

Graduate Student Handbook

Program and Requirements

Welcome to the Johns Hopkins Mathematics Department! In these pages, we will present an introductory description of the academic side of your stay at Hopkins.

Virtually all of our graduate students have been admitted to the Ph.D. program, and most of you have full support (full tuition waiver and Teaching Assistantship). You are expected to be a full-time graduate student in mathematics, engaging in a period of study and research that will culminate in the Ph.D.

The level of the mathematical material that you must learn to control will inevitably rise. Even the way you regard the subject will likely change, perhaps several times. In the end, your research level will be assessed more by what you do, and can be predicted to do, than by what you know. However, you will need to attain a suitably high level of understanding in order to function at the frontiers of mathematics. It is best to view the initial phases of your studies (course work, preparation for qualifying exams) as preliminary to research. In particular, you should aim to acquire an active understanding of, and facility with, the material at hand.

The ability to do research in mathematics is imperfectly correlated with the ability to understand known mathematics. The only way to find out what you are capable of accomplishing is to get started on it. In general, even for established mathematicians, research proceeds rather slowly, and often one wonders in the end why it took so long to figure out something so "obvious". It is for this reason that we recommend that you get your qualifying exams and language exam out of the way as soon as is reasonably possible.

We consider 5 years the amount of time normally needed to complete the degree. We guarantee that a student who is progressing reasonably and performing the T.A. duties faithfully will have his or her support continued through the end of the fifth year. For the meaning of "reasonable progress", see page 4.

The graduate program is designed primarily to prepare students for research and teaching in mathematics. It is naturally centered around the research areas of the faculty, which include algebraic geometry, differential geometry, global analysis, harmonic analysis, number theory, partial differential equations, topology, several complex variables, and representation theory. The program may be supplemented (with departmental approval) in applied directions by courses in theoretical physics, computer science, mechanics, probability and statistics, offered in other departments of the School of Arts and Sciences and the School of Engineering.

Requirements for the Ph.D.

In addition to the general University requirements, doctoral candidates will be expected to meet the following guidelines and requirements:

1. A reading knowledge of French, German, or Russian, to be demonstrated by passing an examination given in the Department of Mathematics.
2. Satisfactory work in the analysis sequence 605 (Real Analysis I) and 607 (Complex Variables I) as well as the Algebra Sequence 601-602. **Enrollment in these two sequences is mandatory for all first year graduate students who have not received advanced placement by passing the corresponding written qualifying exam(s) upon arrival.**

3. Passing written qualifying exams by September of the 2nd year in:
 - A. Analysis (Real and Complex)
 - B. Algebra
4. Satisfactory work in at least 3 other 600-level courses in the 2nd year of study.
5. Passing an oral qualifying examination by March of the 3rd year in the student's chosen area of research. The topics on the exam are to be chosen in consultation with the student's intended thesis advisor.
6. Teaching experience in mathematics at the undergraduate level throughout your stay, mostly as a teaching assistant for a course, under the supervision of both the faculty member teaching it and the Director of Undergraduate Studies.
7. A written dissertation based upon independent and original research.
8. The Graduate Board Oral Examination, which in the Department of Mathematics, is the dissertation defense. (See page 4 of this document.)

Further Information and Advice

1. There will be a new grad student orientation on Monday, August 30, 2004 at 11 AM. Upon arrival, first year graduate students will be guided in their studies in the department by Chair/ Professor Sogge, Graduate Chair/ Professor Zucker and Professor Wentworth .
2. Students should aim to become actively involved in research as early as possible. During the second year the student should find a potential thesis advisor from among the full-time faculty in the department. The advisor will help prepare the student for research in her/his area, and test this in the oral exam; then help to find a reasonable research project, guide the student through the relevant literature, and check up on the student's progress.
3. Students are expected to contribute to the intellectual life of the department. This includes participating in and attending the department seminars.

