Augarithms

Vol. 17, No.13 Visit us at augsburg.edu/math/ April 14, 2004

Last colloquia of the year

Colloquia are held on Wednesdays from 3:40 to 4:40 p.m. in Science 108. Except for the names of some of the speakers, here is the schedule of dates for the 2003-2004 academic year:

Apr.	14	Tim Bancroft, Augsburg College[1]
Apr.	21	Sara Sletten, Augsburg College[2]

Puzzle & Problem

At press time, there were no solvers to the puzzle or problem of the last issue. Sinc this is the final issue of the academic year, there will be no puzzle or problem to carry over to the fall. Have a good summer.

[1]This week's speaker--Tim Bancroft

Tim Bancroft

Senior **Tim Bancroft**, this week's speaker, presented his work "Bulgarian Exchange: Where Does It End?" at the 26th annual regional Pi Mu Epsilon conference held at St. John's University in Collegeville, Minnesota on March 26-27, 2004. Tim did his research this past year under the direction of Su Dorée.

Tim presented on Saturday morning to a crowd of 50 students and faculty. He described the results of his research generalizing the game Bulgarian Solitaire described by Martin Gardiner in *The Colossal Book of Mathematics*. Also attending the conference were senior **Dan Wolf**, junior **Andrew Held**, and faculty members **Su Dorée**, and **Matthew Haines**.

Frank Farris of Santa Clara University and editor of *Mathematics Magazine* (which is in our library and in the math suite), a publication of the Mathematical Association of America, was the invited speaker for the conference. He spoke on "The Edge of the Universe--Hyperbolic Wallpaper" (http://math.scu.edu/~ffarris/EdgeofUniverse.pdf) and "Equitability and the Gini Index"(http://math.scu.edu/~ffarris/Gini.pdf).

[2]Special Added Colloquium (4/21/04: 3:40-4:10 p.m.)

by Sara Sletten

Sara Sletten

As part of regular business practice, the largest retailers in the United States maintain data warehouses of guest (i.e. customer) data — historical purchase, transaction and demographic data. The complexity and level of detail of the guest databases is extraordinary, yet, it is only within the last five years that mathematical and statistical analysis of the data has been used to leverage business practice.

One of the research areas of interest to the analytics team for these businesses is how to accurately portray guest purchase behavior within specific products and across all products sold. The charge to the analytics team is to disaggregate and provide analysis of the data to give clear understanding of customer purchase behavior.

This talk will consider one particular business and how statistical analysis of data played a role in understanding customer purchase behavior and suggested new and exciting avenues for analytic research to leverage business practice.

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The Bi-weekly Newsletter of the Department of Mathematics at Augsburg College

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Mathematician Biography--Sun-Yung Alice Chang

Sun-Yung Alice Chang

Sun-Yung Alice Chang was born March 24, 1948 in Ci-an, China. She studied at the National University of Taiwan. She received her B.S. from there in 1970 and then went to the United States to study for her doctorate. In 1974 she was awarded a Ph.D. from the University of California at Berkeley.

After receiving her doctorate, Chang was appointed as an assistant professor at the State University of New York at Buffalo for the academic year 1974-1975. Following this she was appointed Hedrick Assistant Professor at the University of California at Los Angeles until 1977 when she moved to the University of Maryland as an assistant professor. She was a Sloan Fellow during the year 1979-1980.

In 1980 Chang returned to the University of California at Los Angeles as an associate professor, being later promoted to full professor. She was an invited speaker at the International Congress of Mathematicians at Berkeley in 1986. During 1988-1989 she was also a full professor at the University of California, Berkeley.

Chang's research interests include the study of certain geometric types of nonlinear partial differential equations. She also studies the related extremal inequalities and problems in isospectral geometry.

Perhaps Chang's greatest honour was the award of the 1995 Ruth Lyttle Satter Prize in Mathematics. The prize is awarded every two years to a woman who has made an outstanding contribution to mathematics research in the previous five years. The award is valued at $4,000. Chang received the prize at the American Mathematical Society meeting in San Francisco in January 1995. The citation for the prize read:-

> *The Ruth Lyttle Satter Prize is awarded to Sun-Yung Alice Chang for her deep contributions to the study of partial differential equations on Riemannian manifolds and in particular for her work on extremal problems in spectral geometry and the compactness of isospectral metrics within a fixed conformal class on a compact 3-manifold.*

On receiving the prize Chang spoke about her work:

> *It is an honor for me to receive the prize. Since all the work cited above is joint work with my coauthors (Paul Yang for the most part, but also Tom Branson and Matt Gursky), I would like to express my indebtedness to them.*
>
> *The problems which I have been working on in the past few years are mainly connected with the study of extremal functions of Sobolev inequalities. Such functions play an important role in the study of the blow-up phenomenon in a number of problems in geometry. Following the early work of J Moser and influenced by the work of T Aubin and R Schoen on the Yamabe problem, P. Yang and I have solved the partial differential equation of Gaussian/scalar curvatures on the sphere by studying the extremal functions for certain variation functionals. We have also applied this approach in conformal geometry to the isospectral compactness problem on 3-manifolds when the metrics are restricted in any given conformal class. More recently we have been studying the extremal metrics for these functionals. We are working to derive further geometric consequences. This latter piece of work is a natural extension of the earlier work by Osgood-Phillips-Sarnak on the log-determinant functional on compact surfaces.*

Chang also spoke about the position of women in mathematics research and how things are changing rapidly:

> *Since the Satter Prize is an award for women mathematicians, one cannot help but to reflect on the status of women in our profession now. Compared to the situation when I was a student, it is clear that there are now many more active women research mathematicians. I can personally testify to the importance of having role models and the companionship of other women colleagues. However, I think we need even more women mathematicians to prove good theorems and to contribute to the profession.*

Article by: J J O'Connor and E F Robertson

Hey Kids, Don't Forget!

Saturday night is calculator night at the dome. Be among the first1000 kids to show up with a *MathterCard*™ and get a free calculator.