Monday’s Colloquium
Title: Bayesian Models for Analysis of Airborne Chemical Exposures During the Deepwater Horizon Oil Spill Response and Clean-up Efforts
Speaker: Caroline P Groth ’12
Time: Monday, April 24, 3:30pm
Place: RNS 310

About the talk: In April 2010, the Deepwater Horizon oil rig caught fire and sank, sending approximately 5 million barrels of oil into the Gulf of Mexico over the ensuing 3 months. Thousands of workers were involved in the response and clean-up efforts. Many harmful chemicals were released into the air from crude oil, including total hydrocarbons (THC), benzene, toluene, ethylbenzene, xyylene, hexane (BTEXH), and volatile organic compounds (VOCs). NIEHS’s GuLF STUDY investigators are estimating the exposures the workers experienced related to the event and evaluating associations between the exposures and detrimental health outcomes.

My research focuses on developing statistical methods to quantify airborne chemical exposure in response to this event and other settings in environmental health. Factors complicating the exposure estimation include analytical method and data collection limitations. All analytical methods used to measure chemical concentrations have a limit of detection (LOD), or a threshold below which exposure cannot be detected with the analytical method (measurements below LOD are called censored measurements). However, even these small exposures must be assessed to provide the most accurate estimates of exposure. Similarly, due to the scope of this event, it was not possible to take measurements in all scenarios where workers were involved in the response.

In this talk, I describe a Bayesian model used to quantify exposures under possible LOD censoring in both the chemical response and chemical predictor. Then, I briefly describe how we used a database of over 26 million direct-reading VOC area measurements to supplement our exposure information for THC. Finally, I conclude with possible avenues for future research in environmental health and exposure assessment.

About the speaker: Carrie, a Ph.D Candidate at the University of Minnesota’s Division of Biostatistics, graduated from St. Olaf in 2012, where she was a psychology major and Center for Interdisciplinary Research (CIR) Fellow. Carrie will be defending her dissertation this summer before starting a 2-year postdoctoral research fellowship at Northwestern University.

Thursday’s Research Seminar
Title: Evolutionary Dynamics of Cancer
Speaker: Jasmine Foo
Time: Friday, April 27, 7:00pm
Place: RNS 410

About the talk: Cancer initiation, progres-
sion and treatment can be described as a com-
plex evolutionary process occurring at the level
of cells in the body. Mathematical models of
this process can yield useful insights into the
mechanisms causing cancer and also suggest
possible treatment strategies. In this talk I will
introduce some basic mathematical models of
cancer evolution, and describe some applica-
tions to the design of treatment strategies.

Friday’s Research Seminar

Title: A Universal Taylor Series
Speaker: Joe Benson
Time: Friday, April 28, 3:40pm
Place: RNS 204

About the talk: Built on a set of five axioms,
Euclidean geometry as presented in Euclid’s El-
ements laid the foundation for how mathemat-
ics and geometry were to be studied and under-
stood for the next 2000 years. However in the
19th century, new geometries appeared, con-
sistent under their own sets of axioms, and to-
tally independent of Euclidean geometry. This
led to dramatic new ways of thinking about
geometry and the physical world, exemplified
by the works and ideas of Bernhard Riemann,
Felix Klein, and Sophus Lie. This talk will
provide an accelerated history of these geometric
developments, and then touch on the roles
these ideas play in modern mathematics and
my research in particular.

About the speaker: Joes mathematical in-
terests lie in Lie groups, mathematical physics,
geometric flows, and integrable equations.
When he is not teaching, prepping, grading,
exercising or spending time with his family, he
likes to dabble in these research interests.

MSCS Recital

This year’s MSCS Recital is scheduled for
7:00pm on Wednesday, April 26th in Ytter-
boe Lounge, and we are looking for students
and faculty to contribute acts. Contact Ellen
Haberoth (habero1@stolaf.edu) if you are in-
terested. Spectators are more than welcome,
too!

Senior Salute questionnaire

Seniors, please make sure to respond to the
Senior Salute questionnaire sent out by Ellen
Haberoth this week—the questions are very
short, and we would like to use the informa-
tion to recognize your hard work and exciting
futures!