



Goodsell Gazette

Carleton College

23 February 2018

Northfield, MN 55057

The newsletter for the Carleton mathematics and statistics community

Vol. 36, No. 11



Mathematics and Statistics Colloquium

Speaker: Jennifer Hoeting, Colorado State University

When: Tuesday, February 27, 4pm

Where: CMC 206

Statistical Challenges in Disease Ecology

Abstract: Disease ecology will continue to be of great interest to governments and health-related professions for the foreseeable future. When wildlife diseases spread to humans they can be lethal (e.g., dengue fever is a potentially lethal mosquito-borne viral infection to which over 40% of the world's population is now at risk). In addition, wildlife diseases can have a large economic impact to our food supply (e.g., brucellosis can be spread by bison in Yellowstone National Park to livestock outside the park). The field of disease ecology provides challenges and opportunities for statisticians. In this talk I will review some of the recent statistical advances related to the ecology of infectious diseases including (1) spatial-temporal models for disease, (2) parameter estimation for models that combine empirical (statistical) and mechanistic (mathematical) models for disease dynamics, and (3) dynamics of vector-borne diseases.

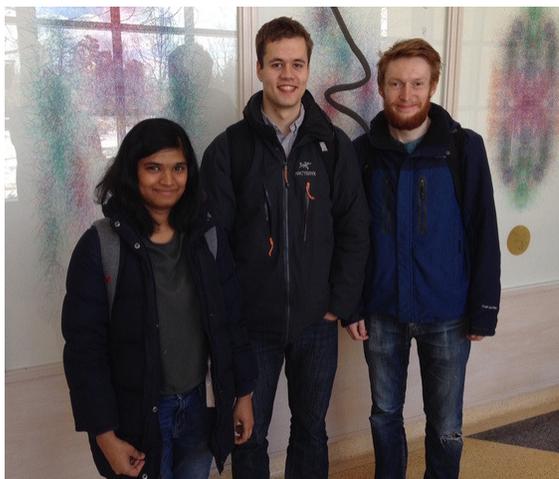
Prospective Math & Stats Majors Meeting

Are you considering a major in mathematics or statistics? The Mathematics and Statistics Department is hosting an information session for prospective majors on Thursday, March 1 from 4-5 p.m. in CMC 206. Come meet with current mathematics and statistics students and professors about the mathematics or statistics major, and enjoy some food!

Carleton teams compete at Konhauser Problemfest

On Saturday Feb. 17, two teams of Carls participated in the 17th annual Konhauser Problemfest at the University of St. Thomas. The team of Ian Seong, Haoyi Wang, and Terry Wang placed third, with an excellent score of 69 points. The team of Will Hardt, Peter Illig, and Neeraja Kulkarni was right behind them with 68 points, giving them a strong fourth place finish. A team from Macalester College earned the

top score, meaning that they will host the Pizza trophy for the coming year. Thanks to all who participated!



Upcoming Events

Week 9, Tuesday, February 27, 4:00pm
Jennifer Hoeting Colloquium Talk - CMC 206

Week 9, Thursday, March 1, 4:00pm
Math & Stats Prospective Majors Meeting - CMC 206

Job and Internship Opportunities

Carleton College, Summer Research

Are you interested in getting paid to do applied statistics research this summer? Andy Poppick will be hiring one or two research assistants for this summer to get involved with an exciting collaboration with scientists at the National Center for Atmospheric Research (NCAR). If you are interested, email Andy (apoppick@carleton.edu) to find out more, attaching your resume and unofficial transcript.

St. Andrew's School, Teacher

St. Andrew's School in Middletown, DE is seeking qualified applicants for a full-time faculty teaching position in mathematics beginning in the 2018-2019 school year. The ideal candidate will be a collaborative partner who seeks to coach students in their small group work and direct engagement with mathematics. St. Andrew's is a 9th-12th grade, all residential co-educational boarding school of 300 students and 70 faculty. Students and faculty alike have a deep commitment to diversity in all its forms and to financial aid. This is an excellent opportunity for a recent mathematics graduate, who might be interested in exploring teaching in a small school setting where she or he will benefit from close collaboration with other experienced mathematics teachers. More information can be found at: https://docs.google.com/document/d/1qC-EpSTFbT4K8NqgQMx8Wu_ jjjYuT1Lm4CZwiJlvdhU/edit/. If you are interested in this opportunity, please submit a resume and cover letter to Dean of Math and Science Harvey Johnson (hjohnson@standrews-de.org).

Problems of the Week

To be acknowledged in the next *Gazette*, solutions to the problems below should reach me by noon on Tuesday, March 6.

- a) Find the minimal area of a triangular region that contains the entire ellipse $3x^2 + 5y^2 = 17$.
b) How many such triangular regions (containing the ellipse, of minimal area) are there?
- Two square matrices A, B of the same size are called *similar* if there exists an invertible matrix S of that size such that $A = SBS^{-1}$. Suppose that

$$A = \begin{pmatrix} a & b \\ c & d \end{pmatrix} \quad \text{and} \quad B = \begin{pmatrix} e & f \\ g & h \end{pmatrix}$$

are 2×2 matrices.

- a) Show that if A and B are similar, then the determinant of the matrix

$$\begin{pmatrix} a-e & b & -g & 0 \\ c & d-e & 0 & -g \\ -f & 0 & a-h & b \\ 0 & -f & c & d-h \end{pmatrix}$$

is zero.

- b) Is the converse true? That is, if the determinant of the 4×4 matrix above is zero, does it follow that A and B are similar?

The first problem posed February 9 proved popular, with solutions arriving from “Auplume”, John Snyder, Peter Illig, and “Möbius Quip”; Peter should stop by CMC 217 to claim a B.B.O.P. item. “Möbius Quip” also solved the second problem, and a good heuristic argument suggesting the correct answer to that problem arrived as well. Good luck on the new problems!

- Mark Krusemeyer



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