

Mathematics Newsletter

NEWS FOR THE UNDERGRADUATE

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Meet Dr. Harvey Charlton



Dr. Harvey Charlton, born in 1934, lived on a quaint farm in Buckingham County, Virginia, which he describes as a “very strange place.” He was the second of four siblings and while growing up, he worked in farming, milling, hatchery operations, construction, and heavy equipment.

Some years later he began his educational career, which can be summed up in one word: DIVERSE. He started his undergraduate studies at MIT. While a junior he took a summer job with a Naval research lab, which resulted in him writing a paper that caused quite a stir. Before finishing his degree he had a conflict with administration, which resulted in his termination. Some time later, while working as a summer analyst for the Army, Dr. Charlton came down with what was thought to be spinal meningitis, which at the time had no survivors. With his prognosis looking grim, he was allowed only one visitor: President Eisenhower’s former Science Advisor, who wanted to talk about the Naval research paper. You will have to ask Dr. Charlton for the rest the story.

Dr. Charlton survived and took a job with the Atomic Energy Division of the Babcock and Wilcox Co. as a student assistant. He was promoted to Project Physicist for the Babcock Wilcox’s parametric studies on the Liquid Metal Fuel Reactor Experiment. He took graduate courses at UVA in four different fields helping him decide on Mathematics as a career. While looking for an appropriate school, he worked for the University of Detroit on the Experimental Research in Gravity project. He settled on VPI, where he obtained his BS, MS, and PhD.



Photo taken in 1967

His chocolate chip pound cake is reason alone to get in on his good side.

Dr. Charlton has been at NCSU for forty-two years. He is married, with two daughters, one son, four grandchildren (two girls and two boys), and three cats. He enjoys studying and working on almost anything, whether it is his house, the yard, one of his three old cars or dragging logs behind his tractor. He also passes a lot of his time playing the violin or cello and he works on developing a form of Fraïssé Logic. So stop by to visit anytime, because he is sure to have many more interesting stories to share.

Advanced Mathematics Courses

These classes may be used as Advanced Math Electives.

Spring 2009

- MA 205* – Elements of Matrix Computations
- 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 437 – Applications of Algebra
- MA 501 – Advanced Mathematics for Engineers and Scientists I
- MA 513 – Introduction To Complex Variables
- MA 537 – Nonlinear Dynamics and Chaos
- MA 544 – Comp. Experiments in Mathematical Probability
- MA 587 – Numerical Solution of Partial Differential Equations--Finite Element Method
- PHI 498 (LOG 437/537)* – Model-Theoretic Semantics

* MA 205 and PHI 498 (LOG 437/537) count as Advanced Math Electives if taken in Spring 2009.

A special Thank You to Margaret Wright for Chairing the External Review Committee in 2008.

Wright is a well-known mathematician in the fields of optimization, linear algebra, numerical and scientific computing and scientific and engineering applications.

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.

Sir Isaac Newton Lived on a Farm:

Isaac Newton's mother insisted that he become a farmer; if it weren't for his uncle he would have never attended Trinity College in Cambridge.



News from the Math Honors Program

- **Eleven** students completed the Math Honors Program last Spring
- **Ten** new students in program this Fall
- A Goldwater Scholarship was awarded to NCSU Math Honor Student, Nicole Kroeger
- Ryan Going received an Honorable Mention for the Goldwater Scholarship
- **Six** N.C. State students participated in the NCSU REU program this summer

Overview of Honors Program

- **Twenty-nine** students are currently participating in the Math Honors Program
- **20-25%** of students graduating with a Math BS complete the Math Honors Program
- **80%** of those students go on to graduate school
- Schools include Berkeley, Princeton, Stanford, MIT, Cornell, NYU and UCLA
- 12 NSF Fellowships
- 3 DoD Fellowships
- 6 Goldwater Scholarships
- 2 Gates Fellowships



A gifted mathematician, Anna Haywood was born in Raleigh, North Carolina in 1858. She was the daughter of a slave woman and her white master. At the age of 10 she became interested in math and science. Later she entered the doctoral program at Columbia University and in 1914 she became the fourth African-American woman to earn the Ph.D.

<http://www.agnesscott.edu/lriddle/women/acooper.htm>

MATH CONTESTS

Deadline in October: The Association for Women in Mathematics sponsors a contest for biographical essays about contemporary women mathematicians and statisticians.

November: The 30th Annual Virginia Tech Regional Mathematics Contest will be held in HA201 from 9:00a.m. to 11:30a.m. on Saturday November 1, 2008

December: The 69th Annual William Lowell Putnam Math Competition is scheduled on Dec. 6, 2008, from 10:00 - 1:00 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.

