This Week's Mathematics Colloquium

Title: Graduate School Evening --- A Panel Discussion
Speakers: Jimmy Peterson, Katie Ziegler, Jill Dietz, Paul Humke, and Paul Roback
Time: Tuesday, October 14, 6:00 pm (pizza); 6:30 pm (presentation)
Place: SC 170

This Week's Colloquium

Interested in continuing your study in the mathematical sciences past your time at St. Olaf? Then you should check out this week's colloquium, which is just for you. Following a pizza dinner at 6:00 pm, the panelists will discuss such topics as these:

- ?? Pre-application thinking and information collection
- ?? The application process
- ?? The graduate school experience
- ?? Post-graduate school opportunities and options

Dessert and informal questions follow at 7:30. An information table will have posters, application forms, and brochures from a variety of schools.

Jimmy Peterson '00 is a graduate student in mathematics at Rice University. Katie Ziegler, also a St. Olaf alum, is a graduate student at Johns Hopkins University. Jill Dietz, Paul Humke and Paul Roback are professors here at St. Olaf and yes, they have all been to graduate school.

Carlson Winners!

The winners of this year's Carlson Contest have been determined! After toiling long with neckties, dice taped together and unusual rugs, these crafty individuals have achieved eternal glory:

First Year Contest:

1st place -	**Matthias Hunt, Joey Paulsen, Paul Tveite**
2nd place (tie) -	**Janna Holm, Kelly Nail, Tracy Pedersen**
2nd place (tie) -	**Brendan Bailey, Tyler Drake, Tim Mitchell**
Honorable Mention (Calc I students) –	**Becky Blessing, Charity Hall, Sarah Pray**

Upper-Class Contest:

1st place -	**Janine Dahl, Noah Loome, Michael Zahniser**
2nd place -	**Scott Harris, Nick Maryns, Jason Saccomano** (who brought some of his

7,412,080,755,407,364 donuts to colloquium; thanks Jason)

3rd place (tie) -   **Mark Kingsbury, Adam McDougall, Dan Sinykin**

3rd place (tie) –   **Pam Kaercher, Will Mitchell**

Congratulations and thanks to everyone who took part in this year's contest! If you are interested in knowing your team's score or would like a copy of the complete set of 15 problems, stop by Professor Molnar's office.

Extra congratulations go to **Michael Zahniser**, the first three-time winner of the Carlson Contest.

Another Math Contest!

The North Central Section of the MAA sponsors an annual math contest for students from colleges in Minnesota and nearby states (including Winnepeg). This year's contest will be on Saturday, November 15th from 9am to noon. This is also a team competition, so if your team enjoyed the Carlson, I hope you will consider the NCS – it's bound to be unimaginably fun. The test is given at St. Olaf (so you don't have to get up too early), and copies of previous year's exams are online at condor.stcloudstate.edu/~maancs/contest/ncsteam.html. Talk to Dave Molnar <molnar> if you are interested.

Another Job Opportunity

Seniors – you're in luck! A second company is running a one-hour information session next Wednesday 10/15 at 7pm.

Epic Systems Corp. is based in Madison, and is one of the largest and finest privately owned producers and sellers of health care information systems. In fact, they are ranked as the #1 health care software vendor in the nation by top technology executives at health care facilities (according to a poll of nearly 2000 such facilities). Because of their success and their involvement in a growing industry, they've been able to hire throughout the past few years while other companies have had to scale back. Plus, they like to hire Oles: they've signed several of our top graduates (in CS and/or Mathematics and/or Statistics) for the past few years.

They are hiring for two kinds of positions. In Project Management, they're looking for people to work with "end users" on installation and training on the Epic software, both on site at at Epic. In Technical Services, they're looking for people who can work with knowledgeable users at a customer site, participate in software analysis, quality assurance, troubleshooting, etc.

Come and see what all the buzz about Epic Systems is about! For more information on these (and other) jobs, see the CEL, or visit their web site at http://www.stolaf.edu/services/career/ and click on OleRecruiting.

Essay Contest

To increase awareness of women's ongoing contributions to the mathematical sciences, the Association for Women in Mathematics (AWM) is sponsoring an essay contest for biographies of contemporary women mathematicians and statisticians in academic, industrial, and government careers.

The essays will be based primarily on an interview with a woman currently working in a mathematical sciences career. Winners will receive a prize, and their essays will be published online at the AWM web site. Additionally, a grand prize winner will have his or her submission published in the AWM Newsletter.

The essay should be approximately 500 to 1000 words in length, and any submissions must be

received by October 31, 2003. For more information on the contest, go to http://www.awm-math.org/biographies/contest.html or talk to Professor Dietz.

The Wall of Fame

Perhaps you've noticed the pictures of Math, CS and Stat majors/concentrators on The Wall of Fame near SC182. Perhaps you've also noticed that the collection is not complete. If you know (or are) someone whose picture should be on The Wall there are at least two solutions for the problem: 1) talk a prof into scheduling a picture-taking time for a class that includes $n>0$ people who qualify for The Wall, or 2) find your way to the Academic Support Center (ASC) to see Peder "have-camera-will-take-your-picture" Bolstad. It would be great to have a complete set of mug shots ... er, uhhh, portraits on The Wall. Let's make it happen!

Last Week's Problem

For each positive integer n, define a(n) to be the number of j between 1 and n inclusive such that 2^j starts with the digit 1. Find $\lim_{n \to \infty} a(n)/n$. That is, find the fraction of powers of two which start with 1.

Last week's problem was solved by **Jason Saccomano '05**, **Paul Tveite '07**, and **Chris Ebert '06**. It appears that three out of every ten powers of two will have initial digit 1, but this does not continue forever. But, note that each time the number of digits increases by one, we get exactly one power of two which starts with 1. (16, 128, 1024, ...) So there are k-1 powers of two starting with 1 less than 10^k (not counting $1=2^0$).

a(n)/n will be largest when 2^n starts with 1, i.e. when $10^k < 2^n < 2 \cdot 10^k$. In that case, a(n) = k, and taking logs (base ten), $k < n \cdot \log 2$, so a(n)/n < log 2. On the other hand, a(n)/n will be smallest when the next power of two starts with 1, i.e. when $5 \cdot 10^k < 2^n < 10^{k+1}$. a(n) = k in this case as well; taking logs on the right-hand inequality, $n \cdot \log 2 < k + 1 = a(n) + 1$,

so a(n)/n > log 2 - 1/n. Combining these results, log 2 - 1/n < a(n)/n < log 2; applying the sandwich theorem, $\lim_{n \to \infty} a(n)/n = \log 2$.

Problem of the Week

This week's problem of the next week is inspired by the Rolling Block Maze on the Carlson. Michael Zahniser and Janine Dahl wonder, if you tape together eight standard dice into a 2x2x2 cube, is it possible for the four numbers on each side to have the same sum? If so, what sums are possible? Remember that on a standard die, opposite faces add to 7.

There are more Rolling Block Mazes and related puzzles at *logicmazes.com* and *clickmazes.com*, two excellent sites. I almost ran a 10x10 maze for the contest, but I think some of you will be glad I didn't. Particularly the "We Hate Rolling Block Mazes" team.

If you want to get the Mess problems ahead of time, they will be sent out on Thursdays on Molnar's math-probsolv email alias. Let him know if you would like to be added to the alias.

*** Please submit all solutions by Wednesday at 5 o'clock to David Molnar by e-mail (molnar@stolaf.edu) or by placing them in his box at OMH 201.

If you would like to receive a copy of the Math Mess in your P.O. Box weekly, please e-mail Donna Brakke at brakke@stolaf.edu.