Teaching Responsibilities

The most important responsibility of the teaching assistant is conducting section meetings. This includes preparation for the meetings and conducting the sections in a professional manner. The main purpose of the sections is to answer students' questions about the course material. (You should not work out in section homework problems that are still due.)

Teaching Assistants may ask the department to reserve a room for activities relevant to the course(s) they are assisting with. Due to the number of requests, a room request for exams must be given one week in advance. *A room request for a review session is needed at least 3 days before the session. All other requests MUST be submitted as early as possible to Jessika. You may not use the department lounge (Krieger 211) for such purpose. A week in advance is standard and appreciated.*

Jessika will send the request to the appropriate scheduling contact and will email you a confirmation.

NOTE - all requests must be written. (E-mail is preferred)

Every effort will be made so that your TA section assignments will not conflict with mathematics courses being offered. This is primarily done by not assigning math courses during the parts of Thursdays and Fridays that discussion sections are held. On the other hand, we can not schedule around courses that other departments offer. If you have conflicts with such courses, it is *your* responsibility to find a suitable TA who will trade sections with you. **This change of scheduling must be approved by the professors involved and by the Chair and Director of Undergraduate Studies.** If you cannot find a suitable substitute, you will not be allowed to take the outside course and must TA the section that you have been assigned.

Preparation:

Since the main purpose of the section is to answer students' questions, it is *essential* that teaching assistants know how to do *and explain* all assigned homework exercises. It is therefore necessary that all teaching assistants prepare solutions to all assigned exercises in detail before section meetings, and have a plan as to how to explain these solutions to the student. It is inexcusable for a teaching assistant to be asked a homework question and not know how to solve it, or to waste time fumbling through calculations, which should have been worked out during preparation.

Professional Conduct:

A teaching assistant cannot be effective in the classroom if he or she appears to regard his or her duties lightly. We expect you to act as dedicated professionals. This includes arriving at your assigned sections a few minutes *before* your scheduled time, and keeping the students occupied for the full scheduled time. In your preparation for your section you should also prepare extra examples and activities for the class in the event that they do not have enough questions to fill the time.

Lack of preparation and unprofessional conduct damage the reputation of the entire department. We are working hard to maintain the image of our teaching staff as being capable and professional. There simply is no room for poor teaching due to lack of preparation or unprofessional conduct. The Director of Undergraduate Studies and the Chair will investigate reports and complaints by students of lateness, rudeness, and unpreparedness. Substantiated neglect of duty can, as in the past, result in full or partial rescinding of the teaching assistantship.

Grading Responsibilities:

The other main responsibility of the teaching assistant is to grade work done by the students, and to record and keep those grades. This includes being available to help proctor and grade exams for the course that you are assisting. We expect teaching assistants to be on time for all grading sessions, proctoring assignments, and other meetings scheduled by the instructors. If for some reason you are unable to attend a grading session you must find a suitable replacement. Check your mailbox and e-mail regularly so as to stay in contact with the instructor, including before section.

When English is a Second Language:

An international student with a Teaching Assistantship is usually assigned to be a full-time grader during her or his first year in the Department. Such students must enroll in the course 370.601 "Communication Strategies in the American Classroom" in the fall. Students must demonstrate communication skills sufficient to conduct sections in the fall of the 2nd year. This will be judged at the end of the 370.601 course. Failure to meet this requirement will affect the student's status in the department.

Students, who are judged to need to elevate their level of spoken English, before they can benefit from 370.601, are advised to take 370.600 "Oral Skills" in the fall instead, and take 370.601 in the spring.

Emergencies:

If an emergency prevents you from meeting any of your scheduled obligations, you must find a substitute who is a TA in the Mathematics Department; or if that is not possible, notify the department (516-7397 or 516-7399) at least 30 minutes before the scheduled time.

