THE UNIVERSITY OF NORTH CAROLINA AT WILMINGTON

Summations

UNCW Department of Mathematics and Statistics Newsletter Fall 2000

Greetings from the Chair

As the newly selected department chair for mathematics and statistics, and on behalf of the entire faculty in our department, I would like to send greetings to our alumni, retired faculty, current students and friends.

Dr. Wei Feng
Department Chair

The department currently has 27 full-time faculty, five part-time faculty and two secretaries. There are about 60 majors in our undergraduate program and 14 graduate students in our Master s program. Our faculty is committed to excellence in teaching and scholarship. Their achievements last year included 18 publications in professional journals, 24 presentations at professional meetings, and 16 internal or external grants. On page 3 of this issue, the awards and accomplishments of our outstanding students are listed.

In this year, the Department of Mathematics and Statistics is carrying out a self-study that is required by the Southern Association of Colleges and Schools (SACS) once every 10 years. The new objectives developed by the department include: enhancing the learning environment of students, increasing the number of undergraduate majors, strengthening the graduate program, developing departmental involvement with other departments, studying the potential for a major in statistics, and working to establish a statistical consulting center.

I would like to express our sincere appreciation to our alumni, retired faculty, and friends for their continuous support to our student award funds and International Graduate Student Scholarship Fund. We look forward to hearing more news about recent developments in your lives and careers.

Wei Feng

High School Math Contest

The 21st annual UNCW High School Mathematics Contest was held in the University Center Ballroom on April 3, 2000. There were 124 participating students representing 17 southeastern North Carolina high schools. The participants were divided into divisions I and II. (Division I high schools have an enrollment greater than 700 students in grades 10-12.) Teams came from as far as Laurinburg, Lumberton, Jacksonville, and Boiling Springs Lake. Individual and team honors were awarded. Students that scored in the top 7% on the contest were invited to participate in the State High School Mathematics Contest that was held April 29 in Durham. **Dr. John Karlof** is the contest director. **Drs. Karin Deck** and **Matt Tenhuisen** are co-chairs of the contest committee and **Karen Spike** and **Dr. Yaw Chang** served on the committee. The UNCW MACS club also assisted with the contest.

(left to right): *Kevin Conner, Daniel Brahm, Rafael Secundo, Veronica Brumbaugh, Deniz Chan, Andrew Lin*

The students honored in this year s contest with a trip to the state contest were:

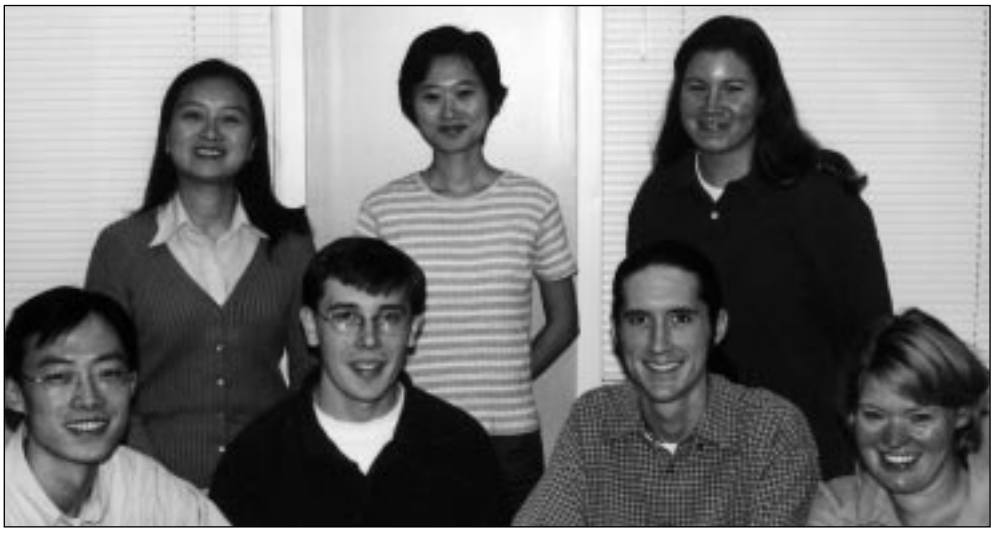
Division I: Andrew Lin (Scotland HS, Laurinburg), **Deniz Chen**, **Kevin Conner**, **Veronica Brumbaugh** (all of Hoggard HS, Wilmington), **Rafael Secundo** (New Hanover HS, Wilmington)

Division II: Daniel Bruhn (Massey Hill Classical HS, Fayetteville), **Gareth Wilson**, **Thane Maxwell**, **Brent Tolan** (all of Cape Fear Academy, Wilmington)

Taking team honors in divisions I and II respectively were Hoggard HS, Scotland HS, Laney HS and Cape Fear Academy, Lejeune HS, South Brunswick HS.

