

Graduate Study in Statistics

School of Statistics
University of Minnesota

2006–7

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1 Introduction

The School of Statistics at the University of Minnesota Twin Cities Campus is a leading center of statistical practice, education, and research. The School has about 20 faculty members and 70 graduate students. We offer programs leading to B. A., B. S., M. S. and Ph. D. degrees.

The Department of Statistics was initially established at the University of Minnesota in 1958. In 1970, the School of Statistics was organized, comprising the Department of Theoretical Statistics (on the Minneapolis campus), the Department of Applied Statistics (on the St. Paul campus), and the Statistical Consulting Service. In 2001, the separate departments were disestablished leaving a united School of Statistics in Ford Hall on the East Bank campus in Minneapolis.

This booklet gives an overview of the Graduate Program in Statistics, and the faculty and facilities of the School of Statistics. Prospective graduate students should also read the Bulletin of the University of Minnesota Graduate School. Further information about the statistics program may be obtained from the Director of Graduate Studies or the Director of the School of Statistics.

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1.1 Graduate Faculty in Statistics

The Graduate Faculty includes 19 members of the School of Statistics, and two affiliated faculty from other departments in the University.

Christopher Bingham Professor. Ph. D. (1964) Yale University. Directional Data Analysis, Time Series Analysis, Multivariate Analysis, Chronobiometry, Statistical Computing. ASA Fellow, IMS Fellow.

Snigdhanu Chatterjee Assistant Professor. Ph.D. (2000) Indian Statistical Institute. Resampling techniques, small area estimation, curve estimation, stochastic processes.

R. Dennis Cook Professor. Ph. D. (1971) Kansas State University. Experimental Design, Linear and Nonlinear Models, Regression Diagnostics, Graphical Methods,

Population Genetics. ASA Fellow, IMS Fellow.

James Dickey Professor. Ph. D. (1965) University of Michigan. Bayesian Statistics, Expert-opinion Probability Modeling, Smoothing Methods, Foundations of Inference. ASA Fellow, IMS Fellow.

Charles Geyer Professor. Ph. D. (1990) University of Washington. Constrained Maximum Likelihood, Monte Carlo Likelihood, Markov Chain Monte Carlo, Statistical Genetics.

Birgit Grund Associate Professor. Ph. D. (1987) Humboldt-Universität. Nonparametric Curve Estimation, Kernel Smoothing, AIDS Clinical trials.

Douglas M. Hawkins Professor. Ph. D. (1969) Witwatersrand University. Quality Improvement, Case Diagnostics, Chemometrics. ASA Fellow, ASQC Fellow.

Tiefeng Jiang Associate Professor. Ph. D. (1999) Stanford University. Bioinformatics, large deviations, random matrix theory and asymptotics of statistics.

Galin Jones Assistant Professor. Ph. D. (2001) University of Florida. Markov chain Monte Carlo methodology. Generalized Linear Mixed Models. Applications in biological and environmental settings.

Frank B. Martin Associate Professor. Ph. D. (1968) Iowa State University. Experimental Design, Analysis of Variance Procedures, Finite Population Sampling.

Glen D. Meeden Professor. Ph. D. (1968) University of Illinois. Bayesian Inference, Decision Theory, Finite Population Sampling. ASA Fellow, IMS Fellow.

Gary W. Oehlert Professor. Ph. D. (1981) Yale University. Environmental Trend Analysis, Nonparametric Regression, Medical Imaging, Statistical Computing.

Peihua Qiu Associate Professor. Ph. D. (1996) University of Wisconsin, Madison. Nonparametric Curve/Surface Fitting, Image Processing, Survival Analysis and Reliability, Statistical Applications.

Xiaotong Shen Professor. Ph. D. (1991) University of Chicago. Likelihood methods, semiparametric and nonparametric models, classification, model assessment, frequency properties of Bayes procedures.

William D. Sudderth Professor. Ph. D. (1967) University of California, Berkeley. Probability Theory, Stochastic Games, Foundations of Statistics. IMS Fellow.

Lan Wang Assistant Professor. Ph. D. (2003) Pennsylvania State University. Models with large numbers of parameters, nonparametric ANCOVA and lack-of-fit tests in nonparametric regression.

Sanford Weisberg Professor. Ph. D. (1973) Harvard University. Regression and Modeling, Diagnostics, Graphical Methods, Computing. ASA Fellow.

Yuhong Yang Associate Professor. Ph. D. (1996) Yale University. Nonparametric function estimation, adaptive procedures, Model selection/combining, Regression with correlated errors, Forecasting, Bioinformatics.

Hui Zou Assistant Professor. Ph. D. (2005) Stanford University. Model selection, Machine learning, Multivariate analysis.

Christopher Nachtsheim Ph. D. Professor of Management.

Ron Regal Ph. D. Professor of Mathematical Sciences, Duluth.

1.2 The Student Body

The student population of the Twin Cities campuses numbers about 41,000, most of whom commute to the University.

In Fall 2006, there are about 85 students in graduate degree programs in the School of Statistics, split about 35/50 between the M.S. and Ph.D. degree programs. About 75% of these are students from foreign countries. A few graduate students pursue their M.S. programs part-time and are currently employed in nearby business and industry.

2 Degree Programs

The Graduate Program in Statistics offers courses of study leading to M.S. and Ph.D. degrees in statistics.

2.1 The M.S. Program

The M.S. degree program in Statistics is designed for students who wish to pursue a career as a practicing statistician in industry, government, or academia. The degree is also valuable for people working in other fields who need mastery of a broad range of statistical methods. The M.S. program consists of courses in both theoretical and applied statistics. An incoming graduate student who has some background in mathematics and statistics can reasonably expect to complete an M.S. program in 4 semesters of study.

The Graduate School offers the M.S. degree under two plans: Plan A, which involves a thesis; and Plan B, which substitutes additional course work and a special project for the thesis. The School of Statistics offers this degree under *Plan B only*.

2.1.1 Prerequisites

Students considering this program should have familiarity with basic statistical concepts and methods, and, at a minimum, mathematics through multivariable calculus and linear algebra. Additional post-calculus mathematics courses, including advanced calculus or real analysis, are highly desirable. Students who lack familiarity with C, Fortran or some other higher-level computer programming language should plan on making up this deficiency during the first year of graduate study.

2.1.2 M.S. Degree Requirements

The basic Graduate School requirements for a Plan B M.S. degree are

- Thirty course credits, including at least six credits in a minor area or related field;
- a grade point average of at least 2.8 (on a 4.0 scale) in program courses, with no grade lower than a "C"; and
- completion of a Plan B Project.

No more than 40 percent of M.S. program credits may consist of those transferred from another institution or earned at the University through Adult Special or Extension programs. The M.S. degree must be awarded within seven years of the earliest coursework included on the official degree program. Consult the Graduate School Bulletin www.catalogs.umn.edu/grad/programs/g164.html for details of Graduate School requirements for the M.S. degree. All Statistics M.S. degree programs must meet these minimum requirements in addition to the specific requirements of the degree described below.

All degree programs are planned with an adviser and are subject to the approval of the adviser and the Director of Graduate Studies. Students must file an official *Degree Program*, designating the courses that will be used to satisfy the requirements for the M.S. This is usually done in the fall of a student's second year.

(Note: Fall 2006 finds the School of Statistics in the middle of a revision of its programs and curriculum. The requirements given here for the M.S. degree apply to those students entering in Fall 2006.)

The Graduate Program in Statistics requirements for the M.S. degree include required courses, elective courses, outside courses, the Plan B project, a seminar presentation, and the final oral exam. Exceptions from some requirements may be granted by the Director of Graduate Studies.

Required courses All Statistics M.S. degree programs must include the following:

- A theory sequence, either Stat 8101-8102 or Stat 5101-5102. Students with strong mathematical backgrounds should consider the 8-level sequence.
- A methods sequence, either Stat 8051-8052 or Stat 5302, Stat 5303, and Stat 5421. Students considering the Ph.D. degree should take the 8-level sequence. The 5-level sequence provides greater coverage of the more traditional statistical methods.
- Statistical Consulting, Stat 8801.

Courses taken elsewhere may be substituted with the approval of the adviser and the Director of Graduate Studies.

Elective courses All Statistics M.S. degree programs must include at least nine credits in elective courses with substantial statistical content. Most 5- and 8-level Statistics courses that do not overlap with the core courses are eligible for use as electives, and courses in statistics offered by other units may be used with the approval of the adviser and the Director of Graduate Studies.

