

The  
N.C. State University

Director: Jeff Scroggs Editor: Julia Reynolds

<http://www.math.ncsu.edu/undergrad/>

## Mathematics Newsletter



### *Meet Leslie Kurtz*

Leslie Kurtz was born in beautiful Bethlehem, Pennsylvania: a college town with an industrial past. Moving from one steel city to another, she completed her undergraduate education with a B.S. in Applied Mathematics from the University of Pittsburgh. After college she moved to Raleigh where she served two years with AmeriCorps, a program that partners with Habitat for Humanity to help eliminate substandard housing. Her position involved teaching

volunteers all phases of home construction. With AmeriCorps/Habitat for Humanity she has built homes throughout North Carolina, Charleston, Mobile, Biloxi, Baton Rouge, and Cedar Rapids.

Besides meeting her husband, the best part of her AmeriCorps experience was empowering volunteers: teaching them that painting and cleaning up are not the only things they can do on a construction site. She found that there is nothing quite like showing someone that they can use power tools (safely!) or build a wall or shingle a roof. She realized that teaching math is not all that different from teaching someone how to build a house. You can't just tell someone how to do it; you have to show them.

Following AmeriCorps she earned her M.S. in Mathematics from NCSU. As a graduate student, she taught her first Calculus class and was hooked. Upon graduation she was offered a full-time Lecturer position. In 2009-2010, she received an Outstanding Teaching Award from NC State. In addition to teaching, she now checks prerequisites and transfer credits for the math department. In her spare time she enjoys drinking tea, reading books, spending time outdoors with her dog, and traveling with her husband.

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## Course Highlights

### **MA 430: Mathematical Models in the Physical Sciences**

**Prerequisites: MA 242, MA 225, MA 405 and a course in Physics OR permission of instructor.**

The purpose of this course is to introduce students to certain ideas and concepts in physics from a mathematics perspective. Topics include:

(1) a linear algebra approach to Euclidean geometry and its implications in Newtonian physics; in particular this part includes a critical development of Newton's laws, a discussion of what might be called Newtonian relativity, a development of the concepts of work, energy, and energy conservation

(2) a very brief review of basic Maxwell electromagnetism relative to a fixed Newtonian inertial frame

(3) a short introduction to special relativity including a careful

description of relativistic inertial frames

(4) a description of the calculus of differential forms on three and four dimensional vector spaces

(5) the formulation of Maxwell's equations using relativistic inertial frames and differential forms.

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

**Prerequisites: MA 405**

The course will start with basic concepts on vector spaces and will quickly move to an in-depth study of linear transformations and their associated matrices. In particular, the rational and Jordan canonical forms will be studied. By the end of the course, students will have mastered the important concepts of Linear Algebra necessary to take the introductory course in Lie Algebras (MA720)

### **MA 522: Computer Algebra I**

**Prerequisites: MA 403 or MA 407 or MA 521 and MA405 or MA 520 or consent of instructor**

The course will equip the graduate level students with advanced but well established material in algorithmic approach to algebra, such as algorithms for symbolic matrices, algorithms for commutative algebra and algebraic geometry, and algorithms for differential and difference equations.

Completing the course work, the students will be able to:

- \* develop advanced algorithms in computer algebra,

- \* read critically scientific articles published in journals and conferences, and

- \* carry out original research in computer algebra or related subjects.

## Advanced Mathematics Courses

These classes may be used as Advanced Math Electives in the Summer/Fall 2011

**MA 351:** Introduction to Discrete Mathematical Models

**\*\*MA 401:** Applied Differential Equations II

**MA 402:** Computational Mathematics: Models, Methods and Analysis

**MA 408:** Foundations of Euclidean Geometry

**MA 413:** Short-Term Actuarial Models

**\*MA 421:** Introduction to Probability

**MA 426:** Mathematical Analysis II

**MA 427:** Introduction to Numerical Analysis I

**MA 430:** Mathematical Models in the Physical Sciences

**MA 437:** Applications of Algebra

**MA 440:** Game Theory

**MA 444H:** Problem Solving Strategies for Competitions

**\*MA 501:** Advanced Mathematics for Engineers and Scientists I

**\* MA 513:** Introduction To Complex Variables

**MA 520:** Linear Algebra

**MA 522:** Computer Algebra I

**MA 719:** Vector Space Methods in System Optimization

\*Classes are also taught Summer Session I

\*\*Class is also taught Summer Session II

## Math Honors Program

### News from the Math Honors Program

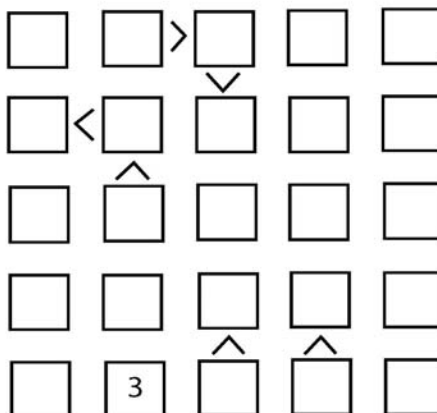
New students joining the program last semester include Allison Camras, Samuel Christie, Jake Logsdon, John Markham, John Nardini, Wesley Stewart, Kelby Stockstill and Peiqian Zhong. Students graduating in May 2011 include Tim Canty, Zach Clawson, Becky Maust and Mike Schuster. Chris Thunes has just returned from the Budapest Semesters in Mathematics and Jeff Fowler is currently participating in BSM.