Next year s contest will be held on April 2, 2001. All high school students in southeastern North Carolina are welcome to participate. Please contact

From the Graduate Coordinator: Sandra McLaurin



(front row): *Yinggang Li, Brian Hetzell, Jody Hinson, Karen Achico*
(back row): *Fang Liu, Ying Wang, Emily Johnson*

In the fall, I like to highlight the new graduate students who are also teaching assistants (TA s). The new TA s have differing backgrounds and experience, and are performing a variety of duties. I asked them to tell us something about themselves and to comment on their experience at UNCW.

Karen Adams Achico from Louisville, Kentucky earned a B.S. in business administration and a B.S. in mathematics from the University of Louisville. After receiving her B.S. in mathematics, she worked as a statistician at a firm in Louisville. Karen moved to the area to be with her husband, Mark who is with the USMC. In addition to tutoring in the math lab, Karen is teaching MAT 100, Foundations of Algebra.

Brian Hetzell, a native of Chapel Hill, N.C., received his B.S. in mathematics from UNCW in summer 2000. Brian likes being a TA and tutoring because he is getting a great review of the basics while helping others. Grading papers has helped him understand and respect what all of his undergraduate and graduate teachers have to go through.

Jody Hinson is from Monroe, NC. He received his B.S. in applied mathematics from UNCW, spring 2000. He is enjoying the challenges of tutoring, grading, and taking classes. He considers being a TA a wonderful and enlightening experience. In addition to the challenge of graduate school, Jody is planning to get married this New Year s Eve.

Emily Johnson, another recent UNCW graduate, received her degree in mathematics this past spring. She is a native of Annville, Pa. As an undergraduate, she was a member of the MACS club. She is learning from her duties as a TA, and likes graduate school because she can concentrate on just mathematics. She is taking three courses and can spend more time on each one.

Yinggang Li is from Wuhan, China. He received a degree in electrical engineering from Huazhong University of Science and Technology. His favorite subject in mathematics is operations research. He also likes working with computers. As a TA, Yinggang assists the mathematics and statistics faculty in computer troubleshooting.

Fang Liu has a degree in electronic engineering from Hubei University in her hometown of Wuhan, China. She worked in an internet company for more than three years before moving to Wilmington. She likes to explore cyberspace when she has free time. As a new graduate TA, Fang has learned a lot from others while studying and has made many new friends.

Ying Wang has a degree in international accounting from Tsinghua University. Her hometown is Shijiazhuang, Hebei in China. She is enjoying her work grading papers for several instructors but is also looking forward to tutoring in the Mathlab in the spring.

Student Awards

The following student awards were presented at graduation in May.

The Adrian D. Hurst, Award
The Adrian D. Hurst Award goes to the junior or senior mathematics major with the highest g.p.a. who has done all course work at UNCW. This year s recipient of the Adrian D. Hurst Award was **Rosa Turrisi Fuller.**

Barbara English Award
The Barbara English Award goes the graduating senior who has the highest g.p.a. **Thomas Neil Woodson, Jr.** was this year s recipient. Thomas already holds a B.S. in political science and received his B.S. in applied mathematics with a minor in physics.

At an awards ceremony in April the following students were named as departmental scholarship winners.

Adrian D. Hurst Scholarship
Rosa Fuller - senior with a double major in mathematics and physics
Diedre Suggs - junior mathematics major

Fred Toney, Jr. Scholarship
David Sutherland - senior mathematics major

J. Marshall Crews Scholarship
Shauna Turner - senior with a double major in mathematics and computer science

Carl Nelson Award
Christina Koenig - junior mathematics major

Bookstore Scholarships
Paris Faison - junior with a major in mathematics and a minor in computer science
Michele Wright - junior mathematics major

These awards are to honor the outstanding juniors or returning seniors in the Mathematical Sciences Department. Selection is made by a vote of the mathematical sciences faculty based on the students academic achievements, extracurricular activities, and a short paper on the subject of the relationship between the students education and career plans.

