

**Welcome Back Mathematics Majors
2015-2016
We hope you had a good summer!**

**The combination for the Undergraduate Lounge has changed over the summer.
The new combination was sent to math majors via email on August 10.**

You can get department information from the [Math Department Web Page](#). That page is temporarily without a webmaster, so some items (such as the main Events Calendar) may be out of date.

The [Undergraduate Web Page](#) is up to date. You should probably bookmark the page and look at it regularly:

- we try to keep the “News and Notes” up-to-date with announcements, as well as items of interest to majors
- the link there to [Information for Majors](#) covers a lot of useful topics
- there are lots of other useful links on our [Web Pages for Math Students](#)

If you’re not already familiar with what’s at our web site, then take a little time to explore once you’re there. There’s probably more available there than you think. Take a quick look at the [site map](#).

Be sure to also look at the excellent set of resources on the [Student Web Page of the American Mathematical Society \(AMS\)](#):

You might want to get in touch with your major advisor, just to re-establish contact and catch up!

Who’s New, Visiting, Gone, ...?

- [Professor Guido Weiss](#) has retired after being a part of our Mathematics Department since 1961. During that long and distinguished career, he also taught semesters at University of Geneva (Switzerland), University of Paris Sud (Orsay), University of Perugia (Italy), Scuola Normale Superiore di Pisa (Italy), University of Peking (Beijing, China), Universidad Autónoma de Madrid (Spain), Beijing Normal University (China), Canterbury University (Christchurch, New Zealand), University of Milano (Italy) and Scuola Matematica Interuniversitaria (Cortona, Italy). Although he will no longer be teaching his famous Freshman Seminar (Math 201), we expect to continue to see him regularly around the department.
- [Professor Matt Kerr](#) has returned from a year’s membership with the Institute for Advanced Study, Princeton, NJ.
- [Professor Jose Figueroa-Lopez](#) is a new associate professor, coming here from Purdue University where he was associate professor of statistics. His research interests are in [statistics](#) (nonparametric estimation methods using sieves, model selection, and adaptive methods), [mathematical finance](#) (estimation methods for high-frequency data; high-frequency trading and

asset price formation; portfolio optimization problems in continuous-time models; emphasis on Lévy-driven and jump-diffusion models), [probability and stochastic processes](#) (stochastic control, stochastic analysis, and simulation), and [information and coding theory](#) (concentration inequalities applied to data compression). His Ph.D. (2004) is from Georgia Institute of Technology.

- [Professor Brett Wick](#) is a new associate professor, coming here from Georgia Institute of Technology where he was associate professor of mathematics. His Ph.D. is from Brown University (2005). His research interests are in analysis including several complex variables, harmonic analysis, operator theory, and the interaction between these subjects.
- [Professor Wushi Goldring](#) arrives this fall as a new assistant professor. His Ph.D. is from Harvard University (2011) arriving after a time at the University of Zurich (Switzerland). His research interests are in algebraic number theory, algebraic geometry, and representation theory.
- [Dr. James Pascoe](#) (Ph.D. 2015, University of California, San Diego) will be our new Chauvenet Postdoctoral Lecturer. He works in areas of analysis including several complex variables and operator theory.
- [Dr. Xuanyu \(Peter\) Pan](#) (algebraic geometry) and [Dr. Songhao \(Travis\) Li](#) (differential geometry) continue as Chauvenet Postdoctoral Lecturers.

Chauvenet Lectureships are “post-doc” positions—two or three year appointments to newer PhD’s to advance their research and teach before seeking a permanent tenure track position. [Who was William Chauvenet?](#) (Also look at the “Trivia” section on [Web Pages for Math Students](#).)

- [Dr. Han Gan](#) (statistics) will continue with us for another year as a visiting instructor.
- [Dr. Ivan Horozov](#) (former Chauvenet Postdoctoral Lecturer) has moved to a job at Bronx Community College of the City University of New York.
- [Dr. Peter Luthy](#) (former Chauvenet Postdoctoral Lecturer) has moved to a job at the College of Mount Saint Vincent, located in the Bronx (NY).
- On leave: [Professor Steve Krantz](#) will be on a leave of absence in the fall 2015 semester; and [Professor Nan Lin](#) will be on leave during spring 2016.
- We are saddened by the loss of [Marie Taris](#), assistant to the math chair, who died on June 2, 2015. For those who knew her, here is an [obituary from the W.U. Newsroom](#).