Related Field or Minor In addition to the courses in the major field, a minimum of two courses is required in one or more disciplines associated with statistics, such as biostatistics, computer science, ecology, economics, genetics, public policy, sociology, or mathematics. These courses must total at least 6 credits at the 5- or 8-level. The program of study in a related field must be approved by the student's adviser and the Director of Graduate Studies. Courses in the minor or related field will be in an area that supports statistics or in an area to which statistics can be applied.

Students considering the Ph.D. degree will usually take mathematics courses (often Math 5615-5616 "Honors Introduction to Analysis") for their supporting field.

As an option, courses in a single field outside the major can constitute an officially designated "minor" provided that they carry at least 9 credits and are approved as a minor program by the Director of Graduate Studies of the minor field.

Grade Point Average M.S. students are expected to maintain a GPA of 3.00 or better in courses included in their Degree Program. Students may take 8801 and at most 4 non-core credits as S-N.

Consulting Requirement M.S. students must earn 3 credits in Stat 8801: Statistical Consulting, as shown in the coursework requirements. This experience may involve service in the Statistical Consulting Service.

Seminar Requirement All M.S. students must give one public seminar, usually on the topic of their Plan B project.

Language There is no foreign language requirement.

Plan B Project The Plan B project is intended to supplement coursework and provides the student with a broader view of the theory and applications of statistics. The student must demonstrate familiarity with the tools of research and scholarship in statistics and the ability to work independently and present results effectively. There are two ways of meeting this requirement in Statistics.

The usual Plan B is an independent investigation of some subject related to the student's program conducted under the direction of a faculty advisor. The student and advisor have wide latitude in the selection of projects. Projects appropriate for a Plan B degree include, for example:

- A data analysis project on a problem of interest.

- A consulting project in conjunction with a client of the Statistical Consulting Service.
- A literature survey of an important area in applied or theoretical statistics.
- The preparation of a coordinated set of statistical computer programs.
- An original research project.

Projects must be approved by the advising faculty member.

The alternative Plan B is usually chosen by students who are also in the Ph.D. program. This Plan B consists of taking three Statistics courses at the 8-level, each carrying at least three credits, and passing the written Ph.D. preliminary examination. The additional courses must be approved by the student's adviser and the Director of Graduate Studies, and cannot be included in the minimum 30 credit requirement for the M.S. degree.

M.S. Oral Examination A final oral examination for the M.S. degree is administered by an examining committee which consists of two members of the Statistics graduate faculty and one faculty member from the minor or related area. The oral examination usually focuses on the Plan B project, but may be a comprehensive examination of the M.S. program course work.

2.1.3 Time Line for the M.S.

This time line assumes a program lasting four semesters beginning in the fall. It also assumes a standard progression of courses. Students with backgrounds stronger or weaker than the norm may take other schedules.

Advising The DGS advises all students during the first year. At the end of the first year, students are assigned other faculty advisors. These assignments need not be permanent, and if a student finds that some other faculty member would suit better, that change can be made.

First year courses During the first year, students take their core theory and methods sequences. As described above, there is some latitude in the choice of courses to fulfill these requirements. Here are two possible schedules:

Fall	Spring	or	Fall	Spring
Stat 8101	Stat 8102		Stat 5101	Stat 5102
Stat 8051	Stat 8052		Stat 5302	Stat 5303
Supporting	Supporting		Supporting	Supporting

Students who are considering the Ph.D. degree will usually take mathematics (for example, Math 5615-6) for their supporting field courses. Those electing the second set of courses would also need to take Stat 5421 in their second year.

Fall of the second year All M.S. students must file a “Degree Program Form” with the Graduate School. This is usually done in the fall of the second year. The program form lists the student’s examining committee and all the courses that are part of the student’s program. This form must be approved by the DGS.

Second year courses During the second year, students will take three statistics electives and Stat 8801 (Statistical Consulting). The statistics electives must be at the 5- or 8-level and can be distributed among the semesters as desired.

Spring of the second year Students generally do their Plan B projects during their last semester, although the Plan B can be done earlier if the student is ready.

Final steps All M.S. students must give a public seminar, usually on the topic of their Plan B project. The seminar is followed by the Masters Oral Exam. The oral usually follows immediately after the seminar. Students must schedule the seminar through the Statistics departmental office, and they must schedule the oral through the Graduate School by filing the appropriate forms once they have obtained agreement on date and time from all members of the examining committee and the departmental office.

2.2 The Ph.D. Program

The Ph. D. degree in Statistics is designed for students who wish to pursue a career in statistics research or advanced applications in academia, government, or industry. Individual programs and dissertations may be oriented toward applied statistics, theoretical statistics, or probability. All three of these areas are studied in the initial phase of the Ph.D. program, which is the same for all students.

2.2.1 Prerequisites

Before starting on Ph.D. coursework, a student must have a background equivalent to that provided by the M.S. program, as well as a knowledge of the elements of real analysis. Students who are familiar with the content of our M.S. core need not take these courses. However, the majority of students working towards a Ph.D. take most of the M.S. core their first year and the M.S. written exam at the beginning of their second year. Then during the second year they take the required Ph.D. courses and the Ph.D. written exam at the beginning of their third year. Students who lack familiarity with C, Fortran or some other higher-level computer programming language should plan on making up this deficiency during the first year of graduate study. Non-credit courses for this purpose are offered frequently by the University’s Academic Computer Services and Systems organization.

2.2.2 Ph.D. Degree Requirements

The Ph.D. degree requires a level of knowledge and of research ability evidenced by examination and by the preparation of a dissertation. The Graduate School, itself, has no explicit major course credit requirement, but expects a solid program of coursework as preparation for the preliminary examinations and dissertation. The Graduate School expects the equivalent of about 30 semester credits of graduate work in the major and *requires* at least 12 semester credits in a minor or “supporting program.” Credits earned in a Master’s program may be counted toward these requirements. In addition, a student must enroll for 24 semester doctoral thesis credits.

The Graduate School requires the completion of all Ph.D. requirements and conferral of the degree within five calendar years following the semester in which the student passes the preliminary oral examination. During this period the student is officially a “Ph.D. Candidate.”

The Graduate School requires registration for at least three semesters in the University of Minnesota Graduate School. If work is transferred from other schools, either the first two years or the last year of the Ph.D. registration must be spent in residence at the University of Minnesota.

Some other Graduate School requirements are included below as requirements of the Graduate Program in Statistics. For details of Graduate School requirements, see the sections concerning the Ph. D. Degree in the *Graduate School Bulletin*. Students are advised to read these sections carefully.

The Graduate Program in Statistics requirements for the Ph.D. include required courses, elective courses, supporting program courses, thesis credits, Ph.D. written preliminary examination, Ph.D. oral preliminary examination, the dissertation, and the Ph.D. final oral examination. All programs are planned with the aid of an adviser and must be approved by the adviser and the Director of Graduate Studies.

Required Coursework A Ph.D. program in statistics shall include the following courses or equivalent material:

Stat 8051-8052-8053-8054	Applied Statistical Methods I, II, III, IV
Stat 8101-8102	Theory of Statistics I, II
Stat 8111-2	Mathematical Statistics I, II
Stat 8802	Statistical Consulting
Stat 8055	Applied Project
Stat 8913	Literature Seminar (1 cr/semester in the second and third years)

Elective Coursework A program must include a minimum of 12 credits in advanced courses approved by the DGS (generally 8-level statistics courses or equivalent).

Minor or Supporting Program

A minor or supporting program consists of a minimum of 12 credits. If all 12

credits are taken in one field, the program may be designated a “minor.” If the work is split between two or more areas it is called a “supporting program.” A minor field program must be approved by the student’s adviser and the Directors of Graduate Studies for both Statistics and the minor area. A supporting program need only be approved by the student’s adviser and the Director of Graduate Studies in Statistics.

We strongly recommend that Math 8651-2 (Theory of Probability Including Measure Theory) be part of the supporting program.

Thesis Credits Ph.D. programs must contain 24 Thesis Credits (Stat 8888). These credits can only be taken after the student passes the Ph.D. oral preliminary exam.

Grade Point Average Ph.D. graduate students are expected to maintain a GPA of 3.00 or better in courses included in their Degree Program with no grades below C. Students may take 8802 and at most 4 elective credits as S-N.

Language There is no foreign language requirement.

