# Department of Mathematics

October 9, 2009

## UNDERGRADUATE MATHEMATICS SEMINAR

The next seminar will be

**DATE:** **MONDAY, October 12th**

**Time &** **4:15pm –** Refreshments in the Math Common Room, **Bailey 204**

**Location:** **4:30pm –** Seminar in **Bailey 201**

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

### TITLE: Agreement in Circular and Treelike Societies

ABSTRACT: Suppose you and your scout troop are lost in the woods, and you are trying to agree on a direction to start walking, but you all have your own idea of the best direction. What conditions might guarantee that there is a compass bearing that you would all find acceptable? This is related to mathematical questions about approval voting, where instead of compass bearings, one has candidates. We will look at how small-scale conditions on people's preferences can guarantee that certain large-scale conditions are met (such as having a candidate with the approval of at least half the voters), focusing in particular on conditions related to circles and trees.

No prerequisites, though familiarity with graphs will be helpful.

## Math, Origami, Insects, and Airbags?

The American Mathematical Society has partnered with the American Institute of Physics to contribute toward the production of Discoveries and Breakthroughs Inside Science, video segments on the latest discoveries and applications of mathematics that are aired on local TV news programs nationwide. Several of the video spots on mathematical applications are at http://www.aip.org/dbis/AMS/.

One of the video vignettes discusses origami, and a surprising application to how airbags are folded. In this spot, the work of origami artist and engineer Robert Lang, PhD, is highlighted. Dr. Lang mentions that the origami algorithms used to fold insects are the same ones behind the invention of the air bags in your car.

"An algorithm that origami artists had come up with for the design of insects was the right algorithm to give the creases for flattening an airbag," Dr. Lang said. "So that has now been adopted into airbag simulation code, and presumably automotive engineers are now using those codes to design airbags."

Lang's origami stag beetle

Dr. Lang maintains his own origami website http://www.langorigami.com/. On this site, not only does he have a wonderful display of his creations, he has numerous links to sites that discuss the science and mathematics of origami. In particular, his page http://www.langorigami.com/science/airbag/airbag.php4 discusses airbags and has an animation showing origami folding and an airbag-folding algorithm.

We're Online! Current and Back Issues of the Newsletter Are Available Through the Math Department's Website:

www.math.union.edu

FREE CALCULUS TUTORING
Available at the **Calculus Help Center** in Sorum House

Sun-Thurs, 7:30-10:00pm

## Mathematically Themed Graphic Novel Reviewed by New York Times

In the September 27, 2009 Sunday New York Times Book Review, "Algorithm and Blues," Jim Holt reviewed the recently published graphic novel, **Logicomix**, written by Apostolos Doxiadis and Christos H. Papadimitriou, and illustrated by Alecos Papadatos and Annie Di Donna. As Holt wrote, this is "a comic book about the quest for logical certainty in mathematics. The story spans the decades from the late 19th century to World War II, a period when the nature of mathematical truth was being furiously debated. The stellar cast, headed up by Bertrand Russell, includes the greatest philosophers, logicians and mathematicians of the era, along with sundry wives and mistresses, plus a couple of homicidal maniacs…".

"The story proper opens on Sept. 4, 1939, three days after the Nazi invasion of Poland. Bertrand Russell is giving a public lecture at an American university on the role of logic in human affairs. Angry isolationists in the audience challenge Russell to explain how logic could justify participating in a world war. Ah, he responds, but what is logic?"

In addition to Russell, Holt writes that Logicomix takes introduces it readers to a number of historical mathematical figures, including Georg Cantor, David Hilbert, Henri Poincare, and Alfred North Whitehead, as well as some classic problems, including Hilbert's Hotel (which with its infinite number of rooms, can miraculously accommodate additional guests even when it's completely full) and "The Barber of Seville", (who shaves all men, and only those men, who do not shave themselves. Does this barber shave himself or not?). The full review is available online at http://www.nytimes.com/2009/09/27/books/review/Holt-t.html?emc=eta1

## Problem of the Newsletter: October 9, 2009

Congratulations to **Schuyler Smith** for submitting a winning solution to the Problem of the (last two) Newsletters. A copy of his solution has been posted on the bulletin boards around Bailey Hall.

**Here is this week's problem**: A quick calculus problem. For $f(x)=x^3+6x^2-15x+k$, the absolute maximum and absolute minimum values on the interval $[-10,2]$ have the same absolute value. Find the value of k.

**Professor Friedman** will accept solutions to this problem until noon Thursday, October 15th. 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.