Course Highlights: New and Not-every-year Offerings

We hope this can help with your planning—particularly if you need to use the fall semester to satisfy prerequisites for a new or occasional offering that will be taught in spring 2016. (Check department for prerequisites if necessary.)

In fall 2015:

- Math 331, *Algebraic Systems* (Professor Thornton). Even though it's required only for majors planning on secondary certification, this is a nice introduction to algebra that's a little more concrete than Math 430.
- Math 416, *Complex Variables* (Professor Beheshti). This is usually a fairly small class in a very active area of mathematics—one that is both mathematically interesting and very useful to scientists and engineers.
- Math 439, *Linear Statistical Models* (Professor Gan). In the past, this course was offered only in alternate fall semesters (trading off with Math 434). We hope that Math 439 will become a regular offering every fall semester in the future.
- Math 434, *Survival Analysis* (Professor Spitznagel). This course will probably continue to be offered only in alternate fall semesters.
- Math 456, *Financial Mathematics* (Professor Stern). The frequency of this course is unpredictable, but we hope to offer it in alternating academic years.
- Math 496A, *Topics in Algebra: Lie Groups* (Professor Feres). This is a "first time offering" by Professor Feres, who says

This is an introduction to Lie theory, with emphasis on matrix Lie groups, particularly the so-called classical groups, and their Lie algebras. Lie theory is a central subject in mathematics and an important tool in physics and engineering. In addition to the mathematical theory, I hope to cover some applications of the theory (as time permits and depending on students' interests) to classical and quantum physics.

The prereqs are Math 309 and 318 (or 308). This course probably won't be offered again for a few years.

In spring 2016:

- Math 4181, *Topology II* (Professor Roberts). This course is offered in even-numbered spring semesters. In odd-numbered springs, it is replaced by Math 407, *Introduction to Differential Geometry*.
- Math 460, *Multivariate Statistical Analysis* (Professor Kuffner). This is an every-other-year course offering.
- Math 469, *Topics in Discrete Mathematics: Linear Algebra in Combinatorics*. This is a new course offering by Professor Shareshian. It probably won't be repeated next year. Note that the prerequisites listed will be Math 310 and Math 429. According to professor Shareshian,
Many problems in combinatorics can be solved in surprising ways using linear algebra. The course will consider several types of problem to which linear algebra methods can be applied, reviewing some requisite ideas from linear algebra (and perhaps learning some new ones) along the way.

- Math 495, *Stochastic Processes* (Professor Feres) will be offered again in spring 2016. In the past, it has been offered only in alternate springs. We hope we will be able to offer it more regularly in the future. Note that prerequisites are Math 318 and 493, or permission of instructor.

The Undergraduate Math Majors Lounge

The Ross R. Middlemiss Math Majors Lounge is in Cupples I, room 222. ([Who was Ross Middlemiss?](#))

Another reminder: the lock combination was changed over the summer and was sent to majors via email on August 10. If you forget the lock combination for the Lounge door, see one of the staff in the Math Office (room 100) or Professor Freiwald. The Lounge is intended for undergraduate math majors, not for general student use, so please don't pass the combination around to others. It's not a large space, and if we're going to have things like the microwave and the computer available, we want to have some control over who uses the room. Please help keep the Lounge neat by

- Using the wastebaskets. A wastebasket that is full or contains discarded food items can be placed in the hallway just outside the Lounge door and the housekeeping staff should empty it overnight or the next morning. Whoever comes in first the next day can put the wastebasket back in the Lounge.
- Not leaving food items (like leftover pizza and half empty soda bottles) sitting in the Lounge. Take what you want home with you and put the rest in a wastebasket in the hallway for pickup. Please be sure to remove any food that you put in the refrigerator.
- Reshelving books in the correct sections of the bookcase (analysis, algebra, etc.)

The housekeeping staff is supposed to clean the Lounge regularly. If anything comes up that needs quick attention, please notify [Kelly Bullard](#) in the Math Office. Also notify Kelly if there are any maintenance issues (e.g., burned-out light bulbs, need for clock battery, ...) or a shortage of supplies (printer paper, chalk, ...)

Remember that the printer is provided as a convenience for majors for occasional printing of relatively small jobs. We expect to replace a toner cartridge or so each year, and to supply several packages of paper. But the budget for these is limited; if it runs out, the printer won't be useable for the rest of the year. Please do your large printing jobs somewhere else, especially for non-math courses and extracurriculars, so that everyone will be able to have convenience printing available in the UG Lounge throughout the whole year.