Ph.D. Preliminary Written Examination The preliminary written examination for the Ph.D. degree is based on the material covered in Stat 8051-8052 and Stat 8101-8102. The exam is normally given just after spring Semester ends. Students take the exam after their first year. The exam is typically given in three sessions, one of which is a take-home. A student who fails this examination will be allowed to retake it only once.

Ph.D. Preliminary Oral Examination This exam covers both major and minor fields and is given by a committee that includes at least three members from the major field and at least one member from the minor or supporting program field. The exam must be taken at least one full semester before the degree is conferred.

The Preliminary Oral Exam is based on a thesis proposal. The student, proposing an area of research, prepares this written document. The proposal should describe the student’s research area, discuss critically the relevant literature, explain the student’s research objectives, and describe initial approaches to the research objectives. The proposal is prepared in consultation with the advisor and other committee members. The proposal need not contain research results and does not limit the student’s Ph.D. topic (the dissertation is expected to contain materials not in the proposal, and some aspects of the proposal may be dropped from the dissertation). The proposal need only to show that the student has a novel and substantial problem, has an approach that may succeed, and has surveyed the relevant literature.

The presentation is a formal oral presentation of the proposal. The presentation is in seminar form, lasting approximately 30-45 minutes, and all students and faculty in the School of Statistics are invited. The presentation serves several purposes: it builds the student’s oral skills, it communicates the student’s research plans to the members of the School, and it helps committee members assess the student’s facil-

ity with the research area.

The examination is a closed oral examination conducted by the student's committee; in most circumstances the examination will immediately follow the oral presentation. The examination evaluates the student's readiness for research, as evidenced by the proposal, presentation, and oral responses to questions. Criteria for evaluation include the clarity of the proposed problem, the student's knowledge of relevant literature, the feasibility and scientific merit of the proposed problem, and the quality of the written proposal, oral presentation, and responses to questions.

Seminar requirement All Ph.D. students must give at least two oral presentations, including those for the Ph.D. preliminary and oral examinations.

Ph.D. Dissertation The culmination of the Ph.D. program of study is a doctoral dissertation, prepared with the guidance of a thesis adviser. The dissertation must demonstrate originality and ability for independent investigation, and the results of the research must constitute a noteworthy contribution to knowledge in the field. The dissertation must exhibit mastery of the literature on the subject and familiarity with the sources, and must be well written.

The Ph.D. dissertation is read by three members of the final oral examination committee, including the student's thesis adviser, one other member of the Statistics Graduate Faculty, and one member from the field of the minor or the supporting program. The readers must approve the dissertation before the candidate may move to the final oral.

A Ph.D. candidate files a dissertation proposal form with the Graduate School shortly after passing the preliminary oral examination. The Graduate School has specific requirements for the format of the submitted copy of the thesis and the candidate should be sure to obtain the latest information from the Graduate School.

Ph.D. Final Oral Examination When the dissertation readers unanimously agree that the dissertation is ready for defense, a final oral examination is held. The oral examination includes a public seminar followed immediately by a closed meeting of the candidate with the examining committee. The examination covers the dissertation subject and related areas. The examining committee will consist, minimally, of three members from the School of Statistics and one member from the field of the minor or supporting program.

2.2.3 Time Line for the Ph.D.

This time line assumes a standard progression of courses beginning with the M.S. material. Students with backgrounds stronger or weaker than the norm may take other schedules. This time line may not include all steps required; students are advised to read the appropriate sections of the Graduate School Bulletin carefully.

Advising The DGS advises all students during the first year. At the end of

the first year, students are assigned another faculty advisor. This faculty member will be your advisor for the next couple of years. As part of choosing your research topic, you find a faculty member who will advise you on your research. This faculty member becomes your dissertation advisor. (In the long run, this is the advisor that matters.)

First year courses For most students, the first year courses will be Stat 8101-8102, Stat 8051-8052, and Math 5615-5616 (Real Analysis). Students with advanced preparation in mathematics may be able to skip real analysis and move to the next step.

Ph.D. Written Exam Students take the Ph.D. written exam in the spring following their first year, just after spring semester classes end.

Second year courses The second year continues the core sequences, including theory (8111-2), methods (8053 and 8054), measure theory and probability (Math 8651-2), consulting (8802), and a literature seminar (8913, both semesters).

The third year Students take Stat 8055, 12 additional credits in advanced statistics electives, and the literature seminar (8913, both semesters).

The coursework in the third year widens a student's knowledge. During this time, students should be thinking about research areas that interest them and potential dissertation advisors. Student/advisor pairings are established by mutual consent, generally in the second semester of the third year.

All Ph.D. students must file a 'Degree Program Form' with the Graduate School. This is usually done once the student has chosen an advisor. The program form lists the student's examining committee and all the courses that are part of the student's program. This form must be approved by the DGS and the advisor.

Applied Project During Fall Semester of the third year, or the summer between the second and third years, students do an applied project (Stat 8055). Students will be paired with researchers from around the University and will work, under the supervision of a Statistics faculty member, on statistical problems that arise in their partner's research. Students prepare a report and give a talk on their work as part of the project.

Fourth and Fifth years The usual Ph. D. preliminary oral exam takes the form of a defense of dissertation proposal and takes place as early as feasible in the fourth year. The student must schedule the oral prelim exam with the School of Statistics and with the Graduate School (which requires at least one week's notice). You must complete a "Doctoral Preliminary Oral Examination Scheduling" form and return it to the Graduate School.

The student should submit a "Thesis Proposal Form" to the Graduate School after passing the prelim oral.

The bulk of the fourth and fifth years is spent in the preparation of the doctoral dissertation under the supervision of a faculty advisor. According to the Graduate

School:

The thesis must demonstrate the student's originality and ability for independent investigation, and the results of the research must constitute a contribution to knowledge. The thesis must exhibit the student's mastery of the literature of the subject and familiarity with the sources. The subject matter must be presented with a satisfactory degree of literary skill.

After the dissertation has been completed, it is reviewed by at least three reviewers, including the advisor and the outside committee member. When the student is ready, pick up a Graduation Packet from the Graduate School. Among the items in the packet is a thesis review form. Reviewers must be given at least two weeks to review the dissertation, and all reviewers must agree that the dissertation is ready for defense.

After the dissertation has been approved, the student should schedule the Final Examination through the School of Statistics and the Graduate School (which requires one week's notice). The final examination takes the form of a public seminar followed by a defense of the dissertation conducted in private by the examining committee.

3 Admissions

Graduate admissions procedures may appear confusing with lots of duplication, but they make more sense once you understand that there are **two** application processes, one to the Graduate School as a whole, and one to the Graduate Program in Statistics.

Only the *Graduate School* can admit you to the University.

Only the *Graduate Program in Statistics* can admit you to a Statistics M.S. or Ph.D. degree program and grant financial aid.

You must apply to, and be accepted by, both the Graduate School and the Statistics Graduate Program; recognizing that there are two parallel applications will make the procedures and scheduling seem more rational.

The Statistics Graduate Program normally grants admission for new students who plan to begin in the fall semester. Admission for students beginning in spring semester will only be granted in unusual circumstances. There are normally no graduate level courses in Statistics during the summer.

3.1 Admission Deadlines

Applicants should have completed and submitted both their Graduate School and School of Statistics applications by January 1. (We begin ranking applicants and making offers in early February, and it takes the Graduate School about one month to process an application.) Those who apply later may still be considered, but late applicants may be rejected simply due to space and/or resource limitations.

3.2 Applying to the Graduate School

All applicants must send the following to the Graduate School:

- 1 (Electronica) application form;
- 2 Application fee;
- 3 **Official** transcripts from all colleges and universities attended;
- 4 A “Statement of Purpose”.

Students who are currently registered at some university must also provide;

- 5 Current registration information.

We recommend that you mail all paper forms (including all transcripts) together in the same envelope. Send admissions materials to the Graduate School at this address:

Graduate School
University of Minnesota
309 Johnston Hall
101 Pleasant St. SE
Minneapolis, MN 55455-0421

You **must** pay the application fee; it cannot be waived or refunded. No admissions action will take place in the School of Statistics until the Graduate School application is complete.

International applicants must also submit the following to the Graduate School:

- 6 **Official** TOEFL score report (MELAB or IELTS can be substituted);

The TOEFL institutional code for the University of Minnesota is 6874, department code 59. Applicants with TOEFL scores below 600 (paper based) or 250 (computer based) are unlikely to receive admission. If you have completed 16 semester credits (within the past 24 months) in an academic program in a recognized institution of

higher learning in the U.S., you do not need to submit the TOEFL as part of the application.