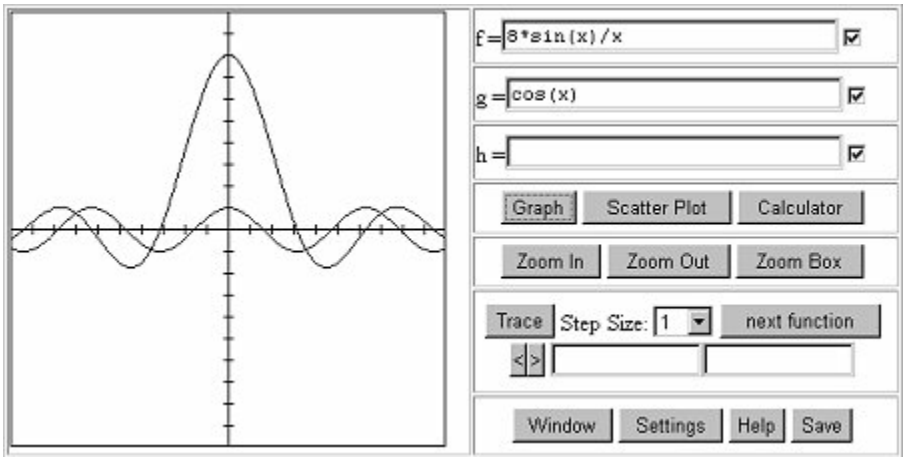
Jeff Brown, Professor • PhD, University of Georgia, 1984

Since the late 1980s my primary research area has been Computer Aided Geometric Design (CAGD). Computers are used extensively in the process of designing automobiles, airplanes, and many other products. Design software must allow the user to edit curves and surfaces with simple input devices, such as a mouse. Research in CAGD concerns the mathematical algorithms that the design software uses to render and edit curves and surfaces.

To support my CAGD research, I did a lot of computer programming. When presenting a new algorithm to solve a certain problem, you need to prove that the algorithm works, and also demonstrate the results by implementing it in a program.

In the fall of 1997 I started learning Java, a new programming language. What excited me about Java was the fact that you could write programs that would run inside web pages. During the spring of 1998 I conducted a seminar on Java programming for the web.

While preparing for this seminar I started to see the tremendous potential that Java had for improving online education. Programs embedded in web pages can make them interactive. Students can experiment with mathematical ideas by working with Java applets. I was hooked!



In the summer of 1998 Russ Herman and I developed an online College Algebra course that uses Java and other programming languages to provide interactive content. Since then I have been actively involved with online course development. I have developed an online calculus course, served as faculty associate and as leader of the UNCW Web Course Development Team, and worked as a consultant for businesses and agencies involved with online education.

Recent Publications

- **Local Approximation of Functions over Points Scattered in R^m**, jointly with W. L. Etheridge, *Applied Numerical Mathematics* 29, 1999, pp. 189-199.
- **Effects of drainage and soil organic content on growth of Spartina alterniflora in an artificial salt marsh mesocosm**, jointly with D. E. Padgett, Am. J. Bot. 1999 86: 697
- **Systems of Coordinates Associated with Points Scattered in the Plane**, *Computer Aided Geometric Design* 14, 1997, pp. 547-559.
- **MathBoard** ®, WYSIWYG applet to display, evaluate and graph mathematical formulas

Congratulations Faculty!

John Karlof for more information at (910) 962-3384 or karlof@uncwil.edu.

Paul Shotsberger s Technology Innovations grant Use of Mobile Wireless Devices to Enhance Undergraduate Teacher Preparation and Support has been funded in the amount of $23,920. It represents an effort to more thoroughly infuse technology into the undergraduate curriculum for prospective mathematics teachers, while strengthening the relationships that already exist between UNCW and area partnership professional development high schools. The purchase and use of Jornada Pocket PC wireless devices and supporting equipment/access will add a new dimension to just-in-time training and support, allowing preservice and inservice mathematics teachers to be literally anywhere and receive information, collaboration and support using web resources. The addition of a cell phone to the equipment configuration, which will act as the modem for the Pocket PC, will enhance each teacher s ability to communicate with parents and others. Each teacher will be loaned the equipment for the upcoming practicum semester (January through May, 2001) and the grant will pay for airtime and Internet access for the time of the loan.