Thirty-five students are currently participating in the Math Honors Program and invitations to join the program will be extended sometime during pre-registration. 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. Moreover, math honors students have received 13 NSF

Fellowships and 4 DoD Fellowships for graduate school as well as many other honors including 6 Goldwater Scholarships and 2 Gates Fellowships. Besides taking more challenging courses to complete their math degrees, math honors program members also do research either at NC State or in a summer REU (Research Experience for Undergraduates). More than thirty students have also done a study abroad program focusing on mathematics, either at the Budapest Semesters in Mathematics or the Math in Moscow Program. Sean Plummer has been accepted to BSM for Fall 2011. Participation in REU's, BSM and similar programs has played a big role in the success of our students in getting into excellent graduate schools. Dr. Paur is happy to talk to any student interested in participating in the Math Honors Program – either stop by her office in SAS 3134 or email her at [sopaur@math.ncsu.edu](mailto:sopaur@math.ncsu.edu) for an appointment. More information about the program can be found on the Math Honors website at <http://www.math.ncsu.edu/honors>.

### Math Puzzle

Visit: [www.math.ncsu.edu/undergrad/newsletter/](http://www.math.ncsu.edu/undergrad/newsletter/) for the answer



Fill the blank squares so that each row and column contains all the numbers 1, 2, 3, 4, 5  
 The signs < ∨ etc. are inequality signs.

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## Proof Techniques

Proof by lack of imagination: "I can't imagine why this would not be true."

Proof by celebrity reference: "Chuck Norris believes it to be true."

Proof by procrastination: "The proof is in the index."

Proof by avoidance: "The limit of proof by procrastination as  $t$  goes to infinity."

Proof by cheesy phrase: "The proof is in the pudding."

Proof by outsourcing: "The proof is left to the reader."

Proof by outrageous wager: "If it is not true, I will eat my hat."

Proof by bullying: "Of course it's true, don't be ignorant!"

Proof by lack of interest: "Does any one care to see the proof?"

Proof by calculus: "This proof requires calculus, and thus it has been omitted."

Proof by supplication: "Please let it be true."

Proof by exercises: "Does it ask us to prove it in the end of the chapter?"

\*This list was compiled from web pages by the students in the undergraduate math lounge



## Undergraduate News

### **Society for Undergraduate Mathematics**

**(SUM)** [www4.ncsu.edu/~nreadin/sum](http://www4.ncsu.edu/~nreadin/sum)

Join us this semester in our events to network with other math majors and have a great time! Also, feel free to come to our meetings every Monday night at 6:00PM in the undergraduate math lounge in SAS hall!

### **Friday, March 18<sup>th</sup> : Casino Night!**

*(Walnut Room in Talley 6-9PM)*

Come play blackjack, poker, roulette and bingo with other math students during our first ever Casino Night! There will be free food and awesome prizes to win through raffles and playing games! The grand prize for the night will be a \$40 gift card to BOJANGLES! Head to the math department office in 2108 SAS Hall and get your tickets for \$1.

### **Thursday, April 7<sup>th</sup> : Movie Night**

Meet in the math commons on the 4<sup>th</sup> floor for free pizza at 6:30pm and then a movie showing at 7pm. Movie showing to be announced. Keep a look out!

### **Thursday, April 28<sup>th</sup> : PAMS BBQ**

Save the date and make sure to join the college in our annual BBQ! More details to be announced.

### **ACC Basketball Tournament Statistics**

The N.C. State basketball statistics crew, headed by teaching assistant professor John Griggs, has been awarded the ACC Men's Basketball Tournament statistics-keeping duties for this season. The stat crew, consisting of ten people, has done NCAA Tournament first and second rounds as well as the Women's ACC Basketball Tournament over the years – but this is the first time for the Men's ACC Tournament. It will take place in Greensboro from Thursday, March 10, through Sunday, March 13.

In addition to Dr. Griggs, there are several other Math Department connections on the statistics crew: Randy Griggs, his son and current NCSU junior in Human Biology; Alex Eichman, current NCSU sophomore in Mathematics; Timmy Tucker, former master's student in Mathematics and current Dean of Students at Nash Community College; and Alan Hoffer, former master's student in Mathematics and current SAS employee and entrepreneur. All ACC schools use the basketball statistical package entitled StatCrew: <http://www.statcrew.com/>

### **ARTISTS/WRITERS WANTED!!!!**

The Math Undergraduate Newsletter is looking for creative students to draw/write original material to be included in upcoming newsletters. It can be anything you want such as pictures, comics, jokes, poems etc., as long as it is appropriate for an academic setting.

Please send all submissions to Julia Reynolds at [joreynol@ncsu.edu](mailto:joreynol@ncsu.edu)



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## Congratulations

### **Awards**

Congratulations to Dr. Moody Chu who was the recipient of the 2011 Board of Governors award for Excellence in Teaching

Congratulations to Ms. Elizabeth Dempster who won the NC State Outstanding Teacher Award for 2010-11.

### **Paper Published**

Undergraduate student Jeff Logsdon had a paper published recently:

Jake Logsdon, A generalization of Knar's formula. Int. J. Pure Appl. Math. 61 (2010), no. 4, 375-379

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## Undergraduate Program

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