Evaluation of Student Progress, and Continuation of Support

Each year the faculty of the department meets to discuss the continuation of financial support for graduate students. Progress is gauged in the following way:

Pre-Thesis Requirements:

The student must do satisfactory work, which is likely to include problem sets or exams, in at least two graduate courses in mathematics each semester until qualifying exams are completed. You must pass written and oral qualifying exams according to schedule (see page 12). After passing the oral exam he or she must do satisfactory work in at least one graduate course in mathematics each semester, three semester courses in the second year.

Research Requirements:

For 4th-year support: sufficient involvement in research.

For 5th-year support: satisfactory progress in research.

For 6th-year support (if warranted): clear expectation of finishing the thesis by the end of the 6th year.

The M.A. Degree

Students are generally not admitted solely to achieve a Master's Degree. However, the Department will award a Master's degree in Mathematics once a Ph.D. candidate has fulfilled the following requirements:

1. Completion, while resident at the University, of both of the basic graduate sequences, 110.601-602, 110.605-607; demonstration of a deeper understanding by passing one written qualifying examination
2. A reading knowledge of French, German, or Russian, to be demonstrated by passing an examination given in the Department of Mathematics.

Graduate Board Oral

The final requirement for the Ph.D. is the Graduate Board Oral, which consists of a thesis defense before a faculty committee composed of two members from the Department of Mathematics and two members of the Hopkins faculty from other departments. The remaining fifth member can be from either inside or outside. Alternates from both inside and outside member must also be listed, in case of last minute defaults. Selection of the outside members of the GBO examining committee is the joint responsibility of the faculty advisor, the student, and the Department's Graduate Chair. The faculty advisor is responsible for initiating the process by recommending appropriate persons. The Graduate Program Coordinator schedules the exam. Because of guidelines established by the Graduate Board, the process should be started **at least three months in advance** of the intended date of the GBO exam.

A copy of the final dissertation draft should be given to each member of the committee, and to the Graduate Board Office, **two weeks before the date of the GBO exam**.

Once the GBO exam has been passed, and suggested changes to the dissertation have been made, the Chair of Mathematics will certify to the Graduate Board that the student has completed all of the requirements for the degree of Doctor of Philosophy in Mathematics. At this point, the student is informally a Ph.D. The Graduate Board formally certifies the completion of all requirements in November and May; the University confers degree in May of each year. In order for the degree to be conferred, the student must be in good financial standing with the University, not owing money for rent, registration, loans, parking fines, tuition, etc. Normally, the Registrar will notify students of any problems before graduation, but like most systems, this is subject to error, and students would be well advised to check with the Registrar that there is no delinquency and respond quickly to any notice.

Job Market

When applying for positions in academia, the student must recognize that in the U.S. mathematics job market, the decisions to hire at some universities start in November. You could lose out on opportunities if you wait too long to apply.

Also, you should keep in mind that a recommender may well need time to assess your work; allow at least one month for that. Inquire with your thesis advisor and the graduate chair about proper procedure for submitting job applications. In deciding when, and even whether, to apply, it is not expected that you have satisfied all requirements for the Ph.D. at the time of application, only that it be clear that you will finish (even by the end of the summer). It is best to wait until you have sufficient solid results that the final content of the dissertation can be envisioned by the advisor.

As the academic job market has grown more difficult, mathematics departments have become more demanding of job candidates. Teaching ability has been emphasized, far more than in the past, even by many research-oriented institutions. It may no longer be enough to have produced a very good thesis to get a good job; a solid teaching record is essential. Since teaching is, in part, judged by undergraduate students, international students should be aware that their perceived command of English can influence the decision whether or not to hire.

Fortunately, the restriction of academic horizons has been simultaneous with the broadening of possibilities in other sectors. This matter has been discussed at some length in past issues of the Notices of the American Mathematical Society, and we recommend that our students read these articles. Mathematical training, of itself, is valued by certain companies. Some additional skills that the student may wish to acquire are facility with computers and some background in applied fields.