International applicants who are admitted must also complete several immigration related forms, including the International Student Financial Certification.

3.3 Applying to the School of Statistics

All applicants must send the following to the School of Statistics:

- 1 School of Statistics application form;
- 2 Three letters of recommendation;
- 3 **Official** GRE score report (no subject test needed);
- 4 Photocopies of your transcripts;
- 5 A photocopy of your Statement of Purpose sent with your Graduate School application;
- 6 A photocopy of the official TOEFL score report (non-native English speakers only).

The School of Statistics application is a one-sheet form that can be found at <http://www.stat.umn.edu/Admissions/SoSApplication.pdf>. We recommend that you mail the application and photocopies of the transcripts, Statement of Purpose, and TOEFL together in one envelope. Materials should be sent to:

Director of Graduate Studies
School of Statistics
313 Ford Hall
224 Church Street S.E.
Minneapolis, MN 55455

Letters of recommendation should be sent directly to the above address, separately from the rest of your application material. These letters should be from persons familiar with your academic and professional accomplishments. The best source for recommendations is often teachers from your mathematics or statistics courses, who can comment on your interest and potential in statistics. There is no special form for letters of recommendation.

Our GRE institutional code is 6874, department code 0704. Except in rare instances, a TOEFL score of 600 (250 on computer-based test, 7.0 on IELTS) is necessary to be considered for financial aid for those applicants whose native language is not English.

By Minnesota State law, teaching assistants for whom English is a second language and who have not studied previously in the United States must pass a spoken English test, the SPEAK test, given by the University of Minnesota. If the exam is not passed, the student is required to take a remedial course in English. It is expected that all students who receive a teaching assistantship will have passed this exam by the end of their first year of graduate study.

3.4 How Admissions Works

The first step is that you must apply! You should have finished both the applications to the Graduate School and the Graduate Program in Statistics by January 1. We can consider later applications provided sufficient resources are available.

When your file is complete, the Graduate School begins its review. This review takes about a month. Nothing else will happen with your application until your Graduate School file is complete (including the fee).

After your file has been reviewed by the Graduate School, it comes to the Graduate Program in Statistics for review. Each member of the admissions committee in the program reviews every applicant and makes a rating. In early February, the Program admissions committee meets and ranks all applicants for admission and financial support. The ranking begins with the ratings produced during the initial admissions screening, but the committee rereads, discusses, and reranks files. At the end of this meeting we have a ranking of the top 50 or so files; the remaining files are not ranked except to say that they are below the top 50. Additional applicants are positioned in the rankings as their files become complete. Admitted students will come from these top 50 applicants. The remaining applicants are notified that their application for admission has been denied.

The Director of Graduate Studies makes the accept/reject decision for the Program based on the rankings and resource availability. Both the Graduate School and the Graduate Program in Statistics must agree on acceptance for the admission to go forward. After the DGS makes the admission decision for the program, the file goes back to the Graduate School, which makes the official notification regarding admission.

For the Ph.D. program, we only admit students whom we can support financially. In the M.S. program, we do admit a few students without financial support.

Suppose that we can support 10 new students next year. We first make offers to our highest ranked applicants. However, these applicants are usually highly ranked by other programs as well and will often receive several offers. Thus we expect only a fraction of our offers to be accepted and anticipate making perhaps 25 offers of support to obtain our 10 new supported students. We do not make 25 support offers at once, however, because more than 10 could easily accept, and we would not be

able to meet our obligations. Instead, we proceed by making a limited number of initial offers, along with waiting list notifications.

Students who receive support offers have until April 15 to respond, but some will respond earlier. As we learn of students accepting and declining our offers, we may extend more offers as we go down the waiting list, until we have obtained our desired number of supported students. This means that we often send out more offers in March and April as applicants make their decisions. The process can extend into May.

Once we have a stable list of students who intend to matriculate in the fall, we send out announcements about orientation, summer English raining, and other opportunities in the summer before classes begin.

4 Financial Support

The Graduate Program in Statistics supports students with Teaching Assistantships, Research Assistantships, and a small number of Fellowships. All of these forms of support are *merit-based*; we have no need-based support. Most support is in the form of TAs, and all RAs go to advanced students.

Students may be awarded recurring support, which means that their support will be renewed as long as they are making satisfactory progress toward a degree in statistics, as judged by the Graduate Faculty of the School of Statistics.

In addition to recurring support, the Graduate Program in Statistics does sometimes hire otherwise unsupported statistics graduate students as Teaching Assistants for a specific semester. This does not obligate the Program to support the student in future semesters. Some students unsupported by the Program can find support from other departments through the graduate assistant job listings at the Job Center.

Please be warned about one troublesome aspect of semester by semester support. The Program makes semester by semester support offers based on *anticipated* need, but we can only hire based on *actual* need. That is, we have a certain number of course sections that need TAs, and we assign TAs to cover those sections. However, and this is a *big* however, College rules only permit the hiring of TAs for sections that have sufficient enrollment. If the enrollment for a specific section does not meet the College criterion, then we are prohibited from hiring the TA for that section. The hire/no hire decision occurs once classes begin.

4.1 Types of Aid

Most graduate students who receive financial aid from the Program are awarded Teaching Assistantships. TAs are employees of the University who receive salary

(stipend) and benefits (tuition offset and health insurance). A half-time Teaching Assistantship provides a full tuition benefit, the bulk of the health insurance premium for the academic year and the following summer (most recently 95% of the premium), and a stipend. In 2005-2006, this stipend was \$13,229. A 25% time TA provides a half tuition benefit (the remainder of tuition will be charged at the resident rate), partial health insurance, and a stipend half as large as that for half-time TAs.

Students who are not native speakers of English must take the SPEAK test administered at the University pass it at a sufficiently high level before they can be used as classroom TAs. New students with recurring support attend an International Teaching Assistant program in the three weeks before classes start to prepare them for their positions.

Research Assistantships carry the same stipend and benefits as a TA and are funded by granting agencies such as NSF, NIH, and the Extension Service. RAs are expected to conduct and assist in the research or consulting associated with the funding project. Most RAs go to advanced students. RAs can be either half or quarter time.

Fellowships provide tuition, insurance, and a stipend without the requirement of specific duties. There are four types of fellowships, and all are highly competitive. Graduate School Fellowships and Departmental Fellowships are awarded to incoming students. Applicants with high GPA's (say 3.7 or better) and high GRE scores may be nominated by the School. A Departmental Fellowship has the same stipend as a half-time TA and is funded by the School; Graduate School Fellowships carry a much higher stipend and are funded by the Graduate School. The Alumni Fellowship carries the same stipend as a half-time TA and is funded by donations from School of Statistics alumni. The Alumni Fellowship is given each year to an outstanding second or third year student. Dissertation Fellowships are funded by the Graduate School for Ph. D. students in their last year of study; competition is keen.

None of the assistantships or fellowships covers the various fees charged by the university (currently around \$300 per semester).

Students are encouraged to apply for national fellowships, for example, those funded by the National Science Foundation. The Graduate School also has a limited number of endowed fellowships for narrow classes of recipients, as well as some special purpose fellowships, such as those for disadvantaged students.

4.2 Course Load

Statistics graduate students who receive financial aid from the School are required to carry a course load of 9 credits each semester at the 5- or 8-level (unless waived

by the Director of Graduate Studies) until the course requirements for the student's degree program are fulfilled.

4.3 Duties of Teaching Assistants

Teaching assistants have various duties including paper grading, supervising recitation or lab sections for elementary courses, and teaching elementary courses. A half-time assistantship obligates you to at most 20 hours of duties per week; generally our teaching assistants work between 12 and 15 hours per week on their prescribed duties. The remaining portion of the 20 hours is spent on other activities directly related to the student's graduate education, such as participation in student seminars, departmental seminars, informal discussions, and so on. Assistants are notified of their assigned duties as early as possible.

First-year TAs are typically assigned to an elementary Statistics course. These courses usually contain 60 to 90 students and meet three times a week with the instructor. Some courses also meet once a week in smaller recitation sections of about 30 to 45 students. The TA is usually responsible for grading homework assignments, preparing solutions, and holding office hours to answer additional questions. In those courses with recitation sections, the TA leads the recitations. TAs should work closely with the instructor to ensure that the course goes smoothly for the students.

