

Goodsell Gazette

Carleton College

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The newsletter for the Carleton mathematics and statistics community

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MCM/ICM Contest

Last weekend 18 students (in six teams) spent four days working furiously on applied math problems for the Mathematical and Interdisciplinary Contest in Modeling. Problems included designing traffic egress from a tollbooth area, identifying bottlenecks in airport security checkpoints, recommending "smart growth" strategies for urban areas, and formulating priorities for a human settlement on Mars! Congratulations to Janna Wennberg, Alice Antia, Willa Langworthy, Marshall Ma, Moliang Jiang, Duo Tao, Pedro Girardi, Addison Williamson, Phineas Callahan, Sam Bacon, Ben Stone, Dan Weithers, Frank

Yang, Yuhao Wan, and Il Shan Ng for competing! If you would like to be on a team next year, or are interested in other fun opportunities in applied math, come talk to Rob Thompson (rthompson) anytime!



Student Paper on Stochastic Models for HIV Transmission

Carleton math and statistics majors Michelle Marinello ('17), Rachel Martin ('16), Evan Olawsky ('16) and Maggie Sauer ('16) just learned that their research paper "Stochastic Models for HIV Transmission as a Vector-Host Disease" was accepted for publication in the Minnesota Journal of Undergraduate Mathematics. The paper grew out of the students' comps project last year. In the paper, the students give a novel analysis of the role of needle distribution, along with sexual contact, in the transmission of HIV in prisons.

Konhauser Memorial Problemfest

On Saturday, February 25, the 25th annual Konhauser Memorial Problemfest will happen right here at Carleton! The contest, which is named after the late Macalester professor and legendary problem poser Joe Konhauser, is only hosted at Carleton once every four years. Teams of up to three students get three hours (9 a.m. to noon) to work together on a set of ten challenging and intriguing math problems. The participants then have lunch together while the solutions are graded, and the results are announced right after lunch. The winning team gets to take the famous granite "pizza trophy" home to their college for the year. You can see the trophy on the table in the math department atrium -- last year's top Carleton team ensured it would stay here for its third year in a row. It would be great to have it stick around for another year! To sign up for this year's Konhauser, contact Rafe (rfjones@carleton.edu). Three people can sign up as a team, but individuals are also welcome to express interest

-- it should be possible to find you some teammates.

If you want to see what Konhauser problems are like, and get some practice solving them, drop by the problem-solving group, which meets on Wednesdays 4:30-5:30 pm in CMC 328.

Budapest Reminder

Don't miss out on a Hungarian adventure! If you are interested in attending either the Budapest Semesters in Mathematics this summer or next fall or the Budapest Semesters in Mathematics Education, your first step is to apply to the Math & Stats Department here at Carleton. The form for this can be found at the Math & Stats Department's website under Resources > Off-Campus Opportunities. In order to receive full consideration, your application for the Budapest Semesters in Mathematics is due to the Carleton Math/Stats Department by Monday, January 30. All it takes is for you to complete an online form and submit your transcript. Contact Bob Dobrow (rdobrow) with any questions.

Job, Graduate & Internship Opportunities

Carleton College: Student Fellowships

The Office of Student Fellowships recently held an informational meeting for First-Years, Sophomores, and Juniors about Carleton-funded fellowship opportunities for summer 2017 or for the following winter break. If you are interested in getting funding to work with a faculty or staff member, consider talking to the faculty member about it! The funding is out there, all you have to do it apply. To view the application process visit: https://apps.carleton.edu/fellowships/carleton_fellowships/. But move quickly, the application deadline is February 1.

Science Education Resource Center (SERC)

The Science Education Resource Center (SERC), through their affiliation with the National Association of Geoscience Teachers (NAGT), is hosting two summer internships. They are looking for candidates who are interested in learning about nonprofit management, assisting with their awards program, providing support for a national conference planned in July, engaging with NAGT's elected officers, gaining experience with marketing and publicity, and much more. The positions are located in Northfield and eligible for Carleton summer internship funding through the Career Center. The deadline is February 13 and students should apply via the Tunnel.

Iowa State University: REU

Are you interested in Linear Algebra or Combinatorics? Well, this REU might be just for you! Participants spend eight weeks working on research projects. The projects are in a variety of mathematical areas, representing the diverse research interests of faculty in the ISU Mathematics Department, such as graph theory, numerical analysis, linear algebra, probability, and dynamical systems. Students will work in teams as part of active research groups at ISU. It is all research, although faculty and graduate students help the participants acquire relevant research background. Students are selected by project and each of the projects lists its prerequisites. The application deadline is February 20th. For more information visit: mathreuprograms.org.

Clemson University: pREU and REU

Are you interested in Number Theory? If you've taken Number Theory or a related course such as Abstract Algebra or Cryptography, consider applying to the REU at Clemson University! The REU is an 8 week program focusing on Coding Theory and Number Theory. Students will work in teams of 2-4 students to conduct original research while being mentored by a faculty member. Students will receive a stipend of \$4,000, travel reimbursement up to \$500, a stipend of \$800 for subsistence, and shared accommodations. Clemson University also offers a five week pre-REU program for students with minimal research experience. The application portal can be found at <https://www.math.clemson.edu/ccnt/undergraduate/reu/> and the application deadline is February 15.

Edge 2017

Edge 2017 will be held June 5 - July 1, 2017 at Mills College in Oakland, CA. Edge is a post-baccalaureate and pre-PhD program for women in the mathematical sciences. The goal of the program is to strengthen the ability of women students to successfully complete PhD programs in the mathematical sciences and place more women in visible leadership roles in the mathematics community. Participants receive a \$3000 stipend plus travel, room and board. The application deadline for the program is Friday, March 3, 2017. For more information, visit

Problems of the Fortnight

To be acknowledged in the next *Gazette*, solutions to the problems below should reach me by noon on Tuesday, February 7. (That's the day after midterm break.)

1. Find the area enclosed by the x -axis and the graphs of the relations $x - y = \sqrt{xy}$ and $|x| = 3$.

2. If you write down Pascal's triangle of binomial coefficients and look at the diagonals running from upper left to lower right, you'll first see 1, 1, 1, 1, ...; call this the 0-th diagonal. The next diagonal is 1, 2, 3, 4, ...; note that adding the *reciprocals* of the numbers in this first diagonal leads to the divergent (harmonic) series

$$\frac{1}{1} + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \dots$$

However, for all later diagonals the corresponding series of reciprocals will converge. So for any integer $k \geq 2$ we can consider the sum of that series of reciprocals of the numbers in the k -th diagonal; for instance, for $k = 3$ this would be

$$\frac{1}{1} + \frac{1}{4} + \frac{1}{10} + \frac{1}{20} + \dots$$

Find the value of this sum, as a function of k .

Several people were undaunted by having problems appear on Friday the thirteenth (of January). Specifically, Liyang Liu solved the first problem, and should stop by CMC 217 to collect a B.B.O.P. item. "Auplume" and John Snyder (in Oconomowoc) solved both problems. If the glum weather, or some political development, or anything else, has you down - why not distract yourself for a bit by trying a problem or two?

- Mark Krusemeyer

If you're having trouble seeing the problems of the fortnight, try enabling images for the message.



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