The Department

Christopher Sogge, Chair and Professor: Fourier analysis, Partial Differential Equations

J. Michael Boardman, Professor: Algebraic and Differential Topology

Nero Budur, J.J. Sylvester Assistant Professor: Algebraic Geometry

Caterina Consani, Assoc. Professor: Algebraic Geometry and Topology

Carel Faber, Professor: Math Physics and Algebraic Geometry

Jason Howald, Director of Undergraduate Studies

Jian Kong, Associate Research Scientist/Lecturer

Chikako Mese, Assoc. Professor: Analysis, and Geometry

William Minicozzi, Professor: Differential Geometry, Partial Differential Equations, Cauchy-Riemann Geometry

Jack Morava, Professor: Algebraic Topology, Mathematical Physics (Joint appointment with the Department of Physics and Astronomy).

Takashi Ono, Professor: Algebra, Number Theory, Algebraic Groups.

Joseph A. Shalika, Professor: Algebraic Groups and Representations, Number Theory.

Bernard Shiffman, Professor: Several Complex Variables, Differential Geometry.

Vyacheslav V. Shokurov, Professor: Algebraic Geometry.

Jian Song, J.J. Sylvester Assistant Professor: Complex Geometry

Florin Spinu, Assistant Professor: Analytic Number Theory

Joel Spruck, Professor: Partial Differential Equations, Geometric Analysis.

Richard Wentworth, Professor: Mathematical Physics, Complex Geometry.

W. Stephen Wilson, Professor: Algebraic Topology.

Chan Woo Yang, J.J. Sylvester Assistant Professor: Harmonic Analysis.

Steven Zelditch, Professor: Quantum Dynamics, Spectral Geometry, Microlocal Analysis.

Qiao Zhang, Assistant Professor: Number Theory

Steven Zucker, Professor: Hodge Theory, Algebraic Geometry.

Support Staff

Tina Stanger is the Administrator Manager. She is responsible for all financial matters in the department and for ensuring that all department business is handled in a timely manner. Please see her if you have any questions related to payroll, faculty budgets, staff, or general department policies.

Linda Buckner is the Administrative Assistant. She handles all matters related to web page updates and manages the faculty hiring files and databases. She is responsible for reimbursements to department members. She also organizes department conferences, including the annual JAMI conference.

Charlene Poole is the Graduate Program Coordinator. She is responsible for all graduate student record-keeping, most matters involving graduate student registration, and oral exams. She processes graduate student payroll forms. Charlene also coordinates the department seminars and related reimbursements.

Jessika Wrabel is the Undergraduate Academic Program Coordinator. She handles everything related to courses. This includes text book ordering, room reservations, course scheduling, first-level student advising, and various other course related items. She also tracks the math majors, double majors, and minors.

The staff are here to assist you with your administrative and professional needs Monday through Friday, 8 AM to 4:30 PM. Requests for the handling of personal business should not be made of the staff. We ask that you first check bulletin boards and printed material available to you before you ask for assistance.

Department Information

Bulletin Boards

Bulletin boards are located along the fourth floor hallway, both mail rooms (209 and 409), the second floor hallway (undergraduate information) and the third floor hallway (graduate information). Please check the bulletin boards for general information.

Computers and E-mail

The Department has a Sun-UNIX computer, called “chow”. Please contact Tina Stanger or Jian Kong if you wish to have an account on chow. We also have an NT server. You can get an e-mail account either on Chow, or on JHED, which is a university-wide e-mail/calendar server.

The department computer room is Krieger 207. The computers are intended for the use of students, staff, faculty and persons authorized by the department ONLY! If you have significant others, friends or family who need to use computers, there is a campus computer lab located in Krieger Hall, room 160. If you need to request an exception to this rule, please contact Tina Stanger. Anyone who allows unauthorized users or visitors into the department computer rooms may lose their own privileges.