At the end of each semester, all the instructors and assistants are evaluated by the students. This feedback can be quite useful in improving one's performance. Both the university and the School of Statistics give courses to help prepare new teaching assistants during the week before classes begin each fall. In addition to being good experience, the time spent being a teaching assistant can be an enjoyable part of one's graduate career.

4.4 The Fine Print

Graduate assistantships are contingent upon satisfactory job performance, current registration as a graduate student, and satisfactory progress in your degree program. You are responsible for knowing the policies and guidelines applicable to your appointment as a graduate assistant. Terms and conditions for appointments are described in detail on the Office of Human Resources web site (<http://www1.umn.edu/ohr/gao>).

5 Student Progress

Students need to be evaluated and informed on their progress. To this end, the Program has developed the following procedures and milestones for evaluating students.

5.1 Evaluation of Students in Statistics

Each spring, the Statistics Graduate Faculty will meet to evaluate student progress. All active statistics graduate students will be evaluated in this meeting. Students will be evaluated on coursework (GPA and progress), milestones (e.g., written examinations), research (where appropriate), and other criteria as described in the Student Handbook. Students holding assistantships will also be evaluated on the performance of their duties as an assistant. There are two possible outcomes of this evaluation: “making satisfactory progress” and “not making satisfactory progress.”

The Director of Graduate Studies will report the results of the evaluation by the Graduate Faculty to each student. Students making satisfactory progress will receive an e-mail apprising them of that finding. Students not making satisfactory progress will meet with the Director of Graduate Studies where they will receive written notification of the deficiencies and the advice of the faculty. Students with extreme or prolonged deficiencies may lose assistantships and/or be dismissed from the program.

In addition to the review by the Graduate Faculty, each Ph. D. student who has selected a dissertation advisor will be reviewed by his or her advisor. The advisor will provide the student with a written evaluation of the student’s progress in research.

Copies of all student progress evaluations (Graduate Faculty and advisor) will be kept in the student’s permanent file.

5.2 Academic Progress Evaluation Criteria for Full-time Students in Statistics Graduate Programs

1. Coursework

- Students are expected to maintain a full load of program courses until coursework is completed. For the M.S., a full load is three per semester; for the Ph.D., a full load may be four courses per semester.
- Students must maintain a cumulative GPA of at least 3.0 on their program courses, with no grades below C. Students with cumulative GPA between 2.8 and 3.0 will be warned that they must improve their GPA.

Students with cumulative GPA below 2.8 or with cumulative GPA between 2.8 and 3.0 for two consecutive review periods may lose assistantships and/or be dismissed from the program.

- Students are expected to have no more than two incompletes. Incompletes should be resolved within one year.

2. Examinations

- Ph. D. students are expected to take the Ph. D. written preliminary exam just after completing their first year coursework. Students failing the Ph. D. written preliminary exam are permitted a second try, which should occur at the next available exam date.
- Ph. D. students are expected to take the Ph. D. oral preliminary exam as soon as possible and in any case before the end of their fourth year.

3. Program of study

- M.S. students must file the Program of Study form no later than fall semester of their second year.
- Ph. D. students must file the Program of Study form no later than fall semester of their fourth year.

4. Research

- Ph. D. students must select a dissertation advisor before fall semester of their fourth year.
- Students should normally complete their research at the end of their fifth year.

6 Student Grievances

Past experience shows that most grievances can be resolved informally by discussion with instructors or the School Director. Nevertheless, the School has a Grievance Officer to consider problems presented that cannot be resolved by less formal means.

There is also a University Grievance Office and an all-University Student Academic Grievance Policy. The policy and implementation information are available in the Grievance Office, 658 Heller Hall (612-624-1030).

7 Facilities and Support

7.1 Libraries

The Mathematics Library is located on the third floor of Vincent Hall, which is immediately adjacent to Ford Hall where the School of Statistics is located. The Mathematics Library houses the main body of reference books and periodicals in statistics. There are also extensive collections in the Biomedical Library (two blocks away in the medical center) and the Magrath Library on the St. Paul campus. Additional holdings are in Walter Library (on the mall with Ford Hall and Vincent Hall), Wilson Library (on the West Bank campus, about a 10 minute walk from Ford Hall over a bridge across the Mississippi), and the Forestry Library on the St. Paul Campus.

The School of Statistics also has a reading room in 304 Ford Hall that has a good collection of the major journals.

7.2 Computing

The School of Statistics has become a leader in innovative use of computing for statistics, particularly in the areas of statistical graphics and Bayesian computations. We maintain a network of about 50 x86 based workstations running Linux; approximately half of these workstations are reserved for student use. Most of the student workstations are in our computer lab in 350 Ford Hall; the remainder are in a student lab in room 146 ClaOff (St. Paul Campus) and scattered among student offices. All of these workstations are networked to each other. The oldest of these workstations is three years, and we replace about one third of the machines each year. These machines provide access to compilers, symbolic mathematics programs such as Mathematica, statistical software such as S-Plus and R, and the usual array of browsers, mail clients, and so on. In addition, the School maintains an assortment of Windows and MacOS based computers for student use.

The School employs computer professionals to maintain our systems and provide user support. In particular, file storage and backup is centrally managed for all Linux workstations.

The University's Microcomputer Group maintains computer laboratories primarily for the use of students. These labs include both Macintosh and Windows based hardware and the typical suite of peripherals such as printers and scanners. Much of the courseware used by the School was written by School faculty, but these labs also provide standard statistical packages such as SAS, SPSS, etc. Statistics instructional computing is done both on the Linux network and in these public labs.

7.3 Offices

All statistics graduate assistants are given the use of office space in the Statistics graduate student offices located in Ford Hall and/or Classroom Office Building (St. Paul), depending on the location of their duties.

7.4 Room use Guidelines

The following rooms are intended for the use of faculty and graduate students in statistics. Please obey these rules.

7.4.1 Office Services Room — 337 Ford

1. The copier is to be used only for classwork as it relates to teaching or TA/RA assignments. Personal copies may be made at Kinkos or at one of the campus copy centers.
2. Transparencies are to be copied on the older copier only. You will need to request transparencies from the office staff.
3. Supplies in the black cabinet are for teaching and TA assignments — chalk, markers, erasers, etc. Please ask the office staff if you need something.
4. If you need help with the copier, **please ask**.

7.4.2 Conference Room — 300 Ford

1. Please call the secretary of the School of Statistics (5-8046) to reserve this room for meetings.
2. Ph.D. oral examinations may be held in this room, if requested.
3. Do not use this room for tutoring.
4. Please—no food or drink except during School social functions.

7.4.3 Reading Room — 304 Ford

1. Check out any book or thesis you wish to remove from the room. There is a card in the inside cover. Sign the card and leave it with the office staff.
2. No food or drink.
3. Make sure that the door is locked when you leave.

7.4.4 Computer Lab — 350 Ford

1. No food or drink, **EVER**.
2. Keep doors closed and locked.
3. Do **NOT** turn off computers.
4. Turn off monitors when not in use.
5. Extra paper for the printers is available in the room 337. Please feel free to restock when necessary.
6. See the office staff for printer cartridges when needed. See Seth, Marisa, or Andrew for other problems.
7. You are allowed a limited amount of free printing. You will be charged per page if you go over that limit. Multiple copies of the same document should be made on a copier, not on the printer.
8. Please read and follow the Acceptable Use policy for computing. Misuse or abuse will result in loss of computer privileges.

7.4.5 Lounge — 395 Ford

1. Please clean up after use — wash dishes, wipe table, etc.
2. Remove old, outdated food from the refrigerator.
3. Please close and *lock* doors when finished, particularly evenings and weekends.

7.5 Web sites

More and more of the publications, information, and operation of the University is on line. Here are a few web sites that current students may find useful.

One Stop the University of Minnesota central site for registration, transcripts, and other services.

<http://onestop.umn.edu>

International Students and Scholars Services (International programs, visas, immigration, taxes, forms, and so on).

<http://www.iss.umn.edu>

Health Insurance Information on graduate student health insurance.

<http://www.bhs.umn.edu/insurance/graduate>

Graduate School Catalog

<http://www.catalogs.umn.edu/grad/index.html>

Graduate School Services Graduate School policies, procedures, information, and services.

<http://www.grad.umn.edu/gsss>

Graduate School Forms Online versions of forms

http://www.grad.umn.edu/current_students/forms/

Council of Graduate Students COGS is the official student governing board of the Graduate School.

