

# MSCS Mess

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## This Week's Colloquium

<b>Title:</b>	Alcohol Use, Policy, and Health Outcomes: An Epidemiologic Perspective
<b>Speaker:</b>	Jessica Musselman
<b>Date:</b>	Monday, April 21
<b>Time:</b>	3:30 pm
<b>Location:</b>	RNS 410

**About the talk:** I will address the caveats related to statistical modeling in epidemiologic studies and discuss two studies that take very different approaches to answering important questions that remain regarding alcohol use and abuse. The Minnesota Adolescent and Community Cohort (MACC) Study is a large cohort study of 4,826 youth age 12 to 16 years at recruitment. Using self-reported responses from a semi-structured repeated interview, this longitudinal study examines initiation and use of tobacco products, alcohol, and other drugs. Data from this study will be used to assess the relationship between alcohol consumption and educational attainment. Preliminary findings suggest higher education is associated with greater consumption, but also with fewer negative consequences related to drinking. I will discuss future directions and current challenges related to this study. Taking a different approach to examine alcohol use and abuse, the goal of the State and Local Alcohol Policy (SLAP) Study is to determine the impact of regulating malt liquor sales at the local level. Its consumption is more prevalent in low income individuals; a group already disproportionately affected by alcohol-related problems. The SLAP study uses an interrupted time series analysis with a comparison group to determine if policies that restrict malt liquor sales are effective in reducing crimes associated with liquor consumption, such as disorderly conduct and vandalism. We developed methods using pilot

data from Madison, WI, to select appropriate target and comparison off-sale liquor outlets and to begin estimating autoregressive integrated moving average (ARIMA) models to test for change over time upon implementation of malt liquor sales restrictions. Future planned analyses from both the MACC and SLAP studies will further our understanding of how individual and population-level traits, as well as local policies, influence alcohol use and the negative outcomes associated with its abuse.

## This Week's Seminar

<b>Title:</b>	Knotting in open chains, closed chains, and proteins
<b>Speaker:</b>	Eric Rawdon
<b>Date:</b>	Friday, April 25
<b>Time:</b>	3:35 pm
<b>Location:</b>	RNS 204

**About the talk:** Some proteins (in their folded functional form) are classified as being knotted. The function of the knotting is mysterious since knotting seemingly would make the folding process unnecessarily complicated. To function, proteins need to fold quickly and reproducibly, and misfolding can have catastrophic results. For example, mad cow disease and the human equivalent Creutzfeldt-Jakob disease come from misfolded proteins.

Traditionally, knotting is only defined for closed curves, where the topology is trapped in the loop. However, proteins have free ends, as well as most of the objects we consider as being knotted (like shoelaces and Christmas lights). Defining knotting in open chains is tricky and ambiguous. We will show one definition of open knotting and search for knotted arcs within knotted open chains, closed chains, and proteins. In particular, we will talk about subknots, i.e. subchains of knotted chains that form simpler

types of knots. This is joint work with Ken Millett, Andrzej Stasiak, and Joanna Sulowska.

## MSCS Recital

Join MSCS students and faculty Wednesday, April 23 at 7 pm in Ytterboe Lounge for good music and good food. If you want to perform and have not signed up, it is not too late. Contact Kay Smith at [smithk@stolaf.edu](mailto:smithk@stolaf.edu).

## Looking for a low-key job over the summer?

Then consider being Professor Dietz’s “Chair’s Assistant” for up to 100 hours (about 10 hours/week for 10 weeks at \$9.25/hour). The assistant will help with a variety of odd jobs, but especially with the “placement” system that advises incoming students which math courses they should take in the fall. Much of the work can be done wherever you want to do it, but you’ll need to be available for occasional on-campus meetings. A successful applicant should have some familiarity and comfort with Excel, Google docs, and Google forms. Also, an assistant must be able to do work without constant supervision. If you’re interested in the job please contact Prof. Dietz ([dietz@stolaf.edu](mailto:dietz@stolaf.edu)) and send her the name of at least one mathematics professor who can act as a reference.

## Mathematical Biology Senior Showcase

On Thursday, April 24th, the senior Mathematical Biology concentrators will present their integrative projects. The poster session and dessert begin at 6:30 pm on the 2nd floor atrium of Regents. A guest speaker will follow in RNS 290 at 7:00 pm.

The following senior Mathematical Biology concentrators will present their integrative projects: Shane Allen, Tommy Dolan, Taisa Kushner, Jenny Mohn, Emily Olson, Fred Sadler, and Seth Spawn.

The speaker is John Zobitz from Augsburg College. He will be speaking on “Approximately correct mathematical models with data assimilation.”

**About the talk:** An outbreak of an infectious disease has occurred. Based on the data collected, what is the best mathematical model to predict the spread of the outbreak?

While this situation is hypothetical, the mathematical question is not. Data assimilation is a growing area of mathematical biology that ‘fuses’ mathematical models with observational data in real-time. This method, along with automated, high-frequency,

in situ data will be a key tool to enhance future understanding of ecological systems. Data assimilation intersects a broad range of mathematical areas, namely probability, statistics, differential equations, numerical analysis.

This presentation will introduce concepts of data assimilation and illustrate case studies where data assimilation is applied to broaden our understanding of ecological systems.

## Research Volume

Did you do mathematics research between May 2013 and May 2014? If so, then Professor Dietz wants your paper for “publication” in the 8th annual “Research Projects in Mathematics” that she edits every year. Whether you completed your paper on campus or off, we want it in the Research Volume. Your parents want it too, especially if you’re on the verge of graduating! Please contact Prof. Dietz ([dietz@stolaf.edu](mailto:dietz@stolaf.edu)) and she’ll tell you what you need to do to get your paper included.

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*If you would like to submit an article or event to be published in the Math Mess, e-mail [jacobsoj@stolaf.edu](mailto:jacobsoj@stolaf.edu)*