

Director, Jeff Scroggs  
Editor, Miriam Ansley  
[www.math.ncsu.edu/undergrad](http://www.math.ncsu.edu/undergrad)  
Fall 2006

# Mathematics Newsletter

NEWS FOR THE UNDERGRADUATE

[undergraduate\\_mathematics@ncsu.edu](mailto:undergraduate_mathematics@ncsu.edu)

## Meet Dr. Sandra Paur

In 1973 the NCSU Math Department hired its first female PhD, Dr. Sandra Paur. Dr. Paur grew up in North Dakota and graduated from the University of North Dakota with double majors in mathematics and natural sciences and completed her PhD in 1973 at Indiana University. She became the Math Honors Advisor in 1980 and has developed that program from 6 students to now over 35!

In 2001–2002, she received an Outstanding Teacher award from NC State. For the last two summers she has assisted with the NC State REU in Modeling and Industrial Applied Mathematics, working with and advising the participants about graduate school and fellowship applications.

When not in the classroom, you may find Dr. Paur reading, cooking, doing power yoga, playing at the beach or white-water rafting. An active member of her church, she is on the Social Ministry Committee and has worked with a variety of homeless shelters and been the furniture coordinator for approximately 15 refugee resettlements. In 2002 she was the overall furniture coordinator for a resettlement of 200 Dega refugees that came to the Triangle area, supervising over 40 sponsoring groups who needed furniture and household goods for their set of refugees.

In 1986, she and her husband began building their earth-sheltered house. It's still not complete, although they have lived there since 1993. Dr. Paur has learned a variety of new skills, including installing hardwood floors, setting and grouting tile, building rock walls and pouring concrete. However, when she does retire from the math department she has made it very clear that her next career will not be as a furniture mover, a tile setter or a stonemason. Other suggestions are welcome.....

### Advanced Mathematics Courses

These classes may be used as Advanced Math Electives.

#### Fall 2006

- MA 325 – Introduction to Applied Mathematics
- MA 401 – Applied Differential Equations II
- MA 408 – Foundations of Euclidean Geometry
- MA 410 – Theory of Numbers
- MA 413 – Short-Term Actuarial Models
- MA 416 – Introduction to Combinatorics
- MA 421 – Introduction to Probability
- MA 426 – Mathematical Analysis II
- MA 428 – Introduction to Numerical Analysis II
- MA 432 – Mathematical Models of Life and Social Sciences
- MA 433 – History of Mathematics
- MA 437 – Applications of Algebra
- MA 502 – Advanced Mathematics for Engineers and Scientists II
- MA 513 – Introduction to Complex Variables
- MA 520 – Linear Algebra
- MA 521 – Abstract Algebra I
- MA 537 – Nonlinear Dynamics and Chaos
- MA 544 – Computer Experiments In Mathematical Probability
- MA 574 – Mathematical & Experimental Modeling of Physical Processes II
- MA 583 – Introduction to Parallel Computing
- MA 591B – Applied Stochastic Processes
- MA 591E – Introduction to Mathematical Modeling in Biology

#### Question and Answer:

Q: Dr. Paur's house is  $5000 \text{ ft}^2$ . The ceilings, walls, floors and footings are all concrete. How many tons of concrete and miles of re-bar did they use? (you may stop by Dr. Paur's office and ask questions.)

A: First person to email [meansley@unity.ncsu.edu](mailto:meansley@unity.ncsu.edu) with the correct answer or closest approximation before 10/31 will receive a prize!

## Business/Finance Math Focus

Math Majors! If you have interest in applying your problem-solving skills in business/finance, consider studying Statistics, Economics, or Actuarial Science. Highly qualified students might manage the 5-year Accelerated MS program in Financial Mathematics. For more information, browse : [www.math.ncsu.edu/finmath/undergraduate](http://www.math.ncsu.edu/finmath/undergraduate).

### Math Department Wins Award

Congratulations to Mathematics for winning the 2006 Departmental Award for Teaching and Learning Excellence (DATLE). This award recognizes our strong commitment to both undergraduate and graduate education, especially our TA and REU programs.