<http://www.cogs.umn.edu>

Professional Development Courses, strategies, and resources for career and professional development.

http://www.grad.umn.edu/postdoctoral_affairs/professional_development/index.html

Classroom, Grading, and Examination Procedures Lots of guidelines for handling a class.

<http://advisingtools.class.umn.edu/cgep>

Scholastic dishonesty What to do about students cheating in your classes.

<http://advisingtools.class.umn.edu/cgep/studentconduct.html>

Incompletes Agreement for the completion of incomplete work.

<http://advisingtools.class.umn.edu/cgep/gradingpolicies.html>

Submitting grades via the web.

<http://advisingtools.class.umn.edu/cgep/gradereporting.html>

8 Off Campus

You can't spend all your time in classes or the computer lab. So what do you do when you aren't studying?

8.1 Extracurricular activities

The metropolitan location of the University makes accessible the resources of the many cultural and recreational facilities in the area such as parks, beaches, art centers, museums, libraries, and zoos. There are many excellent shopping centers and a wide variety of restaurants.

Professional entertainment is provided by the Minnesota Orchestra, the Saint Paul Chamber Orchestra, the Minnesota Opera, The Guthrie Theatre, the University

Theater, the University Orchestra, and a host of other professional theater and music groups. In the realm of sports, the Minnesota Vikings and the Minnesota Twins play in the Metrodome stadium near the West Bank campus. The Timberwolves basketball team plays in the Target Center in downtown Minneapolis, and the Wild hockey team plays in the Xcel Center in downtown St. Paul.

The University, through the department of recreational sports, provides gymnasiums and swimming pools for men and women on both Minneapolis and St. Paul campuses for individual participation in sports. Baseball and softball diamonds, an ice-skating rink, tennis courts, and an 18-hole and a 9-hole par 3 golf course are also available for student use at the university. Statistics graduate students often field softball, volleyball and soccer teams in the intramural sports program and have been remarkably successful. (All those international students sure help the soccer team!) Cross-country and downhill skiing is available in nearby suburban areas. There is an extensive network of excellent paths for running, walking, and biking along the Mississippi River and at the St. Paul and Minneapolis lakes and parks. The University's intercollegiate teams also field mens and womens teams in many sports (I think we've had four or five national champion teams in the past few years).

The Coffman Memorial Union operates three facilities, one in St. Paul and one on each of the banks of the Minneapolis campus. The student unions present a wide variety of social, recreational, and cultural facilities. Services and programs include films, concerts, dances, exhibits, listening centers, arts and craft studios, student stores, post offices, news stands, game areas, bowling alleys, and eating facilities.

This only scratches the surface. A little browsing through the local media will overload you with cultural and recreational opportunities.

8.2 Housing

Students interested in living in a residence hall on campus should contact the Housing Office in Comstock Hall (University of Minnesota, Minneapolis 55455, telephone: 612-624-2994). Listings of apartments, duplexes, houses, sleeping rooms, shared units, and sublets as well as information about temporary housing, public housing, living costs, transportation, and day care in the Twin Cities area is available from the Comstock Hall Housing Office, or from the Housing Office in Coffey Hall (University of Minnesota, St. Paul 55108). The Minnesota Daily, the campus student newspaper, lists classified advertisements for furnished and unfurnished apartments, duplex and houses, rooms, and roommates wanted.

For more information online, visit the University of Minnesota's Housing and Residential Life web site (<http://www1.umn.edu/housing>).

8.3 Transportation

There is a free intercampus bus system between the St. Paul and Minneapolis campuses, which are about 2-1/2 miles apart. Buses run at least six times an hour during the day, and the trip between Ford Hall and the St. Paul Campus takes about 15 minutes. The East and West bank Minneapolis campuses are connected by intercampus buses and a covered walkway/bikeway across the Mississippi River.

An extensive system of express buses operates from various parts of the Twin Cities metropolitan area to the campus. This web site has extensive information about buses, parking, and other transit.

(<http://www1.umn.edu/twincities/parking.html>)

The Twin Cities are served by the Twin Cities International Airport, which is about a 20 minute drive from either campus. In addition, the Twin Cities are on the Amtrak mainline between Chicago and the Pacific Northwest, and are served by Greyhound bus lines.

9 Academic Misconduct

In order to achieve an atmosphere of trust and intellectual integrity in the School of Statistics, it is important that everyone, students and faculty alike, share a vision of what is responsible academic conduct and what is not. The purpose of this document is to clarify what is acceptable conduct for Graduate students in the School in fulfilling their academic obligations such as doing homework, taking examinations, or completing a project. It takes into account the pedagogical value of students learning together by joint problem solving and discussion and the importance of students having free exchange of ideas with faculty members. However, it also recognizes that it is essential for the faculty to be able to evaluate what ideas and techniques an individual student has mastered, which is impossible when students work together during tests or report as their own work results obtained from other people or written sources without proper acknowledgment.

9.1 What is Unacceptable Conduct?

9.1.1 Homework

Discussing homework assignments with other students is normally acceptable. However, instructors have the option to limit or prohibit such collaboration, in which case they must specify explicit rules, preferably in writing, that students are to follow. Direct copying of someone else's homework is never acceptable. On homework assignment involving computation, the use of computer output of another

student is equivalent to copying and is not acceptable.

9.1.2 Examinations

Students may not communicate with anyone but the instructor of the course concerning the content (questions or answers) of an examination, nor consult any source material, unless the instructor issues explicit written instructions to the contrary. This ban precludes communication with fellow students in the course, other students, faculty members, or any other individual, and applies both to in-class and take-home examinations. Providing impermissible aid to other students is as serious an act of misconduct as receiving aid and will incur the same sanctions. Violation of these rules during a Master or PhD qualifying examination will mean automatic failure.

9.1.3 Projects

Projects — papers, plan B projects, computer programs — are longer term tasks which may involve considerable use of the statistical literature, advice of faculty members and discussion with fellow students and others. It is unacceptable to use such resources unless they are cited properly and acknowledged according to the usual procedures of academic research (footnotes, bibliography, etc.). In some cases the faculty member overseeing the project may give written instructions to limit the sources of information to be used, in which case it is unacceptable to go beyond these limits.

9.1.4 Other

It is impermissible to hide, change, or destroy the work or material of another student. In particular, this includes any modification or deletion of computer files, whether program or data. Any student found to have so interfered with another's work will be reported to the Graduate Faculty.

9.2 Procedures and Penalties

If a faculty member determines that a Statistics graduate student has engaged in academic misconduct as described above, they may attempt to resolve the case directly with the student. The penalty will be related to the severity of the student's misconduct. The incident may be reported by either the student or the faculty member to the Graduate Faculty for their information or consideration. If a faculty member suspects a Statistics graduate student has engaged in academic misconduct as

described above but not in a course which they are teaching they will report the incident to the Graduate Faculty.

Once an incident is brought to the attention of the Graduate Faculty, a committee consisting of three other faculty members may be appointed to review the incident. This committee will interview both the faculty member and the student. The committee will present a report to the Graduate Faculty. The Graduate Faculty will determine an appropriate penalty when warranted. The penalty will be related to the severity of the student's misconduct. It may take the form of a warning letter placed in the student's permanent file, loss of financial support or suspension from the program for a specified period, or dismissal from the program. If the student does not agree with the outcomes of this process, he may appeal to the appropriate University authorities. A second offense by the same student will result in dismissal from the program.

10 University-wide Policies

Not only is Minnesota the land of 10,000 lakes, it seems as though it is the land of 10,000 policies. Here are some of the major policies.

10.1 Equal Opportunity Statement

The University of Minnesota is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, veteran status, or sexual orientation. In adhering to this policy, the University abides by the Minnesota Human Rights Act, Minnesota Statute Ch. 363; by the Federal Civil Rights Act, 42 U.S.C. 2000e; by the requirements of Title IX of the Education Amendments of 1972; by Sections 503 and 504 of the Rehabilitation Act of 1973; by the Americans with Disabilities Act of 1990; by Executive Order 11246, as amended; by 38 U.S.C. 2012, the Vietnam Era Veterans Readjustment Assistance Act of 1972, as amended; and by other applicable statutes and regulations relating to equality of opportunity.

Inquiries regarding compliance may be directed to Director, Office of Equal Opportunity and Affirmative Action, University of Minnesota, 419 Morrill Hall, 100 Church Street S.E., Minneapolis, MN 55455, (612) 624-9547.

