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Graduate School Panel

Thursday, November 3,   12pm,   CMC 206

Hmmmm, should I go to grad school in mathematics / statistics? How is grad school different from college? How is grad school different from having an industrial job? Can I get paid to go to grad school? How should I decide where to apply? What's the application process like? What can you do with a PhD in math? In statistics? What about an MS? What's grad school like? A graduate school session will be held on Thursday, November 3 at 12pm in CMC 206. Lunch will be served. Come to hear some different perspectives on these questions and more from a panel of Carleton professors:

Andy Poppick, PhD in Statistics
Liz Sattler, PhD in Mathematics
Peri Shereen, PhD in Mathematics

As If We Don't Have Enough Problems Already...

The annual NCS problem-solving contest will take place this year on Saturday, November 12, from 9am to noon. As in past contests, participants will work in teams of up to three on ten problems, which are usually at a wide range of difficulty levels. Although there will likely be more than seventy teams competing from around the region (there may even be some in Canada), our part of the contest will take place here on campus. If you are interested in participating, please let Peri Shereen know who will be on your team by Thursday, November 10. If you want to participate but don't have a team, let Peri know that too (the sooner, the better!) and she might be able to help you find others with whom you could form a team.

Math & Stats Colloquium: Take What You Have Gathered from Coincidence: Understanding and Using Randomness
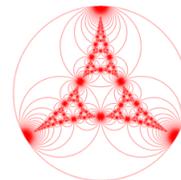
Matthew Richey, St. Olaf College

Friday, November 4, 3:45 - 4:45pm, Weitz Cinema

What does it mean to be random? We all encounter randomness every day -- it is part of how we talk about the weather, sports, and even love. Despite being so familiar, randomness has proven to be an elusive idea to pin down. Even mathematicians have struggled to define randomness, leading to competing and sometimes conflicting definitions. Whatever it is, randomness is a driving force behind many modern computational algorithms. These algorithms -- the Metropolis Algorithm, Markov chain Monte Carlo Methods, and others -- use randomness as the secret ingredient that makes it possible to tackle famously difficult problems such as the Traveling Salesperson Problem and image reconstruction. Using many pictures (and even a few Bob Dylan references), this lecture will reveal the historical quest to define randomness and illustrate how randomness allows us to solve many of today's most challenging applied mathematics problems.

Job, Internship, and Graduate Opportunities

Valparaiso University - Research by Undergraduate Mathematicians   VERUM provides an opportunity for rising sophomore and junior students to engage in a first research experience in mathematics. Applications from rising seniors without prior research experience may also be considered. The VERUM program is looking for exceptional students who want a research experience that will help them to decide if graduate studies in the mathematical sciences should be part of their future plans. Being committed to graduate study is not a prerequisite for this program, but rather a desired outcome. First-generation college students, minority students, and women are particularly encouraged to apply. More details about the projects and the program, as well as application instructions and the 2017 VERUM poster/flyer, can be found at www.valpo.edu/mcs/verum.The VERUM projects for this year will include the following:

- Statistics: Noise-Induced Stabilization of Hamiltonian Systems
- Differential Equations: Mathematical Modeling in Ecology: White-nose Syndrome in North American Bats
- Combinatorics/Discrete Mathematics: Set-Valued Young Tableaux and Lattice Paths
- Graph Theory and Networks: Classification and Characterization of Network

U.S. Department of Homeland Security: 2017 HS-STEM Summer Internships
The U.S. Department of Homeland Security (DHS) Science and Technology Directorate Office of University Programs sponsors a 10-week summer internship program for students majoring in homeland security related science, technology, engineering and mathematics (HS-STEM) disciplines. The program provides students with quality research experiences at federal research facilities located across the country and allows students the opportunity to establish connections with DHS professionals. It is open to undergraduate and graduate students in a broad spectrum of HS-STEM disciplines and DHS mission-relevant Research Areas. Undergraduate students receive a $6,000 stipend plus travel expenses. Ten-week research experiences are offered at a variety of places with areas of research: engineering, computer science, mathematics, physics, chemistry, biological / life sciences, environmental science, emergency and incident management, social sciences, and more. Application deadline: December 7, 2016, 11:59pm EST. Applications and supporting materials must be submitted at https://www.zintellect.com/Posting/Details/2595 Detailed information about the internships can be found at http://www.orau.gov/dhseducation/internships/.

Carney, Sandoe, and Associates: Teaching Position
Carney, Sandoe & Associates is holding an on-campus informational session on Tuesday, November 1 at 7:00pm (in Leighton 236) and then conducting informational interviews on November 2 (in Sayles 050). Carney, Sandoe & Associates is an educational recruitment firm that places teachers and administrators in private, independent, and like-kind (charter, magnet, pilot and merit) schools across the nation and internationally. These schools are exciting, vibrant communities that provide recent college graduates an excellent opportunity to work in a setting that is collaborative, unique, and involved. Every year CS&A helps place candidates in thousands of teaching positions in all primary and secondary school subjects. Teacher certification is not required; they are looking for students with an undergraduate or graduate degree in the subject they would like to teach (i.e. English, History, Math, Chemistry, Physics, Biology, Spanish, etc.). Their services are completely free for all job-seeking candidates. Students who would like to apply for an interview, can drop their resume with the career center by 10/27 or attend the info session.

Problems of the Week

To be acknowledged in the next *Gazette*, solutions to the problems below should reach me by noon on Tuesday, November 8.

1. A bishop moves diagonally (as usual) on the white squares of a rectangular "chessboard", starting in one corner. When the bishop reaches a square along any of the edges of the board, it makes the only possible right-angle turn and continues moving diagonally. When the bishop reaches a corner (where no turn is possible) it simply reverses direction. Depending on the dimensions of the "chessboard", the bishop may or may not visit all the white squares; for example, on a square board the bishop will never get off its original diagonal, but on a 7×8 board the bishop will visit all the white squares. Find a necessary and sufficient condition on m and n for the bishop to visit all the white squares on an $m \times n$ board.

2. A circular disk of radius R is to be moved from the "extreme left" to the "extreme right" of the coordinate plane (from $x = -\infty$ to $x = \infty$) in such a way that the disk always stays between the parabola $y = x^2$ and a single line of the form $y = m(x - 18)$. (The disk is allowed to touch the parabola and/or the line.) Find the value(s) of m that allow(s) for the largest possible R, and find that R.

Solutions to the problems posed September 30 are up in the hallway outside CMC 217. Of those, the first (frog) problem was solved by "Möbius Quip", Yuki Segawa, and "Auplume". Alas, no solutions to the second problem (about cross products) came in.

Solutions for the first problem posed October 14 came in from Will Hardt (who is currently in Budapest), "Auplume", "Möbius Quip", and John Snyder (in Oconomowoc). The second problem was solved by Oscar Smith (who even provided a generalization) and by John Snyder. Good work, all! Yuki, Will and Oscar should stop by CMC 217 some time (in Will's case, once he's back in town) to collect a B.B.O.P. item.

- Mark Krusemeyer

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

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