Drs. Russell Herman and **Gabriel Lugo** are co-investigators of a $1.1 million grant funded by the National Science Foundation entitled A Digital Library of Reusable Science and Math Resources for Undergraduate Education. This interdepartmental, inter-institutional project will create a digital library with content in chemistry, biology, mathematics, physics, and computer science. The library content will range from individual images to animation to video clips to complete instructional modules. An important task of the project will be to develop guidelines for reviewing content submitted for inclusion in the library by other institutions and evaluate patterns of use of the library. The goal of the project is that within two years the digital library will not only be a powerful tool for faculty who are developing digital course material, but will also be an active test bed in which various questions concerning the design of effective digital libraries are being addressed.

Congratulations to the Class of 2000!

Spring 2000 graduates: Joanna Booker, Jody Hinson, Lauri Holland, Emily Johnson, Shannon Koons, Shannon Meyer, Thomas Saraceni, Lisa Soberano, Keith Spencer, Benjamin Stroehl, Laura Taylor

Summer 2000 graduates: Kristina Beard, Brian Hetzell

New Scholarship

UNCW is pleased to announce a new scholarship, the **Gene T. and Elizabeth J. Fales** Scholarship. Mr. and Mrs. Fales created this scholarship in appreciation of UNCW and in memory of **Dr. Adrian Hurst** and in honor of **Dr. J. Marshall Crews**, who were long-time faculty members and mentors. The scholarship is intended to support a student majoring in mathematics or pre-engineering. The Fales Scholarship will provide support to assist with tuition and fees and books for a full-time junior, senior, or graduate student who has declared a major in mathematics or is a full-time student enrolled in the pre-engineering program.

Thank you Mr. and Mrs. Fales!

MATH FUN

When three positive integers are multiplied two at a time the results are 32, 48, and 24. What is the sum of the three integers?

The first correct response will be recognized in the next edition. **Send solutions to summations@uncwil.edu**

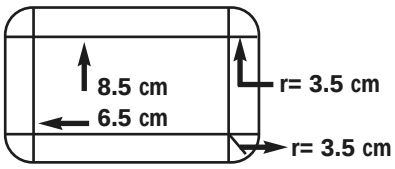
Solution to Spring 2000 Math Fun!

A bug crawls around the outside of a rectangle that measures 6.5 x 8.5 cm. If the bug remains exactly 3.5 cm. from the rectangle at all times, find the area of the region bounded by the bug's path.

Congratulations to **Zach Cox** for submitting the first correct solution to the Math Fun.

Zach graduated in 1975 with a B.S. in mathematics with secondary teaching certification. He taught mathematics and physics courses for two years before entering graduate school at UNC Chapel Hill. After completing his master s degree, Zach taught mathematics and computer science courses at Louisburg College. He is currently living in Raleigh, N.C. with his wife Evelyn and their 3 children Ginny, Anna, and Rob. He is a senior software engineer for Nexus Software where he specializes in the design and implementation of application programming interfaces that allow high-level applications to interact with financial devices in a vendor independent manner.

ZACH'S SOLUTION



If the bug really does stay exactly r units away from the rectangle then it must be exactly r units away at the corners too. It can accomplish this by crawling parallel to the sides of the rectangle up to the point where it is directly opposite the end of a side. Then it can crawl in an arc of radius r until it gets even with the end of the rectangle again when it can again crawl parallel to the edge until it reaches the next corner where it again crawls along an arc. The bug repeats this until it gets back to its starting position.

At each corner the bug must crawl along an arc of 90¡ (1/4 of a circle). So the whole area is the area of the original rectangle plus the area of the four small rectangles whose width is r and whose length is the same as the original width or length plus the area of a circle with radius r.

So this new area can be computed in an easy way.

Area of the whole region = Area of the old region + Area of any new parts

Area of old region = l¥w

Area of new parts = 2rl + 2rw (these are rectangles stuck on the sides of the original) plus the area of the corner parts.

Area of corner parts = Area of a circle of radius r = πr^2

New area = lw + 2rl + 2rw + πr^2 = 8.5(6.5) + 2(3.5)(8.5) + 2(3.5)(6.5) + $\pi(3.5)^2$ = 198.7 cm

Great Job, Zach!