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*Welcome Dr. Nathan Reading! Dr. Reading came to us from the University of Michigan. He is presently teaching MA 341.*

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## Honors Program

Every year approximately 20–25% of math graduates complete the Math Honors Program and about 80% of those students go on to graduate school. Schools they have attended include Berkeley, Princeton, Stanford, MIT, Cornell, NYU and UCLA. Awards received by math honors students included 11 NSF Fellowships and 3 DoD Fellowships for grad school, 5 Goldwater Scholarships and 2 Gates Fellowships. Besides taking more challenging courses to complete their math degrees, math honors program members also research either at NC State or in a summer REU (Research Experience for Undergraduates). Many of them (23 at last count) have also studied abroad, focusing on mathematics, either at the Budapest Semesters in Mathematics or the Math in Moscow Program. Thirty-three students are currently participating in the Math Honors Program and invitations to join the program will be extended sometime during pre-registration. Dr. Paur will be happy to talk to any student interested in the Math Honors Program (HA 202, [sopaur@math.ncsu.edu](mailto:sopaur@math.ncsu.edu)) More information about the program can be found on the Math Honors website at <http://www.math.ncsu.edu/honors>.

Thirteen students completed the Math Honors Program in 2005–06 (graduate program and school indicated in parentheses): Luke Bilbro (PhD, Physics John Hopkins), James W. Davis (BS/MS, Math NCSU), Robert Darwin (PhD, Economics NCSU), Ellie Grano (PhD, Math San Diego), Eric Kalendra (PhD, Statistics NCSU), Brandyn Lee (PhD, Math UNC), Maggie Linak (PhD, Chemical Eng. Univ. of Michigan), David R. Robinson (PhD Statistics NCSU), Daniel Sikes (PhD, Physics Univ. of Wisconsin), Paul S. Smith (MS Classics Edu. UNC), Eamonn Tweedy (PhD, Math UCLA), Donald Warren III (BS Physics NCSU), David S. Wilson and Steven Major (BS/MS Math NCSU).

New students joining the program last spring include Scott Boone, Kimberly Bowers, Dustin Davis, Patrick Ewing, Jacob Frelinger, Kristoph Kleiner, Jeff Olander, Dhruvil Patel, Ryan Pescosolido, Jessica Picard and Cameron Swofford. Several students participated in REU's over the summer: Ellie Grano at UCLA, David Roberson at Lafayette, Cameron Swofford at University of Nebraska at Lincoln and Joel Gomez at Texas A & M. Scott Boone and Ellie Ransom are at the Budapest Semesters in Mathematics this semester.

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*Congratulations to Dr. Ernie Stitzinger who has been named the PAMS College Recipient of the Board of Governors' Award for Excellence in Teaching.*

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*"Euclid taught me that without assumptions there is no proof. Therefore, in any argument, examine the assumptions." Eric Temple Bell (1883-1960) In H. Eves Return to Mathematical Circles, Boston: Prindle, Weber and Schmidt, 1988.*

## MATH CONTESTS

**The 28th Annual Virginia Regional Math Contest** is scheduled on Oct. 28, 2006, from 9:00–11:30am in HA 201.

**The 67th Annual William Lowell Putnam Math Competition** is scheduled on Dec. 2, 2006 from 10:00 – 1:30 am Morning session and from 3:00–6:00 pm afternoon session in HA 201.

The highest scoring NCSU student in the Putnam receives a cash prize.

Walk-in registration starts 15 minutes before both competitions.

For more information contact Dr. Lin at [xblin@math.ncsu.edu](mailto:xblin@math.ncsu.edu).

## Course Highlights

### **MA 520: Linear Algebra**

Instructor: M. Pucha

We will cover standard graduate linear algebra material. Topics include row reduction, vector spaces, linear transformations, linear functionals, eigenvalues, characteristic and minimal polynomials, and canonical forms.