Pass along other comments or problems about the Lounge to [Ron Freiwald](#).

We hope the Lounge can be a friendly place to study or just take a break during the day. As an extra inducement to visit the lounge, we will have some free bagels, donuts, or cookies available there on a few randomly chosen days during the year. On these days, an email will be sent out in the morning to all majors. The food will be there by 10 a.m. and any leftovers will be removed at around 3p.m. to be distributed to hungry graduate students. The supply of food is finite, so "get it while it lasts."

Earning Money

We usually need graders each semester for some courses. If you're interested, please contact [Blake Thornton](#) (room 108A, 935-6301) as soon as possible. Grading positions for the fall probably have been filled, but he can tell you whether we have any other positions available and talk to you about work for the spring semester. If there's a favorite faculty member teaching a course you'd like to grade next spring, feel free to contact him/her and offer your grading services: you don't have to wait to be asked! If the faculty member agrees, then contact Professor Thornton to see if this is possible (well in advance so that he hasn't already assigned some other grader to the course).

You should also contact [Ms. Lisa Kuehne](#) if you might be interested in other jobs handled through Cornerstone.

If you're interested in academic mentoring: you can

- Consider work at Cornerstone Office (in Gregg Residence Hall on the South 40): see <http://cornerstone.wustl.edu/AboutCornerstone/StudentEmployment.aspx>. The department has to recommend you if you haven't done it before.

Generally, for a recommendation to be a mentor for Calculus I (or Calculus II), you should have completed the next course Calculus II (or Calculus III) with at least a grade of A-. For mentoring beyond the level of Calculus II, we'll make individual judgments about recommendations, but you should probably have better than a 3.3 average in math courses, and probably an A in courses you want to work with.

- If you didn't do so over the summer, then contact [Professor Freiwald](#) if you want to be on the department's list of "available tutors." Include the course(s) for which you think you can tutor, and your contact information: email, phone or both. To be eligible, you should probably have a good overall math record, and have received an A- or better in each course for which you want to offer tutoring. We get requests for tutoring at the calculus level, but also for other courses (for example, 309, 493-494, 429-430, 4111-4121, ...) and sometimes we don't have names available for more advanced courses.

When students ask about tutors, we refer them to this list and the student decides who to contact. If someone contacts you during the semester, then it'll be up to you to negotiate rates, times, etc. (*If the student seems like someone you might want to work with, then a short free session, maybe half an hour, would be appropriate for both of you to see if you're a good "fit" together.*)

Some students rely on this tutoring, so please don't offer tutoring to someone unless you're able to faithfully keep appointments and continue through the semester if needed.

- Some of you might be interested in leading one of the calculus PLTL groups. Interviews and hiring for those positions are handled each spring for the following academic year. Contact [Lisa Kuehne](#) (lisak@math.wustl.edu) about the timetable and details if you're interested in PLTL for the 2016-17 academic year. Lisa's office is in Cupples I, room 109 (935-4226)

[Distinction in Mathematics & Latin Honors](#)

All graduating majors (including second majors) are eligible for the awards of Distinction, High Distinction, or Highest Distinction in Mathematics. Specifics are on the [Distinction in Mathematics Awards](#) webpage. The Distinction Award depends only the upper level math GPA and math courses taken. The awards of High and Highest Distinction require a written senior honors thesis. Therefore a majority of majors seeking an award will probably try only for the Distinction Award.

“Latin Honors” are an award attached to the degree, not the major. Therefore they are awarded by the school that grants the student’s degree (Arts & Sciences, Engineering, Business, ...), and each school sets its own criteria. The Math Department, as a part of Arts & Sciences, is not involved with awarding Latin Honors to students graduating from other undergraduate schools, even if there is a second major in mathematics.

For students in Arts & Sciences, the College’s decision to award a degree with Latin Honors depends on the overall GPA and a recommendation from the major Department. The Mathematics Department will recommend those majors who meet the College’s GPA requirements and the Department’s criteria for graduation with High Distinction or Highest Distinction (both involve a written honors thesis). These students will receive both Latin Honors and the appropriate Distinction award. Specifics are on the [Latin Honors webpage](#).

Senior candidates for Latin Honors: you should have already filled out your department proposal for Candidacy for Latin Honors. If not, I must receive the proposal by the end of August. Otherwise the College may not allow your candidacy for Latin Honors! The written thesis and oral presentation both need to be completed by late March for those graduating in May. The College of Arts & Sciences sets the exact deadline. For a suggested timetable for your work: look [at the bottom of this linked webpage](#).

