



# Goodsell Gazette

Carleton College

January 11, 2018

Northfield, MN 55057

The newsletter for the Carleton mathematics and statistics community

Vol. 36, No. 07



---

## Winter Term!

We hope everyone had a wonderful break and a great first week as Winter Term begins at Carleton! The next nine weeks in the Math & Stats Department promise excitement and adventure: Real Analysis proved its popularity with a full class, Gail Nelson is instructing students in advanced topics in Geometry in her Differential Geometry course, and another batch of statistics enthusiasts are learning how to manipulate and visualize data in Intro to Data Science. 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.

---

## Welcome Back Gathering

Did you miss your Math and Stats friends? Do you want to make new Math and Stats friends? Come to our first department social this term! It will be held in CMC 210 on Monday (01/14) from 4-5 pm. Stop by, make Math jokes and eat some homemade dessert made by the SDAs.

---

## Budapest Reminder

Are you interested in studying abroad in beautiful, historic Budapest with either the Budapest Semesters in Mathematics or the Budapest Semesters in Mathematics Education program? There will be an information session with directors of these programs on Thursday, January 24, 3:30-4:30 in CMC 206.

If you are applying to either program, you need to apply to our department, either before you apply or at the same time. The department as a whole then acts as your recommenders, so you don't need to request individual recommendations from members of the department. The application to the department is online (<https://apps.carleton.edu/curricular/math/resources/opportunities/>) and due by February 3.

If you have any questions, ask Deanna ([dhaunspe@carleton.edu](mailto:dhaunspe@carleton.edu)).

---

## 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](mailto:rfjones@carleton.edu)).

---

## **MCM/ICM contest**

The MCM/ICM contest is an international undergraduate math and statistical modeling competition that is being held this year Jan. 24-28. Teams of three students get to select one of six problems to work on during the competition. This year there are two mathematical modeling problems, one data problem and three interdisciplinary problems to select from. Results are submitted electronically and cash prizes are awarded to winners! To learn more about the competition check out their website: <http://www.mcmcontest.com/>. If you are interested in competing, please fill out this interest form by 4pm Wednesday, Jan. 16: <https://goo.gl/forms/LWGS7tTjqlfUBsoq2>. Contact Katie St. Clair ([kstclair@carleton.edu](mailto:kstclair@carleton.edu)) with questions.

---

## **Carleton Alums present at Oxford**

Two Carleton graduates, Joseph Slote and Thomas Bertschinger, presented a paper "Knot Embeddings in Improper Foldings" at the 7th International Meeting on Origami in Science, Mathematics and Education (7OSME) at Oxford University in September 2018. Their work was included in Volume Two of the proceedings from the conference, *Origami*<sup>7</sup>. The work was based on their comps research with Deanna Haunsperger in 2016.

---

## **Carleton Teams Capture High Placings in NCS Contest**

Late last fall four teams of Carleton students were among the 60 teams from 23 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, finishing in the top third of the teams. Leading the charge was the team of Ian Seong, Haoyi Wang, and Yuheng Wang, who placed 8th. The team of Erik Carlson, Hiromichi Ueda, and Arthur Zhang took home 15th place. Close behind them were the teams of Sara Canilang, Patty Commins, and Milena Silva (17th) and Duc Nguyen, Noah Pinkney, and Juanito Zhang Yang (18th). Congratulations to everyone who competed!

---

## **Summer Science Fellowship**

The goal of the Summer Science Fellowship is to broaden participation of historically underrepresented groups (including gender, ethnicity, socioeconomic background, and disabilities) in the sciences/math.

Carleton Summer Science Fellows will have the opportunity to work in a research lab either at Carleton or at another institution for two summers with a summer stipend of \$4600. Summer Science Fellows will be expected to enroll in the one credit Science Fellows Research Colloquium in the spring before and the fall following their research experience. Only first and second year students are eligible. The deadline is today at 5pm.

---

## **NFL Data Science Competition**

The NFL's inaugural Big Data Bowl is here. This sports analytics contest from NFL Football Operations is looking for talented members of the analytics community --- from college students to professionals --- to contribute to the NFL's continuing evolution in the use of advanced analytics. After forming teams and registering, students will be provided more instructions. Note that the submission deadline is January 22. For more information, visit: <https://operations.nfl.com/big-data-bowl/>.

