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Department of

MATHEMATICS & STATISTICS NEWSLETTER

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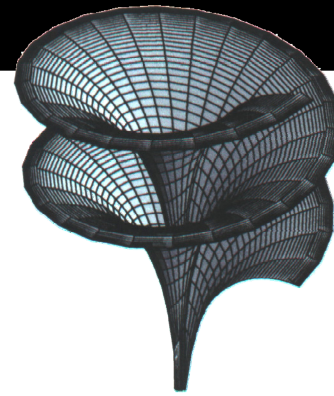


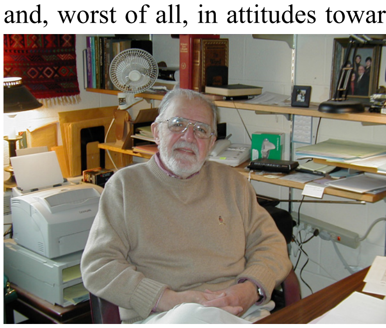
DR. JOHN D. PALIOURAS RETIRES

John D. Paliouras, Professor of Mathematics and former dean of the College of Science retired from RIT effective March 1, 2002.

Born and raised in Athens, Greece, Prof. Paliouras came to the United States in 1957 to attend Alfred University where, in 1960, he received his B.A. in Mathematics. In 1961, after teaching high school mathematics for one year, he went on to the University of Illinois, Champaign-Urbana, where, in 1965, he received his Ph.D. degree in Mathematics (Analysis - Topological Dynamics).

In the fall of 1965, he joined RIT as Assistant Professor in the Department of Mathematics. In 1973, Prof. Paliouras was appointed associate dean of the College of Science, and in 1979 he became its third dean. In that capacity, he was known around the campus for his high standards, work ethic, unwavering principles, perseverance, credibility and integrity.

During the decades of the sixties, the seventies and eighties, the College of Science was viewed as a "second class citizen" because most of its offerings were in the "service area". Unfortunately this view was held even at high places and was reflected in salaries, budgetary and space allocations and, worst of all, in attitudes towards the college. In his quiet way, Prof. Paliouras resolved to change all that, and carried out a long and sustained campaign that eventually established the College of Science as the example to be emulated. He did so through responsible and efficient administration, granting the college's academic departments individual identity and independence, fund-raising for scholarships, equipment and the building addition, attracting outstanding faculty, development of several new programs, persistent and uncompromising emphasis on excellence in teaching, aggressive grantsmanship, support of faculty research and development, and effective student recruitment that became the model for the institute's recruitment strategy. "We were very fortunate," says Prof. Paliouras, "in that the faculty and staff of the college responded to my calls for deeper and more extensive involvement that went above and beyond job descriptions and the call of duty. It was team work at its finest and that's what brought about the recognition our college deserved all along."



Throughout his administrative years, he continued his contact with his "first professional love" – the classroom – and taught "as much as circumstances allowed". He composed notes for various courses, recorded a series of video tapes on complex variables and wrote an excellent textbook, **"Complex Variable for Scientists and Engineers"**. And "when the time came" he returned to his beloved classroom from where he had always wanted to retire, and he did just that.

Prof. Paliouras' life beyond academia has touched the lives of a great many people outside of RIT. Beyond his many years of volunteer work and membership on boards of directors of not-for-profit organizations, he devoted a great deal of time and energy in helping scores of students from his native Greece seeking opportunities for university study in the U.S. Beyond that, he has served the local Greek Orthodox Church and the Greek Community of Rochester in numerous capacities.

RIT, the College of Science and the Department of Mathematics and Statistics have been impacted by the dedicated service of Prof. John Paliouras. We thank him for his many contributions to make this a better place for us, and wish him much happiness in his retirement.

πRIT - A STUDENT ASSOCIATION

A small but energized group of majors in our department has formed an association with a wide-ranging and yet focused set of goals. Interestingly, the membership already includes several students outside our department. The main objectives of the organization are:

1. To increase awareness among students and the public in general about the breadth of the fields of mathematics and statistics and the extent to which they affect not only the scientific world but everyday life.