For more information on Math Contests go to:

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

Invitations to join the Honors program will be extended sometime during pre-registration. As well as taking more challenging courses to complete their math degrees, math honors program members also participate in research either at NC State or in a summer REU (Research Experience for Undergraduates). Many members (**25** at last count) have also studied abroad, either at Budapest Semesters in Mathematics or the Math in Moscow Program. Participation in those programs has played a large role in the success of our students being accepted 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 HA 202 or email her at 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>

To learn more about other successful women in mathematics check out our website:
<http://www.math.ncsu.edu/resources.php>

Course Highlights

MA 205 - Elements of Matrix Computations

Instructor: R. White

This three-credit course contains topics on complex numbers, vectors, determinants, matrices, linear algebraic systems, least squares and linear differential equations. This will enable students to begin the study of discrete models, which require matrix algebra and computing skills. Emphasis is on by-hand computations, but it is to include applications and computing tools. This course will serve to "diversify" math course work and to provide "math-on-time" for first year students in engineering and the sciences. Some returning or transfer students may need a review of 2-D and 3-D vectors and matrices, basic calculus and need to learn a relevant computing tool such as MATLAB. *Preq: C- or better in MA 121 or 131 or 141*

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. These phenomena may be introduced at an elementary level because often they are described by nonlinear difference equations which are discrete dynamical systems and are analyzed by studying iteration of functions. The course will introduce appropriate mathematical concepts, e.g., equilibrium, stability, bifurcation, and fractals. Software will be available so that students can perform computer experiments and discover for themselves the fascinating behavior of nonlinear dynamical systems.

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 587 Numerical Solution of Partial Differential Equations- Finite Element Method

Instructor: Z. Li

The Finite Element Method is a MUST for applied mathematicians, engineers, or anyone who uses computers to solve problems that involve partial differential equations. In this course, we use one-dimensional problems to introduce the finite element method, including the algorithm implementations, the theoretical backgrounds, and applications. Then we will carry over the essential tools to two dimensions. We will discuss some common used finite element spaces, error analysis, and other related topics. Efforts will also be made on the issues of implementation and related softwares. Using the data from the Matlab mesh generator, the students will be able to implement finite element method using their favorite computer languages for complicated geometries in two dimensions.

CONGRATULATIONS:

Our Faculty:

H. Thomas Banks named one of the recipients of the Alumni Association's Outstanding Research Award!

Demetrio Labate has won a National Science Foundation Career Award

Bob Martin named an Alumni Distinguished Undergraduate Professor for 2008-2010!

Marilyn McCollum has been named an NC State Outstanding Teacher for 2007 - 2008, & has become a member of the Academy of Outstanding Teachers.

If you are interested in other corny jokes & riddles or if you are seeking more info about the math program check out our website at: <http://www.math.ncsu.edu/undergrad/index.php>

Our Staff: *Denise Seabrooks who was nominated for the 2008 PAMS/Mathematics SPA Award of Excellence!*

We can't forget our talented Mathematics students:

Nicole Kroeger, a sophomore in Mathematics won the prestigious Barry M. Goldwater Scholarship for 2008-2009.

Anjela Govan, one of our graduate students, was awarded the best contributed paper in the area Data Mining and Predictive Modeling!

Q: Why do mathematicians, after a dinner at a Chinese restaurant, always insist on taking the leftovers home?

A: Because they know the Chinese remainder theorem!

News for the Undergraduate

High-Order Numerical Solution of Wave-Type Equations with Discontinuous Coefficients

Mathematical and numerical aspects of the propagation of waves through the media with sharp variations. The key goal is to build an accurate finite-difference approximation. No special background is required besides standard classes in differential equations and numerical analysis; everything else will be learned along the way. Prof. Semyon Tsynkov, tsynkov@math.ncsu.edu

This summer twenty-six undergraduates participated in the **Seventh 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.

STEM

The NSF-funded S-STEM Research Scholars Program invites applications for scholarships of \$4,625 from undergraduate students to support for tuition, fees, and textbook charges. Undergraduate students are eligible for S-STEM scholarships in their junior and senior years. Please visit the web site below for criteria and application materials. Applications for the academic year 2009-2010 will be accepted until April 30, 2009.

<http://www.math.ncsu.edu/summer/STEM/index.php>

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Participate in Research

RTG

Q: What do high fidelity loudspeakers, cartilage, pharmaceutical dispensers, large space structures utilizing carbon nanotubes, and laser welding have in common?

A: All rely on the mathematics of materials for fundamental analysis.

Through the NSF-RTG program, we have support for undergraduates interested in pursuing related research. Students should ideally have some coursework in differential equations, linear algebra, numerical analysis, and physics, but the main prerequisite is a desire to pursue research in this exciting field. Interested students should contact Ralph Smith (rsmith@eos.ncsu.edu).

The Sum Series

Come eat pizza while you listen to an informal, interesting talk on a mathematical topic or an issue of interest to math majors. The SUM Series is sponsored by the NC State Society for Undergraduate Math, and meets on Thursdays from 3:00 to 3:50 in Harrelson 330. Upcoming events include: Ranking sports teams with Google's PageRank, the mathematics of voting and a math movie night (in the afternoon).