

MSCS MESS

Department of Mathematics, Statistics, and Computer Science
St. Olaf College, Northfield, MN 55057
5 April 2019 | Volume 47, No. 19

Next Monday's Colloquium

Title: Curved Flatland
Speaker: Joe Benson
Time: 3:30 PM
Date: April 8
Place: RNS 310

About the talk: In 1884, Edwin Abbot published Flatland, a novella about residents of a two-dimensional flat world. But what if this world was curved, such as the surface of a sphere? In this talk, we will explore some of the ideas and implications of living on a curved surface, such as the correct notion of lines and parallelism, including geometric explanation of Foucault's pendulum.

About the Speaker: Joe Benson currently teaches at Macalester, studies differential geometry and mathematical physics, and is a former member of St Olaf's MSCS department. He loves teaching and spends most of his time away from work with his wife and three children.

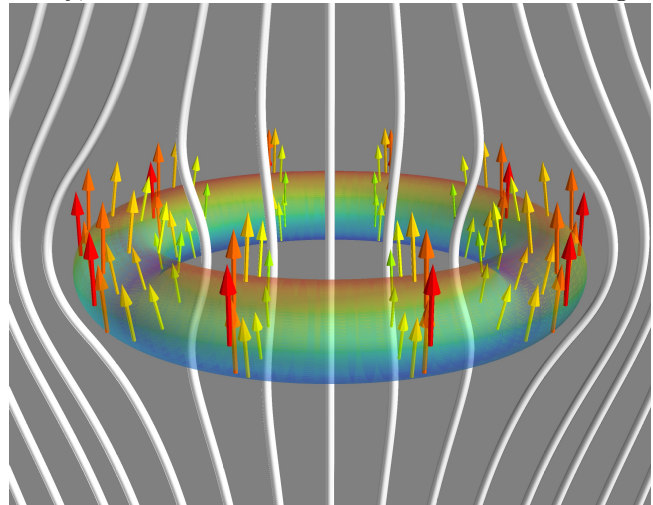
Next Friday's Research Seminar

Title: Fluid Flows with Tiny Tubes
Speaker: Will Mitchell '06
Time: 3:40 PM
Date: April 12
Place: RNS 204

About the Talk: The mechanical properties of thin fibers immersed in a viscous fluid are important in biological and industrial settings such as paper manufacturing, gel electrophoresis, and flagellar swimming. To simulate the fluid mechanical part of this problem, one turns to the Stokes system of partial differential equations. In this talk I will review the calculus of curves and tubes, motivate

the use of integral equations as mathematical models, and finally show some recent numerical results on fluid flow around closed tubes.

About the Speaker: Will Mitchell studies viscous fluid mechanics. He earned a B.A. at St. Olaf College and spent several years teaching mathematics at the junior high level, first in Burkina Faso with the U.S. Peace Corps and later at the International School of Minnesota. Will then completed master's and doctoral programs at the University of Alaska-Fairbanks and the University of Wisconsin-Madison, respectively, and now teaches at Macalester College.



PME Speaker and Induction 2019

Program: Extreme Calculus
Speaker: Paul Zorn
Time: 3:30 PM
Date: April 9
Place: RNS 310

About the Event: Come by to see a talk by our own Paul Zorn followed by the induction of new members to Pi Mu Epsilon, the Mathematics

honor society.

About the Talk: There is more to elementary calculus than may first meet the eye. Well-worn calculus techniques and topics—polynomials, optimization, root-finding, methods of integration, and more—often point to deeper, more general, more interesting, and sometimes surprising mathematical ideas and techniques. Paul Zorn will illustrate his thesis with figures, examples, and real-time Mathematica-aided calculation.

About the Speaker: I was born and raised in India. My professional interests include complex analysis, mathematical exposition, textbook writing, and the role of mathematics among the liberal arts. My 1986 paper “The Bieberbach Conjecture” was awarded the 1987 Carl B. Allendoerfer Award for mathematical exposition. I co-authored several calculus textbooks with my late St. Olaf college, Arnold Ostebee. My most recent book is *Understanding Real Analysis*, 2nd edition (CRC Press, 2017). From 1996 to 2000, I was the editor of *Mathematics Magazine*, and I also served a hitch (2011-2012) as President of the Mathematical Association of America.

