

ΓΟΟΔΣΕΛΛ ΓΑΖΕΤΤΕ

Carleton College
Northfield MN 55057

The newsletter for the Carleton mathematics and statistics community

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Eco-Informatics Summer Institute (EISI) Summer 2012

Eco-Informatics, an emerging discipline, integrates mathematics, computer science, statistics, and engineering with the study and management of ecosystems. Through a ten-week undergraduate/early graduate research experience, EISI will provide interdisciplinary training for young scientists to help manage ecosystems in our technologically sophisticated, globalized world. The Research Experience for Undergraduates program runs from June 17th – August 24th, 2012.

Participants will receive:

1. A total stipend of \$4,000.
2. Up to \$500 for transportation
3. Free lodging at the HJ Andrews Experimental Forest
4. 3 meals per day for the first and final weeks of the program.

Applications are due February 17th, 2012.
For more details and application, please go to:
<http://eco-informatics.engr.oregonstate.edu/>

Applications of Mathematics to Physiology and Medicine

The Department of Mathematics at Duke University will conduct an NSF-sponsored Summer workshop on applications of Mathematics to Physiology and Medicine, May 16-23, 2012. The workshop will consist of a series of lectures covering topics in mathematical biology, physiology, cell biology, biofluid dynamics, gene

networks and neuroscience. Students will work closely with faculty mentors on small research projects related to topics of their own choosing and present the results to the group.

Workshop participants must be U.S. citizens or permanent residents and must currently be enrolled in a degree-granting undergraduate program.

Applications are due March 31, 2012
For additional information, visit:
http://cty.jhu.edu/summer/employment/sites_dates.html.

Summer Research/Classes Deadlines Approaching!

Institution: The University of Wisconsin - Stout
Research field: NSF-funded program in geometric and computational methods in algebra and complex analysis.

Dates: 8 weeks starting on June 9th, 2012

Benefits: \$4000 stipend, \$400 meal allowance, travel reimbursement, and support for travel to Joint AMS/MAA meetings in San Diego (2013)

Website and deadline: Application is due on March 1st, and can be found at
<http://www.uwstout.edu/mscs/reu.cfm>

Institution: Macalester College

Research field: NSF-funded program in applied mathematics. The program will be hosted at the IMA facilities at the Twin Cities Campus of the University of Minnesota (UMN)

Dates: 6 weeks starting on June 18th, 2012

Website and deadline: Application is due on March 1st, and can be found at
<http://www.ima.umn.edu/reu>

Valentine's Day Mathematics

Love is in the air, and if your passion for Mathematics is as strong as ours a particular movie might peak your interest. *The Dot and the Line: A Romance in Lower Mathematics* is a fantastic 1965 Academy Award winning short film based on the 1963 book of the same name by **Norton Juster**, best known as the creative genius behind [The Phantom Tollbooth](#), one of the greatest children's books with timeless philosophy for grown-ups. It was inspired by the Victorian novella [Flatland: A Romance of Many Dimensions](#) and tells the story of a straight line who falls in love with a dot.

Advanced Culinary Geometry

A few weeks ago an article was published in the New York Times regarding the ever growing complexity of Pasta noodle shapes and their implications.

To learn more visit:

http://www.nytimes.com/2012/01/10/science/pasta-inspires-scientists-to-use-their-noodle.html?_r=1&ref=science

Sample The Tour?

You're always welcome to attend the weekly Tour of Mathematics talks, whether or not you're registered for the 1-credit course. Next week (Friday, February 10, 3:30 PM, CMC 206), Katie St. Clair will speak on "Sampling in Population Networks." (Steve Kennedy's topic this week is "The Problem with Apportionment.")

PROBLEMS OF THE WEEK

1. Consider the parabola $y = x^2$. Define a sequence of circles "inside" the parabola as follows: C_0 is the largest circle which is tangent to the parabola at the origin and lies above the parabola elsewhere. For $i > 0$, C_{i+1} is tangent to C_i and is also tangent on both sides to the parabola. Find the center and radius of C_{1000} .

2. Suppose you write out the positive integers in base 10, but without separating them, so that you get the string of digits

123 ... 89101112 ... 192021 ... 99100101 ...

If you cut off this string of digits at some finite stage, typically you will have written fewer 0's than any of the other digits (1's, 2's, etc.), because 0 cannot occur as the first digit of any positive integer. However, this effect gets less significant as the individual integers get more digits, and in fact it is not very hard to show that in the limit as $n \rightarrow \infty$, the proportion of each of the ten digits in the part of the string corresponding to the numbers with at most n digits per number (that is, the integers between 1 and $10^n - 1$, inclusive) approaches $1/10$. Now for the problem: What is the smallest n for which the proportion of digits that are 1 in that part of the string (containing the integers between 1 and $10^n - 1$) is within one percent of $1/10$, that is, less than $1/10 + 1/1000$?

Last week's first problem was essentially solved by John Lee, and he should pick up a B.B.O.P. item from CMC 217 at his convenience. John Snyder (in Oconomowoc) also solved both problems, using technology. Meanwhile, I'm expecting to post my own solutions this weekend, at least for the problems posed the first two weeks of this term; so if you are still thinking of submitting solutions for those, please hurry.

Enjoy midterm break! - Mark Krusemeyer

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