MSCS Mess

Monday's Colloquium

Title: Why Canadian Fur-Trappers Should Stay in Bed When They Have the Flu
Speaker: Lisa Sattenspiel, Department of Anthropology, University of Missouri-Columbia
Time: Monday, April 4th, 7:00 pm
Place: SC182

I describe here a model for the geographic spread of infectious diseases, and, more importantly, describe how the model has been used to study the spread of influenza and pertussis among native Canadian fur trappers and the spread of measles on a Caribbean island. Ethnographic data have been used to estimate essential model parameters and to provide information on the social context within which disease transmission occurs. Simulation results show how mathematical models can be used to explore the role of social organization in channeling disease transmission across time and space.

Lisa Sattenspiel is Professor and Director of Undergraduate Studies in the Department of Anthropology at the University of Missouri-Columbia. She has been involved in mathematical biology research, with a focus on epidemiological modeling. Her research projects have included models for several different infectious diseases, including hepatitis A, HIV, measles, influenza, and pertussis.

Tuesday's Colloquium

Title: Hierarchical Models for Spatio-Temporally Correlated Public Health Data
Speaker: Bradley P. Carlin, Division of Biostatistics, School of Public Health, University of Minnesota
Time: Tuesday, April 5th, 1:30 pm
(treats at 1:15)
Place: SC182

Statisticians are increasingly faced with the task of analyzing data that are geographically referenced, and often presented in the form of maps. In the past decade, hierarchical Bayesian modeling of such data has been greatly abetted by two significant developments in computing: geographic information systems (GISs) for the simultaneous graphical display and summary of the data, and Markov chain Monte Carlo (MCMC) methods for the estimation of relevant posterior quantities. After a brief review of the various types of spatial data, we survey recent activity in this field, emphasizing spatial and spatio-temporal models appropriate for epidemiological and other public health datasets. It will be shown that many of the analytic challenges in this area arise from the need to analyze multivariate data that are misaligned both in space and in support. Fortunately, a hierarchical framework enables reasonably straightforward solutions to the

celebrated modifiable areal unit and change of support problems, while accommodating explanatory covariates and multilevel responses. Throughout the talk we refer to examples drawn from public health practice, including one study attempting to relate radon exposure and lung cancer near a former nuclear weapons facility in southwestern Ohio, and another modeling pediatric emergency room (ER) visit counts for asthma as a function of ozone exposure and a range of sociodemographic variables among children in the Atlanta, Georgia metropolitan area. We close with a brief mention of areas requiring further methodological work, as well as recent developments in software that attempts to unify the disparate MCMC and GIS tasks required.

MATH T-Shirts are Here!

Math t-shirts are here! Two designs to choose from! Look for them at the table in the hallway outside the math classrooms, or else stop by the math office to purchase one. They're $10 each, or 2 for $18. Get one while they last!

Return to Budapest!

We are looking for someone to serve as a teaching assistant in Budapest for the Mathematics 234 Interim in 2006. The primary responsibilities will include grading daily assignments and doing an internship or independent study while there. This assistantship is will be available to any student who has previously studied in Budapest (BSM or the Interim). If you are at all interested in this opportunity, please contact Cliff Corzatt.

Departmental Distinction

Distinction in Mathematics is a significant honor. It is awarded to graduating seniors who show a genuine interest and enthusiasm for mathematics and who have completed work of high caliber that goes beyond the minimal requirements for a major in mathematics.

Students must apply for Distinction in Mathematics; the application deadline is April 20, 2005. Application forms are available at the department office, OMH 202. An application includes two letters of recommendation from faculty members, project supervisors, or others who know the candidate's work. For more information, see the math majors' handbook; copies are available outside OMH 202.

Distinction is also awarded in Statistics and Computer Science. Details about distinction in these areas will be coming out soon.

Nth Annual Math Recital

The Nth annual Mathematics Recital is fast approaching. It will be held on Wednesday evening, April 13th at 7:00pm in Ytterboe Lounge. Good food and beverage will be provided by the math faculty, good music and performances will be provided by faculty and students, and good cheer will be provided by you.

The recital is a comfortable, informal gathering of friends of the mathematics department to share music, other talents and a good time. You are welcome to come simply to watch, but are encouraged to participate as well. If you have an act to contribute, please contact Amelia Taylor who is the emcee for this event.

Problem of the Week

Keeping with the gaming theme: Three students take turns playing a two person game. To keep the players straight, lets name them Bruce, Matt and Paul. The players decide that the loser of a single game will sit out while the other two play. Each game results in a winner and a loser (i.e. there are no ties). After playing for an afternoon Bruce had played 17 games and Paul played 35 times.   Can you say who won the fifteenth game and how many times Matt played?

*** Please submit all solutions by Wednesday at noon to Amelia Taylor (e-mail: ataylor@stolaf.edu) or by placing them in her box at OMH 201.

Last Week's Problem

Write a digit in each square of a 2 x 2 grid. We can read the digits in the rows (from left to right) and the columns (from top to bottom) and think of them as four two-digit number. Suppose that the three two digit numbers found in the rows and the first column are divisible by K. Does the number in the second column have to be divisible by K?

Congratulations to **Robert Orme '05**, **Paul Tveite '07**, and **Will Voorhees '08** for solving last week's POW. Here is an editors combination of the three solutions. Let a be the digit in the top left corner, b top right, c bottom left and d the bottom right. Then the three four two-digit numbers can be given as $10a+b$, $10c+d$, $10a+c$, and $10b+d$. The first three are divisible by K, so there exist integers x, y, z such that $10a+b = xK$, $10c+d = yK$ and $10a+c = zK$. If we let $j = 10b+d$ then the linear system given by these 4 equations must be consistent. A little row reduction shows that for the system to be consistent we need $0 = j -xK-yK+zK$. This implies $j = K(x+y-z)$ and hence K divides $j = 10b+d$.

Friday Research Seminar

Title: Streaming Audio and Video
over the Internet: Challenges and Pitfalls
Speaker: Dr. Amy Csizmar Dalal, Carleton College
Time: Friday, April 8th, 3:30 pm
Place: SC184

According to recent commercials from cable and cell phone providers, we should all be able to watch DVD-quality, full-motion video and receive stereo-quality audio over the Internet. If you've ever tried to watch a video clip from CNN's or ESPN's web sites, or listen to an Internet radio station, you know that the commercials couldn't be further from the truth. Sending good quality, or even barely acceptable quality, video and audio over the Internet is a difficult challenge. Figuring out what exactly constitutes "good" or "acceptable" quality audio and video, and how we measure "good" and "acceptable", is an equally difficult challenge. In this talk, I'll start by providing a quick overview of computer networking and of streaming audio and video.   I'll then discuss why it's hard to send even "acceptable" quality audio and video over the Internet. Finally, I'll talk about how we measure the quality of audio and video, and on the work that Carleton students and I are doing in this area. No previous knowledge of computer networking is needed for this talk!

***If you would like to receive a copy of the Math Mess in your P.O. Box weekly, please   e-mail Donna Brakke at brakke@stolaf.edu.