Copying and Printing

Copiers are located in Krieger 409 and 207. Please see the department staff to obtain access to these machines. We ask for your assistance in keeping these areas neat and organized. If you experience a problem with either machine, please inform the department staff immediately so that a service call may be made. Samples of bad copies prompting a service call should be left on top of the copiers to aide the repair technician. Please see a staff member if the copier is jammed. Do not attempt to clear the jam yourself.

Fax Machine

A fax machine is available in the department mailroom, Krieger 409, for receiving and transmitting work-related faxes. See the staff if you have questions regarding the use of the department fax machine.

Keys

Charlene Poole issues keys to offices and common rooms. In order to be issued keys, all recipients must sign for receipt of keys and agree not to have them duplicated and not to lend them to persons outside of the department. All keys must be returned upon departure from the Department. There is a \$15 replacement fee for each lost or missing key (\$30 for Inteli-keys).

If anyone requests that you open a door for him or her because “they’ve forgotten their keys”, they should be referred to the department office. If you lose your keys, please report it as soon as possible.

Kitchen Areas

The kitchen areas (including refrigerators) should be kept clean and neat at all times. In the past, the department has had problems with bugs in these areas because of the lack of care taken to clean up. The department expects everyone to clean up after himself or herself when using these areas. Be certain to mark containers of food with your name; the refrigerators are cleaned out at the end of each week. If your name is not on your food, the food and container could be thrown away. Please wipe up all spills, wash your dishes, and dry off counter tops.

Coffee and tea are available in Krieger 409 and 209 during office hours. Afternoon teas are scheduled for Mondays, Tuesdays, and Wednesdays at 3:30pm in 209 Krieger Hall. After many seminars, a group of department members accompanies the invited speaker to dinner. You are welcome to join them.

Library

The University's primary mathematics collection is housed in the Milton S. Eisenhower Library on level C. You may borrow books with your JCard.

The Department's library is located in Krieger 413. You may borrow books from this library at any time using this simple procedure:

Write your name, book title, call number, and date on one of the special cards in the room; place the card you filled out in place of the book you are borrowing; when you return the book, reshelv it in the proper place, remove the card from the shelf, and cross out your name.

Mail Rooms

A mailbox has been provided for each member of the department. Faculty and staff mailboxes are located in Krieger 409; graduate student mailboxes are located in Krieger 209. Stamps for personal use may be purchased from the Post Office in Gilman Hall. Mailrooms should be kept closed and the door locked at all times! We have had instances of theft in the past. Personal mail should be sent to your home address. The department cannot be responsible for personal mail. TA's must not tell students to place homework papers or any other papers in TA mailboxes; rather, students should be told to write their TA's name on the papers, and then put the papers through the mail slot in the door of Krieger 209.

Offices

The department assigns offices to graduate students on a yearly basis. Usually, at the end of an academic year, students whose advisors are based on the 4th floor may be moved to Krieger 411 or 415 depending upon the availability of space. You are expected to treat your office with the care you would take when using another person's property. Please keep floor areas clear of debris and books and papers in order. If you find that your office is not conducive to your studies, you may apply to be moved to a different office at the **end of that academic year**. No students will be permitted to move their office during the semester. If your office assignment changes, please be reminded that you need to clear out your desk *completely* and that any old exams or other student papers need to be transferred to the Department Office. You may also request a temporary study area in the MSE Library from the Graduate Program Assistant. These studies are to be used by the graduate student requesting the space **ONLY** and may be utilized for up to one month depending upon availability.

Payroll

Paychecks are issued semi-monthly, on the 15th and last day of the month. Look for them in your mailbox sometime after 11am on payday. If payday falls on a weekend, checks will be issued the Friday before. If payday falls on a holiday, checks will be issued before the holiday. Direct deposit forms are available from any participating bank. You will not receive a paycheck unless the Form I-9 (Employment Eligibility) has been received by the Student Payroll office. Please see Charlene for the completion of the I-9 and withholding forms. (Foreign students must visit the Office of International and Visa Services, 3103 N. Charles St. to complete the Form I-9.) Questions concerning taxes should be directed to the tax manager at extension 8442.