10.2 Sexual Harassment

10.2.1 Introduction

Sexual harassment in any situation is reprehensible and will not be tolerated in this University. It subverts the mission of the University and threatens the careers and well-being of students, faculty and staff. In a university setting, a power differential is inherent in a faculty member's or supervisor's relationship to his or her students or subordinates. However, this policy takes into account all instances of sexual harassment irrespective of university status. It is viewed as a violation of Title VII and Title IX of the 1964 Civil Rights Act and the Minnesota Human Rights Act.

10.2.2 Policy

Sexual harassment is prohibited. Unwelcome sexual advances, requests for sexual favors, and/or other verbal or physical conduct of a sexual nature constitute sexual harassment when:

1. submission to such conduct is made either explicitly or implicitly a term or condition of an individual's employment or academic advancement,
2. submission to or rejection of such conduct by an individual is used as the basis for employment or academic decisions affecting this individual, or
3. such conduct has the purpose or effect of unreasonably interfering with an individual's work or academic performance or creating an intimidating, hostile, or offensive working or academic environment.

This policy applies to the conduct of all persons involved in the mission and/or services of the University, except those whose conduct may be covered under separate university collective bargaining contracts.

10.2.3 Procedures and Guidelines

It is the responsibility of department heads, supervisors, managers, deans, provosts, chancellors and vice presidents to take timely and appropriate action when they know or should know of the existence of sexual harassment. Other persons who suspect sexual harassment should report it to the Office of Equal Opportunity and Affirmative Action. Responsibility for administering the policy and procedures generally lies with the Office of Equal Opportunity and Affirmative Action with review by the Sexual Harassment Board. Each campus will develop procedures for investigating complaints of sexual harassment. These procedures will adhere to due

process for all concerned. They must be approved by the Director of the University Equal Opportunity Office prior to implementation. Violations of this policy could lead to disciplinary action up to and including termination of employment or dismissal from an academic program.

10.3 Consensual Sexual or Romantic Relationships

10.3.1 Introduction

Decision-making responsibilities should not restrict individuals' rights of association and expression unless the exercise of those freedoms conflicts with the institutional necessity of impartiality in academic and employment decisions. As a consequence, the University's Nepotism Policy prohibits persons who are related through blood, marriage or other committed relationship to evaluate, supervise, or participate in employment decisions regarding the other person. The same rules apply to sexual or romantic relationships between supervisors and their subordinates who are not married or in committed relationships because these relationships may also call into question the ability of the supervisor to assess the performance of another solely on academic or professional merit. Similarly, the University Code of Conduct states that members of the University community must not abuse the authority they have been given and must take care to ensure that any personal relationships do not result in situations that might interfere with objective judgment.

The power disparity in supervisor/subordinate relationships make them vulnerable to exploitation as well as claims of exploitation. This is particularly true in faculty/student relationships. The respect and trust accorded a member of the faculty by a student as well as the power exercised by faculty in giving grades or recommendations for future study and employment make voluntary consent by the student suspect.

10.3.2 Policy

For the purposes of this policy, the term supervisor refers to any employee, student, or other person in a position to hire, supervise, grade, advise, evaluate, or otherwise directly influence the academic progress or employment of another employee, student, or other person. The term subordinate refers to any employee, student, or other person who is hired, supervised, graded, advised, evaluated, or otherwise directly influenced by the supervisor.

Consensual sexual or romantic relationships between supervisors and subordinates (as defined above) create conflicts of interest. If such a relationship exists or develops, an appropriate responsible administrator (e.g., a supervisor, Department

head, human resources consultant, EEO officer, Dean) must be consulted to determine whether arrangements can be made to eliminate all conflicts of interest. If such arrangements can be made that do not disadvantage the subordinate and are acceptable to the supervisor, they must be documented, and they must ensure that the individuals do not hire, supervise, grade, advise, evaluate or otherwise directly influence each other's academic progress or employment.

Some relationships involve inherent conflicts of interest that cannot be eliminated. Therefore, sexual or romantic relationships between instructors and students currently in their classes and between advisors and their current advisees are always prohibited whether or not the relationships are consensual. Similarly, relationships between supervisors and their subordinates are prohibited when the working relationship is such that it is not possible to eliminate the conflicts of interest.

Individuals should be aware that consensual sexual or romantic relationship can result in claims of sexual harassment because the voluntariness of the consent may be questioned when a power differential exists. If a sexual harassment claim subsequently is filed, the argument that the relationship was consensual will be evaluated in light of this power differential.

10.3.3 Procedures and Guidelines

The Office of Equal Opportunity and Affirmative Action may be consulted with respect to the appropriate procedures to be used in making alternative arrangements to eliminate conflicts of interest. It is the responsibility of the supervisor(s) of the parties to address violations of this policy. Violations of this policy could lead to disciplinary action up to and including termination of employment or dismissal from an academic program.

10.4 Mutual Responsibilities in Graduate Education at the University of Minnesota

This is a University-wide policy.

Preamble

A major purpose of graduate education at the University of Minnesota is to instill in each student an understanding of and capacity for scholarship, independent judgment, academic rigor, and intellectual honesty. Graduate education is an opportunity for the student to develop into a professional scholar. Graduate research and teaching assistantships offer an "apprenticeship" experience in the academic profession as well as financial support. It is the joint responsibility of faculty and graduate students to work together to foster these ends through relationships that encourage freedom of inquiry, demonstrate personal and professional integrity, and

foster mutual respect. This shared responsibility with faculty extends to all of the endeavors of graduate students, as students, employees, and members of the larger academic community.

High quality graduate education depends on the professional and ethical conduct of the participants. Faculty and graduate students have complementary responsibilities in the maintenance of academic standards and the creation of high quality graduate programs. Excellence in graduate education is achieved when both faculty and students are highly motivated, possess the academic and professional backgrounds necessary to perform at the highest level, and are sincere in their desire to see each other succeed.

The following principles illustrate what students should expect from their programs and what programs should expect from their students, to help achieve this excellence.

Principle 1: Information About Policies and Procedures

The Graduate School and graduate programs are responsible for providing students and prospective students with access to information about their graduate program, areas of specialization, degree requirements, and average time to completion of degrees. Graduate programs are responsible for providing access to information about graduate student financial support in the program, such as the prospects for fellowships, assistantships or other financial support and the proportion of students receiving financial support. In addition, graduate programs should provide students and applicants with information about career experiences of graduates of the program. All such information should be presented in a format that does not violate the privacy of individual students. Programs are encouraged to provide relevant information in their handbooks, websites or other readily accessible formats.

Students are responsible for keeping themselves informed about current policies of their program and the Graduate School that affect graduate students. Students and alumni also have a responsibility to respond to program inquiries about their career development.

Principle 2: Communication About Academic Status

The Graduate School and graduate programs are responsible for providing students with information about their individual academic status: who in the Graduate School and in their graduate program is responsible for communicating to them about admission issues and progress through the degree program, how the communication will take place, and the possibility for appeal to a third party for assistance in resolving disputed issues.

Students are responsible for communicating with the Graduate School and their graduate program about changes in their circumstances that affect their status and progress toward the degree.

Principle 3: Research Contributions

Individual faculty as research directors are responsible for providing students with appropriate recognition for their contributions at conferences, in professional publications, or in applications for patents. It is the faculty member's responsibility to clarify the principles for determining authorship and recognition at the beginning of any project.

Students are responsible for discussing their expectations regarding acknowledgment of research contributions or intellectual property rights with the appropriate person(s) in the research team, preferably early in the project.

Principle 4: University Governance

Departments and graduate programs are responsible for defining specific opportunities for student participation on committees as they deem appropriate. The University recognizes that graduate students make important contributions to governance and decision making at the program, department, college, Graduate School and University level; specific roles for participation are defined at each level by the relevant governing bodies.

Students are responsible for participating in University governance and decision making that enrich the campus community.

Principle 5: Respectful Employment Conditions

University faculty and staff are responsible for assuring that graduate students are able to conduct their work, as students or students/employees, in a manner consistent with professional conduct and integrity, free of intimidation or coercion. Students who are employees also have the protection of all University employment policies and laws. Graduate programs are responsible for providing clear communication to students about the possibility for appeal to a third party for assistance in resolving disputed issues.

Students are responsible for reporting unprofessional conduct to the appropriate body or person, as defined in the academic or employment grievance policy; they should be able to do so without fear of reprisal. Students are responsible for acting in a respectful and fair manner toward other students, faculty, or staff in the conduct of their academic work or work they may do in connection with an assistantship.

