Airplane Puzzles, Games of Strategy, and Reality Television

Speaker: Adam Berliner, ’02
Time: 4pm, Thursday, January 31
Room: CMC 206

Come see what had the speaker yelling at his TV set! In this talk, we’ll see how some pretty interesting mathematics appears in popular culture. Then we will use some graph theory along with combinatorics (and some mathematical savvy) to discuss how puzzles such as magic squares and Sudoku, and games such as Othello, can motivate some pretty interesting and deep mathematics. All math students are invited!

Are You Anxiously Awaiting This? It Seems Probable!

In this week’s Tour of Mathematics talk (Friday, January 25, 3:30pm, CMC 209), Rafe Jones will speak on “Aristocratic Anxiety and Probability Theory”. As always, all are welcome!

How to Spend Your Summer Vacation:

Are you looking for a way to do mathematics or statistics this summer? And maybe even get paid to do so? On Tuesday, January 29 at noon a half-dozen of your fellow math majors, who managed that very trick last summer, will gather in CMC 209 to tell about their experiences. The department will provide pizza, your colleagues will provide valuable advice and information about REUs and other summer programs.

Interested In Medical Science Research?

On January 29, come talk one-on-one with Carleton Alum Scott Kaufmann ’75 about his oncology research at the Mayo Clinic. Sign up through the Tunnel or come to the Career Center. For more information, visit: apps.carleton.edu/career/programs/30_minutes/students/winter2013schedule/.

Career and Summer Opportunities

Acumen, LLC: Acumen, LLC is a rapidly growing healthcare research company led by a Stanford professor with offices just outside San Francisco and in Washington, DC. Employees work on government contracts from a variety of agencies to study the costs and effectiveness of Medicare and Medicaid. The work is appropriate for recent college graduates with mathematics, statistics, programming, economics, or biology experience. Contact Michael Alexander ’12 at mcalexander@gmail.com if interested in joining the growing group of Carls at Acumen.

Johns Hopkins University Center for Talented Youth (CTY): The Johns Hopkins University CTY is seeking instructors and teaching assistants for their summer programs. CTY offers challenging academic programs for highly talented elementary, middle, and high school students from across the country and around the world. CTY is seeking individuals with expertise in a number of mathematics related subjects. For more information, visit: www.cty.jhu.edu/jobs/summer.
**Valparaiso Experience in Research by Undergraduate Mathematicians (VERUM):** The VERUM program is looking for exceptional students who want a research experience that will help them to decide if graduate studies in the mathematical sciences should be part of their future plans. First generation college students, minority students, and women are particularly encouraged to apply. Projects include: Mathematical Modeling in Ecology: What Killed the Mammoth?, Statistics: Estimating the Volatility in the Black-Scholes Formula by Multiple Approaches, and Graph Labelings. For more information, visit: www.valpo.edu/mcs/verum.

**REU at University of Texas at Tyler:** This REU in mathematics targets minority and first generation college students, but encourages everyone to apply. Students will work in groups of three with faculty advisors in the areas of combinatorics on words, knot theory, and tiling theory. The eight-week program will run from June 3 to July 26. Participants will receive a $4000 stipend to pay for housing, food, and entertainment while staying in Tyler. Students must be U.S. citizens or permanent residents to participate. Applications are due by February 11. For more information, visit: www.math.uttyler.edu/reu/.

**REU at Ohio Wesleyan University:** Ohio Wesleyan University’s REU program is in scientific computation, with projects in astronomy, computer science, mathematics, and physics. The ten-week program starts on May 20, 2013. Applications are due March 4. For more information, visit: http://reu.owu.edu.

**The Boston Fed:** The Federal Reserve Bank of Boston is seeking Research Analysts. Qualified applicants have an undergraduate degree in economics or a concentration in mathematics, statistics, or computer science. Applications are accepted through January 31. To apply, visit: www.bos.frb.org/economic/recruit.

**The U.S. Census Bureau:** The U.S. Census Bureau has several employment opportunities in Washington, DC for candidates with mathematics and statistics courses. Opportunities include: Internship Program, Recent Graduates Program, and the Mathematical Statistician position. For more information, visit: census.gov/hrd/www/.

**PROBLEMS OF THE WEEK**

1. Consider the sequence \( (a_n) \) defined by
   \[
   a_{n+3} = 7a_{n+2} - 14a_{n+1} + 8a_n,
   \]
   \[
   a_0 = 4, a_1 = 9, a_2 = 25.
   \]
   Note that the next term is \( a_3 = 7(25) - 14(9) + 8(4) = 81 \). Prove or disprove: \( a_n \) is a perfect square for every \( n \).

2. For positive real numbers \( a \) and \( T \), let
   \[
   F_a(T) = \int_0^T \sin(x^a) \, dx.
   \]
   Find the set of positive real \( a \) for which there exists some positive real \( T \) such that \( F_a(T) = 3 \).

Last week’s problems were both solved by Dylan Peifer and by Justin Troyka; John Snyder, in Oconomowoc, also solved the first problem, with the help of Mathematica. As for the problems posed January 11, the first was solved by Milan Cvitkovic as well as by the three solvers mentioned above. Dylan and John also calculated the determinant (the second problem); Dylan’s calculation was noticeably shorter than mine, and when I post solutions (with any luck, the January 11 solutions will be up by Monday) I intend to take advantage of his method. Milan, Dylan, and Justin can each stop by CMC 217 at their convenience to collect an item from the BBOP. Stay warm, and keep solving problems!

-Mark Krusemeyer

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