

MSCS Mess

Department of Mathematics, Statistics, and Computer Science

St. Olaf College, Northfield, MN 55057

November 6, 2015

<http://wp.stolaf.edu/mscs/mscs-mess/>

Volume 44, No. 8

MSCS Research Seminar

Title:	Topological data analysis of biological aggregation models
Speaker:	Chad Topaz
Date:	Friday, November 6
Time:	3:30 pm- 4:30 pm
Location:	RNS 204

About the talk: Biological aggregations are groups such as bird flocks, fish schools, and insect swarms in which organisms interact socially. These groups are striking examples of emergent self-organization, and simultaneously, they have served as inspiration for the development of algorithms in robotics, computer science, applied mathematics, and other fields. Aggregations give rise to massive amounts of data, for instance, the position and velocity of each group member at each moment in time during an observation. Interpreting this data to characterize the group's dynamics can be a challenge. To this end, we apply techniques of topological data analysis to the influential aggregation models of Vicsek et al. (1995) and D'Orsogna et al. (2006). We construe position and velocity data from numerical simulations as point clouds of data varying over time. Using a method called persistent homology, we identify topological features that persist over multiple spatial scales, and see that the topological analysis detects dynamical events that are invisible to more commonly used methods. This

tutorial-style talk assumes no prior knowledge of topology.

Melby Lecture

Title:	Take What You Have Gathered From Coincidence: Understanding and Using Randomness
Speaker:	Matt Richey
Date:	Tuesday, November 10
Time:	7:30 pm
Location:	Viking Theater

About the talk: In this fall's Mellby Lecture, St. Olaf College Professor of Mathematics, Statistics, and Computer Science Matthew Richey will discuss the slippery definition of randomness and what "random" actually means in mathematical terms. He'll even conduct some applications of randomness in real time. "Mathematicians have thought a lot about randomness and cleared out the clutter, but there are still differences of what constitutes as randomness and what it means to be random," Richey says.

For more information about the talk, visit <http://wp.stolaf.edu/blog/richey-to-deliver-fall-melby-lecture-on-randomness/>

CS Colloquium

Title:	Computer Science Undergraduate Research Projects
Authors:	Andrew Altmaier '18, Nolan Arnold '16, Jake Caswell '17, Jonathan Featherstone '17, Chris Hinton '18, Joseph Jung '16, Rodney Lalonde '16, Omar Shehata '18, Emily Simmons '18.
Date:	Monday, November 9
Time:	3:30 pm- 4:30 pm
Location:	RNS 310

About the talk: What does an undergraduate researcher in CS do, anyway? CS summer researchers will answer that question by presenting their accomplishments in Spring and Summer 2015, which include: creating an automated grading system for programming assignments; studying programming languages that have built-in parallel and distributed computing capabilities; designing a new version of the *WebMapReduce* software used in CS 121 and CS 300; making *Pi'sToGo*, a cluster of Raspberry Pi computers (about the area of a credit card), and *Remora*, a plug-and-play cluster built from USB drives; building HiPerCiC web apps, custom created for humanities professors and for the Alumni Office and the *Manitou Messenger*; and exploring new capabilities for HiPerCiC apps, including interactive maps and 3D objects. Intended for a general MSCS audience, with extras for CS students.

MSCS majors and concentrators elected to Phi Beta Kappa

Fourteen seniors have been elected to Phi Beta Kappa during this Fall semester. (More will be elected in Spring.) Of these fourteen, six are majors or concentrators in MSCS disciplines: Jacob Forster, Gregory Gianopoulos, Nora Gilbertson, Daniel Hickox-Young, Chloe Mitchell, and Owen Puls.

Congratulations to these students for their superior academic achievement.

Founded in 1776, Phi Beta Kappa is the oldest and most highly regarded academic honor society in the United States. 270 American colleges and universities currently have chapters of Phi Beta Kappa. St. Olaf's chapter, the Delta of Minnesota, was granted a charter in 1949. The Delta chapter has around 100 "resident" members here at St. Olaf, including administrators, faculty, staff, and retirees. The Delta chapter even has its own room. In 1992, Room 420 in the English Department wing of Rølvaag Library was renamed the Phi Beta Kappa Room; a handsome plaque on the wall outside marks the spot.

From the Editor

In the multiplication problem below, each digit has been replaced by a letter. Can you determine the value of each letter?

```
      B O B
    × B O B
    -----
      M E O Y
     M I L O
    M E O Y
    -----
    M A R L E Y
```

Editor-in-Chief:	Akina Khan
Faculty:	Thomas Rogers
Mess Czar:	Patty Martinez

If you would like to submit an article or event to be published in the MSCS Mess, e-mail khan@stolaf.edu

If you wish to receive a digital copy of the MSCS Mess every Friday, e-mail martinep@stolaf.edu or check it out online