---

## **Upcoming Events**

**Week 2**, Monday, January 14, 4:00pm  
Welcome Back Gathering - CMC 210

**Week 4**, Thursday, January 24, 3:30pm  
Budapest Information Session - CMC 206

---

## **Job & Internship Opportunities**

### **Arizona State University, MTBI Summer Program**

MTBI is an intensive summer research experience (REU) that prepares undergraduate students for the rigors of graduate level research at the interface of mathematics, statistics, and the natural and social sciences. Select students are invited to Arizona State University for eight weeks, where their time is split between classroom instruction on research methods and hands-on research projects. The application deadline is January 31. For more information, visit: <https://mtbi.asu.edu/summerprogram>.

### **Vassar College (TEU)**

The Teaching Experience for Undergraduates (TEU) program ([teu.vassar.edu](http://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.

### **Ross Mathematics Program**

The Ross Mathematics Program is a residential summer program for high school students who are deeply interested in mathematics. This Program has two sites, one for 6 weeks in Columbus, Ohio, the other for 5 weeks in Zhenjiang, China. At Ross, high school students take an intensive course in Number Theory, involving challenging daily problem sets. Those students are supervised and mentored by Counselors.

Those Counselors grade papers, provide advice on problem solving and proof-writing, participate in more advanced math classes, and have opportunities to present their own informal math lectures. For further information about Ross Counselor jobs, visit <https://rossprogram.org/counselors/>.

### **Privacy Tools Project**

The Privacy Tools Project develops ways for scientists to share research data for producing open, replicable science without compromising the privacy of the individual research subjects whose data is used. Past students have written and contributed to publishable research papers in this fast-moving field, and we expect the same in future years. The Privacy Tools Project seeks students, interns, postdocs, and visiting researchers in Computer Science, Statistics, Government, Mathematics, Law, and Social Sciences with quantitative experience, particularly those with an interest in learning about or working on Data Privacy. For more information, please visit:

[https://cyber.harvard.edu/getinvolved/internships/privacy\\_tools](https://cyber.harvard.edu/getinvolved/internships/privacy_tools).

### **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 (\$470/week for full-time work) for up to 10 weeks and can include expenses for travel and research supplies. Additional expenses up to \$500 can be requested to help defray travel or research supply expenses. Note that 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, March 15. More details are available in the application form, which is found here:

<https://apps.carleton.edu/mathscience/faculty/studentresearchaway/>

### **The Center for Effective Philanthropy, Analyst**

Analysts work closely with CEP's energetic and diverse staff to provide philanthropic foundation executives, boards, and staff with data-driven insights to enhance the effectiveness of their work. The core function of the role is to create reports and compelling written recommendations based on the results of standardized surveys of grantees, staff, and donors that CEP conducts on behalf of philanthropic foundations. Analysts also work with individual foundations or groups of foundations on customized engagements focused on issues of strategy, performance assessment, and organizational effectiveness. For more information, visit: [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

First of all, many thanks to Mike Cohen, who produced problems last term while I was on leave. To begin the new year, here are two problems involving the number 2019. Correct solutions will be acknowledged in the next *Gazette* if they reach me by noon on Tuesday, January 22. (Solutions can be put in my box in the CMC, sent there through campus mail, or e-mailed as pdf files or within the text of an e-mail.)

1. For the purposes of this problem, define a *string* to be a finite sequence of 0's and/or 1's, and say that two strings *commute* if the result of writing them next to each other does not depend on the order in which they are written. (For example, 11 and 111 commute; 101 and 101101 also commute, but 101 and 010 don't commute, because 101010 and 010101 are not the same string.)

- a) How many pairs  $(x, y)$  are there so that  $x$  is a string of length 2019,  $y$  is a string of length 67300, and  $x$  and  $y$  commute? How do you know?
- b) What happens to the answer from part a) if the numbers 2019, 67300 are replaced by  $m, n$ ?

2. Without using technology, evaluate the integral

$$\int_2^3 \frac{x^{2019} + 1}{x^{2020} - x} dx .$$

Mike reports that the last four problems from fall term were solved by "Auplume", but alas not (that he knows of) by any Carleton students. Stay warm, and good luck on the new problems!

- Mark Krusemeyer



*Editors:*            **Saahithi Rao, Owen Biesel**

*Problems of the Fortnight:* **Mark Krusemeyer**

*Web & Subscriptions:*    **Sue Jandro**

