Colloquium: Buffon’s Needle

Abstract: Suppose you have a shape cut out of cardboard and you want to know its perimeter --- but you don't have any measuring equipment. I will demonstrate an amazing way to measure the perimeter simply by throwing your shape on a hardwood floor. The method works as follows: suppose your shape has perimeter $L$ and the cracks in the floor are distance $D$ apart. Now throw your shape on the floor. Under “optimal conditions,” the probability that your shape will touch a crack is exactly $L/(\pi D)$. It's true!

The idea of doing a random experiment to perform a scientific computation is called the Monte Carlo method. Mr. Buffon accidentally invented this method in the 18th century by throwing things on the floor.

The talk will be accessible to everyone --- including you.

Speaker: Drew Armstrong got his PhD in combinatorics at Cornell University and he is currently an NSF postdoctoral fellow at the University of Minnesota.

In his spare time he likes to throw things on the floor.

Details: Thursday, October 2, 4:00-5:00 p.m., CMC 206

Posting Mathematics and Science

Please come to the annual All Science and Math Poster Session on October 24th in Hulings Atrium 3:45-5:15. Register by Oct 10 if you wish to present.

Epic Systems

Epic Systems Corp in Madison, WI is hosting a “Day in the Field” on October 17th, 9:30-3:30 in Verona, WI for students to hear about the healthcare software industry and job opportunities at Epic. RSVP by emailing Becca Terdich at bterdich@epicsystems.com.

Click This

Numbers, numbers everywhere! Check out the numbers in this YouTube video called “100 Movies, 100 Quotes, 100 Numbers.” Search in YouTube for FEeqG6LdWHU.

Seen at the CMC

By now you’ve probably noticed some new faces around the building. You may be asking yourself “Who are these people?” Well, you’re in luck, check back over the next few weeks as we get to know the newest members of the CMC community. This week: Sue Jandro.

Sue is no stranger to the Carleton campus; she comes to us from the Office of Residential Life, where she worked for the last 14 years. Sue says she is enjoying the change so far, and is slowly getting to know all of us at the CMC.

When she’s not at Carleton, Sue can be found spending time with her family; husband and children, Jessica, 3, Isaac, 9, and Ryan, 14. Take a few minutes to stop in, grab a candy from the bowl, and get to know Sue, Administrative Assistant to the Mathematics and Computer Science Departments.
Check This Out

What are you doing next summer? Next year? After you graduate? Now is the time to start exploring your opportunities. The good news is, while you are looking for potential options, programs are looking for you too. Here are a few to consider:

The Joint Program in Survey Methodology at the University of Maryland is looking for talented undergraduate students for paid research assistantships at Federal statistical agencies in the Washington, DC, area. Application deadline is November 15.

Portland State University encourages you to look into their graduate programs in Mathematical Sciences, Statistics, and Mathematics Education. They offer a department that encourages “a culture of communication, cooperation and consultation.”

The North Central Section of the Mathematical Association of America has two meetings each year, and one of them is just around the corner: October 17-18 in Moorhead. Students are more than welcome!

The 11th Annual Nebraska Conference for Undergraduate Women in Mathematics is a great opportunity to hear undergraduate women give talks about their own research. The registration deadline this year is December 12th.

For more information on these and other opportunities, see postings in the hallway on the second floor of the CMC, or talk to your professors.

Problems of the Week

Reminder: Solutions to these problems that reach my box in the CMC by Tuesday evening will be acknowledged in next week’s Gazette.

1. Consider the following two-player game. Starting with the number 0, the players take turns adding to the current sum; whenever it’s your turn, you can choose whether to add 4 or to add 7. For instance, the first eight turns might result in the numbers:

   4, 8, 15, 19, 26, 30, 34, 41

   If on your turn you can make the new sum end in two zeros (in other words, if your turn leaves a multiple of 100), you win.

   Assuming best play by both sides, is there a winning strategy for either player, or should the game go on indefinitely? If there is a winning strategy, should you move first or second to win, and what will be your strategy?

2. Let \( R^+ \) denote the set of all positive real numbers. Consider a continuous function

   \[ f : R^+ \to R^+ \]

   with the following properties:

   i) \( f(2) = 3 \)

   ii) For all \( x, y \in R^+ \), \( f(xy) = f(x)f(y) - f(x/y) \).

   a) Show that if such a function \( f \) exists, it is unique.

   b) Find an explicit formula for such a function (in particular, this will show that \( f \) exists).

   There was great response to last week's problems from the class of 2012: Sen Zhao, Shao Min Tan, and Danny Chen all solved the first problem, and Shao Min and Danny also submitted essentially correct solutions to the second problem; they should both stop by CMC 217 (the department office) to collect a "C" block or other prize item from the B.B.O.P. Good work, all; looking forward to more of your solutions (as well as to solutions from upperclass students, who surely don't want to be left out!)

   - Mark Krusemeyer