Principle 6: Conditions of Employment

The University (through its departments, research projects or other employing units) is responsible for providing to prospective graduate assistants a written offer of financial support before a response to the offer is required. Such communication must indicate their salary and the terms and conditions of their appointment, including the general nature of the work they will be performing, duration of employment, and whether and how this employment is tied to their academic progress. The details of specific teaching or research assignments may need to await later written clarification.

Students are responsible for accepting the conditions of employment only if they

believe they are qualified and able to complete the tasks assigned. Students have a responsibility for communicating in writing any changes in their circumstances that affect their ability to fulfill the terms and conditions of their employment.

Principle 7: Safe Work Environment

Supervisors are responsible for providing a safe working environment for graduate students, and for developing and publicizing safety policies and training programs to achieve that goal.

Graduate students are responsible for helping to maintain a safe working environment, for adhering to safety policies, for participating in training programs and for reporting safety violations to the proper authority.

Principle 8: Responsible Conduct of Research

Students are responsible for carrying out their research in a responsible manner.

The faculty and Graduate School are responsible for ensuring that students receive training and guidance in the responsible conduct of research as appropriate for each field.

Other University Documents

These documents may provide information and guidance relevant to the graduate education experience.

- Board of Regents, Code of Conduct External Link, adopted 7/12/96
- Board of Regents, Academic Freedom and Responsibility, adopted 9/8/95
- Graduate Assistant Office, Handbook for Graduate Assistants
- University Senate, minutes, April 19, 1990 Student Conduct Code

10.5 Acceptable Use of Computing Resources

The University of Minnesota has an Acceptable Use Policy for computing and technology resources

(http://www.fpd.finop.umn.edu/groups/ppd/documents/policy/Acceptable_Use.cfm).

It is mostly unreadable legalese except for this appendix

(<http://www.fpd.finop.umn.edu/groups/ppd/documents/appendix/UseGuidelines.cfm>).

11 School of Statistics Policies

11.1 Acceptable Use of Computing Resources

Some of this policy is a reiteration of the University policy. We also add some UNIX-specific guidelines.

- Choose a good password for your account.
- Do not let other people use your account. Do not reveal your password to anyone for any reason (this includes the system administrators).
- Security attacks on our computers or anyone else's are strictly forbidden.
- You are responsible for understanding how UNIX file permissions work and using them to protect the privacy of information in your account.
- Regardless of any other considerations, cheating on exams and plagiarism are unacceptable. It is not a defense to claim that any files read in the process of cheating or plagiarism had file permissions that made them publicly readable.
- Regardless of any other considerations, reading e-mail of other users is unacceptable. File permissions prevent this if set correctly, but it is wrong to attempt this even if file permissions are not set correctly.
- Tying up a computer for long periods of time is unacceptable.
- Don't leave a computer with the screen lock on for a long time.
- Run big jobs at low priority using the UNIX `nice` and `renice` commands. Use the lowest possible priority (`nice +19` or `renice -n 19`) unless there are other competing background jobs.
- Get permission before running big jobs on any of the faculty machines.
- Do not run multiple jobs simultaneously on any machine. Use a shell script that runs them consecutively.

11.2 Gifts

Student gifts to faculty are *strongly discouraged*, as they can present a conflict of interest.

11.3 Written preliminary examinations

The Ph. D. written prelims are constructed and graded in the following fashion. The DGS appoints a new committee for each exam, and this committee is in charge of constructing and administering the exam. The committee invites the Graduate Faculty to submit potential problems, from which the committee constructs an exam to consist of many types of problems: applied and theoretical, more and less mathematical, computational or not, covering different areas, and so on.

All grading on written prelims is done blinded, in the sense that student papers are identified only by a student-selected code, and the code is not broken until pass-fail decisions have been made. Furthermore, each question is graded independently by two faculty members selected by the committee. Problems are graded on a 1–10 scale, with 6 being the minimum “passing” grade.

After the problems are graded, the entire Graduate Faculty meets to review the performance of each student on each problem. This is still done blinded. Different faculty give differing relative importance to various questions, and all faculty consider the difficulty of the overall exam relative to previous exams. Following deliberation, each coded examination is assigned to a Pass or Fail outcome by majority vote of the faculty.

After the student codes are revealed, students are informed of their outcome by their faculty advisors, who then make themselves available to help the students understand what they may have done wrong on problems that they were unable to solve. Detailed grading is not revealed, in order to place the emphasis on understanding of subject matter and methods of solving problems.

11.4 TA Conflict of Interest

Grading or evaluating a spouse or other close relative presents a potential conflict of interest. Therefore, a Teaching Assistant or Graduate Instructor shall immediately notify his or her supervisor when such a potential conflict arises.

11.5 Room usage

Please see the section on Facilities for some rules regarding the use of various spaces in statistics.

11.6 Teaching Evaluations

School of Statistics policy requires student evaluations of Teaching Assistants whenever the Teaching Assistant is instructor of record or leads a lab/recitation section.

Summaries of the evaluations are added to the Teaching Assistant's file maintained by the School.

The TA's responsibilities in this regard are

1. Receive the "Summary of Student Evaluation of TA" form, typed copies of student comments, and originals of student evaluation forms. TAs may keep the typed copy of comments, but the originals must be returned.
2. Tabulate the grades and compute an average.
3. Produce a short summary of the student comments.
4. Meet with the instructor to return forms and discuss evaluations and grade.

The TA will also be graded by the instructor (Outstanding, Good, Needs improvement). The purpose of this grade is to identify the tails: excellent TAs who should be recognized, and TAs who need some additional help to improve their teaching.

11.7 Letters of Recommendation

University lawyers want students to complete a form to grant professors authority to make oral or written references. This is to protect the University and authorize the release of private information.

(<http://www.ogc.umn.edu/download/studentref.html>).

In addition, the School of Statistics will only pay postage for a total of 30 letters of recommendation. After that the student will have to bear the cost of postage by providing the secretary with addressed, stamped envelopes.

11.8 Student Representation

Each school year at the beginning of fall semester, the graduates students shall meet and elect their representatives.

Graduate Faculty	Two students to attend Graduate Faculty meetings, present student views, and report back to student body.
Computing Committee	One student to attend computing committee meetings, present student views, and report back to student body.
COGS Representative	One student to represent Statistics at the Council of Graduate Students.
Newsletter editor	Two students to assemble fall and spring School of Statistics newsletters.
Seminar liason	One student to collect and present student suggestions for seminar speakers.
Topics class liason	One student to collect and present student suggestions for topics classes.
Q&A organizer	One student to organize fall and spring question and answer sessions between students and selected faculty.
Social organizer	One student to assist DGS in fall and spring social events.

11.9 Posting Grades

Do not display scores or grades publicly in association with names, ID numbers, social security numbers, or other personal identifiers. Identifiers such as code names or code numbers are usually OK. The resulting posting should not be in alphabetical order or numerical order by student name or full ID number.

Graded student work should be returned directly. It should not be left in a publicly available place.

11.10 The Role of GPA

The Graduate Program in Statistics requires a minimum GPA of 3.0 (on a 4.00 scale) for courses included in a degree program. If a student has taken the same course twice, the higher of the two grades may be used.

What role does GPA play beyond the official regulations? First, it is a measure, often quite crude, of a student's progress. As long as it remains above the 3.0 minimum it is just one of several factors used to evaluate a student. Having a GPA fall below 2.80 does not mean automatic dismissal from our program. However, if a student's GPA remains below 2.80 and his or her performance in the core courses is poor, then they can lose their financial aid and eventually be dismissed from the

program.

One of the few times GPA is considered explicitly is when students are considered for the Alumni Fellowship or the Doctoral Dissertation Fellowship (DDF). The DDF is a University-wide competition, and past experience has shown that students with GPAs less than 3.50 have little chance. (GPA is not the sole criterion.)

Possible employers look at GPA, but not just at GPA. A high GPA may be useful in getting an interview, but personality and communications skills play an important role as well and are more correlated with on-the-job success than the GPA.

11.11 TA Credit Load

Teaching Assistants and Research Assistants with appointments of 50% or less must be enrolled for at least nine credits per semester (not audit) or one credit for Ph. D. candidates working on dissertations. Exceptions to this policy may be granted by the DGS. International students may have additional requirements imposed by visa restrictions.

12 Graduate Courses

The most up to date listing of Statistics courses can be found at <http://onestop2.umn.edu/courses/tc/designators.jsp> (choose statistics from the scrolling list).