MSCS Mess

Department of Mathematics, Statistics and Computer Science
St. Olaf College
Northfield, MN 55057

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This Week's Colloquium

Title:	Adolescent Health in the United States, 2007
Speaker:	Andrea MacKay
Time:	1:30 pm Tuesday, September 25, 2007 (Treats at 1:15)
Place:	SC 182

Abstract: *Adolescent Health in the United States, 2007* describes the health of the population, 10 to 19 years of age, with sections on population demographics, health status, violence and victimization, reproductive health, risk behaviors, and health care access and utilization. Because the transition to adulthood often continues through ages 20 to 24 years (young adults), data for young adults are presented in topic areas when comparable data are available, and in charts when space allowed.

Adolescence is a period of accelerated growth and change, bridging the complex transition from childhood to adulthood. This second decade of life is often a turbulent period, in which adolescents experience hormonal changes, physical maturation, and frequently, opportunities to engage in risk behaviors. The patterns of behavior they adopt may have long-term consequences for their health and quality of life. Because of the rapid physical, cognitive and emotional developments that take place during this age period, adolescence is also a time when many health problems may first emerge. During this period, adolescents also experience special vulnerabilities, health concerns, and barriers to accessing health care. Overall, the majority of adolescents are healthy when assessed by traditional measures of morbidity and mortality. Many of the health threats for adolescents are primarily social and behavioral.

Adolescent Health in the United States, 2007 presents the most recent data available on adolescent health in the United States, using data from nationally representative surveys and vital statistics. The differences in health status between younger and older adolescents are documented. The health of the adolescent population also varies by gender, race and ethnicity, and socioeconomic status. Many of the measures of health status are shown by single year of age or by two- or three-year age intervals to highlight the changes that occur in health status as adolescents move through this important developmental period. Understanding patterns of health among adolescents requires attention to differences in the population and recognition of the economic and racial disparities that exist.

About the Presenter: Andrea MacKay is an epidemiologist at the National Center for Health Statistics, Centers for Disease Control and Prevention (CDC). She completed her Masters of Science in Public Health in Epidemiology at Rollins School of Public Health, Emory University, Atlanta, Georgia in 1996.

Upon graduation Andrea joined the Division of Reproductive Health at CDC. Nine years ago she and her husband moved to Bethesda, Maryland and she transferred to the Office of Analysis and Epidemiology at NCHS. She is the author of two chartbooks on Adolescent Health; the most recent

is currently in publication. She is the project consultant for the Institute of Medicine (IOM) committee on Adolescent Health Care Services and Models of Care for Treatment, Prevention, and Healthy Development. She is also a member of the CDC Goals Team for Adolescent Health and a member of the NCHS Ethics Review Board.

As part of her duties at NCHS, Andrea is the lead analyst for 33 maternal and child health trend tables in the annual report on the health of the nation *Health, United States*. Her other areas of interest include maternal morbidity and mortality, and contraception, and she has authored or coauthored nine peer-reviewed journal articles on maternal mortality. She is also a regular participant in the CDC/ACOG Maternal Mortality Study Group and Special Interest Group.

Introducing Jim Scott…

-Statistics Professor

I'm excited to be back in MN and at St. Olaf after having been gone for the past nine years! I actually grew up not too far from Northfield – in a small, southern MN town called Winnebago. After graduating from Blue Earth High School (go Buccaneers!), I attended Macalester College and took a lot of courses in math, statistics, and physics – ultimately, I decided to major in mathematics (phew!). Of course, I didn't know what I wanted to do after college, so I ended up being a computer programmer for an insurance company in downtown Minneapolis. After two years of that, I decided that coding up insurance statements wasn't my cup of tea. It was around this time that I read a book or two about epidemiology. It sounded cool to me, so I packed up the suitcases and headed out to California with the idea of going to Berkeley to study public health and epidemiology. Luckily, it all worked out. I received an MA in biostatistics in 2004 and I finally finished my PhD in epidemiology this past spring. While I was out in California, I got to work on a lot of interesting projects including: investigating an outbreak of tuberculosis among animals at a zoo, using mathematical models to simulate the transmission of water borne diseases, and analyzing data from a randomized controlled trial that investigated the safety of CA tap water. I also got married, became a parent, learned more than anyone needs to know about wine, and I discovered that I love sushi! I'm definitely going to miss all of the great restaurants out in San Francisco and all of the amazing national parks in CA (ask me for recommendations if you're going!), but I'm happy to return to a familiar place and I'm really looking forward to my next couple of years at St. Olaf. I'm always open to visitors – so stop by my office (OMH301) if you want to chat!

