- Research plans and methodology
- Any results obtained up to that point
- Proposed time-line for completion of thesis research.

The thesis advisor may, within reason, require additional information be included. The thesis proposal must be distributed to the members of the thesis committee at least one week before the scheduled meeting. A copy should also be sent to the Department/Graduate coordinator (currently, Ms. Poon at poon@rice.edu), for inclusion in the student's record.

At the proposal defense, the thesis Committee should assess the student progress and knowledge of the research field, assure that the student has developed a coherent research plan, and provide input in time to incorporate useful suggestions in the thesis research. The proposal defense is typically scheduled after the fifth semester (excluding summers) and should be held at least one semester prior the completion of the thesis research. The actual timing is at the discretion of the advisor and the thesis committee, in accordance with university regulations.

The Ph.D. Dissertation and Defense: After approval of the thesis topic, students may spend 1-3 years completing their research and writing the thesis. After finalizing the approved research topic into the final dissertation, the student will present this dissertation in a public defense. Ordinarily the dissertation will be a complete, separate document. Guidelines and templates for preparing the dissertation may be found at <http://gps.rice.edu/candidacy> . A doctoral thesis committee will be reviewing the dissertation and presiding at its defense. Check your General Announcements for regulations. It is your responsibility to ensure that all the thesis committee members have a copy of the dissertation in plenty of time for review prior to the defense. A good rule of thumb is to provide 10 days for review. Be prepared to provide hard copy of the dissertation if so requested.

Dispute Resolution: All requests for exceptions or variances from the policies outlined in this document should be addressed in writing to the department chair. The request should state precisely what exception or variance is requested and detailed reasons given to support the request. Either the department chair or the full faculty will decide the issue, as appropriate. Requests for exceptions to University policies are normally handled through the petitions and appeals process outlined at

http://ga.rice.edu/Home.aspx?id=138#Petitions_and_Appeals; disputes in general and guidelines regarding petitions and appeals are addressed in the University General Announcements in the section: http://ga.rice.edu/GR_disputes/

Degree Conferral (Graduation Procedure): It is the student's responsibility to initiate all paperwork needed for graduation prior to the established deadlines. This consists of the Petition for Approval of Candidacy for a Doctoral Degree, the Application for Degree, and other documents outlined in http://gpsdocs.rice.edu/graduation-Checklists/Graduation_Checklist_December_Conferral_Doctoral.pdf. You should work with the department coordinator to ensure this is accomplished. Graduation/Diploma will not be conferred without the appropriate paperwork, and in some cases graduation will be postponed.

Chapter 6

Professional Master's in Statistics (M.Stat)

The Professional Master's in Statistics (M.Stat) is a non-thesis master's degree offered to help prepare the student for careers in industry, government, and academia. Statisticians make critical contributions in business, medicine, economics, defense, and engineering. The demand for statisticians at all education levels is one of the highest for any professional group. Rice's Professional Master in Statistics (M.Stat) Program prepares students for careers as professional statisticians. It includes a solid foundation in statistical computing, statistical modeling, experimental design, and mathematical statistics, plus electives in statistical methods and/or theory. Students have the opportunity to concentrate on theory, applications, or a combination of the two. It is a bridge to industry, designed to provide advanced learning and training in the applied aspects of statistics theory, methodology and techniques beyond the typical undergraduate program.

All of the material in the previous chapters of this graduate handbook generally apply to the M.Stat student. Specific departures are covered in this chapter. Keep in mind that the critical M.Stat requirements and guidance are found by reference in <https://statistics.rice.edu/why-mstat>.

