

UNDERGRADUATE MATHEMATICS SEMINAR

The next seminar will be

DATE: **MONDAY, September 28th**

Time & **4:00pm** – Refreshments in the Math Common Room, **Bailey 204**

Location: **4:15pm** – Seminar in **Bailey 201**

In this seminar, Union College's **Professor Alan Taylor** will present the following talk:

TITLE: The History of Cake Cutting

ABSTRACT: Mathematical investigations of fair division have often been phrased in terms of the cake-cutting metaphor: How can a collection of people divide something (a cake?) among themselves so that each is satisfied (in some sense) with what he or she receives? The starting point for these investigations is the old divide-and-choose method of fair division, wherein one person does the dividing and the other person then chooses which piece he or she wants. In this talk, we will survey many of the main results achieved in the last 65 years, and we will state a couple of open questions.

AMS Feature Column on Matching Problems, Marriage and School Choice – Related to a Nobel Prize Winning Theory

This month's Feature Column of the American Mathematical Society (AMS), "School Choice", by Joseph Malkevitch of York College (CUNY), available on the AMS's website (<http://www.ams.org/featurecolumn/>), discusses some of the mathematics behind so-called "matching problems". One example mentioned concerns itself with the issue of school choice. Some school districts offer parents choice about where they could send their kids, and parents are asked to rank their selections. "However, if parents are allowed to choose any (public) school in a city or a geographic area they wish, there may be a drastic imbalance between which schools parents would like their children to go to and the number of places that a given school has to accept students." But there are some complicating factors, one of which is that parents might try to 'play the system' and "be tempted not to give their true preferences but mis-report their true preferences in the expectation that this misrepresentation will actually help their child get a better school assignment than would otherwise have been the case." Is there a matching system in which a parent would be best served, strategically, by acting truthfully? Mathematically, under certain situations, the answer is yes! Intrigued? Read Malkevitch's interesting online article.

These types of matching problems comprise a narrow class of problems that can be placed under the heading of "**Mechanism Design**", which Malkevitch describes as "an area of mathematics and economics that is concerned with ... [designing] a system which by the nature of its operations encourages people to "disclose" information which is private to them (i.e., give truthful information) because otherwise they will be hurt." The importance of designing such systems was recognized by the Royal Swedish Academy of Sciences when it awarded the **2007 Nobel Memorial Prize in Economic Sciences** to Leonid Hurwicz, Eric Maskin, and Roger Myerson "for having laid the foundations of mechanism design theory".

Resources for Students

- Free tutoring! The Math Department offers a free tutoring service for students enrolled in its calculus courses through Math 115. The **Calculus Help Center** is open five nights a week, Sunday through Thursday, from 7:30pm to 10:00pm in the seminar room of Sorum House.
- Math Conference at Bard College The annual Mid-Hudson Mathematics Conference for Undergraduates will be held on **Sunday, October 25th** from 9:30am to 4:30pm. The Plenary Address, "Algebraic Number Theory: From Fermat to Function Fields," will be delivered by **Union College alumnus**, and Williams College professor, **Allison Pacelli**. Students and faculty are invited to give a research talk or present a poster. Registration for both speakers and nonspeakers is done via the web at <http://math.bard.edu/mhmc2009> by **October 12th**. (This conference is **FREE!** and participants are provided a continental breakfast, lunch, and afternoon tea.

Putnam Exam 2009: Get Ready!

Do you like challenging problems? Do you immediately seek out the Problem of the Newsletter when you receive this newsletter? Then you should consider participating in the **William Lowell Putnam Mathematical Competition**, what Time magazine called the "world's hardest math contest" (Dec. 22, 2002). Thousands of students from hundreds of colleges and universities across the U.S. and Canada take part in this one-day competition on the first Saturday in December each year. The competition consists of 12 challenging problems. Students are given six problems at a time in each of two three-hour sessions. Each problem is scored from 0-10, so the theoretical maximal score is 120. The typical median score is 0 or 1 point! (We did say it is *challenging!*)

Last year, Union's team did very well, with several students scoring well above the median.

This year's exam will take place on **Saturday, December 5th**. Although this is after the fall term ends, we can make arrangements for you to stay in your dorm room the nights before and after the exam, or possibly take the exam at an institution closer to your home.

If you think you might be interested in taking the exam, please contact **Professor Paul Friedman** at friedmap@union.edu by **Thursday, October 8th**.

Class of 2009: Stay in Touch

Union College email accounts of recent graduates are set to expire at the end of September. To continue receiving the Math Newsletter, please send your preferred email address to Professor Friedman at friedmap@union.edu.

Problem of the Newsletter: September 25, 2009

Congratulations to (alumnus) **Andy Mackenzie '09** for submitting a correct solution to last week's problem. A solution to the problem has been posted on the bulletin boards around Bailey Hall

Here is this week's problem: Players 1, 2, 3, ..., n are seated around a table and each has a single penny. Player 1 passes a penny to Player 2, who then passes two pennies to Player 3. Player 3 then passes one penny to Player 4, who passes two pennies to Player 5, and so on, players alternately passing one penny or two to the next player who still has some pennies. A player who runs out of pennies drops out of the game and leaves the table. Find an infinite set of numbers n for which some player ends up with all n pennies.

Professor Friedman will accept solutions to this problem until noon Thursday, October 1st. Email your solution to him (friedmap@union.edu) or put it in his mailbox in the Math Department's office on the second floor of Bailey Hall.