

Goodsell Gazette

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 on Tuesday, February 9 from 4:00 to 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 Madeline Handschy from NextEra Analytics. 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: Optimizing the performance of coupled renewable energy and energy storage resources

Speaker: Madeline Handschy

Abstract: Renewable energy sources - solar and wind - are inherently variable, and unlike a traditional power plant, energy generation can't be 'turned up' or 'turned down' at will. In the past several years, the rapidly falling price of Lithium Ion batteries and related technology has made it more feasible than ever to build solar or wind farms coupled with energy storage capabilities to mitigate some of the variability of the renewable resource and provide more control over the energy output of the farm. In this talk, I will give an overview of working at NextEra Analytics and give examples of how we are applying math to operate energy storage projects as well as evaluate potential new renewable + energy storage hybrid projects.

Putnam Signup Time is Here!

It's time to register for this year's William Lowell Putnam Mathematical Competition. The "Putnam" is a giant among college math problem-solving contests -- a challenging exam focusing on mathematical insight and ingenuity. Typically, several thousand undergraduates across the United States and Canada participate, and the median score is usually less than 10 out of a possible 120. So if you get one of the twelve problems right, you're doing great!

This year the contest will be held on Saturday, Feb. 20 in "unofficial mode." That means signup and participation are easy. To sign up, just fill out the short form here: aops.com/contests/putnam/student.

The contest will be "self-administered." Arrangements haven't been made public, but I would guess you'll download the problems and work on them wherever you like. The contest typically runs in two sessions, a

3-hour morning session for the first six problems, and a 3-hour afternoon session for the second six problems. You can spend however much time you like (up to the 3-hour max for each set).

If you have any questions, send them to me at rjones@carleton.edu. Whether you've participated in the Putnam contest before or are considering doing so for the first time, you'll probably enjoy getting experience with past Putnam problems (and learning some new problem-solving strategies) at our weekly problem-solving group, which meets every week on Wednesday, from 4:30 to 5:30. Contact me for the zoom link and if you'd like to be added to our problem solving email list.

Kolenkow-Reitz Fellowship Information Session

The Kolenkow-Reitz Fellowship (www.carleton.edu/math-science/research/studentresearchaway) provides research support for Carleton students working with non-Carleton science and math faculty at another institution during the summer. These research opportunities are intended to encourage Carleton students' development as scientists and their exploration of mathematics and the sciences as a possible career, and are appropriate for students at any stage of their STEM exploration! At this information session, we'll demystify what the fellowship is all about, how to find opportunities, how advisors and trusted faculty members can help students find opportunities, and what the application process looks like.

Date: Tuesday, February 9, 2021

Time: 12:25-1:25pm

The application deadline is 5:00 PM on Monday, March 29, 2021. Questions? Contact Amy Csizmar Dalal (adalal@carleton.edu) or Stephanie Schroeder (sschroeder@carleton.edu).

Upcoming Events

Week 6

Tuesday, February 9, 12:25 - 1:25pm

Kolenkow-Reitz Fellowship Information Session - Zoom

Tuesday, February 9, 4:00 - 5:00pm

Madeline Handschy Colloquium Talk - Zoom

Job & Internship Opportunities

Big Data Summer Institute - University of Michigan

This part-time 8-week virtual summer institute will introduce undergraduate students to emerging challenges at the intersection of Big Data, Statistics, and Human Health. The program will include contributions from a diverse group of University of Michigan faculty in the biomedicine and public health fields and their perspective of big data. Working in teams, students will participate in mentored big data research projects. Program dates are June 7 - July 30, 2021. Visit www.BigDataSummerInstitute.com for more information.

Data Science Summer Intern - Proofpoint

This opportunity is brought to us by a Carleton alum, Ryan Skinner '13 (Physics). You are highly encouraged to reach out to Ryan via LinkedIn with any questions regarding the organization or the position prior to applying. Ryan noted this: Our team is hiring two undergraduate interns in machine learning/data science this summer. I would love to see one (or two!) of the positions filled by a Carleton student if it's a good fit -- the team is really down-to-earth and they have been great mentors to past interns. Past interns have contributed to patents and production code used by customers.

Apply ASAP but absolutely no later than February 8, 2021 to ensure you get considered. Find more information and apply at <https://carleton.joinhandshake.com/jobs/4362008>.

Problems of the Fortnight

To be acknowledged in the next *Gazette*, solutions to the problems below should reach me by noon on Tuesday, February 16.

1. Consider the parabola $y = x^2$. Define a sequence of circles “inside” the parabola as follows: C_0 is the largest circle which is tangent to the parabola at the origin and lies above the parabola everywhere else. For $i > 0$, C_{i+1} is tangent to C_i and is also tangent on both sides to the parabola. Find the center and radius of C_{1000} .
2. Given that the system of four nonlinear equations in four unknowns

$$\begin{aligned}a^3 + 2abc + bcd &= -19, \\a^2b + b^2c + abd + bd^2 &= 18, \\a^2c + acd + bc^2 + cd^2 &= -27, \\abc + 2bcd + d^3 &= 26\end{aligned}$$

has a unique solution in integers a, b, c, d , find that solution, without using technology. (Although a modest amount of calculation will be needed, cleverness will be much more effective than “brute force” for this problem.)

So far, the first problem posed January 22 has been solved correctly by Erin Watson, who can collect a B.B.O.P. item; there was another serious attempt, and several people reported working on the second problem - in one case, conjecturing the right answer - but without getting through it yet. I would still be happy to get more solutions, to those problems as well as to the new ones. Have a good midterm break!

- Mark Krusemeyer



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