



Goodsell Gazette

Carleton College

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Northfield, MN 55057

The newsletter for the Carleton mathematics and statistics community

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Welcome Back!

We hope everyone had a wonderful break and a great first two weeks as Winter Term gears up again at Carleton! The next eight weeks in the Math & Stats Department promise excitement and adventure: Abstract Algebra has demonstrated its popularity with over forty students enrolled in the class, Gail Nelson is instructing students in advanced topics in analysis in her Real Analysis II course, and another batch of statistics students is gaining a deeper understanding of analyzing data sets in Statistical Inference. No matter what you're most interested in, the Math & Stats Department has something for everyone -- stay tuned via the Goodsell Gazette (published biweekly!) for the current goings-on in the CMC.

Mathematics and Statistics Colloquium

Speaker: Katy Micek, PhD

Date/Time: Tuesday, January 16, 4:00-5:00 p.m.

Location: CMC 206

Want to learn about data science and research in industry?

Dr. Katy Micek, Data Scientist at 3M, is visiting to speak about her work and her career path. Stay tuned for more info on the talk (which will be posted on the bulletin board and via the Math & Stats interest list).

Budapest Reminder

Are you interested in going on the Budapest Semesters in Mathematics or Budapest Semesters in Mathematics Education study abroad program next summer or fall? If you are, your first step is to apply here at Carleton! Applications are now available and 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 program is due to the Carleton Math & Stats Department by January 29. We will be having an information session on Thursday, January 18 at 4 pm in CMC 206. Contact Gail Nelson (gnelson) with any questions.

Problem Solving Group

If you have always really enjoyed the problem-solving aspect to your classes, then the problem-solving group is just for you. Come join us in CMC 328 from 4:30-5:30 on Wednesdays, where we will work on solving some fun and challenging math problems together. All are welcome. This term we will focus on working problems from past editions of the Konhauser problemfest, a semi-legendary local team competition that features fun and challenging problems of a variety of difficulty levels. Watch the Gazette for information later this term on how to sign up. Rafe Jones will be hosting the session. You can contact him for more information at (rfjones@carleton.edu).

Math & Stats Interest List

Sign up for the Math & Stats interest email list! Sign up to keep updated on events and opportunities around the Math & Stats Department. Send a blank email to mast-interest+subscribe@carleton.edu to join. (This email list is separate from the list for majors.)

Carleton Teams Capture High Placings in NCS Contest

Late last fall four teams of Carleton students were among the 67 teams from 27 colleges and universities in the region who competed in the annual NCS problem-solving contest. The results of the contest came in after the last Gazette of the fall, but all the Carleton teams acquitted themselves admirably. Leading the charge was the team of Weijia Ma and Emma Qin, who placed third. The team of Will Hardt, Peter Illig, and Neeraja Kulkarni was close behind in fifth place, while the team of Haoyi Wang, Terry Wang, and Rosa Zhou took home ninth place. The all first-year team of Ian Klein, Elwood Olson, and Logan Peters put in a solid showing as well. Congratulations to everyone who competed!

Celebrate Math Week

Sibley Elementary is looking for Carleton Computer Science, Math, and Stats students to volunteer and help celebrate math week, January 22-25 at their school. If you are interested, please send an email to Megan Holleran: holleran.megan.ann@gmail.com.

Impossible Objects

The Mathematics of 3D Illusions

When: Wednesday, February 21, 7pm

Where: Coffman Memorial Union, University of Minnesota

Kokichi Sugihara, a professor at Meji University in Tokyo, Japan will be giving a talk at the University of Minnesota as part of their IMA (Institute for Mathematics and its Application) Public Lecture Series. In this

lecture, Sujihara will show the various behaviors of "impossible objects," together with the mathematics behind them, and consider why human perception is so easily fooled by these kinds of visual illusions. For more information about the talk, visit: www.ima.umn.edu.

Upcoming Events

Week 3, Tuesday, January 16, 4:00pm
Katy Micek Talk - CMC 206

Week 3, Thursday, January 18, 4:00pm
Budapest Information Session - CMC 206

Job & Internship Opportunities

Vassar College, TEU

The Teaching Experience for Undergraduates (TEU) program (teu.vassar.edu) is accepting applications for the summer 2018 math and science programs through February 28th. TEU provides a rich summer experience for undergraduates from 61 partner liberal arts institutions who are interested in secondary STEM teaching careers. Applications and recommendations may be submitted directly online at the TEU website.

Wells Fargo, Sophomore Financial Analyst Internship

Sophomore Summer program participants will have the opportunity to work in a Wells Fargo office in a major city in the U.S. They will gain early exposure to the business world, have access to mentors and senior leaders who will provide guidance, network at firm-wide events that will ensure exposure to all the areas within Wells Fargo, engage in hands-on exploration of the credit and lending career path, develop an understanding of how academic and professional careers relate. Participants will also participate in a number of social activities throughout the summer to get to know the corporate culture, interact with other summer interns, as well as participate in our team member networks. Visit the Tunnel to learn more about the qualification and details of this position. The deadline to apply is January 16.

