

The Quaternion

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The Newsletter of the Department of Mathematics and Statistics



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Technology in the (Large) Classroom

USF was very fortunate this year, with no faculty layoffs, and we continue to make do with the resources we have. One way we make do is with mass lecture courses.

With over 39,000 students at USF-Tampa and 34 faculty in the department, compromises must be made in order to provide students with the classes they need. That includes using mass lectures, usually of 150 – 250 students, for courses like College Algebra, Finite Mathematics, Mathematics for the Liberal Arts, and Introductory Statistics.

A mass lecture course is divided into quiz sections of 20 – 30 students each, each meeting perhaps twice a week. Students get interaction and feedback in the quiz sections, which are led by teaching assistants, but in the auditorium it's all too easy to hide, get lost, or zone out.

Technology is not an answer in itself; in fact, students complained in a recent English survey about the dullness of Power Point presentations. Both history and research suggest better results from personal interactions for students. But as offering that to thousands of students is prohibitively expensive, technology can at least offer compromises that allow us to engage students and enrich their education.

One device is the *classroom response system*, in which each student brings a *clicker* to each lecture session. A clicker transmits tiny messages to a receiver hooked to the teacher's computer. The teacher's computer knows who belongs to each clicker, so the teacher can take roll by asking everyone to click. Then during the lecture, the teacher can ask students to work out little exercises and enter their answers via the clicker; the computer knows the correct answer and can instantly grade the responses. The teacher gets a statistical breakdown of the grades immediately, and can give the class instant feedback.

For example, Fran Hopf starts off a College Algebra session with some warm-up exercises on material from the previous session: solve for x in $2x = 7$. She walks around the auditorium for a minute, receives the students' answers, and then can tell the class that one person entered $x = 3$, one entered $x = 4$, and 95 correctly entered $x = 3.5$. She is carrying a "tablet", a kind of miniature laptop with a stylus so that whatever she writes on the tablet appears on the main screen.

That was the first of seven clicker exercises she did that day. At the end of the semester, clicker responses will be a small part of the course grade.

Speaking of grading, another place where technology fills the gaps is in grading homework, traditionally one of the most labor-intensive parts of teaching. These lower level courses tend to have homework assignments consisting of many small problems designed to test and reinforce a certain palette of basic skills. Textbook publishers now provide automated grading programs for their textbooks.

A program for a particular text will have that textbook's exercises built into it, as well as an editor so that the teacher can enter her own exercises. To do homework, the student goes to a website to do the exercises, each with a box for the student to provide an answer. The student may ask for a hint in the form of a similar solved example. The student may enter an answer and ask if it is correct (the teacher specifies how many attempts a student is permitted before the answer is final); thus the student gets instant feedback on all the homework exercises, which is one aspect in which the technology is superior to traditional labor.

While we will continue to hope for and press for more resources to teach, we also will provide the best education for our students that our resources allow. And technology in and out of the classroom is an increasingly important component of that education.

Faculty News

Catherine Beneteau, with **Dima Khavinson**, **Thomas Bieske** and **Sherwin Kouchekian** sponsored the 25th *Southeastern Analysis Meeting (SEAM)* at USF during March 20 - 22, 2009. The purpose of the

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conference is to “to disseminate and exchange the latest ideas and developments in classical analysis, complex and harmonic analysis, and operator theory.”

In addition, **Dima Khavinson** has received an NSF grant to expand his work on *Complex Analysis, Potential Theory and Applications*.

For the last seven years, **Scott Rimbey** has served as Associate Chair. He is a USF alumnus who went on to get a M.S. from Florida State University and a Ph.D. from UCLA. He has stepped down as Associate Chair, to be followed by **Leslaw Skrzypek**, an analyst who received his M.S. and Ph.D. from Jagiellonian University in Poland before coming to USF in 2003.

