This Week's Mathematics Colloquium

Title: Bunting, Baseball and (Billy) Beane

Speaker: Matt Richey

Time: Tuesday, September 30th, 7 pm –

TAILGATE PARTY starts at 6:15

This Week's Colloquium and TAILGATE PARTY!!

Since the beginning of time, the sacrifice bunt has been a standard part of every manager's arsenal. However, in recent years there has been increased scrutiny of this revered strategy.   Perhaps the foremost proponent of "dump the bunt" is Billy Beane, general manager of the Oakland A's (see Moneyball: The Art of Winning an Unfair Game, by Michael Lewis). Beane has surprised the baseball community by building a winning team with a minimal payroll.   His approach includes using "sabremetrics" to analyze players and strategies---including the sacrifice bunt. Even the New York Times has entered the fray: see "Baseball: The Lost Art -- Strategy of the Bunt; No More Easy Outs," August 17, 2003.

The bunting question was first investigated over 30 years ago by   Earnshaw Cook in "Percentage Baseball" (Cambridge MIT Press, 1966). Cook concluded that – except in rare circumstances – bunting appears to cause a decrease in runs per inning. His reasoning used readily available data (in 1966) and a few elementary ideas from probability. Using updated data and computational power, we recreate Beane's arguments and investigate the efficacy of the sacrifice bunt in the modern game. We will also ask (and answer) some great trivia questions.

Matt Richey has been a member of the St. Olaf mathematics faculty since 1986.   He received his BA from Kenyon College and his Ph.D. from Dartmouth.   His research interests, beyond baseball,   include mathematical physics and computational geometry. In spare moments Matt watches (pro) sports and plays (amateur) golf.

In addition, be sure to check out the tailgate party before the colloquium! There will be LOTS of food (vegetarian and non-vegetarian options), and, with any luck, a live bluegrass band, *Pigs in a Pen*, featuring our very own Matt Bloss on the old five-string. Festivities start at about 6:00pm near the parking lot at the front of OMH. THEN, after Prof.

Richey's talk, there will be SUNDAES served. Loads of fun are guaranteed for all!

What's an Actuary?

Quoting from www.beanactuary.org, "actuaries are the leading professionals in finding ways to manage risk; they are the analytic backbone of our society's financial security programs; their work is intellectually challenging, and they are very well-paid." For these reasons and more, actuary is consistently rated as one of the top jobs in America (#2 is the most recent ratings).

Actuaries in the U.S. and Canada achieve professional status by passing a set of examinations prescribed by the Casualty Actuarial Society (www.casact.org) or Society of Actuaries (www.soa.org). Course 1 is called Mathematical Foundatons of Actuarial Science. The examination for this course consists of four hours of multiple-choice questions. The purpose of this course is to develop a knowledge of the fundamental mathematical tools for quantitatively assessing risk. The application of these tools to problems encountered in actuarial science is emphasized. A thorough command of calculus and probability topics is assumed. Additionally, a very basic knowledge of insurance and risk management is assumed.

Anyone interested in actuarial examinations (or the actuarial profession in general) should feel free to contact Paul Roback (OMH206, x3861) or Amelia Taylor (OMH205, x3480) with any questions. St. Olaf College is an actually an official host site of the Fall 2003 actuarial exam for Course 1, to be given on Thursday, November 6th, although the deadline for taking this exam has unfortunately passed. However, St. Olaf will also host the Spring 2004 exam for Course 1. For students who have already signed up for the fall exam, there will be a sign-up sheet posted between OMH205 and OMH206 for anyone interested in forming study groups for the exam.

Regional Workshop at UNL

The sixth Regional Workshop in the Mathematical Sciences (mathematics, statistics and computer science) will be held at the University of Nebraska-Lincoln on November 7th and 8th, 2003. The aim of the workshop is to promote interaction among faculty and students at UNL and those at universities and colleges and in the industrial sector in the region. The workshop is designed to be of interest to undergraduate students who have begun to consider graduate school as well as graduate students and faculty in mathematics, statistics, and computer science.

