Goodsell Gazette

Carleton College *13 January 2017*

Northfield, MN 55057 *The newsletter for the Carleton mathematics and statistics community* *Vol. 35, No. 09*

Welcome Back!

We hope everyone had wonderful breaks and a great first week as Winter Term gears up again at Carleton! The next nine weeks in the Math & Stats Department promise excitement and adventure: Real Analysis 1 proved to be such a big draw for students it was expanded from a single section to two; similarily, probability has demonstrated its popularity with over forty students enrolled in the class. 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.

Carleton Teams Score Big in NCS Contest

Late last fall three teams of Carleton students competed in the annual NCS problem-solving contest. The results of the contest came in after the last Gazette of the fall went to press, but we're thrilled to announce that all three Carleton teams finished in the top 10. Congratulations to Marshall Ma, Ian Seong, and Ben Stone, who placed sixth, to Shilin Ma and Weijia Ma who placed eighth and to Liyang Liu, Frank Yang and Yuhao Wan who placed tenth.

Budapest Reminder

Are you interested in going on the Budapest Semesters in Mathematics or Budapest Semesters in Mathematics Education study abroad program next fall? If you are, then get started on your application right away! The form can be found at the Math & Stats Department's website under Resources > OffCampus Opportunities. In order to receive full consideration, your application for the program is due to the Carleton Math Department by January 30. Contact Bob Dobrow (rdobrow) with any questions.

Problem Solving

If you like solving math problems, and want to hone your skills, come to our weekly problem-solving meeting! It meets every Wednesday from 4:30 to 5:30pm in CMC 328. This term we are delighted to have Jacob Spear '16 assisting with the sessions. Each week will feature a short handout with problem-solving strategies and practice problems organized around the strategies. The big problem-solving event this term is the annual Konhauser problemfest (more info on that in a future Gazette edition), and we will be working many practice problems from past versions of that exam. Feel free to just show up to a session: no advance prep required. If you have questions, contact Rafe Jones at rfjones@carleton.edu.

Job, Graduate & Internship Opportunities

Federal Reserve Bank of San Franciso: Economics Research

The Federal Reserve Bank is looking for recent graduates to join the Economic Research Department as Research Associates this summer at the San Franciso Federal Reserve. Research Associates work closely with economists at the top of their fields on a variety of research questions and real-world policy issues while developing a toolkit

beneficial for graduate study and future career paths. Research Associates typically stay with the Department for two years, with many going on to competitive graduate programs. Candidates should have intermediate coursework in economics and a strong foundation in mathematics and statistics. Prior research experience, programming experience, and familiarity with statistical programming packages is a plus. The positions are full-time and salaried. Questions regarding the position and application can be directed to SF.ER.RArecruiting@sf.frb.org. Candidates can find addtional information and apply at: http://www.frbsf.org/our-district/careers/search-for-jobs/?job=516140

Teaching Experience for Undergraduates

Have you ever thought about teaching at the high school level? Well, the Teaching Experiences for Undergraduates (TEU) program is a seven-week immersive summer experience in secondary science education at Brown University in Rhode Island and Trinity College in Hartford, CT, funded by the National Science Foundation. TEU participants earn a generous stipend, take a 60-hour course in science pedagogy, and apply what they're learning to teaching urban high school students under the supervision of a master teacher-mentor. If you are committed to a career in secondary education or seriously interested in exploring the possibility of such a career, apply now. For more information and to apply, visit TEU.vassar.edu.

National Center for Atmospheric Research: Summer Internship

The Summer Internships in Parallel Computational Science (SIParCS) program at the National Center for Atmospheric Research (NCAR) offers undergraduate and graduate students significant hands-on R&D opportunities in high performance computing (HPC) and related fields that use HPC for scientific discovery and modeling. This program embeds students as summer interns in the Computational and Information Systems Laboratory (CISL), an organization within NCAR. CISL is charged with provisioning supercomputing and data systems to the geosciences research community, as well as conducting research and development in computational science, data analysis, scientific visualization and numerical modeling. These twin roles of service and research in CISL support NCAR's broad scientific mission of discovery in the atmospheric and related sciences. Visit https://www2.cisl.ucar.edu/siparcs for more information.

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 3, 2017. More details are available in the application form, which you can find here:
https://apps.carleton.edu/mathscience/faculty/studentresearchaway/

Problems of the Fortnight

To be acknowledged in the next *Gazette*, solutions to the problems below should reach me by noon on Tuesday, January 24.

1. A fixed integer N is the product of two distinct primes. Integers from the set $\{1, 2, \ldots, N\}$ will be chosen randomly, with replacement, until the product of all the integers chosen is divisible by N. The expected value of the number of integers that will be chosen is $\frac{277}{5}$. Find (with proof, of course) the integer N.

2. Suppose a particle starts at the point $(0, 1)$ in the plane, heading due northeast, and continues to travel at some constant speed so that at any point (x, y), its direction is 45 degrees to the right from the direction that is away from the origin. (For example, at the initial point $(0, 1)$, the direction away from the origin is due north, and so the particle starts off heading northeast.)

   a) Explain why the particle will eventually leave the first quadrant.
   b) At which point in the plane will the particle leave the first quadrant?

Solutions to all problems posed last term have now been posted in the hallway outside CMC 217. Before that, of the problems posed November 11, the first was solved by "Auplume" and by John Snyder (in Oconomowoc), while the second was solved by "Möbius Quip". Good luck with problem solving (and other activities) in the new term!

- Mark Krusemeyer

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

Editors: ***Saahithi Rao, Steve Kennedy***
Problems of the Fortnight: ***Mark Krusemeyer***
Web & Subscriptions: ***Sue Jandro***