Full-Time Faculty

Dr. James Blum
Dr. Jeffrey Brown
Ms. Sandra Carlson
(Math Lab Director)
Dr. Yaw O. Chang
Dr. Thaddeus Dankel
Dr. Karin Deck
Dr. William Etheridge
Dr. Wei Feng
(Chair)
Mrs. Terry Fleck
Dr. Michael Freeze
Dr. Dargan Frierson
Dr. Daniel Guo
Dr. Kenneth R. Gurganus
(Undergraduate Coordinator)
Dr. Russell Herman
Dr. John Karlof
Dr. Subramanyam Kasala
Dr. Xin Lu
Dr. Gabriel Lugo
Dr. Sandra McLaurin
(Graduate Coordinator)
Dr. Shiva K. Saksena
Dr. Paul Shotsberger
Dr. Douglas D. Smith
Dr. Karan Smith
Dr. Kenneth Spackman
Mrs. Karen Spike
Dr. Matthew TenHuisen
(Assistant Chair)
Dr. Ram Vedantham

Welcome New Faculty!

(left to right): *Daniel X. Guo, Michael Freeze, Jim Blum*

Jim Blum received his B.A. in mathematics from the University of Michigan. He taught mathematics at Southwestern Michigan College for about 3 years. He received his M.S. in applied mathematics and his Ph.D. in statistics from Oklahoma State University. Dr. Blum s research interests include varying coefficient models, categorical data analysis and statistics education.

Dr. Michael Freeze received his Ph.D. from the University of North Carolina at Chapel Hill, 1999. Dr. Freeze joins us after a year as a visiting professor at UNCW. His research has been on theory and associated invariants of Dedekind domains, including the strong and weak Davenport constants. Other fields of interest are combinatorial group theory and computational number theory.

Dr. Daniel X. Guo graduated form Indiana University with a Ph.D. in Applied Mathematics and M.S. in computer sciences in 1999. He was on leave last year with permission to work at Oak Ridge National Laboratory. His research fields are numerical analysis, numerical computation, computational fluid dynamics, and numerical simulation of atmosphere and ocean circulation.

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Alumni! We want to hear from you!

Name: _____
Dr./Mr./Mrs./Ms. First Middle Maiden Last Suffix

Address: _____
Street/PO Box City State Zip Code+4

Phone: Home ( ) _____ Work ( ) _____ E-Mail _____

Employer: _____ Position _____ Gift Matching Co.? ☐ YES ☐ NO

_____
Street City State Zip code + 4

Grad. Date: _____ Degree/Major: _____ Is spouse UNCW alumnus? ☐ YES ☐ NO

Alumni News! Send your update to: **alumnews@uncwil.edu** or complete our form on the web at **www.uncwil.edu/alumni**

Yes, I want to support the UNCW Mathematics and Statistics Department!

Enclosed is my gift of $ _____ made payable to **UNCW**

Please direct my gift to:

☐ **Mathematics and Statistics Trust Fund** ☐ **Crews Scholarship Fund**
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Thank you for your consideration and generosity.

2000 Pi Mu Epsilon Initiates

(left to right): *Rosa Fuller, Deidre Suggs, Shauna Turner, Christine McFayden, Paris Faison Jonathan Duggins, Paul Chapman and faculty advisor, Dr. Karin Deck.*

The 2000 Pi Mu Epsilon initiates were: **Paul Chapman**, **Jonathan Duggins**, **Paris Faison**, **Christopher Hahn**, **Christine McFadden**, **Shauna Turner**, and **Deidre Suggs**. Other current students who are members of Pi Mu Epsilon are **Thomas Casey**, **Rosa Fuller**, **Sarah Levitt**, and **David Sutherland**.

In addition to being excellent mathematics students, this group has minors or majors ranging from chemistry, computer science, elementary education and physics.

We want to hear from you!

Please provide us with information about yourself. Where are you and what are you doing? Do you know of other alumni? If so, please include information about them as well.

An EEO/AA institution. 600 copies of this public document were printed at a cost of $744.75 or $1.24 per copy (G.S. 143-170.1).

Alumni News

Caroline Wilkie Greenough 94 is employed as a mathematics teacher at Topsail High School. She married Keith Greenough in May 2000.

Keith Hedrick 79 is an internal auditor at Norfolk Southern Corporation in Philadelphia, Pa.

Charlie Hu 94 is now working at Sycamore Networks which is located north of Boston. Sycamore Networks is a young public company producing intelligent optical switches and transport.

Kimberly A. Pitha Meares 98 is currently employed at Raytheon Missile Systems as a systems engineer. Her husband Aric is a manufacturing engineer at Applied Materials -ETEC Systems. Kimberly is finishing up her master s degree in mathematics at the University of Arizona. They live in Tuscon, Ariz., with their son Dylan.

Jonathan Rowell 95 is currently a Ph.D. candidate in Biomathematics at Cornell University.

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