Senior Banquet

The faculty of St. Olaf’s MSCS Department cordially invites any senior department majors or concentrators to the 2019 Senior Banquet. The dinner and program will be held on Wednesday, May 1, at 6:30 PM in the sun ballroom. Those interested can [click here](#) or go to the MSCS website and navigate to the link via the events section.

Distinction in Mathematics

Those interested in applying for distinction in Mathematics should consult the email from Ellen for information about the procedure. The general criteria are a 3.6 GPA in courses labeled Math, extensive coursework beyond the requirements of the major, including at least three 300 level math courses, and distinguished work in at least one of the following areas:

- Scholarly inquiry in mathematics or mathematics education, resulting in a paper and public presentation.
- Independent study in mathematics or mathemat-

ics education with a St. Olaf faculty member, resulting in a paper and public presentation.

-Extensive participation and significant achievement in mathematics problem-solving activities and contests. Participation should be sustained over 2 or 3 years; high scores and public presentation of solutions measure achievement.

Fall Course Info

We reached out Professors and asked them about the upper-level courses they’ll be teaching in the fall. Here’s what they said:

Math 330: Differential Equations II with Prof. Wright: Partial differential equations arise as models of physical phenomena such as diffusion of heat or chemicals, flow of fluids, structure of molecules, radiation of electromagnetic waves, biological motion, spread of disease, and pattern formation. This course will focus on the theory of partial differential equations, how they arise from physical principles and conservation laws, how they model physical behavior, and how to construct and interpret solutions to them. Topics include separation of variables, Fourier series solutions, Sturm-Liouville eigenvalue problems, and numerical solutions. Prerequisites: Math 226 and Math 230.

Math 344: Real Analysis II with Prof. Hanson: You say that you really liked Real I (Math 244), but it wasn’t abstract enough for you and you’d like to dig deeper? Then, maybe, Real II is the course for you. In this course we will examine the Lebesgue Integral, a bigger, faster, stronger version of the integral than the Riemann Integral that we know and love from our calculus days. Defining and understanding this integral will require us to develop something called measure theory, a way to calibrate the size of fairly arbitrary sets on the real line. We’ll see lots of epsilons and deltas, of course, and there will be plenty of opportunities to use concepts from Real I.

Math 396: Directed Undergraduate Research with Prof. Dietz: This course is dedicated to the joy and challenge of doing original mathematics research. Just imagine how proud you’ll be when you prove your first theorem that no one else has proved before! It may sound daunting, but plenty of students just like you have done successful research projects in the past—trust me,

I've worked with more than 90 students on these kinds of projects so I know what I'm doing, and several papers have been published as a result.

This is a great course for students who will be getting jobs after graduation, going to graduate school, or going into teaching; that is, it's good for for everyone! You'll certainly learn mathematical content, but you'll also learn to take control over a significant project— from start to finish— in a unique setting.

My research area is in algebra, mostly group theory, so yours will be too, and Math 252 is a prerequisite for the course. I'm not yet sure what the exact topics will be, but have all summer to think about it.

I'm looking for at least 6 students to work together on two different research projects. Don't fret too much about the 8am MWF time slot; since there will be just a few students in the course, we can probably meet whenever we want.

Email dietz@stolaf.edu if you're interested in the course since you'll need permission to enroll. Include some relevant background information and a sentence or two about why you want to be in the course.

To submit an article, event, or anything else for publication in the mess, email jadkow1@stolaf.edu; to receive the Mess digitally each Friday, email habero1@stolaf.edu; visit <http://wp.stolaf.edu/mscs/mcs-mess/> for a digital archive of previous MSCS Mess issues.

Stat 316: Advanced Statistical Modeling

with Prof. Roback: In Stat 316, we will build upon regression techniques from Stat 272 to handle commonly occurring situations in which critical assumptions— normally distributed responses, independent observations— are violated. Case studies that we'll consider include: Do animal bites increase during full moons based on ER records? Did voting patterns during the Reconstruction in Alabama depend on distance to the nearest railroad? What factors of individual performances (audience type, solo vs. ensemble) or individual musicians (experience, psychological baseline measures) are related to a musician's performance anxiety? Do college basketball referees tend to even out fall calls over the course of a game? Methods that you learn in Stat 316 will broaden your statistical horizons beyond the already powerful techniques you learned in Stat 272.

Save the Date: May 2 Math Across the Cannon

The annual Math Across the Cannon event will be hosted at St. Olaf on the evening of May 2.

Will Jadkowski, Editor
Dave Walmsley, Faculty Adviser
Ellen Haberoth, Mess Czar