2. To promote the concept of undergraduate research and improve conditions under which more students will be involved in this activity. To this end they propose to create a database whereby faculty expertise and student interests can be matched.

3. To project, promote and facilitate graduate work in mathematics and statistics. In order to attain this multi-faceted goal, a "center of information on graduate programs" is being contemplated to make available the general information needed to start a student's search and lead them to their goal.

4. To review our programs and propose changes based on how students view requirements, minors, concentrations, sequencing of courses and related matters. For instance, recently, the association submitted to the department a proposal for changes in our Computational Mathematics program. The suggested changes represent "the other side of the story".

5. To project the voice of the student – "a form of activism", as one of the officers of the group put it – on matters of interest common to RIT and the department on the one hand, and the students on the other.

6. To organize activities, presentations, field trips and social gatherings for the purpose of promoting camaraderie among the students, increasing interaction with other student and professional organizations and the public at large, and fostering the spirit of the group, namely, the belief that students' opinions should have a channel through which to enter the process of shaping and promoting the curricula that, in turn, shape the future of those who graduate from them.

MATH AWARENESS MONTH

April was Math Awareness Month. The Department of Mathematics and Statistics sponsored a series of talks, aimed at a general audience and addressing this year's theme: Mathematics and the Genome. The series included:

"Probability Theory and the Hardy-Weinberg Law," April 16th, Prof. James Halavin, RIT

"Mathematical Puzzles and the Human Genome," April 23rd, Prof. Rhys Price Jones, RIT

"Pharmacokinetics/Pharmacodynamics: Differential Equations in Drug Development," April 30th, Ms. Luann Phillips, Cognigen Corporation

This year's theme focused on the vastly important role mathematics has played, and will play, in human genome research. Geneticists are nearing completion of the entire sequencing of the human genome, the catalog of all our genes. This vast gathering of information has already begun to be analyzed by mathematicians in hopes of decoding its hidden fundamental medical and biological insights.

Prof. James Halavin's talk centered on a classic example of the collaboration between biology and mathematics. Developed in 1908, the Hardy-Weinberg law is an algebraic formula used to estimate the frequency of a dominant or recessive gene in a population based on the frequency with which the trait is found in that population.

In one of his lectures, geneticist Reginald Punnett was asked to explain, "If brown eyes were dominant, then why wasn't the whole country becoming brown-eyed?" Punnett turned to his friend and mathematician, G. H. Hardy. Out of this Cambridge University conversation came the Hardy-Weinberg Law, named after a German mathematician who developed some of the specific cases.

Although the original mathematics behind the Hardy-Weinberg Law is not difficult, today many mathematical disciplines such as numerical analysis, statistics, and modeling are needed to translate genetic information into data useful to biological researchers. Besides the obvious boon to the medical sciences and the pharmaceutical industry, the benefits will include advances in agriculture and livestock production as well as tertiary developments in the sciences of forensics, energy technologies, and environmental resources.

This year's Math Awareness Month served to remind mathematicians and lay people alike of the intimate connection between the human genome and mathematics. This link, newly forged at the advent of the science of genetics with Mendel and Punnett, has become increasingly tempered as we mathematicians have sifted through the human genome.

Hardy-Weinberg Law http://www.ndsu.nodak.edu/instruct/mcclean/plsc431/popgen/popgen3.htm

UNDERGRADUATE RESEARCH

This year our department launched an Undergraduate Research Initiative aimed at bringing faculty and students together on joint research projects. This year **Jennifer Baldwin** and **Bill Kronholm** worked with Prof. Darren Narayan on a research project investigating optimal ways to rank players in a round robin tournament.

Jennifer and Bill presented their results in their talk "*A Linear Programming Approach to Player Rankings, a Preliminary Report*" at the Thirty-Third Southeastern Conference on Combinatorics, Graph Theory and Computing, held at Florida Atlantic University in March. The students' presentation at this conference was made possible by support from JetBlue Airways and a gift from RIT Alumni, Kay and Tony Carlisi.

