

ΓΟΟΔΣΕΛΛ ΓΑΖΕΤΤΕ

Carleton College

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Northfield, MN 55057

The newsletter for the Carleton mathematics and statistics community

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Mathematics and Statistics Colloquium

The Math/Stats Colloquium Series will be held virtually Tuesday, January 26, from 4:00 pm --- 5:00 pm, with an informal "tea" held before the talk at 3:30 pm, where you can drop by and connect with others in the Math/Stats Department.

We are pleased to welcome Dr. Mel Currie, former Chief of the Cryptographic Research and Design Division at the NSA. The Zoom details will be sent out via the mast-interest mailing list, so be sure you are on the list! (Email sjandro@carleton.edu to join the mailing list.)



Title: A Little Magic with Combinatorics and Analysis

Speaker: Dr. Mel Currie

Abstract: We'll take a look at how baking a nice bowl of combinatorics with a dash of analysis yields Brouwer's Fixed Point Theorem in the two-dimensional case. We'll leave with a sense of why it must hold in higher dimensions as well. Shades of algebraic topology!

Congratulations to Deanna Haunsperger

Recipient of the Yueh-Gin Gung and Dr. Charles Y. Hu Award for Distinguished Service to Mathematics

The 2021 award goes to Deanna Haunsperger for her prolific service to mathematics, including with the Mathematical Association of America; for her influential leadership of women in mathematics; for her long focus on inclusion and on building inclusive mathematical communities; and for a laudable career that has been rich in mathematical research, mathematical education, and mathematical exposition.

Read more at

www.maa.org/sites/default/files/Awards/Deanna%20Haunsperger%20-%20Gung%20and%20Hu.pdf

Budapest Semesters in Mathematics or Mathematics Education

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?

If you are applying to either program, you also need to apply to Carleton for OCS permission, as well as to the math/stats department. The department as a whole then acts as your recommenders, so you don't need to request individual recommendations from members of the department. These forms, along with more information about the programs, are available at

<https://www.carleton.edu/math/further-opportunities/off-campus/> and are due by January 31st.

If you have any questions, contact Owen Biesel (obiesel@carleton.edu).

Summer Research Opportunity

Are you interested in doing research in statistics with Math/Stat department faculty this summer?! We have two research projects in statistics that are described on our department website at <https://www.carleton.edu/math/further-opportunities/on-campus-research-opportunities/>. The form to apply for these positions is also on this webpage. We'll accept applications through the end of the month.

Summer Science Fellowship

The goal of the Summer Science Fellowship is to broaden participation of historically underrepresented groups (based on gender, race, ethnicity, socioeconomic background, or disability) in the sciences and math. This fellowship is targeted towards first and second year students only and comes with a 2 year summer stipend of \$480/week. The deadline for applications is January 28th at 5pm. Any questions can be sent either to Vermilion Villarreal (villarrealv@carleton.edu) or Amy Csizmar Dalal (adalal@carleton.edu).

Apply at <https://www.carleton.edu/math-science/research/summer-fellows/>.

Job, Internship, & Other Opportunities

Marquette University - Data Science Across Disciplines REU

The Data Science Across Disciplines Research Experiences for Undergraduates (REU) program is seeking motivated undergraduate students of all levels majoring in data science, computer science, statistics, mathematics or related areas, to join their summer 2021 program.

This program, sponsored by National Science Foundation and hosted by Marquette University (WI), will immerse undergraduate students in an interdisciplinary research-intensive training and mentoring opportunities. Find more information at <https://reu.cs.mu.edu/> and apply by February 15.

Ross Mathematics Program - Camp Counselor

We are looking for math graduate students or upper division undergraduates who have taken a college course in Abstract Algebra and are familiar with some elementary number theory. Counselors also need strong social skills to enable them to take leading roles in supervising and guiding teenagers.

The 2021 Ross Program will be an intensive, six-week, online math camp for high school students who are deeply interested in mathematics. Students take a proof-based Number Theory course that involves challenging daily problem sets. Each Ross counselor supervises a small group of students, grading their written work and providing advice on proof-writing and problem-solving. Counselors can also participate in more advanced math classes, and have opportunities to present their own informal math lectures.

The 2021 Program will be online for 6 weeks, Sunday June 27 through Friday August 6, 2021. Ross Counselors receive a base salary of \$3000. There will be opportunities for additional pay as extra tasks arise. Visit <https://rossprogram.org/counselors/> for further information about this job.

Mastery Learning Hour - Volunteer Tutors

Mastery Learning Hour is a new non-profit project which provides free math tutoring to K-12th grade children via zoom. We work with Title I schools and provide tutoring in English and Spanish. We need more student volunteers to help us meet the needs of the millions of families who are struggling to learn during the pandemic.

One of the most challenging impacts of the pandemic is that it has further widened the educational gap between children who have access to private tutoring and those who don't. We currently have hundreds of kids on our waiting list and are urgently seeking more student volunteers who can donate an hour a week of their time to help children with math.

Contact manisha@masteryhour.org or apply at <https://www.masteryhour.org/>.

Brown University - Summer Undergraduate Research Program

The Summer@ICERM program at Brown University is an eight-week program designed for a select group of 18-22 undergraduate scholars. It comes with a \$3,570 stipend. (Providence, RI room, board, and travel funding provided for in-person programming, pandemic permitting.)

The faculty advisers will present a variety of research projects on the theme of computational polygonal billiards and flat surfaces. This overarching theme will allow participants to use the theory of flat surfaces, along with the computational tools of pre-existing free software including Sage packages, to work on open problems in the field.

Throughout the eight-week program, students will work on their assigned projects in groups of two to four, supervised by faculty advisors and aided by TAs. Students will meet daily, give regular talks about their findings, attend mini-courses, guest talks, and professional development seminars, and will acquire skills in free software development. Students will learn how to collaborate mathematically, working closely in their teams to write up their research into a paper. Applications submitted by February 14, 2021, will receive full consideration. Find more information and apply at <https://icerm.brown.edu/summerug/2021/>.

Upcoming Events

Week 4

Tuesday, January 26, 4:00 - 5:00pm

Problems of the Fortnight

To be acknowledged in the next *Gazette*, solutions to the problems below should reach me by noon on Tuesday, February 2.

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 $1, 1, 1, 1, \dots$; call this the 0-th diagonal. The next diagonal is $1, 2, 3, 4, \dots$; 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 .

At press time, correct solutions (modulo a tiny computational error in one case) to the first problem from January 8 had arrived from Erin Watson, Sebastian VanDer Ploeg Fallon, and "Auplume". Sebastian and "Auplume" also solved the second problem, and rumor has it that another solution to that problem may be on the way. Meanwhile, Sebastian and Erin should both consult with Sue Jandro to make arrangements to collect a B.B.O.P. item. Good luck on the new problems, all!

- Mark Krusemeyer



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