Honors Cords for Graduating Majors

Each year the Department distributes honors cords for certain graduating majors to wear at Commencement: those who have earned Latin Honors or any of the Distinction in Mathematics Awards, and students who are recipients of one of the [Departmental Prizes](#).

Honors Cords will distributed at the Annual Department Awards Ceremony on Thursday, April 28, 2016 at 4:30 p.m. in Cupples I, room 199.

Students who have earned Honors Cords and are graduating in August or December can pick them up from Professor Freiwald (Cupples I, 201).

Miscellaneous

Change in Major Requirements

The changes apply only to the entering freshman class (Class of 2019) and later. But if you're giving advice to new freshman majors later this year, remember that a change has happened

The most notable change is that one additional upper level elective course is required in each track. There are additional smaller changes in some tracks.

The new track requirements are at <http://wumath.wustl.edu/fall15classfive-major-tracks>
At the top of that web page, there is a link back to the older requirements that still apply to the Classes of 2016, 2017, 2018.

Juniors Meeting

Not long after classes start you'll get an email about an upcoming meeting especially for junior majors (although anybody's welcome). The purpose is to talk about longer term plans: senior projects, graduate school, jobs, internships, etc. We'll chat over pizza about the possibilities and try to have a representative from the Career Center there as well.

Planning for Graduate School?

Talk with your advisor about planning and a timetable (a few deadlines, particularly for certain fellowship applications like NSF, may be as early as November). [Here's a pretty good, rule-of-thumb planning calendar.](#)

[Professor Mohan Kumar](#), the Chair of our Graduate Committee, would be a good source for general information—for example, how does our department decide whether to admit someone as a graduate student? What are the most important considerations—course work? independent work? GREs? letters of recommendation? ... Former Graduate Committee Chair [Professor Rachel Roberts](#) might also be a good resource for general information.

Also look at the graduate program links [provided by the AMS](#). In particular there, notice the [Postbaccalaureate Program, Smith College](#), for women with bachelor's degrees who did not major in mathematics or whose mathematics major was light. Students might also look at the summer "prep" program [Immerse](#) at the University of Nebraska.

If there's sufficient interest, we can schedule a meeting early this fall about graduate school plans for everybody who's interested. Contact [Professor Freiwald](#) if you're interested.

Looking for jobs or internships?

Be sure to work with the [Career Center](#): that's your best resource. I'll forward to majors any information I receive about job opportunities, recruiters, ... but that kind of information is much

more likely to be sent to the Career Center than directly to the Math Department. The best time to check for internship information is in September or January. The Career Center can also help you with preparing a resume, information about the GRE's and applying to graduate schools, etc.

Also look for the links on [Web Pages for Math Students](#) and also the resources at the AMS website for majors.

Math Competitions

Putnam Competition, sponsored by the Mathematical Association of America (MAA)

If you're interested in the Putnam Exam Competition, please watch for information about the Putnam Practice Sessions which will start soon after classes begin. You are welcome at the practice sessions even if you don't plan to actually participate in the competition. The exam is always held on the first Saturday in December. Any number of students can participate.

[Read how the MAA describes the nature of the exam material](#)

Missouri MAA Competition, sponsored by the Missouri Section of the MAA

The 21st annual [Missouri Collegiate Mathematics Competition](#) will be held on the campus of Missouri Western State University (St. Joseph, MO) on Thursday evening/Friday morning April 7-8, 2016. There is an awards banquet Friday evening. Early in the second semester, we'll ask who's interested in participating. We will leave W.U. midmorning Thursday (this is about a 6 hour drive!) and arrive back Saturday afternoon. We can take two teams of 3 students each; if more than 6 are interested in going, then we'll have to make some choices based on class, courses taken, grades, ... The Department will provide transportation and cover expenses.

Also, the Missouri Competition overlaps with the spring meeting of the MAA Missouri Section at the same location on April 8-9, 2016. At that meeting, there are usually some students who make presentations of work they're doing. We'd like to encourage any students who have been working on a mathematics honors project or something similar to consider making a short presentation of the work at the meeting if there's an opportunity on Friday afternoon. It's good experience to talk about what you've done in front of strangers.

Undergraduate Math Club

Look for an email about planning for the Math Club this year. We'd welcome student suggestions about the kind of activities the math club should have: talks (by whom, what topics), more math-related films, sessions working together on problems/puzzles, more undergraduate speakers, or whatever. Please send any suggestions.