This year the focus of the workshop has expanded to include a component on undergraduate research. In particular, a portion of the workshop on Saturday will be devoted to parallel sessions of talks by undergraduates on their own research projects, and we particularly invite contributions by undergraduates to these sessions.

The workshop will begin with registration at 1:00 pm on Friday, November 7, 2003, and will end by 3:00 pm on Saturday, November 8. Friday's schedule will begin with a series of plenary talks aimed at a general audience. After the plenary talks there will be a dinner, a panel discussion, and a social gathering after the panel discussion. The workshop will continue on Saturday with several parallel sessions devoted to a variety of topics in the mathematical sciences. There will be an opportunity for contributed talks at these sessions, again with the understanding that all talks at the workshop should be aimed at a level that enables access to advanced undergraduate students.

During the workshop, meals will be provided for all participants. In addition, we will provide lodging for

the night of Friday, November 7. In some cases there may be limited funds available for transportation costs. There will be a banquet fee of $5 for students and $10 for other registrants.

The deadline for receipt of abstracts, registration and funding applications is October 29th, 2003. We have reserved a block of rooms at the Town House Motel in downtown Lincoln, and at the Holiday Inn Express, for the night of November 7th, and those wishing to secure accommodation there will need to notify us by October 29th at the latest.

You can find a website for the workshop at http://www.math.unl.edu/~regionws. If you are interested in attending, send an e-mail to Professor Richey at richeym@stolaf.edu.

Did We Mention There's Cash?

Just a little reminder that the Carlson contest will be held on Tuesday and Wednesday, Oct. 7 and 8. This is a team competition, with CASH PRIZES up to $35! So get you team together (up to three people) and email molnar@stolaf.edu (subject: Carlson) with the names and current math classes of your team members.

Last Week's Problem

Peter and Scott are playing a game where they flip a coin until either heads or tails comes up twice in a row. If HH comes up, Peter wins; if TT comes up, Scott wins. So, they have the same chances of winning... until Michael shows up. They decide Michael will win if HT comes up before either HH or TT (figuring HH, TT, and HT each have 1/4 probability of coming up on successive tosses). Now, do Peter and Scott still have the same chances of winning? What are each of their probabilities of winning the three-player game? For more of a challenge, change HH to HHH, TT to TTT, and HT to HHT!

Last week's problem was solved by **Nick Frank '07, Q, Paul Tveite '07, Matthias Hunt '07, Michael Zahniser '04, Senator Zorn**, and Visiting

Master Problem Solver **Randy Bailey**. Only Matthias solved the much harder version. In the basic version, the game must end after no more than three tosses. Of the 8 possibilities (write them out), 3 give the win to Peter, 3 to Michael, and 2 to Scott. So the probabilities are 3/8, 3/8, and 2/8. After consulting with Matthias and Zorn, I think this is the simplest solution to the harder problem:

Let P_H be the probability that Peter wins if the first toss is heads, P_T if the first toss is tails. If tails is the first toss, either TT follows (with probability 1/4) and Scott wins, or we end up back in a situation just as if heads was tossed first. So $P_T = (3/4) \cdot P_H$. If heads is tossed first, Peter has a 1/4 chance of winning outright on the next two tosses, and a 1/2 chance of returning to the "initial tails" state, so $P_H = 1/4 + (1/2) \cdot P_T$. Solving these equations, $P_H = 2/5$ and $P_T = 3/10$, so Peter wins with probability $(1/2) \cdot (2/5) + (1/2) \cdot (3/10) = 7/20$. Michael's chances (convince yourself) are exactly the same. Which leaves Scott with a 6/20 chance of winning.

Problem of the Week

What is the smallest number with exactly 1001 positive factors? Is this the same as the smallest number with *at least* 1001 positive factors?

*** 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.