M.Stat Advisor: Since the M.Stat degree is not a thesis program, there is no separate mentor/advisor process; Dr. J. Dobelman is the M.Stat advisor and as such advises on courses and other matters associated with the students' tenure of study. Each M.Stat student will meet with the M.Stat advisor early in each semester to discuss curriculum choices, M.Stat specializations, and so forth. This advisor will be present throughout the student's graduate career. *Students are required to discuss their curriculum choices with the advisor* to help ensure that the student's choices and plans are in tune with the various requirements for his or her degree program

Importance of Orientation: An entry orientation for M.Stat students is presented prior to the beginning of the incoming fall classes, and it is critical that all new M.Stat students attend this orientation. Due to the compressed timeframe in which the M.Stat degree is obtained, mistakes can be costly. Taking the wrong course without coordinating with the M.Stat advisor can result in your not graduating when you think you should. These errors and other guidance are addressed in the M.Stat orientation.

M.Stat Study Space: A study space for M.Stat students has been established in DCH 2093. The space is outfitted with a [shared] networked printer, Mac and Windows workstations, and a wired conference table and chairs. Since the space is shared with some 40 possible M.Stat students, certain rules have been put in place regarding use of the M.Stat study room; they are posted on the wall, but can be summed up as:

- a. Maintain a professional appearance at all times; leave the room neater than when you found it;
- b. Be cordial to one another; only M.Stat students are permitted to make use of the facility;
- c. No overnight occupation;

- d. Do not leave food trash in the room;
- e. Respect each other's belongings.

Any questions on these rules should be addressed to the Department Coordinator or the M.Stat Advisor.

Finances: Since M.Stat students are expected to provide their own financing, mandatory grading and teaching assistant duties are not assigned. Some paid opportunities for grading arise from time to time in some of the larger courses; the Graduate Coordinator or M.Stat advisor will generally seek out appropriate students to assist in this.

The M.Stat Graduate Curriculum: The M.Stat track specializations and required courses are listed on the M.Stat website, <https://statistics.rice.edu/why-mstat>. Core (required) courses, track-specific and elective courses comprise the curriculum requirements. The student and M.Stat advisor will jointly develop the course of study needed to best meet the student's needs.

Course level is in accordance with current university requirements (that ALL 30 hours be completed at a course level of 500 or greater). Up to two courses outside the department may count as electives upon coordination with the M.Stat student advisor. Courses outside the Department must be at the 400-level and above. PASS/FAIL grades are NOT ACCEPTABLE for any courses used to satisfy the 30-hour M.Stat curriculum requirement. Certain optional courses are available, which are 1-hour courses, but these will not count toward the 30-hour graduation requirement. Some graduate courses in other departments may be listed at 5 hours, but only 3 hours will count toward the M.Stat degree.

Coursework in the M.Stat curriculum is not easy. You should plan on taking approximately 3 courses per semester, and no more than 4. Taking more than these can result in your inability to maintain good academic standing, which according to the current General Announcements is keeping your term GPA above 2.33. You should be concerned if your cumulative GPA falls below 3.0. If you find yourself in this position, contact the M.Stat advisor as soon as possible so that a course of action may be established. The procedures for academic and judicial discipline, including academic probation, dismissal, disciplinary probation, suspension and expulsion, termination of financial support, and degree revocation, are found in the University General Announcements at http://ga.rice.edu/GR_dismissal/.

Transfer Credit (5th Year M.Stat Students): Some students in the 5th year M.Stat program will need to transfer courses taken while a Rice undergraduate into the graduate program. A list of these courses is normally developed during negotiations for the 5th year M.Stat admission. It is your responsibility to timely coordinate with the Department Coordinator since there is a form to complete in order to have the courses transferred to the graduate program. Keep in mind that no course may be counted twice; only courses taken in addition to the 120 hours required for the undergraduate degree are subject to transferal, and only those courses so determined to be M.Stat-eligible by the M.Stat advisor.

In some special cases, students from other undergraduate institutions may be permitted to transfer up to 6 hours into the program, but the documentation requirements to show that they are eligible are somewhat onerous.