Washington University Actuarial Club (WUAC)

The purpose of WUAC is to provide Washington University students with a better all-around understanding of the actuarial profession, give members a chance to meet other actuarial students and relevant faculty, build networks, and provide resources to aid members with actuarial exams. For more information, contact [Tiffany Zhang](#).

Washington University Chapter: Association for Women in Mathematics (AWM)

The WashU Chapter of the AWM seeks to introduce and connect students into a supportive network of other female college math majors and professionals. Typical activities might focus around networking and professional skills, post-graduate opportunities, speakers, and group outings. If you're interested in helping and being part of the Chapter, please contact [Professor Rachel Roberts](#).

Math Circles

Math Circle is an outreach activity for middle and high school students. It is a nationwide program in which our department participates. Some majors, especially those interested in education, might be interested in planning a session or helping out at one of the Math Circle meetings during 2015-2016. [Click here for more information about Math Circle](#), and here's a link to an [article from the W.U.Record](#) about Math Circle. Contact [Dr. Blake Thornton](#) (Cupples I 108A, 935-6301) if you'd like to participate or to talk about the program. It may also be possible to earn 1-2 credits for 200-level independent study working with Math Circle on a regular basis.

Loeb Undergraduate Lecture in Mathematics

Each spring this lecture features a well-known mathematician in an annual lecture for undergraduates. The tentative date/speaker for this year is Thursday, Thursday, February 25, 2016 at 4:30 p.m. with guest speaker Professor Robert Devaney (Boston University). Professor Devaney does work in dynamical systems, primarily complex analytic dynamics, but also including more general ideas about chaotic dynamical systems. Lately, he has become intrigued with the incredibly rich topological aspects of dynamics, including such things as indecomposable continua, Sierpinski curves, and Cantor bouquets. Professor Devaney is a past president of the Mathematical Association of America (MAA, 2013-2015).

Ways to Socialize with People in the Department (and sometimes have a snack)

The department wants to encourage a sense of community among majors, faculty and grad students. If you have an idea that would help promote such interactions, please send suggestions to Professor Freiwald. We're open to all sorts of things if students are willing to join in or help to organize. Here are some suggestions about ways to get more involved.

Spend time in the Undergraduate Lounge, room 222, when others are there.

Attend some Math Club, W.U. Actuarial Club, or AWM meetings.

Form a study group with a few others from one of your classes.

Come to one of the department “teas” which precede colloquium talks. These talks are usually research level and beyond the reach of most undergraduates (and a lot of graduate students too) but undergraduate majors are welcome just to attend the tea and not the talk.

Teas are most often at 4 p.m. on Thursdays in the Department Lounge (room 200). Usually, there are some drinks and light snacks like chips and salsa or cookies. Sometimes the food is a little more elaborate. You can always check the schedule by looking at the “[Events](#)” link on the Department’s home page. Most people at colloquium teas/talks will be faculty and grad students. If you’re shy, bring another undergraduate along with you.

There will be a [Departmental Winter Potluck Lunch](#) for undergraduate math majors, grad students and faculty. It’s planned for Wednesday, December 9, 2016—the day before finals start. It’s a good break from your study and there’s always a lot of food including potluck contributions. You’re invited to bring food to share, but if that’s not possible, don’t worry: come and enjoy! [Mark your calendar](#) and watch for announcements later with more details.

There will be a [Departmental Awards Ceremony](#) on Thursday, April 28, 2016 at 4:30 p.m. in Cupples I, room 199. This is an occasion to present teaching awards to faculty and graduate students, present undergraduate prizes and honors cords, and recognize other achievements. And there will be some refreshments beforehand! More information to come later.

For graduating seniors and their families, we expect to have a [Math Department Senior Open House](#) on the day before Commencement, Thursday, May 19, 2016—immediately following the Arts & Sciences Recognition Ceremony.

We are always open to [suggestions](#) about curriculum or comments about any other issues. Please feel free to stop by to talk to provide suggestions/feedback or send questions to

- [Professor Ron Freiwald \(Director of Undergraduate Studies\)](#)
- [Professor Blake Thornton \(Coordinator of Lower Division Teaching, including calculus and differential equations\)](#)
- [Professor David Wright, Department Chair](#)

Thanks and have a good semester!

Ron Freiwald, and the
Mathematics Department Undergraduate Committee
August 2015