Masahiko Saito has served as Graduate Program Director for eight years. He is a topologist who received his M.S. from the University of Tokyo and his Ph.D. from the University of Texas (Austin). After stints at Toronto, Texas and Northwestern, he came to USF in 1995. He is stepping down, to be followed by **Yuncheng You**, an analyst who received his M.S. from Fudan University in Shanghai and his Ph.D. from the University of Minnesota. After stints at Minnesota and Purdue, he came to USF in 1990.

Stephen Suen has served as Graduate Admissions Director for two years. He is a combinatorist who received his Ph.D. from the University of Bristol in the United Kingdom and taught at Hong Kong and Carnegie-Mellon before joining USF in 1993. He is stepping down as Graduate Admissions Director to be followed by **Xiang-dong Hou**, whose research interests range from algebra and number theory to combinatorics. Hou received his M.S. from the University of Science and Technology in China and his Ph.D. from the University of Illinois at Chicago. He joined Wright State University in 1990, but moved to USF in 2003.

Chris Tsokos was elected President of the International Federation of Nonlinear Analysts (IFNA). IFNA is a global interdisciplinary professional organization seeking to promote an understanding of related complex nonlinear problems and approaches to solutions in all disciplines. More than 125 countries around the globe are key participants. This election brings IFNA’s headquarters to USF, increasing the university’s international exposure and impact.

In addition, **Chris Tsokos** and **Kandethody Ramachandran** have produced a text entitled *Mathematical Statistics with Applications*. It has been published by Academic Press.

George Yanev arrived at USF in 1996 as a Visiting Scholar after receiving a Ph.D. in Mathematics from the University in Sofia, Bulgaria, and holding visiting positions in Bulgaria and Turkey. He received a Ph.D. in mathematics with a statistics concentration from USF in 2001, when he became an assistant professor in the Environmental Science, Policy and Geography program at USF-St. Petersburg. He moved to USF-Tampa as an Assistant Professor of Mathematics in 2004, where he worked in statistical modeling, branching stochastic processes, and Bayesian inference. He has moved to the University of Texas-Pan American as an Assistant Professor, and we wish him well in his further adventures.

*We are pleased to welcome two new faculty members. **Razvan Teodorescu** is joining our Mathematics unit and **Rebecca Wooten** is joining our Statistics unit, and we look forward to working with them.*

Center for Mathematical Services

The Center for Mathematical Services (CMS) conducts a summer program for gifted and high-ability students from junior high and high schools in the surrounding counties of the Tampa campus of the University of South Florida. This year marked the 30th anniversary of this program. We had 43 students participating in the program involving Mathematics, Computer Science, and Environmental Science. Two students were awarded stipends to do research in Mathematics on a project funded by the grant from the Academy of Applied Science:

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Research and Engineering Apprenticeship Program (REAP). The Principal Investigator on this grant was Professor J.S. Ratti.

Student News

During the last year, we awarded twenty-four Bachelor of Arts degrees to: Howard Alexander IV, Amanda Amick, Osman Amin, Eleonora Antoniou (Magna cum laude), Arash Ardestani (Magna cum laude), Lori Beasley, Julio Chapeton, Amy Cherven (Magna cum laude), Jessica Couvertier (Honors), Robert Curry, Edward Fausto, Matthew Fleeman, Laura Handbury, Dane Harmon, Courtney Howard-Kirby, Zachery Jett (Magna cum laude), Cody Ligon (Honors), Kenneth Mascarinia, Anthony Pendino (Magna cum laude), Jose Pizarro, Lauren Polt, James Spence, Daniel Villon, and Brian Vohaska (Honors).

We also awarded twelve Master of Arts degrees to: Arash K. Ardestani (*Asynchronous Cellular Automata - Local Slowdown Produces Global Speed-up*, under Richard Stark), Sarah K. Bleiler (*Orthogonal Filters and the Implications of Wrapping on Discrete Wavelet Transformations*, under Catherine Beneteau), Bongjin Choi, John A. Clark (*On a Conjecture Involving Fermat's Little Theorem*, under Stephen Suen), James Jennings-Wyckoff, Kenneth C. Killian (*Maxwell's Problem of Point Charges in the Plane*, under Dmitry Khavinson), Ludwig C. Kuznia, Alzaki M. Muhammed, Wendy Pogoda, Daniel P. Siu, Dimitrios Vovorras, and Brian D. White.

