

# Signs of Mathematics

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*Department of  
Mathematics*  
*2007 Newsletter*  
*University of Central  
Arkansas*

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## NEW MASTER'S PROGRAM IN APPLIED MATHEMATICS

The Department of Mathematics at the University of Central Arkansas admitted the first cohort of students in a new Master of Science Degree program in Applied Mathematics in fall 2006. The new graduate program is built on the success of the applied mathematics track of the existing B.S. in mathematics.

The focus of this new program is to train students in the process of mathematical modeling, so that the graduates can better serve both business and government in the state of Arkansas. By applying mathematical modeling within business, engineering, planning and other areas, significant problems can be studied using analytic and numerical methods.

The new program has both thesis and non-thesis options. The thesis option requires 30 graduate credit hours of course work with

six credit hours of research. The non-thesis option requires at least 33 graduate credit hours and the successful completion of comprehensive examinations.

Graduate teaching assistantships with stipends and tuition scholarships are available during the academic year. Two new faculty members have expertise in numerical analysis and fluid dynamics, and several tenured faculty members have experience working with students on research problems in mathematical modeling, differential equations and symmetry analysis, dynamical systems and control theory.

In addition to the new M.S. program in Applied Mathematics, the department offers a M.A. degree in Mathematics Education, a B.S. degree in Mathematics and Applied Mathematics, a B.A. degree in Mathematics, and a B.S.E. pro-

gram in Mathematics Education.

In fall 2007, the department plans to award 20 graduate teaching assistantships, ten in each program. For more information on this new program or any other program in the department, phone 501-450-3147 or visit the website:

<http://www.uca.edu/math>.

## UPCOMING EVENTS

The Regional Math Contest, organized by **Dr. Carolyn Pinchback**, will be on February 24, 2007. The State Math Contest will be on April 29, 2007. **Dr. Charles Watson** will serve as the director. Both contests will be held in the Mathematics and Computer Science building on the campus of UCA.



## FROM THE CHAIR'S DESK.....

The year 2006 was very productive. Foremost, we are proud to have started the new MS program in applied mathematics. Currently, the department has 14 full-time graduate students pursuing the MA or MS degree, and about 150 undergraduate

students pursuing the BA, BS or BSE degree. I am pleased to report our undergraduate research program is thriving. During 2006, there were 16 undergraduate math majors engaged in various research projects ranging from symmetry analysis, control theory, hydrology to mathematics education. The Department has awarded the highest number of BS degrees in mathematics over the last five-year period when compared to the other public universities in the state. Faculty members were active in publishing research papers, presenting at national and international conferences, providing professional service and securing intramural and extramural grants. These were some good *Signs of Mathematics* at UCA. I hope you enjoy this revival edition and keep in touch. With Best wishes, *Ramesh Garimella, Chair, [rameshg@uca.edu](mailto:rameshg@uca.edu)*.

## FACULTY NEWS



Burg



Le



Rubinshtein



Welter

In fall 2006, **Dr. Clarence Burg** and **Dr. Long Le** joined the Math Department as tenure track faculty members. Dr. Burg received his Ph.D. in computational engineering from the University of Mississippi in 1999, whereas Dr. Le received his Ph.D. in fluid dynamics from the State University at Buffalo in 2006. Also, in August 2006 **Dr. Evgenia Rubinshtein** accepted a visiting assistant professor appointment for AY 2006-07. Dr. Rubinshtein received her Ph.D. from the Florida State University. Her research area is Statistics. Also **Ms. Leslie**

**Gomes** was hired as an instructor for fall 06. Ms. Gomes received her MA degree from UCA in spring 06. In fall 06, **Dr. Singh Tomer**, returned to the department as a full-time faculty member after having taught in the Department of Computer Science for the last eight years. Dr. Tomer's research interests are in theory of computation and algorithms. **Mrs. Jennie Welter** joined the Department as a secretary I in August 2006. **Dr. Linda Griffith** received a grant in fall 2006 from the *South Education Cooperative Services* for creating and implementing target testing for grades 3-8 in mathematics, literacy and science.