### **MA 544: Comp. Experiments in Mathematical Probability**

Instructor: J. Silverstein

Explore the benefits of using computers to gain insight into mathematical behavior. Examples will be chosen from topics in probability theory which are not typically covered in other courses or which do not have a complete mathematical treatment at this time.

### **MA 583: Introduction to Parallel Computing**

Instructor: R. E. White

The first half of the course will introduce the basic multiprocessing architectures and message passing interface (MPI) subroutines. The second half will use MPI to solve linear systems via direct and iterative methods. Accounts on current multiprocessing computers will be provided. The student (undergraduate or graduate) should be familiar with basic linear algebra.

### **MA 591B: Applied Stochastic Processes**

Instructor: R. Buche

Randomness is prevalent in nature and essential to model in real-life applications. We will study various stochastic process models, including those in queueing, biology, and finance, along with the theory needed for their analysis. Some of the theory needed falls in the areas of Markov chains, branching processes, binomial-tree method, ODEs driven by various noise models, etc.

### **Ma 591E: Mathematical Models in Biological Sciences**

Instructor: M. Olufsen

This course will explore mathematical modeling in biological sciences. You will be responsible for two group projects. For more information contact Dr Olufsen.

### **MA 325: An Introduction to Applied Mathematics**

Instructor: R. E. White

Five modules are taught by faculty who are working in specific areas of applied math. The course will enable the student to formulate a cohesive plan of study for the third and fourth year. Education majors will find the variety of applications and a sampling of teaching styles to be very interesting. Also, perspective majors in pure or applied mathematics will find this to be good survey of mathematics. Students should have had multivariable calculus.

### **MA 537: Nonlinear Dynamics and Chaos**

Instructor: J. Selgrade

In recent years there has been an explosion of interest in nonlinear behavior, chaos, and fractals in the physical and biological sciences. Chaotic behavior has been observed in disciplines as diverse as meteorology, medicine, and economics. The course will introduce appropriate mathematical concepts, e.g., equilibrium, stability, bifurcation, and fractals. Software will be available to perform experiments and discover for themselves the fascinating behavior of nonlinear dynamical systems.

### **MA587: Numerical Solution of PDEs – Finite Element Method**

Instructor: M. Haider

This course offers an introduction to the finite element method, which is a powerful numerical solution technique for elliptic and parabolic PDEs. While theoretical foundations will be described, emphasis will be placed on algorithm design and implementation. This course will be useful for students interested in the numerical solution of applied PDE models for various physical phenomena (e.g. fluid and solid mechanics, heat transfer, wave scattering etc.).

Answer for Fun With Math: 21 two –point FGs  
7 three-point FGs



## News For The Undergraduate

***Congratulations** to Michael Shearer who received the 2006 Elva and LeRoy Martin Teaching Effectiveness Awards, as well as been named an Outstanding Teacher for 2005–2006 at NC State University and has become a member of the Academy of Outstanding Teachers.*

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***Congratulations** to Dr. Moody Chu for receiving the NCSU Alumni Distinguished Undergraduate Professor Award.*

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### **PARTICIPATE IN RESEARCH**

This summer fourteen undergraduates participated in the **Fifth Annual Undergraduate Summer Research Symposium** through programs such as Research Experiences for Undergraduates (REU), Reaching Incoming Student Enrichment (RISE), Student Research Internship (SRI) and Alliances for Graduate Education and the Professoriate (AGEP). These students participated in research followed by a presentation at the symposium. We applaud their efforts and hard work.

Attend the UNCG **Undergraduate Math Conference, Nov. 11<sup>th</sup>**. We are especially interested in students that present their results at the conference. Contact Mrs. Bucklad if you are interested in attending.

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### **FUN WITH MATH**

Kabe Bryant scored 81 points for the Los Angeles Lakers in their 122 -104 victory over the Toronto Raptors on January 22 – the second highest total in NBA history. He made 28 of his 46 field goal attempts and 18 of his 20 free throw attempts. How many two-point field goals and three-point field goals did he make? Answer on page 3.

## **NORTH CAROLINA STATE UNIVERSITY**

Department of Mathematics

Campus Box 8205

Raleigh, NC 27695-8205