Professional Communications and English Proficiency: English is the official language at Rice and the Department. It is strongly encouraged that all M.Stat students avail themselves of taking optional courses in engineering leadership and communications; these skills cannot be emphasized enough in the professional setting. Typical offerings include

ENGI 505	ENGINEERING PROJ MGMT & ECON
ENGI 510	TECHNICAL AND MANAGERIAL COMM
ENGI 515	LEADING TEAMS AND INNOVATION
ENGI 528	ENGINEERING ECONOMICS
ENGI 529	ETHICS & ENGINRNG LEADERSHIP
ENGI 545	STRATEGIC THINKING
ENGI 600	GRADUATE COMMUNICATIONS SEM
ENGI 610	MGT FOR SCIENCE/ENGINEERING
ENGI 614	LEARNING HOW TO INNOVATE?
ENGI 615	LEADERSHIP COACHING FOR ENGR

While these courses presently do not count toward the M.Stat curriculum requirements, they are genuine Rice Courses and do contribute to the graduate transcript. Check the [curriculum planning website](#) for the most enrichment recent course listing.

M.Stat Student Portfolios: Due to accreditation requirements from the Southern Association of Colleges and Schools (SACSCOC), all M.Stat students are required to submit a portfolio of their work while a student at Rice University in the Department of Statistics. Although students will be collecting samples of their work throughout their tenure as students, it is expected that the required portfolio will be provided by the students in their last semester. **SUBMISSION OF THE PORTFOLIO WILL BE REQUIRED TO GRADUATE OR IN ORDER TO BE GRANTED AN EMPLOYMENT RECOMMENDATION.** The items in the M.Stat student portfolio will consist of:

- a. 3 (graded) final or major exams
- b. 1 class project
- c. 1 page personal statement identifying strengths, weaknesses and career goals. This should be updated from that used in your M.Stat application
- d. Current resume
- e. Most recent transcript, including courses in progress

The portfolios are available on Owl-Space under the project site "M.Stat Student Portfolios." You will have access to the drop box folder with your name on it. Please go ahead and start uploading the required files as soon as possible and inform Margaret Poon (poon@rice.edu) when you have added required items to the Owlspace site.

As a part of the accreditation process, each year a random sample of the portfolios will be evaluated by the evaluation committee to see whether the program outcomes are being met.

Note:

Access to the M.Stat student portfolios is restricted to current credentialed M.Stat students and is found at the special project site "M.Stat Student Portfolios"; your drop box is in the menu item under drop box. After you've logged into Owl-Space, the current website is <https://owlspace-ccm.rice.edu/x/ObrPPf>.

Academic Progress Review: The Office of Graduate and Postgraduate Studies (OGPS) as well as the SACS requires a written annual review of M.Stat student progress. For M.Stat purposes, the transcript is an adequate form of written assessment, which will be reviewed at the end of the second semester.

Internships for International Students: The M.Stat degree does not require an internship; however, it is recognized that many students will want to enhance their education with a related internship in industry, and we provide an independent study course structure under which the international student may accomplish this objective. International students under the jurisdiction of the Office of International Students and Scholars (OISS) cannot work, for salary or otherwise, without an approved Curricular Practical Training (CPT) plan on file. In order to do this the student must:

- a. Obtain an offer letter from the company for which they have negotiated the internship.
- b. Complete the form [F-1 Curricular Practical Training](#) and obtain necessary approval signatures.
- c. Sign up for the appropriate STAT 590/591 Independent Study course; note that this must be done within the Add/Drop deadlines declared in the Office of the Registrar's Academic Calendar <http://registrar.rice.edu/calendars/>. Only 1 hour of course credit is permitted.

NOTE: If you have missed the add deadline for the course, you may take the course the following semester. If you are graduating and will be unable to defer the course, under OISS rules you will NOT be permitted to accept the internship. This is another reason especially that graduating M.Stat students should have any internships in hand prior to the course add deadline.

- d. As a part of the independent study course, and in order to receive a grade, the student will be required to submit an 8-10 page summary of the work performed and how it dovetailed into their M.Stat degree. These internship reports are normally due about 1 month prior to the end of the semester in which the course is taken.

Additional information and international program information is available on the OISS website, <http://oiss.rice.edu/studentwork/>. Each student is expected to make themselves aware of all applicable policies and requirements for their visa status. The department coordinator is also available to assist you in this area.