## STUDENT NEWS

*Graduate students  
Awards for Majors  
Curriculum Change  
New Minor  
Summer Course*

### Graduate Students

In fall 2006, the Department awarded 11 graduate teaching assistantships. **Tim Bennett, Ashley Embry, Beau Jones Sydney Marks, and David Watts** were awarded teaching assistantships in the new MS program whereas **Marcel Carcea, Cara Cates, Mary Foster, Candice Kendrick, Cailin Noble, Susie Young** were given teaching assistantships in the MA

program. Each graduate teaching assistant is provided with an IBM ThinkPad to enhance his/her teaching.

### Awards for Majors

At the Honors Convocation, held in April 2006, **Amber Fason** received the *Dorothy Long Award* (presented to an outstanding female upper classman in mathematics), and **David Watts** received the *O.L. Hughes Award* (presented to outstanding senior mathematics major). Freshman Mathematics major, **Lucille Busch**, received *O.L. Hughes Scholarship* for AY 2006-07.

### Curriculum Change

The Department added ECON 2320 and ECON 2321 as ancillary requirement options to the applied mathematics curriculum.

### New Minor

Students pursuing a B.S. degree in mathematics or applied mathematics are now allowed to substitute the requirements for teacher licensure for the minor. This option would allow the students to choose a teaching career at some time in the future, if desired.

### Calculus I in Summer

For the first time in several years, the Department offered nine-week Calculus I during summer 2006. We are planning to offer it again in summer 2007. For more information on summer 07 classes, call 450-3147.

### On-line Calculus

UCA Mathematics faculty members **Drs. George Bratton and Charles Watson** developed an on-line Calculus I

(Math 1591) course during spring 2006. For more information on this on-line course, please contact Dr. Bratton at 450-3147.

### Math Club

Math Club was revitalized during fall 06 under the leadership of the graduate students **Cara Cates** and **Cailin Noble**. Faculty advisors for the Math Club are **Le and Butcher**. All mathematics majors are encouraged to become active members of the Math Club and attend its monthly meetings. More information about the Math Club is posted on the bulletin board near the Mathematics Office Suite.

# RESEARCH



## *Dr. Danny Arrigo Wins Research Award*

At the campus-wide annual Awards Ceremony, our own **Dr. Danny Arrigo** received the University's 2006 Award for Research and Creative Activities. Dr. Arrigo's research area is symmetry analysis. Besides his own research, Dr. Arrigo is currently working with five undergraduate students on various research projects.

### Student papers

**Michael Schelkopf**, received the first place, and **Akhil Mehta and Chase Ransom** received the second place in the student paper presentation competition at the MAA regional meeting at the campus of the University of Arkansas at Fayetteville at the end of March 2006. All three students are math majors, and were mentored by Dr. David Peterson. Another mathematics major, **Jason Torrance**, mentored by Dr. Arrigo, made a poster presentation at the joint meetings of AMS-MAA, held in San Antonio in January 2006.

### Student poster presentations

Undergraduate applied mathematics majors **Ethan Hereth, Olabode Sule, Katie Reynolds, and Luis Suazo**, (all mentored by Dr. Arrigo) and **Chris Pickens** (mentored by Dr. Liu) made poster presentations on their research projects at the annual AMS/MAA Joint Meeting held in New Orleans in January 2007. The students' trip to New Orleans meeting is sponsored by the Department, Dean's Office and the Office of Sponsored Research Programs.

## GRADUATES IN 2006

### Bachelor of Arts in Mathematics

Sydney Marks

### Bachelor of Science in Mathematics

Tara Beck	Nicole Becnel
Bradley Burnette	Cara Cates
Rachel Courtney	Paige Covington
Holly Easley	Altankhuyag Gongor
Emily Hodo	Beau Jones
Cailin Noble	Steven Stock
Jason Torrance	David Watts
John Wharton	Susie Young

### Bachelor of Science in Mathematics Education

Mechelle Belanger	Mary Foster
Jessica Frye	Raymond Girdler
Bethany Knight	Katie Lilly
Britni Pulliam	

### Masters of Arts in Mathematics

Valerie Burkhart	Michelle Creekmore
Leslie Gomes	Holly Morado
Angela Spicer	Miranda White
Joshua Yowell	

## *Attention!*

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If you are an alumnus of our department, your name should have appeared on the department website under the link "past graduates." If it is not there, please email your information to [rameshg@uca.edu](mailto:rameshg@uca.edu). We will add your name to the website.