Ever since the conference, the students are more energized than ever and have signed up for another course with Prof. Narayan, in which they will continue their research and prepare their results for publication.

Svetlana Bukharina, one of our Computational Mathematics majors, is working with Prof. David Ross on developing algorithms for equations of minimal surfaces.

In the absence of gravity, a drop of liquid on a plane assumes a shape that is a spherical cap – part of a sphere cut off by a plane. The height at which the sphere is cut off is determined by the contact angle, which is a function of the material properties of the liquid and the plane.

This simple solution no longer applies if the contact angle varies from point to point on the plane. This is the case, for example, if the plane is not clean, or if its material composition varies spatially. The algorithm Svetlana and Prof. Ross have developed solves the more general problem.

This problem has applications in various fields, for example, crop-dusting, where tiny drops of liquid must be made to cling to plants, and ink-jet printing, where tiny drops of ink must adhere to paper. Svetlana will be presenting their results at the 50th Annual Meeting of the Society for Industrial and Applied Mathematics to be held in Philadelphia this July.

For her project in last fall's Mathematics Modeling class, **Jennifer Goodenow** worked on a model of polyvascular clepsydrae, or cascading water clocks. The problem she worked on involved viscous liquids; it was suggested by a problem posed by Prof. Richard Orr about inviscid liquids. Jennifer is working with Profs. Orr and Ross on a short paper describing her work.

MATHEMATICS FORUM TAUGHT BY DR. WILLIAM BASENER

At the request of several of our mathematics majors, Prof. William Basener taught a course in topology during the spring quarter.

Perhaps you are wondering, "Just what is topology ?" If asked this question, Prof. Basener will hand you a Mobius strip made of paper. Once you realize that the strip has only one side, Prof. Basener will smile and say, "Topology is what allows us to work rigorously with things like that."

Topology is known first and foremost as the branch of mathematics that deals with amusing geometric objects like the Mobius strip, knots, and higher dimensional surfaces. This does not, however, do justice to its importance. It is fundamental to all of mathematics because it deals with the concept of continuity.

Topology was developed during the 1800's as a fundamental concept in a number of fields: geometry, chaos, astronomy, differential equations, analysis, and graph theory. It has since then become a foundational concept in every discipline of mathematics. For instance, topology has played an essential role in Wiles' proof of Fermat's Last Theorem via elliptic curves, and in John Nash's Nobel Prize winning work on economics via the Brower Fixed Point Theorem.

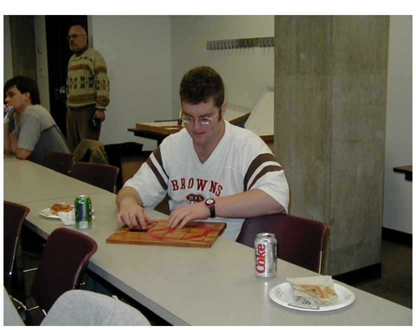
There were eleven ambitious students enrolled, about half of whom were mathematics majors and the other half computer science majors. They proved theorems such as the Brower Fixed Point Theorem, the Pancake Theorem (if two pancakes are placed on a plate, there is always a way to cut them both in half with one stroke of a knife) and the theorem stating that the set of all integer multiples of an irrational number mod 1 is dense in the unit interval. This last theorem plays a role in the celebrated KAM (Kolmogorov-Arnold-Moser) Theory. A set of notes for the course is available at Prof. Basener's website.

CURIOSITY SEMINARS

On March 29th Mr. Alex Meadows, Stanford University presented "Solutions to Equations: They Do Exist! Topological Degree in Banach Space".

On March 27th Ms. Kristen Camenga from Cornell University (Preparing Future Faculty Program) spoke on "A Tale of Two Proofs of the Five Color Theorem".