We also awarded a Doctorate of Philosophy to Branko Miladinovic (*Kernel Density Estimation of Reliability with Applications to Extreme Value Distributions*, under Chris Tsokos).

We wish them all well on their further adventures.

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Math Club News

The Math Club met every other Friday. Invited speakers included Matt Fleeman, Matt Wiseman, and Egor Dolzhenko.

Michael Johnson, Julie Manuel, and John Rodriguez participated in the 2009 Mathematical Competition in Modeling (MCM), coached by Prof. Brian Curtin; they presented their work on *Optimizing Traffic Circles* at the April 4 Math club meeting.

Twelve math undergraduate students traveled to the December 9 MAA Suncoast Math Conference at Saint Leo University. John Rodriguez presented his work on *Mathematical Treatment of Production of TAGs by a Green Alga, Chlorella Vulgaris*. And Jessica Couvertier, Ryan Grotheer, Matt Fleeman and Julie Manuel participated in the Math Jeopardy Competition and won first place.

In October, Robert Curry, Zach Jett, Lauren Polt, John Rodriguez and Besjana Zeqo joined a group of USF students touring the Oldsmar Lockheed-Martin Factory and Assembly floor and participated in a career-mentoring session with Lockheed-Martin.

The Math Club-sponsored undergraduate student contest, *The Math Problem of the Month*, continued strongly in its fourth straight year. Matt Fleeman and Armando Signorini were multiple-winners of the contest this year.

Outgoing President Jessica Couvertier, Vice-President Daria Karpenko, and Treasurer Ryan Grotheer have stepped aside for incoming President Julie Manuel, Vice-President Michael Glidden, and Treasurer Ingrid Cotton.

PI MU EPSILON News

On April 24 seventeen USF students and faculty members were inducted into PME. They were: Andrew Burruss, Jessica Couvertier, Donald Dahl, Matt Fleeman, Michelle Gallow, Pedro Gomez, Mile Krajcevski, Michelle Krause, Michael

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Kummer, Julie Manuel, Lauren Polt, Charli Regel, Jessica Sobkowiak, Athena White, Mathew Wiseman, Joseph Vorder Bruegge, and Besjana Zeqo. Matthew Wiseman won the 2009 PME Outstanding Scholar Award. At the banquet, Professor Vilmos Totik spoke about *The Good Old Induction*.

PME hosted the Hillsborough County math Bowls, when about 400 of the best math high school students from Hillsborough County competed in Algebra, Geometry, Pre-calculus, and Calculus. Middleton and King High Schools won the fall and spring bowls, respectively.

Outgoing President Joy D'Andrea and Vice President Helen Barclay stepped aside for incoming President Michelle Krause and Vice President Besjana Zeqo.

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We'd Like to Hear from YOU!

The Department of Mathematics & Statistics would like to hear from alumni, friends, collaborators, members of the community, and fellow explorers of and guides to the world of mathematics and statistics. Contact us at:

974-2643, or fax 974-2700. E-mail mathdept@math.usf.edu. We have a web-page at

<http://www.math.usf.edu/>. Snail-mail address is Department of Mathematics & Statistics, University of South Florida, 4202 E. Fowler Ave., PHY114, Tampa, FL 33620.

Appeal for funds

We are a growing department in a new university, and we strive to develop new programs to meet the needs and provide opportunities for our students and our community to fulfill their aspirations. With all due respect to Benjamin Franklin, many of the best things in education and scholarship cost money. We would appreciate any assistance we can get from alumni and the community. Feel free to contact our chair, Marcus McWaters, at the above address for details.