Returning After a Break

In the past, some graduate students leaving Baltimore during a break have returned to the department late for classes and/or teaching. It has become department policy that graduate students return to the department **at least one day prior** to the beginning of a new semester. The student is responsible for obtaining plane/train/bus tickets and for renewing your visa for return. Failure to adhere to this policy may result in a penalty.

Upon your arrival, you first need to meet with the professor/s for whom you will TA/grade. They will have plans and information to give you prior to the beginning of class. You will also need to meet with the professors with whom you have signed up to take classes. Most class meeting times and days will be pre-set (before the beginning of the semester). However, there is always the possibility that a professor will change the day/time at the last minute.

Security

Please keep offices locked when not occupied and keep your personal valuables locked up. (There have been quite a few problems in the past with larceny.) **Please make certain that the doors to the common rooms are completely closed when leaving them. Computer rooms and mailrooms should be kept locked and the doors closed at all times!**

The Security Department phone numbers follow:

Emergency - x 6-7777

Non-Emergency - x 6-4600

Escort Service - x 6-8700

Telephones

Telephones for **mathematics graduate student use** are located in the department's computer room (Krieger 207). The extension is 6-7572. Outgoing calls are limited to campus and local calls. Out of consideration for other students, we ask that you limit calls to five minutes.

Additional Helpful Information

The University Book Store, Credit Union, Post Office, and M&T Bank are all located on the basement level of Gilman Hall. (The clock tower building on the upper quad.)

- Office of International and Visa Service, 3103 N. Charles St. x6-1013
- Financial Aid, Garland 146, x6-8028
- Student Employment and Payroll, Garland 72, x6-5411
- Tax Office, 33rd St., x7-8442
- Office of the Registrar, Garland 75, x6-8080
- Counseling and Student Development Center, Garland, x6-8278
- Security Office:
 - Emergency, x6- 7777
 - Non-Emergency, x6-4600
 - Escort Service, x6-8700

University Information

Registration

You are required to register for courses each semester. Auditing a course does not count. Support in terms of stipend, fellowships, or tuition assistant is contingent on this. Registration material will be mailed directly to you by the Registrar's office. Please make an appointment with your advisor prior to registration each semester to discuss your schedule. Your advisor or the Department Chair must sign the registration form. If signed by the Department Chair, the advisor's initials must appear beside each course listing. Please leave the pink copy with the Graduate Coordinator (**Charlene**). A late fee will be applied to registrations if forms are not submitted by announced deadlines.

Financial Aid

Financial aid situations will vary to the degree that the student situations vary. Specific question concerning student loans should be directed to the financial aid office. Copies of the Graduate Student Financial Assistance Brochure may be obtained from the Student Financial Services Office. You may call them at x68724 to discuss individual needs.

Qualifying Exams

Syllabus

Exams

Look on the Web: <http://mathnt.mat.jhu.edu/exams/>

All entering students will use this system.

1. The core qualifying exams.

The core qualifying exams will consist of two written exams, one in Algebra, one in Analysis. These will be two-and-a-half hour exams covering the core material in each subject (syllabi are available). The exams will be administered twice a year (September and May).

Both exams must be passed by September of the second year, better by May of the first year. Exams may be taken one at a time. Exams may be taken multiple times without penalty. We encourage entering students to try the exams in September of the first year.

2. The oral major exam.

In addition to the core qualifying exams, there is an oral major exam in the intended area of research. Examining committees should consist of two faculty members (which must include the intended advisor). The intended advisor must approve the material on the exam in advance.

Students are required to pass this exam by March of the third year. Failure to do so will result in loss of support. Students are allowed two attempts to pass this exam.

3. The student must pass a language exam (for reading knowledge). **The oral exam will not be scheduled until the language exam has been passed.**