On April 2nd, Visiting Assistant Prof. Matt Coppenbarger presented a talk on puzzles entitled "The Principle of Parity in Analyzing Puzzles".



The mathematical principle of parity is the obvious fact that even and odd numbers form two disjoint sets. It is a powerful tool used most often in impossibility proofs but also plays a role in the analysis of some very challenging puzzles.

Many puzzles were analyzed, including *The Puzzle of 15* (first introduced in the 1870's), the *14-15 Puzzle*, (a variation of the previous one by Sam Loyd), the *Soma Cube* (by Piet Hein), and many other puzzles based on polyform shapes. Lastly, the *Eternity Puzzle* was briefly discussed. A $1.4 million prize is offered to the first person to produce its complete solution!

On April 9th, Prof. Doug Meadows presented a lecture titled "An Elementary Evaluation of $\zeta(2k)$".

The *Riemann Zeta* function is defined by $\zeta(z) = \sum_{n=1}^{\infty} 1/n^z$.

The *Riemann Hypothesis* (first conjectured in 1859), the greatest unsolved problem of modern mathematics, is that the non-trivial roots of this function all have real part of 1/2.

In the February 2002 issue of the American Mathematical Monthly, Josef Hofbauer gave a simple proof of the well-known result that $\zeta(2) = \pi^2/6$. Prof. Meadows noted that this could be generalized to calculate the Riemann Zeta function evaluated at $2k$, where k is any positive integer. In the 18th century, Leonhard Euler obtained the same result using infinite product expansions of various trigonometric functions, expressed in terms of the Bernoulli numbers. Prof. Meadows' computation is based on a recursive evaluation, and is much simpler than Euler's solution.

Additionally, Prof. Meadows showed the connection between his recursive relations and those defining the Bernoulli numbers. He also discussed the occurrence of the Bernoulli numbers in several other parts of modern mathematics, such as Kummer's classification of regular primes in the 19th century and Milnor's classification of exotic spheres in the 1950's.

MARISSA ROBERTSON

This past summer I did a co-op at Blue Cross/Blue Shield of the Rochester Area. I worked in the actuarial department on a variety of different projects that involved gathering large amounts of data about claimants and then analyzing the data to find trends and various frequency distributions. I used Microsoft Excel and Microsoft Access a great deal and also learned another software package called Impromptu.

My co-op experience was very valuable because I had the opportunity to learn how a large insurance company operates, and I was able to explore the actuarial profession. However, as an applied math major I was not able to put my math skills to use because most of my work involved statistics. This was slightly disappointing but useful at the same time because it made me realize that the actuarial field is not for me. Discovering that you do not enjoy a particular kind of work is often as helpful as finding that you do like it.

Although it wasn't right for me, I think that an actuarial co-op would be very beneficial for students interested in statistics, and I highly recommend working at Blue Cross/Blue Shield. It is a great place, and the people are wonderful.

MAA SEAWAY SECTION MEETINGS AT SUNY BROCKPORT

Several faculty from the RIT Department of Mathematics and Statistics attended the Seaway Section meeting of the Mathematical Association of America at SUNY Brockport on April 19th and 20th. Professional talks were presented by Profs.

Munir Mahmood, James Marengo, and Hossein Shahmohamad.

The meetings consist of invited and contributed talks by faculty and students, workshops, and book sales. These meetings provide an excellent opportunity for faculty and students from RIT to interact with their colleagues from other schools as well as industry. Our department has traditionally been well represented at these meetings and plans to host them in November 2003.

MONROE COUNTY MATH LEAGUE

On March 7th, the Department of Mathematics and Statistics hosted the 25th Annual Monroe County Math League All-Star Competition.

The day-long event attracted more than 550 students and teachers from approximately 30 high schools in the Monroe County area to the RIT campus. Students competed in a variety of mathematics sessions and for the chance to represent our area at the state-wide mathematics competition to be held on April 27th in Niskayuna, NY.