Mathematics and War

--Kay Smith

Mathematics has been applied to warfare for at least 2000 years. Archimedes (287-212 BC) used his knowledge of mathematics and mechanics to construct a variety of war machines at the request of King Hiero II, ruler of Syracuse, the Greek city where Archimedes lived. According to the Greek historian Plutarch, Archimedes designed these machines "not as matters of any importance, but as mere amusements in geometry, in compliance with King Hiero's desire and request …that he should reduce to practice some part of his admirable speculation in science, and … bring it more within the appreciation of the people in general." The machines enabled Syracuse to defeat a Roman attack led by Marcellus in 213 BC. Polybius, another Greek historian, provided the following account of the siege:

> Archimedes had constructed artillery which could cover a whole variety of ranges, so that while the attacking ships were still at a distance he scored so many hits with his catapults and stone-throwers that he was able to cause them severe damage and harass their approach. Then, as the distance decreased and these weapons began to carry over the enemy's heads, he resorted to smaller and smaller machines, and so demoralized the Romans that their advance was brought to a standstill. In the end Marcellus was reduced in despair to bringing up his ships secretly under cover of

darkness. But when they had almost reached the shore, and were therefore too close to be struck by the catapults, Archimedes had devised yet another weapon to repel the marines, who were fighting from the decks. He had had the walls pierced with large numbers of loopholes at the height of a man, which were about a palm's breadth wide at the outer surface of the walls. Behind each of these and inside the walls were stationed archers with rows of so-called 'scorpions', a small catapult which discharged iron darts, and by shooting through these embrasures they put many of the marines out of action.

Archimedes was killed during another attack by the Romans in 212 BC. According to one account, he was intently drawing diagrams in the sand when a soldier encountered him. The soldier commanded Archimedes to follow him, but when Archimedes said that he had to solve his problem first, the soldier killed him.

Reference:
http://math.nyu.edu/~crorres/Archimedes/Siege/Summary.html

International Research for Undergraduates in Real Analysis and Dynamical Systems

With significant support from the National Science Foundation and St. Olaf College, the Department of *Mathematics, Statistics and Computer Science* will sponsor four undergraduate research scholars during summer of 2008. These undergraduates will join teams of professional research real analysis at one of two host institutions, Lodz University in Poland or Selesian University in the Czech Republic.

See our website for additional info:
http://www.stolaf.edu/people/humke/REU2005-2007/REUintro.html.

Grant funding allows full support for three International Interns per summer for each of the next three years. This support includes:

- all travel expenses to/from the host sites
- all living expenses while in residence in Europe
- A $4300 research stipend.

The grant also pays for travel and living expenses at one or perhaps two professional conferences upon return. This is a wonderful opportunity and available only for St. Olaf students. Josh Campbell and David Swanson are our current International Research Scholars and they will tell about their experiences during the Colloquium on October 2.

Can you miss out on this opportunity?
I DON'T THINK SO!!

Application is simple:

- Ask 3 professors to write a letter in support of your application. (Two references must be from mathematicians.)
- Complete a 9 question application form on the right hand column of the math website: www.stolaf.edu/depts/math or directly at http://www.stolaf.edu/people/humke/REU2005-2007/REUintro.html

The Deadline for all materials is :
November 9, 2007

The Director's Summer Program at the National Security Agency

CRYPTOLOGIC MATHEMATICS FOR EXCEPTIONAL UNDERGRADUATE MATHEMATICIANS

The Director's Summer Program is the National Security Agency's premier outreach to the nation's most outstanding undergraduate mathematics majors. Each summer we invite two dozen exceptional students to collaborate with each other and with NSA mathematicians on problems critical to the intelligence gathering and information assurance missions of the agency. Admission to the 12-week program is highly competitive. Applicants should have a demonstrated superior mathematical aptitude. A full year of abstract algebra and analysis are recommended. Some computer experience is desirable, particularly with C or C++ and mathematical software packages.

Because of the lengthy security processing required, the deadline for applications is 15 October each year. To apply, a student should send a resume, at least two letters of recommendation from faculty members familiar with their technical work, and current transcripts. A list of courses which will have been completed by the end of the academic year should also be included.

Students must be U.S. citizens.

Editor-in-Chief:	Kate Tummers
Faculty Advisor:	Katie Ziegler-Graham
MM Czar:	Donna Brakke
Problems Editor:	Mike Weimerskirch

Problem of the Week (POW)

There was a typo in the problem last week so here is the correct problem:

What is the minimum value for n, such that points $P_1, P_2, \ldots, P_n$ can be placed on a circle of circumference ***31***, so that for each positive integer k, $1 \le k \le 30$, there is an arc P_iP_j of length k?

Solutions to the Problem of the Week should be submitted to Mike Weimerskirch's mailbox in OMH 201 by Friday, Sept. 28.

Game Night

Date: Wed. Oct. 3
Time: 6:30
Location: SC 188

There will be pizza!

The game of the month is *Philosopher's Phutball*
for rules: http://en.wikipedia.org/wiki/Phutball
Questions? see Mike Weimerskirch in OMH 304

Problem Solving Group

The Problem Solving Group is designed to prepare students for the Putnam Exam, the Konhauser Problemfest and other problem solving competitions.

Meetings will be held each Tuesday at 7:00pm in SC 188.

The first meeting will be Tue. Oct. 2.

For more information, see Mike Weimerskirch (OMH 304) or Kay Smith (OMH 209)