

# Goodsell Gazette

Carleton College  
Northfield MN 55057

The newsletter for the Carleton mathematics and statistics community

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## *Math Across the Cannon*

**B**ob Devaney, Professor in Mathematics at Boston University, will be at Carleton and St. Olaf next Thursday, November 3, to give two talks on his research dealing with fractal geometry and the “chaos game.”

*The Fractal Geometry of the Mandelbrot Set* from 2:30-3:30 PM in Regents Hall 310 (Olaf):

This lecture will describe several folk theorems concerning the Mandelbrot set. While this set is extremely complicated from a geometric point of view, it will be shown that, as long as you know how to add and how to count, you can understand this geometry completely. We will encounter many famous mathematical objects in the Mandelbrot set, like the Farey tree and the Fibonacci sequence. And we will find many soon-to-be-famous objects as well, like the "Devaney" sequence. There might even be a joke or two in the talk.

*Chaos Games and Fractal Images* from 7-8 PM in the Weitz Cinema, with a reception starting at 6:30:

This lecture will describe some of the beautiful images that arise from the "Chaos Game." It will be shown how the simple steps of this game produce, when iterated millions of times, the intricate images known as fractals. The lecture will describe some of the applications of this technique used in data compression as well as in Hollywood. There will also be a challenge for students present to "Beat the Professor" at the chaos game and maybe win his computer.

## *Symmetry in Math*

**F**rank Farris, Benedict Distinguished Visiting Professor of Mathematics, will be giving a talk on Wednesday, November 9 about visual representation in mathematics.

*Seeing Mathematics* from 7-8 PM in the Gould Library Athenaeum:

When it comes to communicating mathematical thoughts, the eyes have it over the ears. Drawing diagrams to supplement proofs is as old as Euclid, but advances in computer graphics make the argument even stronger: For teaching mathematical ideas, the right picture is better than any number of words, especially when our ability to distinguish colors gets involved. We offer images that teach concepts of geometry, simple and complex, highlighting the rich and varied concept of symmetry.

## *Mathematica Policy Research Position: Research Assistant/Programmer*

**M**athematica Policy Research (MPR) is seeking Carleton students to apply for open positions as Research Assistant/Programmer in their 5 national offices (Princeton, NJ; Washington, DC; Cambridge, MA; Ann Arbor, MI; Oakland, CA). MPR encourages those interested to apply by the end of February. More information can be found at:

<https://careers.mathematica-mpr.com> .

Rachel Smyth, a current employee, has offered to respond to any questions Carleton students might have; you can reach her at:

[RSmyth@mathematica-mpr.com](mailto:RSmyth@mathematica-mpr.com) .

### *Attention: Game Theory and Economic Applications in Winter, not Spring*

Lauren Feiler, Professor of Economics, has changed her offering of Game Theory and Economic Applications to winter term, instead of the usual time in spring term. The class will not be offered again this year.

### *Annual NCS Problem-Solving Contest*

The annual NCS problem-solving contest will take place this year on Saturday, November 12, from 9 am to noon. As in past contests, participants will work in teams of up to three on ten problems, which are usually at a wide range of difficulty levels. Our part of the contest will take place here on campus. If you are interested in participating, please let Eric Egge know who will be on your team by Thursday, November 10. If you want to participate but don't have a team, let Eric know that too and he might be able to help you find others with whom you could form a team.

### *Be a MathPath Camp Counselor*

Are you looking for a way to earn some money this summer while having a good time and meeting new people? Consider applying to the MathPath summer camp at Mount Holyoke College in Headley, MA which provides instruction and activities for middle school age students who are highly gifted in mathematics. Room and board is provided in addition to a \$3000 salary and travel reimbursement. Apply online by January 31<sup>st</sup> at [www.mathpath.org](http://www.mathpath.org).

### *University of Pennsylvania Announces New Graduate Program in Robotics*

For more information on UPenn's "Robotics and Perception" Program, or to apply, visit <http://igert.perception.upenn.edu>.

### *PROBLEMS OF THE WEEK*

1. Suppose you start with a regular  $n$ -gon, where  $n$  is at least 5, and you draw in all the diagonals that don't pass through the center. This divides the region enclosed by the regular  $n$ -gon into several parts, one of which contains the center.

a) What is the shape of the part containing the center? How do you know?

b) What is the area of the part containing the center, as a function of  $n$  and of the area of the entire region?

2. Suppose you shuffle an ordinary deck of cards thoroughly and you then deal out a hand of 13 cards from the top. If you consider only the number of cards in each of the four suits (spades, hearts, diamonds, clubs), you are said to be looking at the *distribution* of the hand. Suppose you look at the distribution without regard to the order of the suits. For instance, a 6-3-3-1 distribution might contain six diamonds, three hearts, three clubs, and one spade, but it might equally well contain six spades, three diamonds, three clubs, and one heart. Possible distributions range from the extremely unlikely 13-0-0-0 to the extremely unexciting 4-3-3-3. Which of the many possible distributions is most likely, and why? (Finding an exact argument may turn out to be a challenge, but you should at least give some explanation for your answer.)

Solutions from afar: Last week's first problem was solved by Justin Troyka (who is in Budapest for the term) and by John Snyder in Oconomowoc, WI. As of now, no word on the second problem.

- Mark Krusemeyer

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