This event proved to be a wonderful opportunity to showcase our campus to some of the top high school students in our area. Hopefully, we will see some of them return in the near future to engage in the training we offer to prepare them for a career in mathematics or statistics.

DR. ROBERT MOSES: THE ALGEBRA PROJECT

Karen Quinn
Mathematics Instructor, Office of Special Services

Dr. Robert Moses, a Harvard graduate, a Civil Rights activist, co-author of *Radical Equations: Math Literacy and Civil Rights (2001),* and the passionate founder of **The Algebra Project**, visited our campus on March 28, 2002, during RIT Diversity Week, and spoke to RIT faculty, staff, students, community and corporate leaders, and to local educators, about ongoing efforts to bring an end to "sharecropper education," specifically in mathematics.

In the early 1960's, Robert Moses participated in promoting voter registration of black sharecroppers in Mississippi. He played an active role in empowering them to demand on their own behalf the right to vote. Through **The Algebra Project**, he is using mathematics as an organizing tool to motivate underserved populations to assert their rights to math literacy, to access upper level mathematics, science and technology courses and, therefore, to gain access to economic opportunity and fully functioning citizenship. He maintains that mathematics literacy is the civil right of all students for educational and economic opportunities, a floor that needs to be established for all children in this country.

During his visit, Robert Moses conducted two "hands-on" workshops giving participants a taste of the experiential approach that **The Algebra Project** uses to teach algebra. Instead of memorization of formulas, he uses students' daily activities and culture to have them create the conceptual language of mathematics. The curriculum directs students through a 5-step process, beginning with the actual experience of a physical event. This helps them understand how mathematical relations, formulas, and rules are developed through the "regimentation of ordinary discourse".

Started in 1982, **The Algebra Project's** target population consists of the inner city students and rural students across the "black belt," in over 20 sites in 13 states.

For more information on **The Algebra Project**, one can access its website at: www.algebra.org/index.html.

2001 PUTNAM COMPETITION

The William Lowell Putnam Mathematical Competition was held on December 1, 2001. The exam is a very prestigious and challenging annual competition, taken by approximately 3000 students from across the United States and Canada.

Seven students from RIT participated in the exam this year: Donald Butler (81st percentile), John Chatham (50th percentile), Joel Dreibelbis (67th percentile), Vitaliy Gyrya (94th percentile), Melissa Matthews (90th percentile), Zhi Li Pan (50th percentile) and Choi Lung Wong (50th percentile).

Our team (Wong, Gyrya, Butler) ranked 65th out of 336 teams, which placed us in the 81st percentile. Congratulations to all contestants for a fine effort!

The following problem appeared on this year's exam: *Can an arc of a parabola inside a circle of radius 1 have length greater than 4?*

DR. GRUBER'S LEAVE OF ABSENCE

How should one travel on a surface to get from one point to another by traveling the shortest distance possible? There are lots of places in Europe and Asia that an airplane can fly to from North America going over the North Pole instead of over the Atlantic Ocean and travel fewer miles. Differential Geometry helps determine the shortest routes, the geodesics.

There are other kinds of surfaces in mathematics that are not seen in everyday experience. For example there are surfaces whose points are functions that approximate probability for a small interval, probability distribution functions. Can the distance be found between probability distribution functions traveling along geodesics? This is very useful to statistical inference. For example, if there are two different probability distributions based on different prior knowledge, how does the distance differ from the prior distribution for the probability distribution that also takes sampling into account? Can statistics for tests of hypothesis be based on geodesic distances?

Prof. Marvin Gruber is very busy thinking about these questions while he is on sabbatical leave during the current academic year. He is also investigating the suitability of The Generalized Riemann Integral for Probability and Statistics. In addition, he continues his research on Ridge and James-Stein estimators for linear models that he started twenty-five years ago in his Ph.D. dissertation.

DR. SHAHMOHAMAD'S INVITED LECTURE

Prof. Hossein Shahmohamad was invited by the Department of Mathematics at University of Rochester to give a talk at their weekly colloquium. The title of the talk was "Chromaticity, Equivalence, Roots & Uniqueness".