## *Did you Know?*

Our *Statistical and Applied Mathematics Services (SAMS)* has been revitalized. *SAMS*, consisting of applied mathematics and statistics faculty members, provides consulting services to individuals or organizations for a modest fee. For more information on *SAMS* contact **Dr. Ayrin Molefe** at 501-450-3147.

## ***PRESENTATIONS***

**D. Arrigo and J. Torrence** , *The formation of rateholes in granular hoppers*, Joint AMS/MAA Meetings, San Antonio, TX, January 2006.

**G. Bratton**, *Simulations in teaching introductory statistics*, NCTM Annual Meetings, St. Louis, April 2006.

**G. Bratton**, *Essential Maple for Calculus*, ICTM, Orlando, March 2006.

**S. Butcher**, *Phantom Circles in the Rational Plane*, MAA Sectional Meetings at the University of Arkansas at Fayetteville, April 2006.

**D. Foss**, *Engaging Middle Level Mathematics Teachers in Professional Development*, Association of Teacher Educators, Atlanta, February 2006.

**R. Garimella**, *A Solution of an operator equation on a Banach space*, Department of Mathematics and Statistics, University of Arkansas at Little Rock, January 2006.

**W. Liu**, *Mixing Enhancement via Flow Optimization*, Proceedings of 45th IEEE Conference on Decision and Control, December 2006.

**W. Liu**, *Theoretical control analysis on regulation of blood glucose levels*, Department of Mathematics and Statistics, University of Arkansas at Little Rock, November 2006.

**W. Liu**, *Spatiotemporal patterns and decay in diffusive fluid mixing*, University of Cincinnati, May 2006.

**D. Peterson**, *Comparing acoustical properties of the Hammered Dulcimer and the Yang Qin*, Joint Meetings of American and Japanese Acoustical Societies, November 2006.

## ***PUBLICATIONS***

**D. Arrigo**, *Type-II hidden symmetries of the linear 2D and 3D wave equations*, (co-authored with B. Abraham-Shrauner, K. S Govinder) Journal of Physics A: Mathematical and General, 39 (20), 2006, pp.5739-5747.

**C. Burg**, *The residual formulation of the method of manufactured solutions for computationally efficient solution verification*, (co-authored with Vasanth Murali), International Journal of Computational Fluid Dynamics, Vol. 20, No. 7, August 2006, pp 521-532.

**C. Burg**, *Analytic study of 2D and 3D grid motion using modified Laplacian*, International Journal for Numerical Methods in Fluids, Vol. 52, 2006, pp. 163-197.

**R. Garimella**, *A solution of an operator equation related to the KdV equation* (joint work with Hryniv and Souour), Journal of Linear Algebra and Applications, Vol. 418, issues 2-3(2006), 788-792.

**W. Liu**, *Closed-Loop Separation Control: An Analytic Approach* (co-authored with M.R. Alam and G. Haller), *Physics of Fluids*, 18, 043601, 2006.

## ***GRANTS***

**D. Arrigo**, *Stress distributions within rat holes in granular materials*, URC Grant, \$3,900.

**C. Bratton**, *Analyses of rat performance data on a radial arm maze*, URC Grant, \$363.

**C. Burg**, *Space-time finite volume methods for computational simulations involving moving surfaces*, URC Grant, \$3,840.

**L. Griffith**, *Target Testing/Mathematics Coaches Training*, Southern Education Service Cooperative, \$146,880.

**W. Liu**, *Feedback Control in Diffusive Fluid Mixtures*, URC Grant, \$4,810.

**W. Liu**, *Theoretical Control Analysis on Regulation of Blood Glucose Levels* , URC Grant, \$3,200.

## ***MORE NEWS***

**Drs. Danny Arrigo, Long Le and Evgenia Rubinshtein**, presented papers at the annual joint meetings of AMS/MAA held in New Orleans in January 2007. **Drs. George Bratton, Clarence Burg, and Weijiu Liu** received *University Research Council* grants for the 2006-07 academic year to work on various research projects.

**Drs. Donna Foss, Carolyn Pinchback, Jean McGehee and Charles Watson** are collaborating with **Dr. Carolyn Williams** of the College of Education at UCA on several *No Child Left Behind* Programs grants. **Drs. Danny Arrigo, Donna Foss and Ramesh Garimella** accepted to serve on Ph.D. Thesis Committees of candidates in Australia and India. **Dr. Charles Seifert** served as the President of the Faculty Senate at UCA for the academic year 2005-06.