Degree Conferral (Graduation Procedure): It is the student's responsibility to initiate all paperwork needed for graduation prior to the established deadlines. This consists of the Petition for Non-Thesis Master's, Application for Degree Form and other documents outlined in the [Graduate](#)

[Checklist](#) . You should work with the department coordinator to ensure this is accomplished. Graduation/Diploma will not be conferred without the appropriate paperwork, and in some cases graduation will be postponed.

Careers for the M.Stat Graduate: A good discussion of career options and strategy is found in the M.Stat webpage under “Career” (<http://statistics.rice.edu/M.Stat>). It cannot be emphasized enough that you must begin preparation for the career (or internship) well in advance of your graduation. Waiting until April of the graduation year to start searching for jobs is going to result in failure; for the international student, this has serious ramifications. Expect many rejections, or being ignored, before hitting an interview invitation. The M.Stat placement record is impressive – a list of placements is available at <https://statistics.rice.edu/people/alumni>. We have compiled an informal *caveat emptor* list of sites that post current job offerings in academia, government and industry; you may wish to peruse these listings on the prototype M.Stat webpage available at: <http://www.stat.rice.edu/~dobelman/M.Stat/M.Stat.career.html>.

Interaction with Other Graduate Students: You, as an M.Stat student, play an important role in the social environment at Rice. Maintaining an active involvement at Rice events and department functions like the Monday lunches, colloquia, parties, informal chats and other events will enhance everyone’s enjoyment of his or her time as a graduate student. Be engaged, keep an eye out for activities which will be announced, make friends, and help others.

Appendix

STAT Policy on Student Computing

The STAT department provides computing resources to students for the purposes of research and education. The acquisition, operation, and maintenance of the computing resources are supported by university and faculty research funds. This policy provides students with guidelines on proper usage of the computing resources. Any doubts about appropriate usage should be resolved by query to the System Administrator or by visiting this link <http://vpit.rice.edu/AUP.aspx>

1. All graduate students in the MA, M.STAT, and Ph.D. degree programs can have accounts on the STAT system. New graduate students should fill out a form, available from the department coordinator to request the creation of new computer accounts.

A faculty sponsor can request accounts for undergraduate students or non-STAT graduate students, who are involved in a faculty-sponsored research or educational project. To obtain such an account, a student must submit a request form with the signature of a faculty sponsor.

2. Students may use office desktop equipment to

- read and write email
- create and maintain a personal web page
- browse the Web for educational or research purposes
- log in to Owlspace for computational coursework
- perform teaching functions (grading, TA work, etc.)
- perform research on faculty-led projects (includes thesis research)

In all cases, research-related use has priority.

3. Students may use non-desktop departmental equipment (printers, scanners, computing and file servers...) to

- perform research on faculty-led projects (includes thesis research)
- perform teaching functions (grading, TA work, etc.)
- store small amounts of information unrelated to their research projects, including email and a personal web page.

4. Personal copying and printing on department machines are discouraged. Personal documents can be fulfilled at the RMC copy center or the Fondren Library.

5. Students may not use departmental equipment to

- play computer games, chat online, and things of similar nature unrelated to the educational and research missions of the university;

- store, print, or process significant amounts of information of a purely personal nature or unrelated to the educational and research missions of the university.
6. Termination of computer accounts: A STAT graduate student's account will be terminated one year after the student's enrollment as a STAT student has ended. Former students who continue their collaboration with the faculty after graduation can retain their accounts upon the request of the faculty member. The account for an undergraduate student or a non-STAT graduate student will be terminated six months after the student's involvement in a faculty-sponsored project has ended.
 7. In addition to the specific policies outlined above, students are bound by the Rice policy for Appropriate Use of Computer Resources, which can be found on the web at <http://vpit.rice.edu/AUP.aspx>. The system administrator will respond to infractions of these policies. Response to serious infraction may include closing of the offending party's account.