The chromatic polynomial of a simple graph G, P(G,n), counts the number of different ways of coloring the vertices of G with n colors so that no two adjacent vertices have the same color.

Many properties of P(G,n) were discussed: Which graphs do not share their "signature" with other graphs? Some chromatically unique graphs were presented. What graphs generously share their "code" with other graphs? Some infinite families of chromatically equivalent homeomorphs were discovered and presented. What is known about the roots of P(G,n)? Well, the smallest non integer root is 2.547...

Furthermore, some open problems regarding the chromatic polynomial were posed.

OUTSTANDING UNDERGRADUATE SCHOLAR AWARD RECIPIENTS

Anne McDonald

A graduate of Rush Henrietta High School, Anne is one of only two students at RIT working on a double major. She plans to complete her BS in economics this May and anticipates completing her BS in applied statistics next May. Anne is a Nathaniel Rochester Society Scholar and is very active in both community and work activities. She served as a senator to Student Government, participated in Women's Center activities, and was a member of several university committees. Anne is a peer mentor and a teacher in the GEAR-UP Program for eighth grade students. She has been a research assistant and worked at Wallace Library. Anne has been selected to represent the College of Liberal Arts as their student delegate during Commencement this year.

Jennifer Ann Richter

A graduate of Chautauqua Lake High School in Mayville, NY, Jennifer is a fifth-year student in the applied statistics program. She is a recipient of the Association for Women in Mathematics Award, the Mathematics and Statistics Department Excellence in Statistics Award, and the RIT Quality Cup Award. A Nathaniel Rochester Scholar, Jennifer is a member of the Math Club, Phi Kappa Phi, and Golden Key International Honor Society, of which she is secretary. While co-op is not required for her program, Jennifer completed co-op assignments for Bristol-Myers Squibb in analytical research and development, at CIGNA where she worked as an actuarial intern, and at Cognigen as a math/stats intern. She works on campus as a math tutor. Jennifer will be attending graduate school at the University of Rochester.

Marissa N. Robertson

Salutatorian of her senior class at Kenmore West High School in Buffalo, NY, Marissa is a fifth-year applied mathematics major. She is a recipient of RIT's Presidential and Alumni scholarships, the Excellence in Fourier Series Award, and the 2001 Mathematical Association of America and the Association for Women in Mathematics Student awards. Marissa has completed co-op assignments with Blue Cross/Blue Shield of the Rochester Area and National Fuel Gas Distribution Corporation and has worked on campus at the Student Life Center. She is a calculus teaching assistant and math tutor in our department. She also enjoys sports and is an avid RIT hockey fan. After graduation, Marissa will be working at the National Security Agency as a cryptologic mathematician.

PROBLEM CORNER

An n x n array of numbers whose sums along the rows, columns and two diagonals are the same number is called a ***magic square of order n***. A magic square of order n is called ***normal*** if the numbers used in the square are sequential integers starting with 1.

Magic squares have been around for a long time. According to Chinese legend, the first magic square appeared to the mythical emperor Yu about 2000 years ago while he walked beside the River Lo. The emperor spotted the square in a pattern on the back of a tortoise. The pattern he is said to have seen is the same order 3 magic square given below. They have fascinated many since then, appearing in the painting *Melencolia I* by Albrecht Dürer in 1514. Benjamin Franklin called constructing magic squares "trifling and useless" activities, but nevertheless found time to build an order 16 normal magic square.

The normal magic square of order 3 is given below.

4	9	2
3	5	7
8	1	6

The sum of each row, column, and diagonal is 15, called the ***magic constant***. Not including reflections and rotations, the solution given above is unique; there are no other ways to rearrange those numbers to make a magic square without it being a variation of the above square. Things are very different for higher order: not counting reflections and rotations, there are 880 normal magic squares of order 4 and over 275 million normal magic squares of order 5.