Summer Break Research Funding Opportunity

Are you considering doing research at another institution? Carleton may be able to help fund this research. The Kolenkow-Reitz Fund provides student stipend and travel support for Carleton students working with non-Carleton science and math faculty at another institution during summer break. Awards fund student stipends (\$450/week for full-time work) for up to 10 weeks and can include expenses for travel and research supplies. No award will exceed \$5000. Students must work full-time in order to qualify. Carleton students are eligible to apply for this funding. Before applying, students should have already contacted and discussed the nature and timing of their project with the person they are planning to work with, as well as a faculty member at Carleton who can vouch for the project. The application deadline is Friday, February 2. More details are available in the application form, which you can find here: <https://apps.carleton.edu/mathscience/faculty/studentresearchaway/>

NIST SURF Program

The SURF Program is designed to inspire undergraduate students to pursue Ph.D.s and/or careers in STEM (science, technology, engineering, and mathematics) through a unique research experience that supports the NIST (National Institute of Standards and Technology) mission. Over the course of 11 weeks, SURF participants majoring in biology, chemistry, computer science, engineering, materials science, mathematics, nanoscale science, neutron research, statistics, and/or physics contribute to the ongoing research in Boulder, CO or Gaithersburg, MD. It is anticipated that successful SURF students will move from a position of reliance on guidance from their NIST research advisors to one of research independence during the program period. The application deadline is February 12. To get more details, visit: NIST.GOV/SURF.

National Association of Geoscience Teachers, Summer Internship

The Science Education Resource Center (SERC), through their affiliation with the National Association of Geoscience Teachers (NAGT), is hosting a summer internship. They are looking for good, quality candidates that 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 deadline for applying is February 25 through the Tunnel.

Travelers, 1:1 Sessions

Are you looking to expose yourself to different industries and get a better idea of what you might want in the future? Find out what an actuary is and does, and if you are interested, find out how you can better prepare yourself while at Carleton for a future position as an actuary. Learn about actuarial careers from Carleton alumni working at Travelers Insurance! Dotty ('01) works with international insurance, Stephen ('05) creates predictive models, and Anne ('16) can speak to the exam process. Come and learn! RSVP for 1:1 sessions for Tuesday, January 16 via the Tunnel.

University of Nebraska - Lincoln, Summer Research Program

The Nebraska Summer Research Program offers students an excellent opportunity to hone research skills and to experience life as a graduate student at a Big Ten university. Students will enhance their academic resume, work closely with faculty and peers, and have fun with social and professional development activities, all while receiving numerous benefits. The online application makes it easy for students to apply for up to three different research groups. Priority review of applications begins February 1 and all applications are due by March 1. For more information, visit: <https://www.unl.edu/summerprogram/home>.

Problems of the Fortnight

To be acknowledged in the next *Gazette*, solutions to the problems below should reach me by noon on Tuesday, January 23.

1. A prime number p is called a *Germain prime* (after the number theorist Sophie Germain) if $2p+1$ is also a prime (which might or might not be another Germain prime). For example, 1009 is *not* a Germain prime, because $2 \cdot 1009 + 1 = 2019 = 3 \cdot 673$ is not prime. On the other hand, 509, which is prime, is a Germain prime, because $2 \cdot 509 + 1 = 1019$ is another prime; in fact, $2 \cdot 1019 + 1 = 2039$ and $2 \cdot 2039 + 1 = 4079$ are also prime, so 509, 1019, 2039 are all Germain primes. Alas, $2 \cdot 4079 + 1 = 8159$ factors as $41 \cdot 199$, so our sequence of “linked” Germain primes ends with 2039. Now for the problem: Does there exist an infinite sequence of “linked” Germain primes, such that all numbers in the sequence are prime and each number q in the sequence is followed by $2q+1$? Why, or why not?

2. Suppose you have a regular 2018-gon $X = P_1P_2 \dots P_{2018}$ in the plane whose center is at the origin, and you have 2018 equal weights, of which you must use at least one. The way to use a weight is to put it at one of the vertices $P_1, P_2, \dots, P_{2018}$ of X ; at each vertex there is only room for one weight. When you are done placing the weights you are going to place, the weights should be balanced, that is, the center of gravity of X should be at the origin. (In particular, you actually have to use at least two of the weights, because a weight at a single vertex will definitely throw the polygon out of balance.) How many different balanced configurations of weights can you end up with? (Two configurations are only considered the same if the weights are at exactly the same vertices.)

The second problem posed November 11 was solved by John Snyder in Oconomowoc; unless I lost track of something in the massive sorting of things in my office over the break (if so, apologies!) or in my e-mail, there isn't anything else to acknowledge at the moment. However, in the “better late than never” category, I've now posted my own solutions to all problems from last term in the hallway outside CMC 217. Looking forward to getting more of your solutions this term!

- Mark Krusemeyer



Editors: **Saahithi Rao, Liz Sattler**

Problems of the Fortnight: **Mark Krusemeyer**

Web & Subscriptions: **Sue Jandro**