Martin Gardner, famous by way of his monthly articles on recreational mathematics in *Scientific American*, spent a few articles discussing more "exotic" magic squares, that is, magic squares with additional or special properties. Three of the many challenges assigned to his readers are reprinted here.

Problem 1: Discover an order 4 normal magic square that has the additional properties where the sums in any of the four quadrants, add up to the magic constant.

Problem 2: Discover a normal magic hexagon using 19 hexagonal cells. The solution is unique and extremely difficult to find.

Unsolved Conjecture: Discover an order 3 magic square whose entries are all different perfect squares, or prove that this is impossible. The original prize of $100 is still offered for a solution to this problem. The closest known solution is given below.

127^2	46^2	58^2
2^2	113^2	94^2
74^2	82^2	97^2

The solutions to Problems 1 and 2 will be included in the next installment of Problem Corner.

WINTER DEAN'S LIST

Brett Billings *
Neil Brenner
Donald Butler
Tonya Campbell
Dennis Colburn
Shana Dagel
Joel Dreibelbis *
Gregory Dufore
Jennifer Goodenow
Brian Grundy
David Hagen
Thomas Henthorn Jr. *
Teresa Hesley
Jason Hills
Stephanie Jones *
Victor Kostyuk *
Laura Beth Lincoln
Garrett Manhart
Melissa Matthews *
Zhi Li Pan
Terese Puma
Mark Schindlbeck
Michael Short
Victoria Shults *
Jin Hua Song
Robert St. Pierre *
Michael Voelkel
Kathryn Webb
Benjamin Zindle *

Congratulations to all!
(* denotes 4.0 GPA)

πRIT and MATH & STATS CLUB EVENTS

April 5 "Puzzle Hour" – A look at a variety of puzzles and approaches to their solutions, involving the concept of parity, by Prof. Matthew Coppenbarger

April 12 Math/Stat Party at Prof. James Halavin's home. Many students (and some faculty, too) gathered together to play badminton and bocce and to eat subs, chips, cookies and Halavin's famous jambalaya!

April 12 "Filling Gaps" – An informal history and analysis of number systems, from counting numbers to complex numbers, with many interesting hypotheses along the way, by Prof. David Ross

April 19 "Unusual Dice Labeling" – A look at the problem of tossing dice with unusual labels, and associating a polynomial with each die and factoring it to study the frequency of occurrence of sums, presented by Prof. David Hart

May 3 "Diophantus' Method of Finding Pythagorean Triples" – A presentation of the ingenious method Diophantus used to generate all possible Pythagorean Triples, by Prof. Paul Wilson.

May 7 "Fibonacci Determinants" – Another example in which the Fibonacci numbers unexpectedly appear, a joint work of Nathan Cahill (MS 2000) and John D'Errico (Chemistry 1979) by Prof. Darren Narayan.

ANNOUNCEMENTS

Papers accepted or published recently:

The Efficiency of Shrinkage Estimators with Respect to Zellner's Balanced Loss Function by Prof. Marvin Gruber, published in the Proceedings of the Annual Meeting of the American Statistical Association.

Spectral Asymptotics of the Dirichlet-to-Neumann Map on Multiply Connected Domains in R^d by Prof. Carl Lutzer, published in the Journal of Inverse Problems, Institute of Physics Publishing.

Student Recognitions:

Last November, two students from our department, Shawn Dwyer and Joanne Mule, passed the first actuarial exam.

Four of our best female students – Jennifer Baldwin, Svetlana Bukharina, Marissa Robertson and Jennifer Goodenow – have been invited to attend the NSF funded Fourth Annual Nebraska Conference for Undergraduate Women in Mathematics.

Tiffany Swasta has been accepted to participate in the prestigious Ohio State Biology REU Program for the summer of 2003.

Mathematics and Statistics Newsletter

Contributors: Prof. William Basener
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Prof. Matthew Coppenbarger
Prof. James Marengo
Prof. John Paliouras
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